GREAT LAKES DROUGHT MONITORING, IMPACTS, AND SEA GRANT

Molly Woloszyn
Extension Climate Specialist
Illinois-Indiana Sea Grant
Midwestern Regional Climate Center
Network of 33 Sea Grant programs in every coastal and Great Lakes state, as well as Guam and Puerto Rico.

Federal-state partnerships:
- NOAA
- State University partners
NATIONAL SEA GRANT COLLEGE PROGRAM

Provide integrated research, communication, education, and extension programs to coastal communities that lead to the responsible use of the nation’s ocean, coastal and Great Lakes resources through informed personal, policy, and management decisions.
HISTORY OF SEA GRANT

1862 Morrill Act: established many Land Grant Universities

1914 Smith Lever Act: ensure the flow of information from researchers and the USDA to the people.

1966: Sea Grant College Program created

“County Agents in Hip Boots”

Some are cooperative Extension, some are not.
  * Bottom line...we’re on the ground in communities and working with stakeholders!
DROUGHT REPORTING AND SEA GRANT

~1,000 people

Wide range of topics...

• Aquatic invasive species
• Sustainable seafood/aquaculture
• Pollution prevention
• Ecosystem services
• Coastal restoration
• Land use planning
• Water resources
• Climate change
• Environmental literacy

Sea Grant Climate Network
Seeks to increase the effectiveness of Sea Grant climate programming and outreach nationwide.

Reach out to Sea Grant in your state and make a connection!
RECENT GREAT LAKES DROUGHT IMPACTS

Summer – Fall 2016: Eastern Great Lakes Basin

New York:
- Extreme drought for the 1st time on the US Drought Monitor (so since at least 2000)

Impacts
- Record low streamflow and groundwater
- Private wells going dry
- Ithaca, NY: estimated 30 days of water left
- Yields of corn, soybeans, hay were lower than average
- Dried up pastures

North American Drought Monitor
As of 8/31/2016
RECENT GREAT LAKES DROUGHT IMPACTS

Summer 2012 – Early 2013:
Western Great Lakes Basin

Widespread severe drought
Extreme drought near the basin

Very low streamflows across the southern Lake Michigan in IL/IN.
GATHERING AND DOCUMENTING

Great Lakes Quarterly Climate Report

Partners
- Environment & Climate Change Canada
- Great Lakes Environmental Research Laboratory
- U.S. Army Corps of Engineers
- NWS River Forecast Centers
- Midwest Climate Hub
- State Climatologists
- Sea Grant

Quarterly Climate Impacts and Outlook

Great Lakes Significant Events - for December 2016 - February 2017

_Drought_:
- Persistent dry conditions, drought developed in the eastern Great Lakes basin. Several counties in New York experienced extreme drought conditions for the first time since at least 2000, when the U.S. Drought Monitor data began.

_Agriculture_:
The yields of corn, soybeans, and hay are expected to be lower than average in some drought areas. Died up pastures forced farmers in New York to supplement with feed, which is usually saved for the winter. Despite the drought conditions in New York, grape growers indicated berries were ripening faster than usual and may be smaller in size, but higher quality. Areas to the west that were wetter are expecting above-average yields this summer.

_Seasonal growing degree day accumulations_ were above average for much of the basin. This may reduce the risk for fall freeze damage since crops may reach maturity before the first killing freeze.

_Water Resources_:
- As a result of drought conditions, streamflow and groundwater levels were at record or near-record low levels in parts of New York, with some private wells going dry. In late July, Ithaca, New York’s water supply was critically low, with an estimated 90 days of water left without significant rain or reduction in use.

_Transportation & Infrastructure_:
The mid-July flash flooding around western Lake Superior resulted in many road closures, including major interstates. In Lake Superior, numerous vessels were affected by downburst winds. Six vessels became adrift and some were overturned. Preliminary damage estimates for eight Wisconsin counties totaled over $28 million to public infrastructure.

_Hot and dry weather and aging infrastructure_ led to a dozen water main breaks in the Buffalo, New York area in July.

_Water Quality_:
The size of the western Lake Erie harmful algal bloom is smaller this year due to developing and persistent drought conditions in the region. However, NOAA scientists have found that toxic algae is still forming as bloom toxin concentrations are significantly higher than last year. The driver behind changes in toxicity are still under investigation and areas of algal scum could still present risk and should be avoided.
DROUGHT IMPACTS

Great Lakes Water Levels

Multi-year droughts can affect water levels, but a few months or a year of dry conditions will likely not.

1999-2013: unusually long period of low water levels

- High over-lake evaporation
  - Reduced cloudiness
  - Increased solar insolation
  - Less ice cover

High water on Lake Erie

Low water on Lake Michigan
DROUGHT IMPACTS

Record low water levels: do they correspond with drought?

Superior: 1925 or 1926
Michigan-Huron: 1964
Erie and Ontario: 1934-1936
DROUGHT IMPACTS

Water Quality

The 2012 North American drought and accompanying low tributary discharge was associated with a **record-breaking hypoxic event** in Lake Erie.

Fish Habitat

Hypoxia decreases the amount and quality of habitat available for fish
- Also influences metabolism, growth, reproduction, and behavior

Low flows in Lake Superior streams are a serious problem for trout.
DROUGHT IMPACTS

Water Supply

Some communities rely on other surface water and groundwater, which can become threatened during drought.
DROUGHT IMPACTS

Agriculture

Many of the same crops and therefore impacts you’d find in the Midwest

Specialty crops much more widespread though
FEEDBACK FROM GREAT LAKES USERS

More difficult to assess drought in the Great Lakes using the U.S. Drought Monitor with the basin broken up into two regions.
THANK YOU!
mollyw@illinois.edu