



**US Army Corps
of Engineers
Detroit District**



Great Lakes Update

Great Lakes Spring Summary

Each of the Great Lakes experiences a seasonal rise in water levels each year. This exact timing and magnitude of this rise varies from year to year for each lake based on the location of that particular lake as well as the weather for that particular season. This update article will focus on the increases in water levels for the Great Lakes this spring compared to other years, and also discuss in more detail the factors that influence this rise.

Lake Superior

The seasonal rise for Lake Superior typically begins in March. This is much later than both Lake Erie and Lake Huron which typically see their rise begin December or January. One reason for this is the difference in geographical locations between the lakes. The Lake Superior basin consists of the most northern watersheds located in the Great Lakes drainage area. Much of the precipitation that falls during the winter falls as snow and stays frozen throughout the winter. The runoff from this snowpack that works its way into Lake Superior is a major component of the supply of water to that lake during the spring. Many portions of the watershed draining into Lake Superior still contain snow into the month of May and it takes more time for that runoff to work its way into the lake, which contributes to the seasonal rise.

As precipitation begins to fall as rain instead of snow, that water also works its way through Lake

Superior's various sub-watersheds and into the lake. Total precipitation is typically higher during the spring months for Lake Superior which also contributes to the rise throughout the spring.

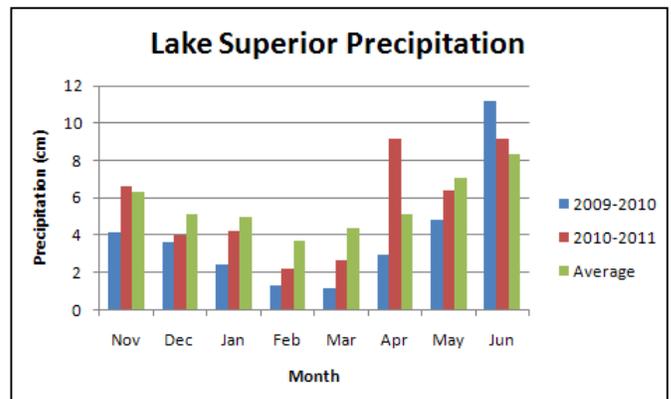


Figure 1: Lake Superior Monthly Precipitation

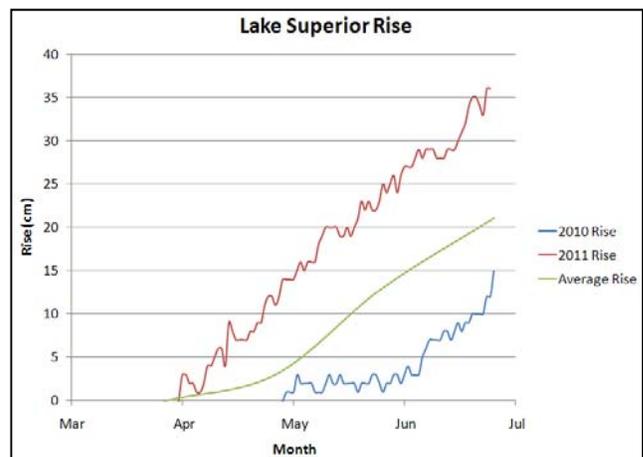


Figure 2: Lake Superior Seasonal Rise

Figure 2 shows the rise in water level for Lake Superior from its lowest water level in the spring, and then continuing to its level as of the end of June. The rise is shown for this year, last year, and also for the historical average. Note that although the rise typically begins in March, this can vary from year to year. The last important thing to note on this graph is that each line is showing the rise in water level from the lowest point, not the actual water level value. The actual lowest water level that the lake reached each of these years was different, however, this analysis is focused on what the total rise in the water level was so the lowest level reached before the spring rise is considered the zero point for each year. Similar figures are shown later in this summary for the other Great Lakes.

As shown in Figure 2, the total increase in water level for Lake Superior by the end of June for this season was 35cm. This was 9cm more than average and 25cm more than last year. After examining Figure 1 it is clear to see the difference in precipitation totals between this year and last year and then see the influence this had on the water levels.

Lakes Michigan-Huron

The seasonal rise for Lakes Michigan-Huron (M-H) typically begins about one month earlier than for Lake Superior, with the rise beginning in February. Like Superior, the runoff from the melting snowpack is also an important component to the spring rise, however due to the geography of the lakes the snow melts a bit earlier in the year.

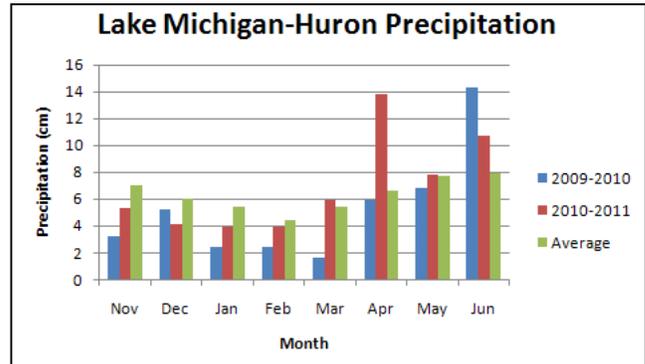


Figure 3: Lakes M-H Monthly Precipitation

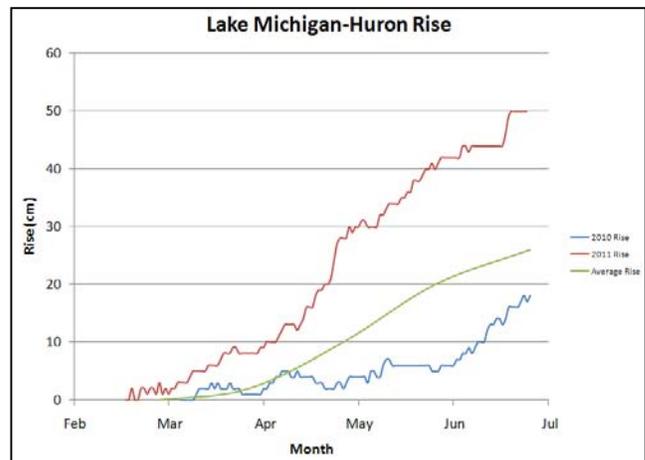


Figure 4: Lakes M-H Seasonal Rise

It's important to note that the seasonal rise for Lakes M-H in 2010 didn't begin until March due to the dry conditions for that season while the water level started rising in February this season. The total rise of 50cm for this season was 25cm more than average and 32cm more than last season.

Lake Erie

The seasonal rise of Lake Erie is affected by the same factors as the upper lakes. However, due to the location and size of the watershed, the water level normally begins rising in January. The drainage basin for Lake Erie is smaller than the previously mentioned lakes; therefore the response in water level due to runoff from the watershed is typically faster.

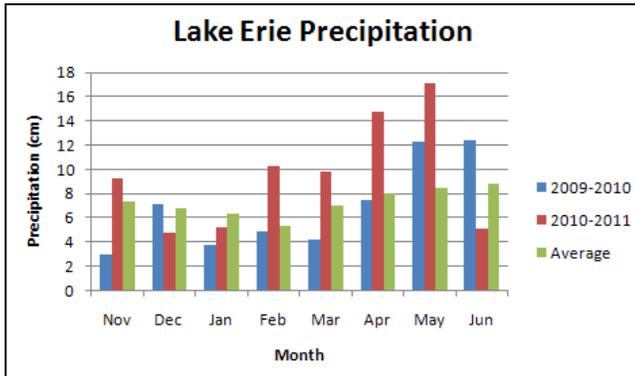


Figure 5: Lake Erie Monthly Precipitation

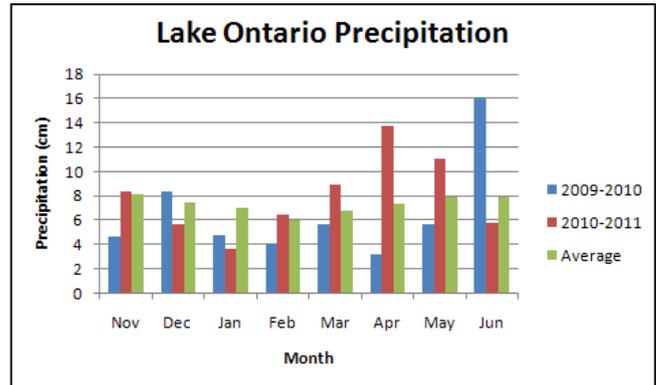


Figure 7: Lake Ontario Monthly Precipitation

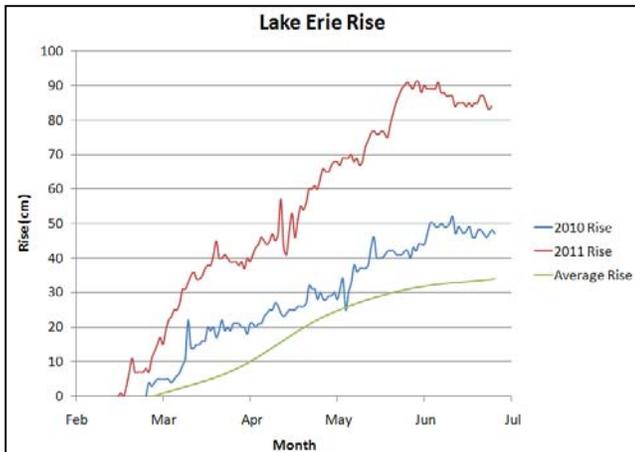


Figure 6: Lake Erie Seasonal Rise

The rise in the water level for Lake Erie this season has been dramatic. The monthly mean water level in February was 23cm below the long term average (LTA) water level for that month, and now after this swift rise the monthly mean water level for June was 25cm above the LTA. Again, this was driven by the dramatically high precipitation totals experienced throughout the Erie drainage basin over the course of the spring.

Lake Ontario

The outflows from Lake Ontario are regulated through control structures along the St. Lawrence River. The regulation strategy has an impact on the level of Lake Ontario and its seasonal rise, however the lake level tends to follow a similar pattern from year to year.

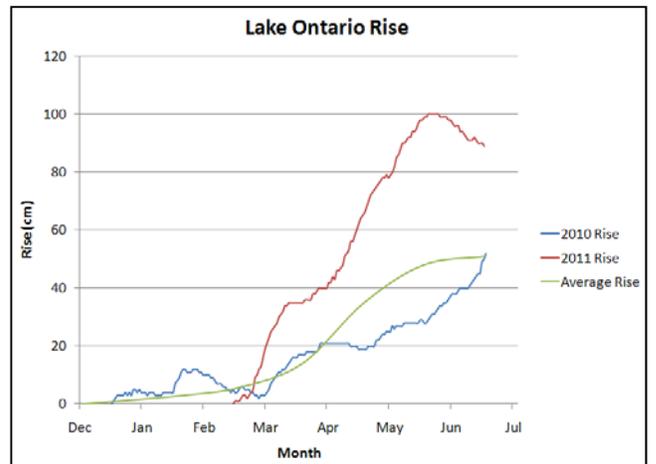


Figure 8: Lake Ontario Seasonal Rise

Like the other lakes discussed, Lake Ontario’s water level experienced a very large rise this past spring. Again, Figure 7 shows the higher than average monthly precipitation totals for this year. The peak rise of Lake Ontario’s water level was roughly 100cm, which is almost twice as much as a typical seasonal rise. Due to heavy rain in June of last year, the 2010 water level had a late increase, bringing the rise for that season to near average. Outflows from Lake Ontario were close to average for the past three months, and the water level rise was still significant. This again highlights the major impact precipitation and runoff into the lake have on water levels.

Summary

As shown through the rises in water levels for most of the Great Lakes this spring, increased precipitation and the associated runoff into the lakes can have a major impact on water levels. Lake Erie is a clear example of how several months of above average precipitation can bring a water level that was below LTA to above its LTA. To continue monitoring the lake wide average water levels for the Great Lakes please see the U.S. Army Corps of Engineers website at: <http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/>