

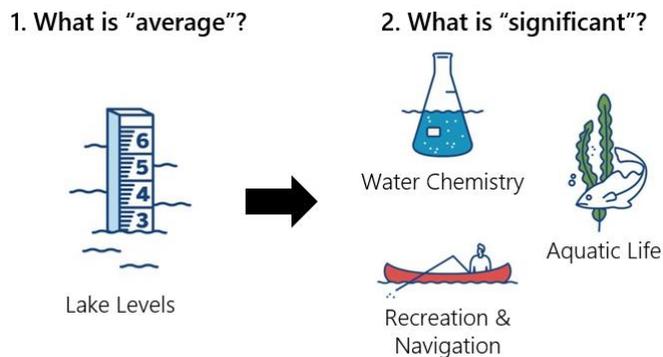
As part of the Central Sands Lakes Study, DNR and its partners have been [monitoring](#) water resources throughout the study area. We are gaining a better understanding of the unique land and lake features and the causes of water level changes in and around the study lakes.

To complete the study, we must answer two important questions:

1. What is an “average seasonal water level”?
2. What does a “significant reduction” of water levels mean?

To answer these questions, we are first describing each lake’s characteristic hydrology – or how water flows in relation to the landscape. Second, we are evaluating how ecological factors including water quality, nearshore habitat, lake vegetation, recreational uses, and fish and aquatic life are affected by changes in lake levels (Figure 1).

Figure 1: Overview of DNR’s process to determine significant reduction of lake water levels



Water levels have been very high in the last couple of years. These conditions offer unique challenges and some opportunities. While the study was designed to look at the impacts of low water levels, the high levels have afforded an opportunity to catalog and evaluate high-water impacts. And with a dry period in 2011-2012, we now have data for the study from both ends of the spectrum.

One interesting change due to higher groundwater levels is that in 2019, Long Lake and Plainfield Lake shifted from having groundwater flow in on one side and out on the other, to being low points in the water table for a few months resulting in the lakes receiving groundwater from all directions (Figures 2 and 3). These changes highlight the dynamic nature of water levels and lake characteristics in this area and underscore why having multiple years of monitoring data are important.

Figure 2: Groundwater levels in wells and lake levels around Long and Plainfield Lakes in summer, 2018. Lakes exhibit “flow-through” conditions, with groundwater flowing in from the north and flowing out to the south. (Image from Wisconsin Geological and Natural History Survey)

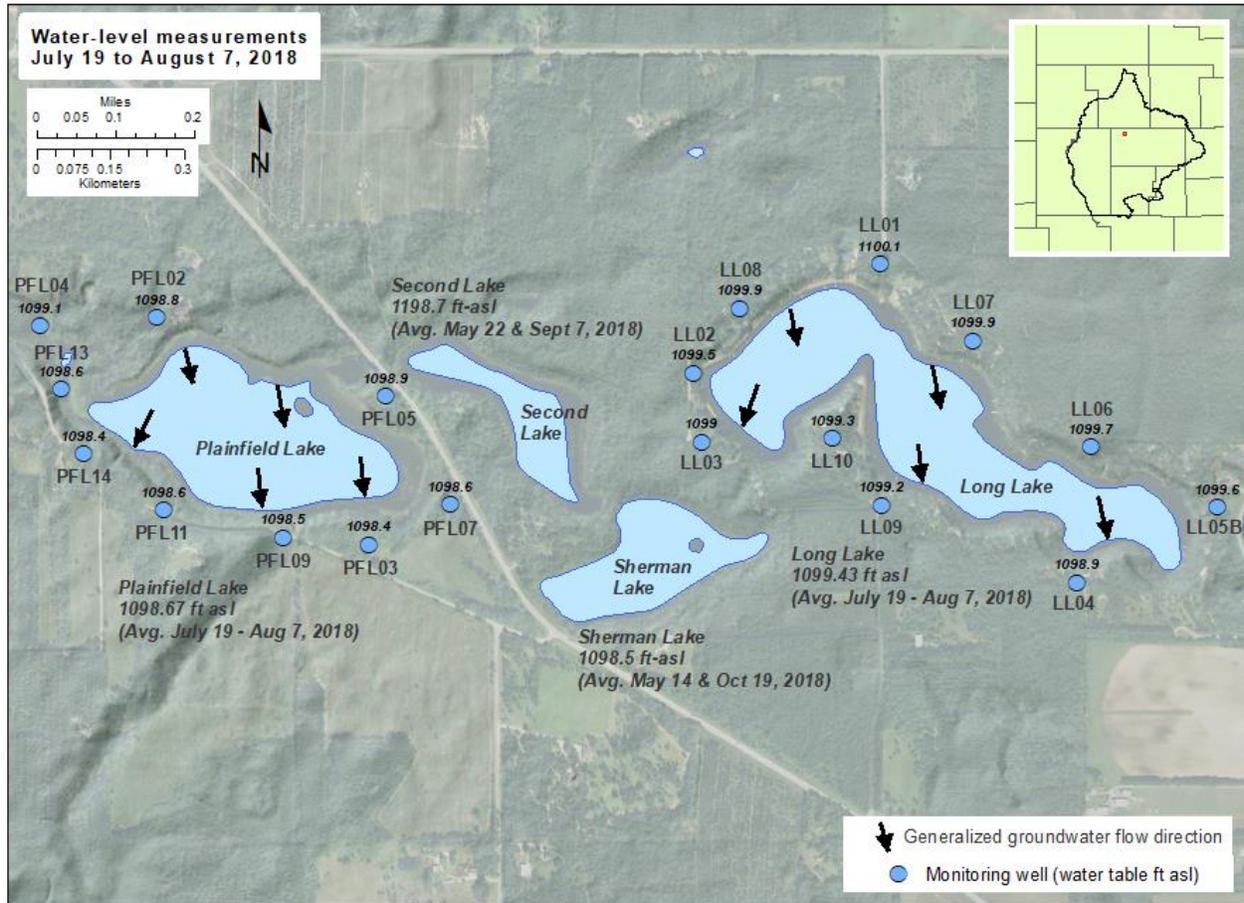
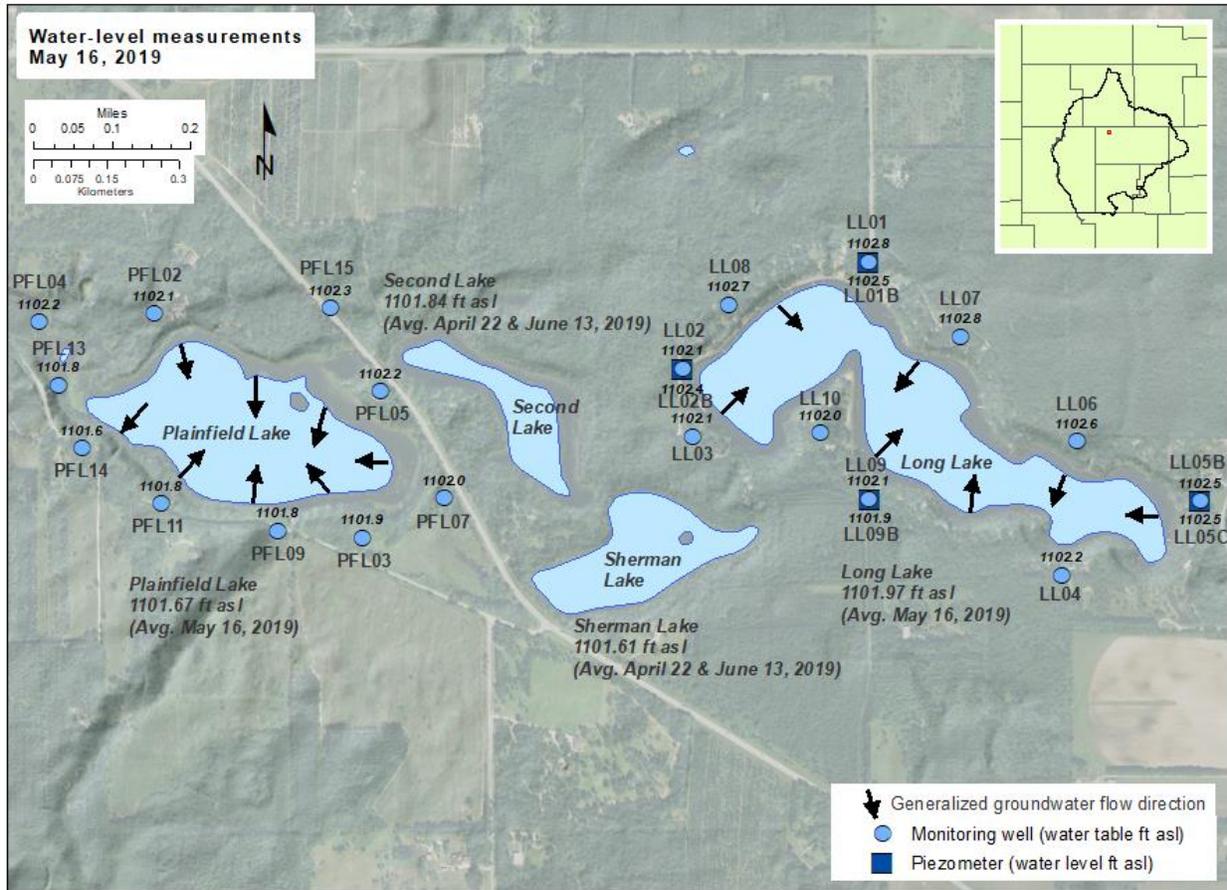


Figure 3. Groundwater levels in wells and lake levels around Long and Plainfield Lakes in spring 2019. Groundwater flow is almost entirely towards the lakes from all directions. (Image from Wisconsin Geological and Natural History Survey)



While the flow regime at Long and Plainfield lakes changed, no such change occurred at Pleasant Lake (Figures 4 and 5). This is due to where Pleasant Lake is on the landscape; Pleasant Lake is much closer to streams where water levels are relatively constant.

Figure 4: Groundwater levels in wells and lake levels around Pleasant Lake in summer, 2018. The groundwater flows through the lake with nearby Tagatz and Chaffee Creeks strongly influencing groundwater flow directions. (Image from Wisconsin Geological and Natural History Survey)

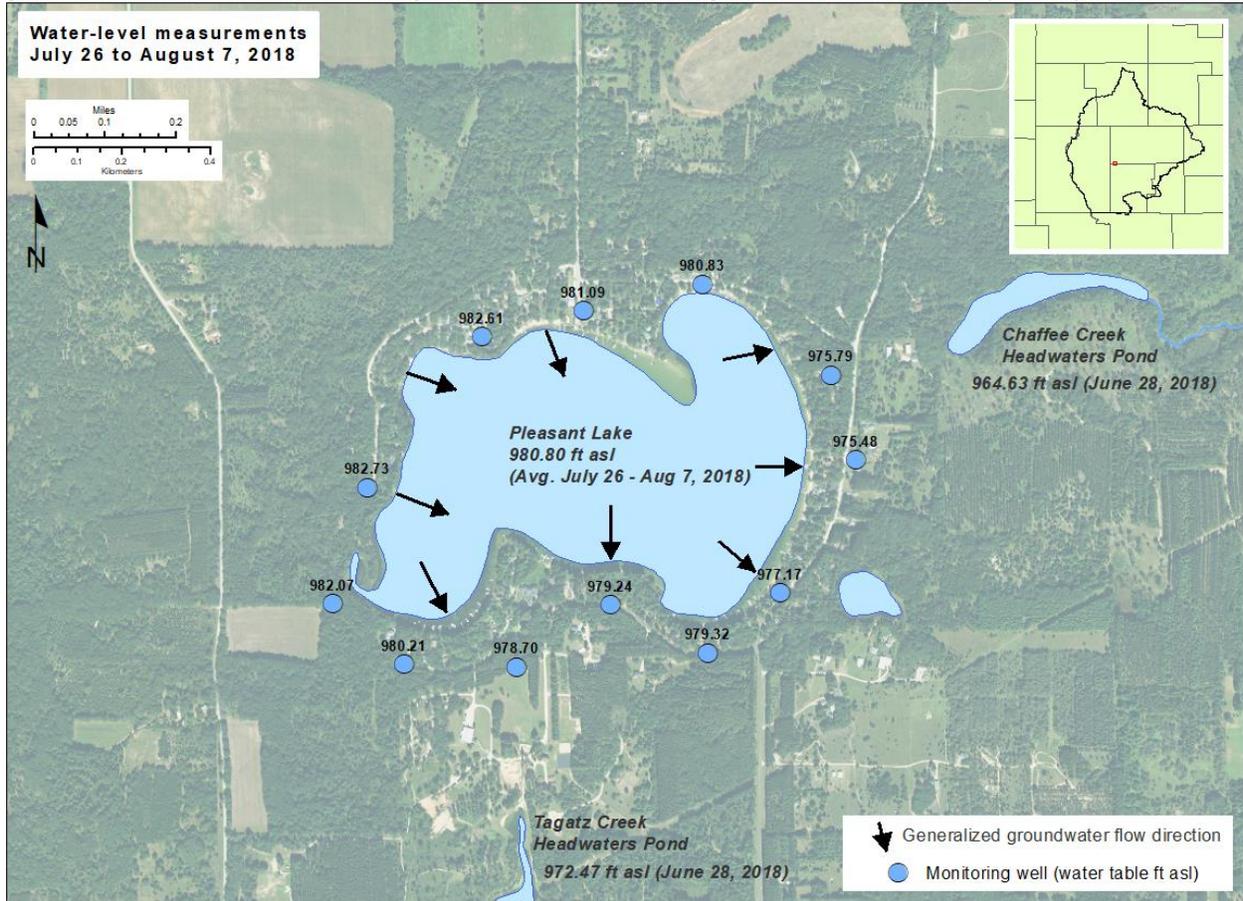
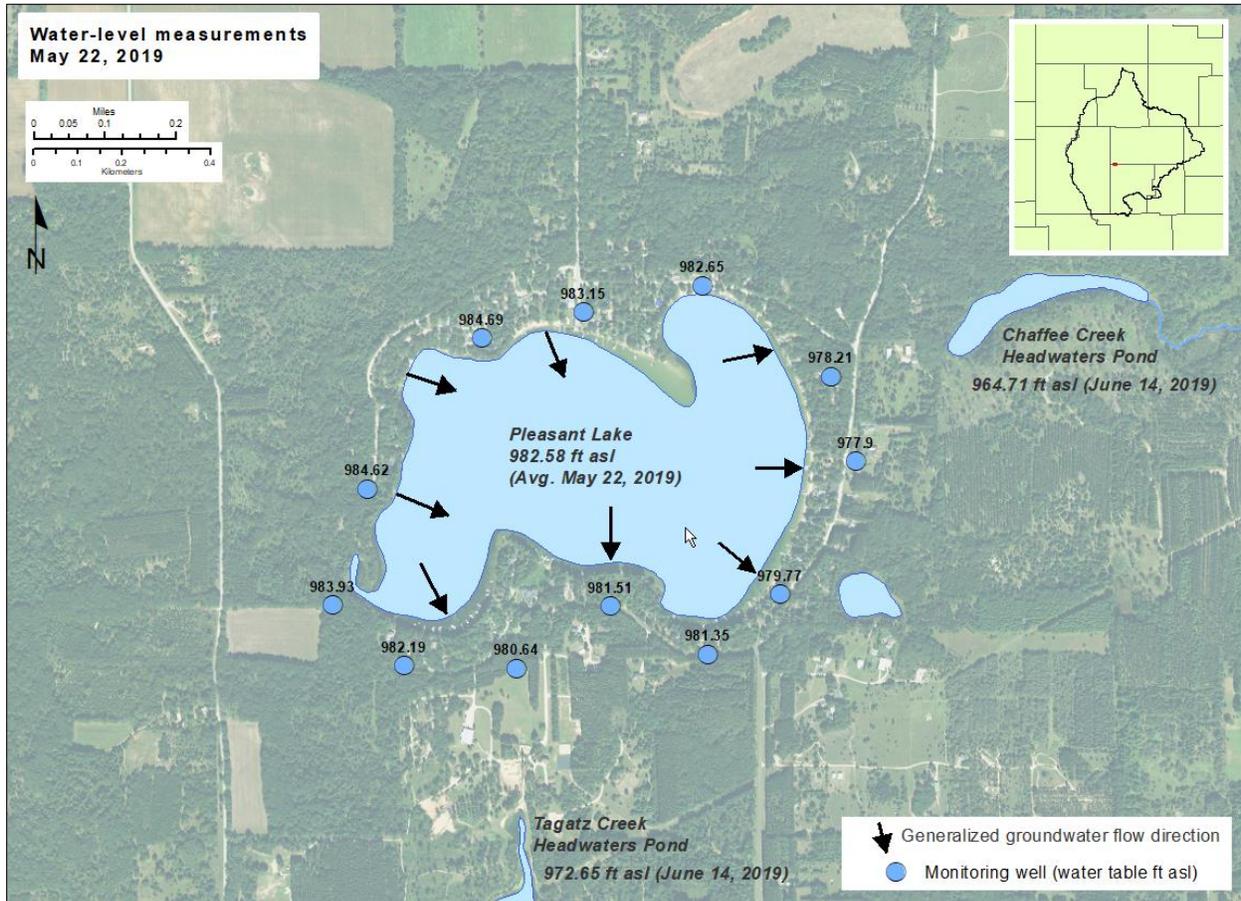


Figure 5: Groundwater levels in wells and lake levels around Pleasant Lake in spring 2019. Although water levels have risen, the flow direction remains consistent since summer 2018, with nearby creeks still strongly influencing groundwater flow direction. (Image from Wisconsin Geological and Natural History Survey)



We see these differences in water levels historically as well. In the past, Long and Plainfield Lakes have experienced water level fluctuations that are much larger than those at Pleasant Lake, even though Long and Plainfield Lakes are smaller and shallower than Pleasant Lake.

Part of our evaluation of how ecological factors are affected by changes in lake levels revealed another interesting finding. Our 2019 fish survey identified Bluegill and Pumpkinseed in Plainfield Lake. In 2018, when lake levels were about 3 ft. lower, we found no fish in Plainfield Lake. It's unclear if the fish were present in 2018 and too small to be counted or if they were planted.

These lake findings are part of larger effort that includes compiling geologic data and conducting field investigations to aid in the construction of the study's groundwater flow model. The model will simulate the water budget and evaluate impacts of groundwater withdrawals on the three study lakes.

The Central Sands Lakes Study is an effort by the Department of Natural Resources (DNR), partnered with the Wisconsin Geological and Natural History Survey (WGNHS), and the United States Geological Survey (USGS) to study the extent of groundwater withdrawal impacts on three lakes in Waushara County – Plainfield, Long and Pleasant Lakes. The study is part of a requirement under [2017 Wisconsin Act 10](#), and must be completed by June 2021.

Stay tuned to learn more. The DNR plans to host a series of technical webinars early this summer (2020) to provide stakeholders information on the lake level impact risk methodology, geologic data collection, and groundwater flow modeling portions of the study.

For more information about the study and the technical webinars, visit the DNR website: <https://dnr.wi.gov/topic/Wells/HighCap/CSLStudy.html>, sign up for Central Sands Lakes Study email updates, or contact DNR project manager Jeff Helmuth, jeffrey.helmuth@wisconsin.gov, (608) 266-5234.