

## Joliet Alternative Water Source Study

### Topic #12: Climate change and potential impact to water sources

When people hear the term “climate change”, they might think of global warming, melting ice caps or holes in the ozone layer. There is significant discussion and disagreement on whether climate change is real. As we evaluate alternative water sources, we need to consider the impact that climate change might have on the sources being considered.

National agencies, state agencies and climate experts present several views on climate change, as follows:

- Historical data on climate change in Illinois, the United States and the World is available through the Illinois State Water Survey at the following website:  
<https://www.isws.illinois.edu/statecli/climate-change/cc.htm>.
- Each state will experience climate change differently. The NOAA National Centers for Environmental Information has prepared Climate Summaries for each State. Illinois’ State Climate Summary can be found at: <https://statesummaries.ncics.org/chapter/il/>.
  - In this summary, there are 3 key messages: Average Annual Temperature has increased by ~1°F since the beginning of the 20<sup>th</sup> century, precipitation in spring and summer has generally been above average over the past two decades and extreme flooding and drought have occurred periodically in recent years.
- In August 2016, the United States Environmental Protection Agency (USEPA) released the following document on What Climate Change Means for Illinois:  
<https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-il.pdf>.
  - The document notes that changing climate is likely to increase the frequency of floods in Illinois because spring rainfall and average precipitation are likely to increase, and severe rainstorms are likely to intensify.
  - For Illinois’ Rivers, flooding will occasionally threaten both navigation and riverfront communities.
  - For Lake Michigan, changing climate is likely to reduce water quality as a result of more algal blooms due to warmer water and runoff due to severe storms, as well as the possibility that severe rainstorms could cause sewers to overflow into the lake more often, threatening beach safety and drinking water supplies.
- Temperatures in Illinois will slowly change in the next two decades and then potentially increase more significantly from 2040 to 2070 (<https://www.nprillinois.org/post/illinois-issues-states-climate-changing#stream/0>).
  - Higher future summer temperatures (some saying as hot as Texas), could result in a higher demand for water for irrigation and outdoor water use.
- Potential impacts of climate change on water level in Lake Michigan – Overall prediction is that changes in climate will likely impact average levels on Lake Michigan, but are not expected to limit the availability of Lake Michigan water for current or potential future Illinois water utilities. (<http://www.glisa.umich.edu/climate/lake-levels>)
  - Current models do not agree on the extent of climate impacts on lake levels. Levels are expected to continue to vary between historic high and low levels.

- Permitted allocations for use of Lake Michigan water are not expected to be impacted by variation in lake levels. Allocations for Illinois water utilities are protected under Supreme Court rulings that quantify Illinois' total diversion from the lake.
- Water utilities that operate intakes on Lake Michigan consider the impact of low lake levels on their supply when they evaluate their available capacity.
- A local perspective from two climate experts is presented in the following article: <https://news.wttw.com/2018/10/10/what-global-warming-could-mean-lake-michigan>.

Taking into account all of these perspectives, the Illinois climate change predictions include:

- Average annual temperatures will increase.
- Average precipitation will increase, with increases most likely to occur in winter and spring and come in the form of extreme precipitation events which will increase the frequency and intensity of floods.
- Increases in temperatures will increase evaporation rates and the rate of loss of soil moisture resulting in the likelihood of more intense future summer droughts.

Therefore, the potential for climate change to impact water supply alternatives for Joliet include:

- Potential increase in peak water demand resulting from higher temperatures or longer/more intense periods of drought;
- Potential reduced raw water quality due to warmer temperatures and increased run-off from extreme precipitation events;
- Potential reduction in water demand resulting from more precipitation during winter and spring;
- Potential increase in periods during which low flow restrictions resulting from longer/more intense periods of drought could limit the amount of water that Joliet could withdraw from potential river sources;
- Potential reduced Lake Michigan intake capacity resulting from lower lake levels associated with longer/more intense periods of drought.