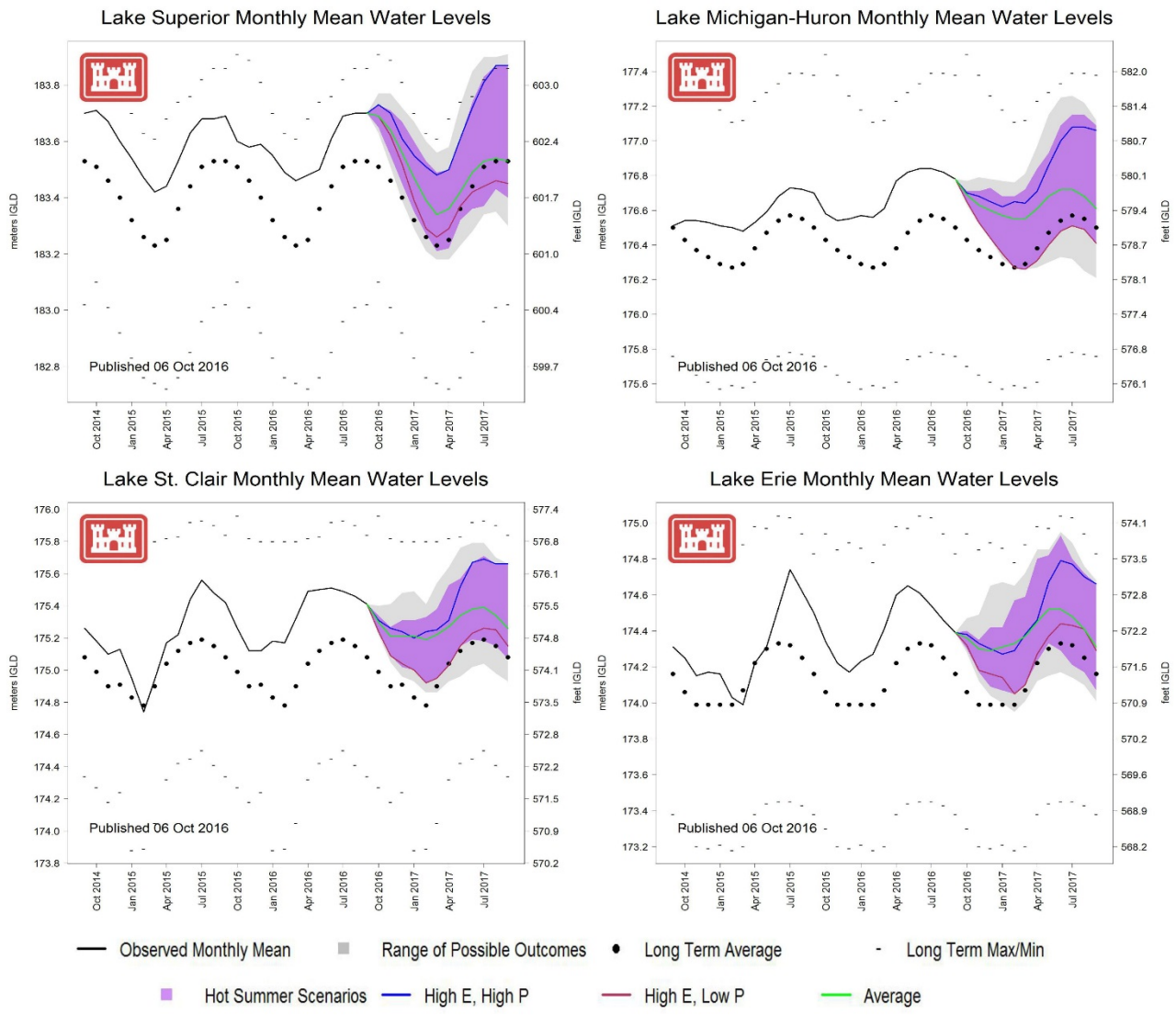
US Army Corps of Engineers
Detroit District

Great Lakes Water Level Outlook

Volume 5: October 2016 12-Month Outlook



E – Evaporation, P – Precipitation

*At this time, water level outlooks for Lake Ontario are still under development due to complexities of its weekly regulation process.

Overview

As of October 1st, all of the Great Lakes, except Ontario, continue to experience water levels above their long term average (LTA). The summer months, June, July, and August (JJA) for the Great Lakes basin were quite warm. In the period of record (POR), 1948-2016, JJA 2016 average temperature for the basin ranked 4th highest. The warm air temperatures this summer has also impacted the water temperatures of the Great Lakes, which are currently very warm basin wide and are above last year's water temperatures. In the fall, the air and water temperatures can greatly affect the evaporation from the lakes and impact the Net Basin Supply. Net Basin Supply (NBS) is the combined effect of precipitation over the lake, evaporation from the lake, and runoff to the lake. Increased evaporation would occur when cooler air moves over the warm lake. This edition of the Water Level Outlook incorporates the projection of water levels if NBS values are similar to those seen during the years a hot summer was experienced in the Great Lakes basin.

Hot Summer Scenarios

The hot summer scenarios were created using NBS sequences during the 15 hottest JJA average temperature in the POR. With 2016 ranking 4th, the other 14 years were used to demonstrate potential scenarios. On the graphic, the purple plume represents the range of water levels that would result if the NBS values are the same as those that were experienced during the 14 years a hot summer occurred, as in 2016. The varying colored lines represent water levels that would result if NBS values are similar to those experienced in a High Evaporation (E), High Precipitation (P) fall, a High E, Low P fall, and average NBS conditions of the 14 hot summer years.

High E, High P; High E, Low P; and Average

The first two scenarios represent differences in fall evaporation and precipitation, following a hot summer, which affected NBS to the lakes. The third scenario, Average, represents average NBS conditions of the 14 hot summers. Water levels that would result from NBS similar to those seen during these 3 scenarios are denoted by lines within the plume on the graphic. The High E, High P scenario is characterized by above normal evaporation and above normal precipitation during the fall. If a scenario like this were to occur, the initial drop in water levels for Lakes Superior and Michigan-Huron would not be as large as normal. Lake Superior could even rise above its long term maximum at the end of the 12 months. Lakes St. Clair and Erie would continue their seasonal decline in the fall, but rise in the spring. The above normal precipitation during the fall in this scenario likely keeps the water levels from large seasonal declines in the winter. The High E, Low P scenario is characterized by above normal evaporation, but below normal precipitation during the fall. This scenario would depict a stronger seasonal decline in lake levels for each lake. All of the lakes would experience quite low NBS for at least the next 6 months. Lakes Superior and Michigan-Huron would both eventually fall below their LTA. The average line represents the water levels if average NBS conditions of the 14 hot summers were experienced. The average NBS scenario indicates a seasonal decline on all of the lakes, but they all remain above or equal to their LTA.

Climatic Outlook as of October 2016

The latest forecast updated by the Climate Prediction Center indicates a continuation of above normal temperatures across the basin until November. In the January to March timeframe, the western portion of the basin is forecasted to experience below average temperatures. Even with temperatures forecasted to remain above average, there is a strong likelihood for considerable evaporation to take place due to the warm water temperatures. The seasonal outlook for precipitation indicates above average precipitation for most of the basin from January until June. The above average precipitation could help to balance out the NBS if large evaporation rates occurred on the lakes in the fall. The El Niño Southern Oscillation (ENSO) index is no longer forecasted to develop into a La Niña for the fall and winter. Currently, ENSO-neutral conditions exist and the forecast is favoring that ENSO-neutral conditions will persist through the winter.