REPORT SUMMARY

Information Support for Groundwater Management in the Wisconsin Central Sands, 2013-2015

George J. Kraft
David J. Mechenich
Jessica Haucke

Center for Watershed Science and Education
College of Natural Resources
University of Wisconsin – Stevens Point / Extension

August 30, 2016

This report documents data and information gathering efforts for 2013 through 2015 that support groundwater management activities in the Wisconsin central sands. The central sands contain Wisconsin's greatest density of high capacity wells and of groundwater pumping. This pumping is widely recognized as the cause of low groundwater, lake, and wetland levels and low streamflows.

The goal of these efforts was to provide monitoring and modeling support for management and policy processes that address groundwater pumping effects on aquatic resources in the Wisconsin central sands, with these specific objectives and outcomes:

1. Measure baseflow discharges on select streams and groundwater levels in select wells; provide data to USGS and WDNR for archiving.

Baseflow was measured at 32 stream locations and groundwater levels were measured at four. Data were uploaded to agencies and are provided as electronically appended material.

2. Estimate irrigation rates for crops grown in central Wisconsin for years 2013 and 2014.

Median irrigation rates in 2013 and 2014 were 9.3 and 7.8 inches, respectively. Irrigation rates were greatest for potato followed by field corn, sweet corn, and snap bean. For 2008 through 2014, the annual irrigation rate across all crops was 8.7 inches, with a range of 4.0-14.9 inches. Annual irrigation rates correspond to the dryness of summers.

3. Compile precipitation, groundwater, and lake level data from NOAA, WDNR, County, and USGS data sources for years 2014 and 2015 and merge with previously compiled data. Use the assembled data to provide a context for the relative wetness or dryness of the study period.

Precipitation in 2014 and 2015, respectively, was greater than average by 4.0 and 8.8 inches at Stevens Point, 4.2 and 0.9 inches at Hancock, and 6.8 and 4.1 inches at Wautoma. The Palmer Drought Index

ranged from near normal to unusually moist, and has not fallen below "normal," or average, since the end of 2012. Discharges at reference streams were above average, at the 77th-80th percentile, as were groundwater levels in most areas with few high capacity wells.

4. Estimate pumping drawdowns for select monitoring wells and lakes for 2014-2015 by statistical comparisons to reference sites.

Drawdowns in four long term monitoring wells were estimated at about 4.5 feet at Plover and Hancock, 0.5 feet at Bancroft, and 2.3 feet at Coloma. Drawdowns in four lakes with long record, which reached 3.3 to 8 feet in 2007-2010, were 1.8 to 5.5 feet in 2015.

5. Run existing groundwater flow models to meet agency and process needs and to explore cause-and-effect relationships of diminished surface waters to groundwater pumping.

This work occurred irregularly through the life of this two-year project with results passed along to agency contacts.

List of Electronically Appended Materials

1: Excel file; "Q for Central WI Rivers thru June 2016"

2: Excel file; "Lake Level Data Updated thru 2016"

3. Stream and lake elevation survey (folder)
    - Survey description
    - Shapefile

4. Description of past modeling efforts (folder)

5. Refined stream reach segmentation schema (folder)