

APPENDIX B: MEETING MINUTES

Wisconsin Groundwater Coordinating Council Meeting Minutes – August 24th, 2007

Department of Agriculture, Trade and Consumer Protection Board Room
28911 Agriculture Drive, Madison.

Members Present: Todd Ambs (DNR); James Robertson (WGNHS); Lori Bowman for Kathy Pielsticker, and (DATCP); Eric Scott for Berni Mattsson (Commerce), Anders Andren (UWS), Henry Anderson (DHFS), George Kraft (Gov. Rep), Bob Pearson for Dan Scudder (DOT).

Others Present: Judy Ziewacz (Office of Energy Independence); Chris Babiarz, Steve Wittman and Peter Boger (WRI); Kevin Masarik (UW-SP); Jim Vanden Brook and Matt Karnowski (DATCP); Ed Morse (WRWA); Mike Lemcke and Jeff Helmuth (DNR).

The meeting began at 10:00 AM.

Introductions and general business – Introductions were made. The minutes of the May meeting were approved.

Consideration of 2007 GCC Report to the Legislature – Jeff Helmuth reported that only a few minor changes (corrections of typos, elimination of redundancies) has been proposed since the second draft of the annual report was distributed on August 13th. The document was briefly discussed and then approved unanimously by the council.

Plans for the FY 09 Joint Solicitation – Anders Andren introduced Chris Babiarz who will be filling in for one year for Jim Hurley who is in Washington D.C. on a Sea Grant appointment. Chris presented a timeline for the joint solicitation for FY 09 similar to the preceding year. Mike Lemcke reported that DNR was attempting to estimate funding levels but it would be difficult due to the multiple funding sources and budget uncertainties. Todd Ambs emphasized that the 2006 Groundwater Advisory Committee report to the Legislature and the Great Lakes Compact both identified a need for more research on water quantity issues. Mike said that those issues would be included in the DNR's monitoring and research priorities.

Update on WRI education/outreach project – Steve Wittman passed out some sample copies of the WRI's brochure on the GCC's role in groundwater research and monitoring. Anders asked for input on how the brochure should be "rolled out", and how many copies each of the agencies would like. It was agreed that Groundwater Awareness Week (March 9-15) would be a good time for to publicize it. Noting the cost (\$7/copy) there was substantial interest in developing a webpage and Internet links rather than printing numerous paper copies. A downloadable pdf file would be the most useful format. There was also interest in a shorter (1-page) version referencing the website. A news release should be planned. Todd suggested that important Legislative contacts be made one-on-one. Anders suggested that WRI ghost-write a guest column for a local newspaper for Todd's review. Todd agreed and thanked Peter and Steve for their hard work so far.

Governor's 25x5 Goals: Office of Energy Independence's (OEI) role in implementing – Judy Ziewacz, the Director of OEI, introduced the Office which was created in April 2007. The mission of the office is to advance Governor Doyle's vision for energy independence. OEI's

Energy Independence Mission (“Achieving Energy Independence by 2025”) consists of three main goals: 1) generating 25% of electricity and transportation fuels from renewable resources by 2025; 2) capturing 10% of the emerging bio industry and renewable energy market by 2030; and 3) becoming a national leader in groundbreaking energy research.

The current focus of OEI includes serving as a single point of contact for businesses, local units of government and NGOs pursuing bio development, energy efficiency, and energy independence as well as developing energy independence policy options for consideration by the Governor. Judy has also been engaged in identifying federal funding opportunities and identifying barriers to implementation of the Governor’s energy independence initiatives.

The OEI’s first year plans include developing the biomass marketplace, increasing consumption of biofuels and establishing energy efficiency as a state priority. The goal for 2025 is 1 billion gallons of biofuels (versus ~320 million in 2007). Other considerations for biofuels include cellulosic ethanol, the setting of Corporate Average Fuel Economy (CAFE) standards at the federal level, plug-in hybrid electric vehicles, and hydrogen fuels.

BioPower generation is also a focus, with the 2025 goal set at 21,000 gWh (up from 2313 in 2005). This huge increase will rely on great increases in wind and biomass power generation. New technology (i.e. fuel cells) and new feedstocks from waste streams & research are also important. Judy said the OEI would need to find Wisconsin’s competitive advantage in diverse feedstocks and distributed energy and rely on sectoral & communities strategies.

Biomass power generation uses organic matter such as plant material, vegetation, agriculture waste, or forestry waste as a fuel or source of energy. Use of biomass as an energy source results in little net production of carbon dioxide. Primary potential sources of biomass in Wisconsin are crop residues, planting switchgrass on CRP, forest residues, hybrid poplars, and primary mill waste. Judy cited several examples of biomass projects in Wisconsin including the Nelson Dewey Power Plant where they have offset 10% of their coal use with biomass, and a Biomass Exchange which brokers for biomass across the Midwest. Judy also pointed to the state fleet using E85 fuel, wood pellets used to heat water at water parks, campuses getting off the grid, and milk truckers using biodiesel fuel.

Anders Andren pointed out that in Scandinavia and Northern Europe nuclear power has gained prominence in power generation. Eric Scott pointed out that there are materials compatibility issues with ethanol fuels (i.e. ethanol is corrosive to many metals) and thought the conservation element was largely missing. Todd Ambs also wondered why there wasn’t more of an emphasis on reducing demand noting the large amounts of energy used to process drinking water.

Several GCC members brought up the difficulties in siting ethanol plants. George Kraft offered that at 4 gal water per gallon of fuel produced, the production plants should be located on rivers and not be utilizing groundwater. Jamie noted the environmental legacy that the plants were leaving in areas where they are inappropriately located and asked if the state should have a siting standard. Todd suggested that the policy and technology was not yet caught up with the industry.

Judy said it must be taken one step at a time and that her emphasis was on how to position Wisconsin in the biofuels/biomass market.

Education Subcommittee report – Kevin Masarik reported that the subcommittee had been working closely with Peter and Steve on the WRI pamphlet. Another long-term project that the subcommittee has been involved with is Lynn Markham’s Groundwater in Comprehensive

Planning website. The subcommittee has provided substantial input to both projects.

Groundwater Pollutant Transfer and Export from a Northern Mississippi Valley Loess Hills Watershed – Kevin Masarik reported that this 2003-04 study assessed the role of groundwater in the export of nutrients and pesticides from the Fever River Watershed; an agriculturally dominated watershed. Over 100 water bodies in this area are listed as impaired on the State 303(d) list, and half of the land area is in impaired watersheds. About two-fifths of the area is in cropland and another fifth in permanent pasture. Streamflow is baseflow dominated by groundwater discharge occurring through well defined riparian springs, ill-defined riparian seeps, and streambed discharge.

Groundwater pollutant transfer to a receiving stream was estimated and compared with that from runoff. Then the following approach was used to determine whether groundwater transfer and export were likely at a steady-state or increasing:

1. Groundwater pollutant transfer to the receiving stream was determined through repetitive sampling of stream water quality and discharge during the study period.
2. Comparisons with runoff transfer and export were made at a gauging and sampling station which measured water quality and discharge during runoff events.
3. Questions about steady-state vs. increase were inferred by sampling water quality and groundwater age-date at groundwater discharge features, such as riparian springs.

Groundwater age-dates ranged from 1969 – 1989. Nitrate-N ranged from 4.7 to 23.5 mg L⁻¹ while dissolved reactive P ranged from 0.003 to 0.052 mg L⁻¹; both showed a positive relationship to groundwater age-date. Denitrified N ranged from 0 to 4.5 mg L⁻¹ and was negatively correlated to groundwater age-date. Metolachlor ESA was the most pervasive pesticide residue detected in groundwater samples, followed by de-ethylatrazine, alachlor ESA, atrazine, and de-isopropylatrazine, the summed concentration of pesticides ranged from 2.1 to 9.1 µg L⁻¹.

Baseflow accounted for approximately 86% of the total streamflow in the Fever River. Nitrate accounted for the largest nutrient loss; groundwater NO₃ export (23.4 kg ha⁻¹ yr⁻¹) accounted for 80% of the total annual N loss. Even though runoff represented only a small portion of the annual streamflow, 85% of total P was transported during runoff events. Pesticide concentrations were generally highest during spring runoff events, however; pesticide residues were present in baseflow year round and show that the amounts transported by groundwater can be significant.

The land-use practices, geology and hydrological settings in the Fever River watershed are representative of much of southwest Wisconsin. Kevin concluded that the watershed is not yet in equilibrium with current land-use and denitrification within the aquifer is not capable of sufficiently denitrifying current NO₃ loading rates to groundwater. As a result, concentrations of NO₃ in the surface waters of these systems will likely increase before finally stabilizing because of the time it takes for groundwater to penetrate the aquifer and reach discharge locations. Understanding groundwater surface water relationships are critical for interpreting stream water quality data and understanding past and future impacts of land management decisions.

The presentation was well-received and GCC members thanked Kevin for his hard work on the project.

Agency Updates

DATCP – Lori Bowman and Jim Vanden Brook

- Statewide survey is winding down - going to the Board in November.

- Alachlor ESA hearing
- Senate hearing on banning phosphorus in turf fertilizer.
- The new nutrient standard went into effect on August 1.
- DATCP will seek funding for research in the next budget. Very few leaching studies have been done on nitrogen or phosphorus applied at recommended rates. DATCP needs leaching indices for both nutrients. George Kraft suggested that a mass balance approach would work for nitrogen.
- The NE WI karst task force recommendations are not very restrictive and are largely based on professional judgement. There is also a need for research on this issue.

DOT – Bob Pearson

- DOT has worked closely with Ken Bradbury and Chuck Dunning over the years in providing access, maintaining and looking for new sites for groundwater level observation wells on DOT property. Currently there are 24 wells in the network on DOT property.

UW – Anders Andren

- After several iterations in the federal budget the Water Resources budget will be the same as in the past.
- Madison campus out-of-state tuition remission has led to increased costs of projects.
- USGS national strategic plan released and one area is groundwater. A groundwater census is the main focus.
- There is a new Office of Technology document that looks at quality, quantity and institutions and concludes that the institutions need more support.

DHFS – Henry Anderson

- DHFS has been working with DATCP on the survey, added several questions.
- Work continues on the Blue Cross/Blue Shield arsenic project at the school of health.
- Encouraging private well testing for pregnant women

DNR – Todd Ambs and Mike Lemcke

- The flooding crisis had made the previous couple weeks extremely busy but had shown the value of county zoning in preventing problems.
- The alachlor ESA hearing was a beneficial Legislative process.
- DNR has had success in increasing private well inspections (>400% increase). Numerous problems were found resulting in referrals, prosecutions and getting a positive message across.
- British Petroleum Corporation earned a permit earlier this year to discharge more ammonia and suspended solids into Lake Michigan as part of an expansion of the company's Whiting, Ind., refinery that would create 80 permanent jobs. Reaction to the increase has been showing an appreciation for the importance of the Lake. [Note: reaction to this permit has led to Indiana reconsidering it.]
- One joint solicitation contract was recently cancelled. Poor communication and lack of work products forced the cancellation.

WGNHS – Jamie Robertson

- The survey has been trying to characterize the presence of manganese in the Madison water supply. Cutting samples were useful in determining the source.
- Viruses are also being found in the Madison water supply. This indicates that the water supply and wastewater infrastructure have not been adequately maintained.
- The survey is helping the DNR develop a process for permitting high-capacity wells.

WRWA – Ed Morse

- WRWA is trying to restore their funding for wellhead protection.

Set next meeting location and adjourn – The next meeting will be held 10:00 – 1:00 on November 16th at the Department of Natural Resources, Room 875, GEF 2 building, 101 S. Webster Street, Madison. The meeting adjourned at 1:00 pm.

Respectfully submitted,

Jeff Helmuth, Hydrogeologist - Program Coordinator
Groundwater Section
Department of Natural Resources

Wisconsin Groundwater Coordinating Council
Meeting Minutes – November 16, 2007
Department of Natural Resources, Room 613

Members Present: Todd Ambs(DNR); James Robertson (WGNHS); Lori Bowman for Kathy Pielsticker (DATCP); Eric Scott for Berni Mattsson (Commerce); Chris Babiarz for Anders Andren (UW-System); and Chuck Warzecha for Henry Anderson (DHFS).

Others Present: Mike Lemcke & Laurel Braatz (DNR); Bruce Rheineck (DHFS); Ed Morse (WRWA)

Introductions and General Business – The meeting began at 10:00 AM. Introductions were made. Chuck Warzecha made a motion for approval of the minutes. Lori Bowman seconded the motion. The August meeting minutes were approved as presented.

FY 09 Joint Solicitation – Christopher Babiarz reported that the deadline for proposals was November 12th, and the online submittal process went well. Chris handed out a list of the 15 proposals received. The requested funding level totaled about \$864,000 over two years (~\$582,000 in FY 09 funds). As stated in the Joint Solicitation, the estimated funding level for FY 09 is approximately \$340,000. The proposals cover a broad range of topics and originate from a geographically diverse group of Wisconsin research institutions. The next step is to audit the budgets and to prepare proposal packages for the review process. As in previous years, at least three outside reviews will be sought for each proposal. The deadline for outside reviews will be in January 2008 prior to the meetings of the GCC Research Subcommittee and the UWS Groundwater Research Advisory Council.

Request for Pre-approval of UW-System Continuing Projects – Christopher Babiarz proposed that the GCC consider approving a UW Water Resources Institute strategy to optimize federal funds from their USGS 104(B) base support. If approved by the GCC, two projects originally funded with FY 08 state funds during their first year would be transferred onto federal funds for their second year. The transfer would free additional state dollars to fund new projects in FY 09. Selection of the two projects would be based on sufficient progress during the first year and the impact of potential outcomes. The candidate projects are “A Thermal Remote Sensing Tool for Mapping Spring and Diffuse Groundwater Discharge to Streams” (Steven Loheide, Principal Investigator), and “Occurrence and Generation of Nitrite in Ground and Surface Waters in an Agricultural Watershed” (Emily Stanley, Principal Investigator). A motion to endorse this strategy was offered by Chuck Warzecha and seconded by Lori Bowman. The motion passed unanimously.

Education Subcommittee Report – Mike Lemcke reported that the Education Subcommittee met on October 24, 2007. The majority of the meeting was spent on discussing the upcoming fact sheets that Peter Boger will be drafting for the Water Resources Institute. The first fact sheet will be on manure. The GCC Subcommittee will be heavily involved in their review to provide consistency and adequate input from the GCC members. Secondly, it was noted that the Groundwater Comprehensive Planning website that USGS and UW-Extension Center for Land Use Education (CLUE) created is now up and running. It is anticipated that it will be a well-used resource by communities in their comprehensive planning efforts. Lastly, this round of Groundwater teacher workshops will be held in January of 2008 in Green Bay, Stevens Point, and Jefferson. Twenty-four schools will be selected to attend. Each school will send 2 teachers to

receive training on how to use the model effectively in the classroom and will take a model back to their school.

Agency Updates

WGNHS - Jamie Robertson noted that there has been quite a bit of interest in the potential impact of ethanol plants on the environment. He wants to make sure people understand what the development and expansion of the ethanol plants may mean to the resource. It appears that market forces are currently limiting plant expansions. However, ethanol is now being touted as a bridge to future technology based on cellulosic renewables.

Jamie commented that the lowering of lake levels in different areas of the state continue to generate a lot of calls and point to climatic change. He also noted that Ken Bradbury was selected for a Fulbright Senior Specialists project in South Africa at the University of the Western Cape where he will present professional development courses in groundwater protection. Recipients of Fulbright Scholar awards are selected on the basis of academic or professional achievement. The Fulbright Program, the U.S. flagship international educational exchange activity, is sponsored by the Department of State, Bureau of Educational and Cultural Affairs.

DHFS - Chuck Warzecha commented that DHFS has been providing free well tests to expectant mothers for bacteria, nitrate, and fluoride since mid 1990s. The agency has now begun mining the data to see if any trends can be seen. Initially they are looking for missing geographic areas of the state, and an exposure assessment. During the past year DHFS has added a metals package (14 metals) to this free testing. In cooperation with DATCP they have also added it to sampling that DATCP conducts. Chuck expressed hope that mining of this data will provide information akin to work done by Kammerer, and past CDC surveys.

DHFS has also been heavily involved in activities surrounding this past year's flood. A lot of work was done in the LaCrosse area and in South Eastern Wisconsin. Although the agencies handled the floods well we need to be better prepared for the next such event. We need to use the information that was provided to landowners and others and create a pamphlet or other informational material that will let people know what they can do to prepare their private well for the next time it floods.

All joined in on a discussion on the preparedness for flooding topic. What should the GCC do to be involved in getting ready for the next flooding event? What lessons did we learn? How does groundwater fit into the bigger scheme of preparedness? What statistics can be put together? Wisconsin had about as much rain as South Eastern Minnesota yet Minnesota lost a lot more structures. Vernon County had a lot of damage and it has limited zoning. We also learned a lot about dam structures. At the conclusion of the discussion it was decided that the GCC needs to be the point of contact for groundwater. At a minimum a pamphlet/brochure needs to be developed on how to prepare citizen's private well for the next flooding event. It should also be determined what information staff needs to take with them when going out into the flood.

The GCC will have further discussion on this topic at next meeting to determine who should be invited to attend a separate meeting on this issue, what the sideboards should be, and what the desired outcomes should be.

DATCP - Lori Bowman reported that they are working through post-budget issues. A primary need is to develop a strategy to optimize the use of an additional 6 million dollars they received. Nitrate and water quality continues to require their attention and they are trying to proactively get

a handle on its many issues. For the upcoming December DATCP board meeting staff will present on what nitrate analysis they have conducted and its resource implications. Through the budget the Clean Sweep program has been expanded to include prescription drugs. With this expansion comes a whole host of medical issues that will need to be worked through. The agency also continues to lead a task force on lead arsenate.

Commerce - Eric Scott noted that the agency is involved with the energy independence group. The group has begun by looking at what size biodiesel tanks to regulate. There is a long way to go on this issue. The sunset of the PECFA program was vetoed in the budget. They are now looking at tightness of piping and dispensers. The Department will soon have a new Secretary. His name is Jack Fischer and he is from the business sector.

DNR - Todd Ambs noted that a standard for alachlor-ESA had passed and would become effective on February 1, 2008. Part of the budget was to make well filling and sealing available through the well compensation program. The end of 2007 marks the deadline for the Groundwater Advisory Committee to document how the new groundwater quantity law is working and to propose modifications to the law. The committee is still deliberating on its recommendations. It is hoped that a bill supporting the Great Lakes Compact will be introduced in early 2008 and be enacted before the session over. The bill will propose a sustainable water management system for the Great Lakes.

Monitoring and Data Management Subcommittee Report – Mike Lemcke reported that the subcommittee met on September 25, 2007. There was a comprehensive update from DNR staff on activities surrounding the implementation of Groundwater Quantity Law. The current focus is on establishing ownership and usage of the approximately 3,700 historic high capacity wells. The task is well underway with over 3,000 of the wells having been inventoried. As work continues on tracking the remaining wells the agency has sent its first mailing asking for pumping information for the known high capacity agricultural wells. Data is just beginning to be returned. Over the next several months the agency will begin requesting pumping data from the other high capacity wells. There will be a lot of effort put into this initiative over the next year.

Log Den – Questions Raised (Viruses in Groundwater in Door County) – Laurel Braatz reported on many aspects of this water-borne disease outbreak that occurred at the Log Den restaurant in late May – early June 2007. Due to the severity of the illness and the numbers affected there was significant media attention. The contaminant source investigation concluded that the main cause was norovirus due to its presence in stool and water samples. Investigative techniques included well logging, illness surveys, area of contribution mapping and offering of free sampling. State Lab of Hygiene testing revealed a large suite of microbes and anthropogenic compounds. Nearby private well testing revealed a smaller number of microbes, including viruses. County dye-tracing showed a probable leak prior to the dose tank. Treatment was installed in June and included ultraviolet disinfection, filtration and softening. In July, a chlorination system was put into place and Log Den water was safe to drink.

This contamination event will undoubtedly be cited as a benchmark for future viral contamination cases. It was a test of our abilities to work on this type of issue. The incident raised many good questions and pointed out areas where progress is needed. It set a baseline of data for future investigations to improve upon. Source tracking played a key role and allowed the investigation to deal with the source of the contamination problem rather than just address the symptoms. Options for source tracking were improved and options for treatment were scrutinized. While Log Den's treatment option works it may not be the best option for small systems in the long run.

Laurel suggested that the approved technology for small systems treating drinking water and wastewater could be improved and that research is needed to develop better options.

The group thanked Laurel for her hard work and excellent presentation.

Adjourn – The meeting was adjourned at 12:45. The next meeting will be held on March 3rd at the Water Resources Institute.

Respectfully submitted,

Jeff Helmuth, Hydrogeologist - Program Coordinator
Groundwater Section
Department of Natural Resources

Wisconsin Groundwater Coordinating Council
Meeting Minutes – March 3, 2008
UW Water Resources Institute Conference Room
2nd Floor of Goodnight Hall, 1975 Willow Drive, Madison

Members Present: Anders Andren (UW-System); Kathy Pielsticker (DATCP); George Kraft (Gov. rep.); Dan Scudder (DOT); Mike Lemcke for Todd Ambs (DNR); Ken Bradbury for James Robertson (WGNHS); and David Swimm for Berni Mattsson (Commerce).

Others Present: Lori Bowman (DATCP); Chris Babiarz (WRI); Martin Shafer (UW-Madison Env. Chem. & Tech); Bob Pearson (DOT); Jeff Helmuth (DNR);

1) Introductions and General Business – The meeting began at 10:00 AM. Introductions were made. Anders Andren chaired the meeting. The November meeting minutes were approved as presented.

2) Education Subcommittee Report – Jeff Helmuth reported that the Education Subcommittee met on January 14, 2008. Kevin Masarik, with assistance from Tom Braun and other subcommittee members, had shared plans to prepare a draft fact sheet or fact sheets on water re-use and conservation.

Groundwater Awareness Week (March 9-15) activities planned by the group include Kevin Masarik and Steve Wittman preparing a variety of groundwater-related press releases and Steve Wittman arranging a Larry Meiller Show program for March 12 with Henry Anderson and Steve Ales (DNR).

The subcommittee has also been reviewing drafts of fact sheets prepared by Peter Boger at WRI highlighting GCC-coordinated research on nitrate, arsenic, groundwater quantity and manure-related issues. Progress has been only moderate due to the controversial nature of these issues. Mike Lemcke asked if the effort should be continued. Consensus was that work should continue and the controversies should be identified in the fact sheets.

Jeff added that several members of the subcommittee were involved in the Groundwater Teacher Workshops in late-January in Jefferson, Stevens Point, and Green Bay. The workshops continue to be beneficial and in-demand.

3) FY 09 Joint Solicitation Update – Chris Babiarz reviewed the FY 09 joint solicitation process. The automated online submittal process worked well and the proposal reviews went smoothly. The Groundwater Research Advisory Council (GRAC) meeting on February 18th provided a prioritized list of 9 projects of interest to UW with a limitation of 1/3 of the FY 09 UW groundwater research budget for any one project.

Jeff Helmuth added that the subcommittee review process had also gone smoothly and added that he was concerned with the trend towards fewer proposals. The reduced interest this year is likely influenced by the relatively small amount of funding available, but the higher cost of graduate students is also a big factor. Several proposals exceeded \$50,000 this solicitation. There was continued discussion on the increasing costs of research and monitoring and how the research and monitoring budgets are not keeping up.

Chris described the proposals approved by GRAC for funding, showed the priority order and

explained the rationale used to develop the list. Chris finished by stating that both the UW and DNR intend to have funding decisions made before the March 1st graduate student signing date.

4) Request for Approval of the FY 09 UW-System Groundwater Research Plan Chris Babiarczyk asked the GCC for approval of the UWS Groundwater Research Plan. George Kraft moved, Mike Lemcke seconded and the GCC unanimously approved the plan. Jeff Helmuth was directed to prepare a request to the Secretary of DOA for expenditure of FY09 UW System funds for groundwater research for Todd Ambs signature.

5) Manure Management in Northeast Wisconsin – Ken Bradbury and George Kraft gave some background on several well contamination incidents related to manure and on the activities of the Northeast Wisconsin Karst Task Force, including their February 9th report. Both Ken and George are members of the task force. The Task Force focused on practices to protect groundwater from manure pollution. Reactions have been varied with the dairy industry concerns and counties considering the recommendations for their codes. Kathy Pielsticker stated that the report needs to take into account common sense economics and other sources of nitrogen and bacteria. DATCP is currently working towards a legislative solution to find resources to focus on the issue through nutrient management planning. George Kraft noted that Robin Shepard (UWEX) was preparing a letter to the DATCP and DNR Secretaries regarding a more comprehensive approach than nutrient planning; an approach that would take industrial and municipal waste spreading into consideration too. George opined that 3 feet of soil was just not enough to attenuate year-after-year manure applications and that other parts of the state offered more appropriate settings for livestock operations.

Kathy Pielsticker said there was a need for new tools and resources. George noted that the UWEX proposal would be convened with more involvement from the dairy industry. Ken suggested that Dan Scudder said that DOT had a strong interest in the issue too. Bob Pearson added that promoting the use of the karst reporting form by agency staff would be helpful. Anders Andren said he would recommend that the GRAC consider the report's recommendations in putting together next year's research priorities and Jeff Helmuth said he'd do the same at DNR.

6) Preparedness for Flooding – Following up from the November meeting, Mike Lemcke asked what role the GCC wanted to play in protecting wells from the next flooding event. Although the agencies handled the 2007 floods well there was consensus that any problems should be documented before discussion at the next meeting. Additionally DNR and UWS should consider prioritizing “vulnerability of private wells to flooding” as a monitoring and research priority in the next joint solicitation. [Note: since this meeting the DNR has put up a new webpage called “Recommendations for Private Wells Inundated by Flooding” at <http://dnr.wi.gov/org/water/dwg/flood.htm>]

7) Agency Updates

DATCP – Kathy Pielsticker reported that DATCP had received \$6.5 million for nutrient management and the program is now starting up. The arsenate report is expected out very soon and the groundwater survey is due out in May. The new pharmaceutical Clean Sweep program has \$80,000 this year for grants to municipalities and counties to pick up un-wanted prescription drugs. The agency is also giving \$250,000 in grants for capital improvements related to pollution prevention.

DOT – Dan Scudder reported that DOT had created a Water Resources Team. Bob Pearson is the Team Leader and will lead internal coordination on water issues. Other groundwater-related staff are Mike Sproul for road salt issues and Dan Reid, a geologist.

WGNHS – Ken Bradbury reported that WGNHS was working on two SEWRPC projects; one on estimating recharge and the other on the sustainability of the shallow aquifer for private wells. Another project is monitoring the rebound of the piezometric surface in the Lower Fox River Valley since six municipalities have switched to surface water. There have also been inquiries from Fond du Lac County regarding the potential impacts of a recently-approved expansion (to 7000-cows) of an animal operation in Rosendale. Kathy Pielsticker noted that the operation is the best-managed operation in the area. Ken added that there was continuing concern in Sheboygan County over low lake-levels and that meetings were occurring regarding potential groundwater studies.

Commerce – Dave Swimm reported that Commerce was working with DNR on guidance for closure of groundwater contamination sites with residual contamination.

DNR - Mike Lemcke noted that Todd Ambs was working on the Great Lakes Compact. It is still hoped that the compact will pass this legislative session

UWS – Anders Andren reported that UW-Madison and most other campuses have implemented higher fringe benefits thus making proposals even more costly. This follows last year’s addition of \$8,000/research assistant for tuition remission. Anders has been visiting Washington D.C. trying to restore Water Resources Institute funding which has been zeroed out in each of the last seven years budget negotiations. Anders is also taking the lead on drafting a National Water Resources Strategic Plan which he will share with the GCC. Anders noted that USGS has started a water census initiative; “Water for America”. Its purpose is to describe the status of U.S. water resources and identify trends over time. It will look at water quality problems including emerging contaminants such as viruses, bacteria and pharmaceuticals; drought and groundwater quantity problems; ethanol production impacts and more (<http://water.usgs.gov/wsi/>). Part of the initiative is a pilot study of water availability in the U.S. portion of the Great Lakes Basin (http://water.usgs.gov/wsi/study_units.html).

8) Arsenic Species (III,V) Distribution In Wisconsin Groundwaters: Field Measurements And Prediction Using Multivariate Analysis Of Geochemical Data - Martin Shafer explained that the environmental fate, toxicity, and mitigation strategies of As are dependent upon its complex chemical speciation. Thus it is important to identify arsenic release mechanisms in a species-specific manner. Arsenate (As V) is the oxidized form of arsenic and is anionic at relevant groundwater pH ranges. Arsenite (As III) is the reduced form of arsenic and is uncharged at relevant groundwater pH ranges. Arsenite is more toxic to humans and is retained more efficiently in human tissues. Arsenate has a stronger capacity to sorb to aquifer surfaces and is therefore less mobile in groundwater systems. Questions Martin set out to answer include: “What are the concentrations?”, “What is the dominant arsenic species?”, and “Can the speciation be predicted by aquifer geochemistry?”

The study included meta-analysis of existing groundwater data, a field study of 60 wells in Wisconsin, and multivariate statistical analyses.

Analysis of >5300 records compiled from nine states showed that the data sets have limited information on arsenic speciation, redox sensitive species, and are compromised by poor detection limits. Meta-analyses identified co-varying geochemical analytes (calcium, iron II,

sulfate, and sodium) and identified the most likely inorganic arsenic species (III or V) for each identified arsenic release mechanism based on known geochemical mechanisms.

The field study focused on measuring arsenic speciation and important geochemical parameters in 57 of the previously analyzed sites (all in Wisconsin) to test our predictions. Arsenic speciation is strongly tied to oxidation state and so on-site separation is required. HPLC-ICPMS analysis was used for both inorganic and organic arsenic species.

Multiple-Linear Regression Models showed a high correlation of % As III with low Eh and low pH conditions. Remaining work includes incorporating oxygen isotope data, additional statistical analyses and preparing manuscripts.

9) Adjourn – The meeting was adjourned at 12:45. The next meeting will be held at 10:00 on May 16th at the Wisconsin Geological and Natural History Survey.

Respectfully submitted,

Jeff Helmuth, Hydrogeologist - Program Coordinator
Groundwater Section
Department of Natural Resources

Wisconsin Groundwater Coordinating Council
Meeting Minutes – May 16, 2008
Wisconsin Geological and Natural History Survey Conference Room
3817 Mineral Point Road, Madison

Members Present: James Robertson (WGNHS); Henry Anderson (DHS); George Kraft (Gov. rep.); Chris Babiarz for Anders Andren (UW-System); Mike Lemcke for Todd Ambs (DNR); Lori Bowman for Kathy Pielsticker (DATCP); Bob Pearson for Dan Scudder (DOT); and Eric Scott for Berni Mattsson (Commerce).

Others Present: Ken Bradbury and Dave Hart (WGNHS); Steve Wittman and Peter Boger (WRI); Barb Lensch (NRCS); Chuck Dunning (USGS); Jeff Helmuth (DNR);

1) Introductions and General Business – The meeting began at 10:00 AM with Jamie Robertson as chair. Introductions were made. The March meeting minutes were approved.

2) Preparedness for Flooding – Following up on discussion at the November and March meetings, Mike Lemcke described DNR efforts to help well owners be prepared for flooding. Jeff Helmuth handed out DNR’s advice on flooded wells and printouts of the DNR’s webpage, *Recommendations for Private Wells Inundated by Flooding* at <http://dnr.wi.gov/org/water/dwg/flood.htm> including a link to a video demonstrating how a water sample should be collected from a well. Mike asked if there was anything else that should be done to address flooding impacts on groundwater. Hearing none Mike and Jeff asked that any comments on the web pages be sent to Jeff.

3) FY 09 Joint Solicitation Update – Chris Babiarz gave a brief overview and a handout detailing the results of the FY 09 joint solicitation process. Tables of continuing and new UW and DNR projects were included as were abstracts of each.

Jamie Robertson asked if the goals of the agencies were met through the process. Chris and Mike Lemcke noted that both UWS and DNR priorities were met by the selected projects. Jamie asked if there was a need to hold another proposal writing workshop. Jeff Helmuth replied that the automated proposal submittal system implemented by the WRI largely addressed that need. Henry Anderson added that the proposal process could be streamlined with an abstract preproposal review but that would add more time to the review process. Henry added that overall the joint solicitation was not onerous relative to other similar grant processes.

4) Update on WRI Education/Outreach project – Steve Wittman reported on WRI activities during Groundwater Awareness week that included Henry Anderson and Steve Ales (DNR) on Larry Meiler’s public radio show and several press releases. Peter Boger reported on progress on the series of fact sheets. The arsenic and nitrate fact sheets were nearing completion. The fact sheet on manure is more problematic. Upon recommendation of the Education Subcommittee Peter had met with Ken Bradbury and Fred Madison who suggested a more factual approach. Peter presented a handout showing statistics on annual manure and nitrogen production by animal in Wisconsin. Peter asked how far he should go with this approach and Jamie Robertson and others suggested going as far as the data could support. The use of maps of livestock density, karst potential, “brown water” incidents, fish kills, and groundwater susceptibility were also discussed. Lori Bowman noted that when the recent statewide survey was presented to the DATCP Board, the Board asked if there was a correlation with cattle, dairy, or potato production. No direct correlation could be found at the scale of the data (square mile). The correlation was

also weak with soil texture at this scale. Lori advised against speculating on correlations that can't be supported by the data. Lori and Ken Bradbury agreed that brown water incidents are mostly anecdotal and not well documented. Ken added that the most relevant facts were how many cows, how much manure and how much land it is applied on. Henry Anderson emphasized the need for a map to show the relevance to Legislators. George Kraft said it would be a disservice to omit mention of the brown water incidents.

5) Education Subcommittee Report – Jeff Helmuth reported that the Subcommittee met on April 7th, 2008. Kevin Masarik, with assistance from Tom Braun and other subcommittee members, shared a draft fact sheet on water re-use. Tom had been working with 25 systems now operating in the State. There is a need for consistent education on this issue.

In addition to the WRI press releases noted above, Kevin had produced a series of 5 press releases for groundwater awareness week and distributed through the UW-ES network. The subcommittee also spent considerable time reviewing and discussing the WRI fact sheets reported on in item 4). At the April 7th meeting Jim Vanden Brook and Sara Walling from DATCP were on hand to provide information and advice for the manure fact sheet. Jim had suggested focusing on implementation of existing code i.e. nutrient management planning.

6) Draft Outline for the 2008 GCC Report to the Legislature – Jeff Helmuth said he planned to use the same approach to preparing this report as in past years and presented a timeline for the reports completion, suggestions for highlights, and an outline of the report. Jeff emphasized that he would need significant input in writing the “directions for Future Groundwater Protection” section. There was discussion which resulted in numerous suggestions for the section, including:

- A new paragraph on the Great Lakes Compact
- Surface water impacts of high-capacity wells
- Other unresolved groundwater quantity issues – How water-rich are we?
- Nitrate
- Manure
- Need for continued funding for implementation of nutrient management planning
- Climate change/global warming
- Biofuels
- Concerns with farmers moving out of CRP program

Jeff said he would draft the section based on this discussion and include it to GCC members when he sent out sections for updating in mid-June.

7) Agency Updates

DOT – Bob Pearson reported that DOT has a lot of good information in older highway plans related to springs. The plans are now on microfiche and could be used to supplement other historical information on springs. Jamie Robertson said that WGNHS will find a way to utilize the information.

DNR - Mike Lemcke noted that Todd Ambs and had been very busy with the Great Lakes Compact which recently was passed by the Legislature. Several Drinking Water and Groundwater program staff had completed 60% of the inventory of high-capacity wells and were also beginning to collect pumping data. The methods for collecting the data range from measuring fuel usage to telemetry. It is not currently clear what will happen with non-complying well owners but the law requires DNR to have 50% reporting compliance by the end of 2009.

George Kraft and others underscored the importance of pumping data for a wide range of groundwater issues. Mike added that Cycle 9 of the groundwater standards was underway.

Governor’s Representative – George Kraft noted that the UWSP Groundwater Center was working on a variety of projects including nitrate, the Little Plover River, and lake levels. High-capacity wells are clearly impacting both the Little Plover and some lakes.

DATCP – Lori Bowman handed out DATCP’s April 2008 report, “Agricultural Chemicals in Wisconsin Groundwater” (http://www.datcp.state.wi.us/arm/agriculture/land-water/environ_quality/pdf/ARMPub180.pdf). The report summarizes results of a private well survey conducted in 2007. The purpose of the survey was to obtain a current picture of agricultural chemicals in groundwater and to compare the levels in the 2007 survey with levels found in surveys conducted in 1994, 1996 and 2001. Wells were selected using a stratified random sampling procedure and samples were analyzed for 32 compounds including herbicides, herbicide metabolites, one insecticide, and nitrate-nitrogen. Time trend analysis was performed to determine whether the proportion of wells that contained atrazine, TCR, nitrate-nitrogen, alachlor ESA and metolachlor ESA in private wells had changed since 2001. The results of this analysis did not show any statistically significant changes for these compounds over this time period. The estimate of the proportion of wells that exceeded the 10 mg/l enforcement standard for nitrate-nitrogen was 9.0%. Lori noted that given that newer wells have been drilled deeper, it’s not clear if groundwater quality is getting worse. It’s also difficult to identify land use causes at the scale (1 sq. mi.) that the land use data represents.

Lori reported that DATCP is giving grants to communities for prescription drug Clean Sweeps. They are working with the Department of Justice and the Federal Drug Enforcement Agency on liability issues.

DATCP is also working to make Cody Cook’s well construction report GIS search tool available to staff in other agencies. Lori asked Jamie if there were any WGNHS concerns with making the WCRs available. Jamie said he had none.

WGNHS – Ken Bradbury reported that WGNHS was finishing a project in Iowa County and hopes to begin new projects in Columbia and Fond du Lac Counties next year. Concern about potential impacts from a recently-approved large expansion of an animal operation in Rosendale is the impetus for the Fond du Lac County project. Ken also reported that WGNHS was working with several local water suppliers, Madison, Middleton and Fitchburg on well siting questions.

Jamie Robertson reported that geologic mapping was being undertaken in Brown and Waupaca Counties. Jamie noted that there seemed to be more public acceptance of groundwater flow modeling and more desire for applying modeling results to groundwater problems. George Kraft agreed and noted that the modeling efforts under the Source Water Assessment Program in the Central Sands area had been used for several subsequent projects. Jamie also noted that WGNHS was documenting virus presence in sewage and drinking water systems. This highlights the need for investment in infrastructure improvements. Ken added that these projects show that deep wells are more vulnerable than had been thought.

DHFS – Henry Anderson reported that DHFS is splitting into two agencies; the Department of Health Services and the Department of Children and Families. The Division of Health Administrator was stepping down. The Health program will lose about 30% of its Information Technology support and social services programs will be migrating to the other agency. Current

activities include the 9th cycle of groundwater standards where there is lots of public interest in manganese.

8) Monitoring and Data Management Subcommittee report – Jeff Helmuth reported on the March 26th, 2008 Subcommittee meeting. The focus of the meeting was on monitoring needs in Groundwater Management Areas. Dave Hart talked about his experience characterizing and predicting groundwater levels and movement in both GMAs (Brown County and SE Wisconsin) and how significant long-term data needs in both GMAs were not being met. In Brown County six utilities' recently switched to surface water making predictions of groundwater level recovery important due to potential arsenic and other water quality issues. Local hydrostratigraphy and data scarcity make these predictions difficult. Recent loss of several wells used for long-term water level monitoring makes the need for new wells more acute.

In the Southeast WGNHS and USGS have done extensive hydrostratigraphic characterization and flow modeling. Problems with deep aquifer water quality and surface water declines have made this an area with serious long-term water supply issues. More deep sandstone water levels are needed to verify the flow modeling. More stream gaging data is needed to understand high-capacity well impacts on surface waters.

At the same meeting Jason Smith of USGS reported on the observation well network. There are very few wells in either GMA for long term deep aquifer water level monitoring. Due to flat funding, many wells were in need of repair or had been discontinued. Funding has been requested of DNR but almost all DNR funding for groundwater research and monitoring is used in the joint solicitation process and the joint solicitation is not really set up for this type of work. The 2003 Groundwater Quantity Act allocated funding for groundwater quantity-related monitoring but that funding had not currently been made available. However, other funding appropriated through the Act may eventually be available. The subcommittee did not recommend that DNR prioritize monitor network maintenance in the FY10 joint solicitation because of objections to using dwindling funds on network instead of research-oriented projects. The consensus was to pursue other sources of funding for the network.

9) Status of Wisconsin's statewide groundwater monitoring network - Ken Bradbury, with Chuck Dunning, described the network as being comprised of 102 wells around the state: 3 with continuous real-time recorders, 16 with continuous non-real time recorders, and 83 with periodic manual measurements. Of the 83 that are measured manually, 33 measured by USGS staff and 50 are measured by observers. The network is used 1) to establish a benchmark for trends related to pumping, land use change, climate change, industry, etc., 2) as a surrogate for site-specific water level trends needed for siting septic systems, landfills, highways, industries, etc., 3) to aid the development of water supply systems and to document the impact of pumping on water resources, 4) to provide calibration data for groundwater flow models and other predictive tools used in water supply and management, 5) to understand the impacts of droughts and floods on hydrologic systems, and 6) as baseline data for groundwater resource evaluation and research. A statewide map showing the location and aquifer monitored and a couple example hydrographs illustrated the breadth of information generated by the network.

The USGS and WGNHS have supported the network through a cooperative partnership since 1964. The current budget of \$82,000 is split approximately 50:50 between the two agencies. No funds are available for well replacement, abandonment, upgrades, or major repairs.

Some of the problems facing the network include: maintaining an aging set of wells (some wells no longer meet code requirements), wells being "lost" due to development or land ownership

changes, wells being vandalized, wells becoming clogged or plugged, and some local observers are retiring. Flat or decreasing funding and increasing costs means wells are being dropped from the network (e.g. there is currently only one active well in the deep sandstone in SE Wisconsin).

The network badly needs more support. In the short-term an annual budget increase of about \$20,000/yr cash is needed just to maintain the existing level of monitoring. In the longer term more funding is needed to add wells to the network to improve data collection, add wells in Groundwater Management Areas (GMAs) and to take advantage of other wells of opportunity. A prioritized list has been developed and submitted to DNR; total is >\$500K.

Jamie thanked Ken and Chuck for their presentation and asked what the GCC could do to help. Ken said they could suggest funding sources, support requests to agencies (DNR), and help communicate the value of the network to state agencies and to the public.

10) Mechanisms of Groundwater Flow across Aquitards – Dave Hart explained the general hydrology of the Southeast Wisconsin study area with an emphasis on the role the Maquoketa Formation plays as a regional aquitard noting that it is largely responsible for the significant drawdown in the deep sandstone aquifer and the distance between the groundwater and surface water divides. Both are important effects due to water quality problems in the sandstone and the Great Lakes Compact use of the surface water divide to define the basin and potentially prohibit withdrawals from the Great Lakes Basin to thirsty communities outside the basin.

Despite the Maquoketa formation's important role as an aquitard, groundwater flow modeling work shows that approximately 12 million gallons per day move across the Maquoketa. Before this study it was unknown what the role of the rock, fractures, multi-aquifer wells, or erosional windows have in this movement.

Hydraulic conductivities measured in the laboratory, and by conducting slug tests, and using local and regional scale models, vary by almost 10 orders of magnitude and include flow rates higher than possible from just flow through rock. That coupled with a lack of evidence for erosional windows limits the possible explanations for the high flow through the Maquoketa to fractures and cross-connecting wells. Fractures known to be present in the formation include the Waukesha fault which is identified by outcrop in a quarry and offset in well logs as well as many other joints and fractures both large and small. Although without an offset it is nearly impossible to locate and identify these fractures it is expected that rock over 400 million years old would be extensively fractured.

By estimating the number of cross-connecting wells and the amount of water that could flow down those wells into the lower aquifer, Dave was able to estimate that the total well flow as about 30 % of total flow across Maquoketa shale. This leads to his recommendation that we continue to fill and seal multi-aquifer wells because they do not contribute enough water to the deep sandstone aquifer to offset the risk of contaminants entering the deep sandstone aquifer through these wells.

Dave also suggested that additional observation wells should be placed in the deep sandstone aquifer to improve our data and modeling predictions. Dave also advocated that DNR continue tracking the status and use data of high capacity wells. He found that only 69 of the 172 multi-aquifer wells in DNR's database (at the time of the study) had pumping records available.

The Council thanked Dave for his important research. Jeff Helmuth asked how many wells it would take to properly calibrate the regional groundwater flow model. Dave thought about 4 to 5

per county would be optimal. Mike Lemcke clarified that new well “abandonment” (now termed “filling and sealing” legislation made filling and sealing eligible for well compensation account funding. Also there is a new webpage for submission of required filling and sealing forms. Bob Pearson asked if plugging multi-aquifer wells would help groundwater rebound in the Silurian aquifer to which Dave replied that the effect would be very localized. Discussion of gamma and/or video-logging the deep Waukesha well followed ending with Mike Lemcke saying he would again check into funding opportunities. Bob Pearson opined that every State Park could be required to have a long-term observation well.

11) Adjourn and Next Meeting – The meeting was adjourned at 1:00. The next meeting will be held at 10:00 on August 22nd at the Wisconsin Department of Agriculture, Trade, and Consumer Protection.

Respectfully submitted,

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Groundwater Section
Department of Natural Resources

