



GROUNDWATER QUANTITY WORKGROUP REPORT

DATE: January 10, 2017

TO: Food, Land & Water Project Steering Committee

FROM: Groundwater Quantity Workgroup
Co-Chairs: Mike Carter, Skip Hansen and Andy Johnson
Facilitator: Don Last

SUBJECT: *Interim Report on Workgroup Progress*

Workgroup Charter

The Steering Committee asked this Workgroup to consider groundwater quantity issues, particularly in the Central Sands region. The Steering Committee asked the Workgroup to consider the following (summarized) questions:

- What are the main issues of concern in the Central Sands?
- Is the situation getting better or worse?
- What are our “bottom-line” expectations for resource protection in the Central Sands?
- Do current arrangements protect shared resources, and allocate them in a fair and efficient way?
- Should we consider new or supplementary approaches?
- How will we measure success?
- Where do we go from here?

Workgroup Membership

See attached list of workgroup members (including changes) and attendance to date. The Workgroup co-chairs believe that the Workgroup reasonably represents stakeholder interests, although it may be appropriate to consider adding a cranberry grower and a municipal water utility representative.

Workgroup Meetings

The Workgroup has held 2 meetings to date, on August 23 and November 10, 2016. Both meetings were well attended. There was excellent, constructive participation by all represented stakeholders.

- On August 23, Workgroup members introduced themselves, shared basic perspectives, and began to identify and address key issues and information needs.
- On November 10, the Workgroup heard and discussed expert presentations on Central Sands hydrology, as well as relevant water law in Wisconsin and other states (see draft minutes attached).

Problem Description

The Workgroup is focusing mainly on the rather unique groundwater pumping challenges in the Central Sands. The Workgroup has worked to define, with greater clarity, the primary issue in the Central Sands.

The issue in the Central Sands is not groundwater depletion *per se* (there is an ample groundwater supply overall), but rather the impact of groundwater pumping on *surface water* levels – especially in the late summer months. Streams and lakes in the Central Sands are closely connected to groundwater, making them vulnerable to groundwater pumping. Stream and lake levels depend on water levels in the top few feet of the groundwater aquifer. Groundwater pumping can have a significant impact on those top few feet, without “depleting” the rest of the aquifer.

There are now about 3,000 high capacity wells in the Central Sands, compared to just 100 in 1950. Much of the pumping demand is for irrigated agriculture. Municipal and industrial wells, where present, can also have a major impact. The Central Sands area is a national leader in potato and processed vegetable production, and irrigation is critical to that production. Irrigated agriculture plays a major role in the Central Sands economy.

Evidence suggests that groundwater pumping has a significant impact on surface water levels in some parts of the Central Sands– at least on a seasonal basis. That can affect fish reproduction and other biological processes, and can also affect navigation, tourism, recreation, scenery and residential property values. The exact size and scope of the groundwater pumping impact is still a subject of discussion and research. The impact of an individual well depends, to a significant degree, on its distance from the affected stream or lake.

Some, but not all, of the water withdrawn by irrigation wells is eventually returned to the aquifer as recharge. The recharge rate depends on a number of factors, including plant evapotranspiration rates. Seasonal “cones of depression” around irrigation wells can have a significant impact on stream flow, even if recharge quickly restores well water levels when pumping stops. The stream flow impact tends to lag behind the groundwater impact, and also tends to dissipate more slowly. Stream flow impacts can lag by weeks or months, and can accumulate to some degree over multiple pumping cycles.

Multiple wells can have a cumulative impact on surface water levels, although the size of the cumulative impact can be hard to pin down. Modeling suggests that cumulative pumping reduces groundwater levels by as much as 2-6 feet in some parts of the Central Sands (compared to predicted levels without pumping) – at least on a seasonal basis.

Key Challenges

There is, presumably, some “sustainability” limit to groundwater pumping in the Central Sands. Yet groundwater pumping and other use demands continue to grow, as the local population and economy expand, and as agricultural production continues to intensify.

There is already significant conflict over the scope and allocation of groundwater pumping rights; and conflicts may grow if we cannot find cooperative solutions. Scientific and legal uncertainties have complicated the search for solutions. The Workgroup hopes to make progress in answering the following questions:

- ***How, and to what extent, does groundwater pumping affect surface water levels?*** Recent advances in groundwater modeling shed considerable light on this question, although more information would be helpful. Part of the challenge is to isolate groundwater pumping effects from other effects, such as climate, land use, and normal seasonal flux. The Workgroup hopes to clarify the underlying facts, and identify key points of agreement, disagreement and uncertainty. The Workgroup also hopes to identify key information and research needs.
- ***What are our “bottom line” surface water preservation goals?*** There is a general consensus among Workgroup members that we need to protect surface water levels. But surface water levels vary considerably, as a result of precipitation, climate swings, drainage, seasonal flux and other factors – not just groundwater pumping. Conditions may also vary from stream to stream, and lake to lake. Can we identify essential minimum base flow standards with greater clarity, and not just on a “case by case” basis? What base flow levels do we aim to preserve? And what would it take to maintain those levels? This has technical, as well as public policy components.
- ***How can we, in a fair and responsible way, allocate a limited resource among many competing uses?*** Even if we can agree on key facts and conservation goals, we must still confront some hard questions related to the fair and efficient allocation of groundwater pumping rights. DNR has authority to deny or restrict an individual well permit if the proposed well will have an adverse impact on surface water levels. But how do we account for the combined impact of many wells? How do we maintain a “fair” allocation of pumping rights between thousands of current and future users, whose needs are constantly changing and evolving? How do we allocate pumping rights between “new” and “existing” uses? And how do we encourage *everyone* to conserve groundwater, for the common good?

Next Steps

We have asked the expert hydrologists in our Workgroup to work together on a brief summary of key facts (to the extent that those facts are understood at this time). We hope that this summary will provide a useful starting point and context for further policy discussions. The hydrologists may identify key points of agreement, disagreement and uncertainty, which can also help us to identify further information and research needs.

At our two remaining meetings, we hope to come to a better, shared understanding of the facts. We also hope to refine our discussion of conservation goals, and ways to achieve them. We plan to maintain our regional focus on the Central Sands, and will likely discuss a range of alternative approaches – including both voluntary and regulatory approaches – that could help us meet our conservation and resource allocation needs.

We do not plan to address groundwater quantity issues on a statewide basis – partly because of time and information constraints, but also because problems vary widely throughout the state. However, some of the “lessons learned” in the Central Sands may be useful statewide.

Groundwater Quantity Workgroup Member List

First Name	Last Name	Organization	Attended Meeting 8/23/16	Attended Meeting 11/10/16
Andrew	Asleson	Wisconsin Rural Water Association	No	No
Jake	Barnes	Friends of the Tomorrow/Waupaca	Yes	Yes
Ken	Bradbury	WI Geological and Natural History Survey	Yes	Yes
Mike	Carter	Bushman's Inc.; Co-chair, Groundwater Quantity Workgroup	Yes	Yes
Andy	Diercks	WI ATCP Board; FLW Steering Committee	Yes	Yes
Patty	Dreier	Portage County	No	Yes
James	Drought	GZA GeoEnvironmental Inc.	No	Yes
Adam	Freihoefer	WDNR	Yes	Yes
Scott	Froehlke	Wisconsin Institute for Public Policy and Service; FLW Steering Committee	Yes	Yes
Skip	Hansen	Central Sands Water Action Coalition; Co-chair, Groundwater Quantity Workgroup	Yes	Yes
Tamas	Houlihan	Wisconsin Potato Vegetable Growers Association	Yes	Yes
Justin	Isherwood	Potato Farmer	Yes	Yes
Andy	Johnson	Marathon County Conservation, Planning and Zoning; Co-chair, Groundwater Quantity Workgroup	Yes	Yes
Lawrie	Kobza	Boardman & Clark LLP	No	No
Mike	Koles	Wisconsin Towns Association	Yes	Yes
George	Kraft	UW Stevens Point	Yes	Yes
Jordan	Lamb	DeWitt Ross & Stevens	No	Yes

First Name	Last Name	Organization	Attended Meeting 8/23/16	Attended Meeting 11/10/16
Don	Last	UW-Extension Emeritus; Facilitator, Groundwater Quantity Workgroup; FLW Steering Committee	Yes	Yes
Bob	Martini	Retired DNR Water Resources	Yes	Yes
Amber	Meyer-Smith	Clean Wisconsin	No	No
Ben	Niffenegger	Lanlade County Shoreland Protection Specialist	No	Yes
Kara	O'Connor	Wisconsin Farmers Union	No (Darin Von Ruden attended)	Yes
John	Ramsden	NRCS	Yes	No
Carl	Sinderbrand	Axley Brynson, LLP	Yes	Yes
Christine	Thomas	UW Stevens Point Dean of the College of Natural Resources, FLW Steering Committee	Yes	No
Allison	Werner	Rivers Alliance	Yes	Yes
Elizabeth	Wheeler	Clean Wisconsin	Yes	No
Jim	Wysocki	Wysocki Family of Companies	Yes	Yes
Louis	Wysocki	Wysocki Family of Companies	No	Yes