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## County to consider water recommendations

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MARQUETTE - The Marquette County Board is scheduled to consider recommendations today from an aquifer subcommittee in response to reports of declining inland lake and aquifer water levels, including those at K.I. Sawyer.

In September, a technical study group reported to the county board on declines in groundwater and surface water levels of lakes in Marquette County - particularly those associated with the Sands Plain aquifer - and on a 1995 groundwater recharge proposal that would divert water from the Escanaba River to recharge the Sands Plain aquifer.

The group was asked to study the issue after residents living around Martin Lake at K.I. Sawyer had complained about dramatic declines in water levels - which they attribute to well pumping by the county for the Sawyer community - had negatively impacted property values and their ability to enjoy their lakefront homes and cottages.

### Article Photos



A grassy area is shown near a dock where the waters of...



"We collectively looked through a number of data sources that were available to us, going from about 1980 to 2013," Dan Wiitala, a professional geologist in the study group, told the county board. "There's been a number of studies that have been done both on the Sands Plain aquifer hydrology and studies of lake level fluctuations near K.I. Sawyer by the U.S. Geological Survey."

Sands Township had also commissioned some groundwater modeling during the 1990s and groundwater monitoring there has continued. Private data and some collection of information by the group was also considered.

In September, the county board voted to have the planning commission consider the group's findings and report recommendations back to the county board. The planning commission sent the issue to its aquifer subcommittee, which has met twice and produced four recommendations.

At its Nov. 5 meeting, the planning commission voted to forward the subcommittee's suggestions to the county board, which is scheduled to consider acting on them at its meeting at 6 p.m. today in Room 231 of the Henry Skeewis Annex to the Marquette County Courthouse.

The recommendations include:

- Investigate the possibility of creating a water monitoring network in cooperation with various partners, including the Keweenaw Bay Indian Community, Northern Michigan University, Michigan Tech University, the Superior Watershed Partnership, Cliffs Natural Resources, Lundin Mining Corp. and local cities and townships.

- Refer exploration of a regional mitigation of water supply to the Climate Adaptation Task Force for discussion. According to the Superior Watershed Partnership, the task force was formed "to help prepare local leaders and the general public to think proactively about the effects of climate change and to develop strategies that will make the Upper Peninsula more resilient and effective when dealing with the consequences of climate change."

- Request the task force provide guidance on best practices for planning and zoning in response to climate change.

- Study water capacity at K.I. Sawyer to give the county board a better idea of what water supplies are available for economic development.

The study group's September report produced several findings related to surface and groundwater conditions in the Sands Plain area, concluding water losses were primarily related to changing climate.

The group concluded aquifer water levels and lake water levels have declined significantly in the Sands Plain and other Marquette County watersheds over the past 10 to 15 years.

"Declines are caused primarily by large-scale climatic conditions, resulting in a period of hydrological drought over a wide regional area," the report stated.

Wiitala said some water level declines were reversing recently at some locations.

The Sands Plain is characterized by sandy glacial deposits with high water infiltration rates through those sands, complex hydrogeology with unconfined and confined aquifer systems and relatively impermeable bedrock boundaries with no connection to other basins, Wiitala said.

The primary water source for the plain is precipitation, which averages 34 inches annually, with 15 inches needed for groundwater recharge, Wiitala said.

Two major river systems, the Chocolay and East Branch of the Escanaba, drain the plain to Lake Superior and Lake Michigan, respectively.

Lakes on the plain are connected to water table (unconfined aquifer) levels. Wiitala said not all lakes are the same, with surface inlets and outlets important for some.

"Lakes which do not have those inlets are pretty much reliant on groundwater levels and then rainfall and a very localized watershed for their contribution," Wiitala said.

On the Sands Plain, 95 percent of stream water flow comes from groundwater discharge, which results in a stable stream level even during drought conditions. Chocolay River tributaries draw 47 million gallons a day from the aquifer, the group said.

In addition, water pumping from the aquifer produces localized drawdown, including 600,000 to 2 million gallons per day from the Michigan Department of Natural Resources fish hatchery in Harvey, 200,000 to 500,000 gallons per day for the K.I. Sawyer water supply and some undetermined amount of pumping by small private wells.

"Most groundwater removed from storage has been released as stream flow to the Chocolay River system," the group concluded. "Groundwater pumping from Sands Plain aquifer creates localized drawdown on top of natural declines."

Wiitala said not all lake levels will react the same, even under the same atmospheric conditions and being situated in relative close proximity to each other.

"In order to understand precisely what's going on, one would have to collect a tremendous amount of data and study it over a fairly long period of time, to understand each lake individually," Wiitala said.

He said current Sawyer pumping levels from groundwater are not significant enough to produce the water declines recorded at Martin Lake. However, Wiitala said pumping at higher volume in previous decades may potentially have had an effect.

The group said the 1995 Greenwood Plan would divert water from the Goose Lake Outlet (Escanaba River) to the Sands Plain aquifer, with up to 11 million gallons per day potentially available for groundwater recharge.

Construction costs to implement the plan are estimated at \$15 million, with the plan providing a water level benefit to a population of roughly 760 people, including 133 residential water supply wells in Chocolay and Sands townships.

Lake and aquifer levels at K.I. Sawyer would not benefit from the recharge plan.

Detailed hydrogeological and engineering studies would be needed to implement the plan because of technical uncertainties. Regulatory considerations are also involved for wetland and stream impacts, and watershed diversions.

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