

# Spring Flooding Risks

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**Michigan Department of Environment, Great Lakes & Energy**  
**February 10, 2020**

***National Weather Service...Helping to Build a Weather-Ready Nation***



# Great Lakes Water Levels and Shore Erosion

## What Are the Lanes?



### National Weather Service

Weather Forecasts

Winds, Waves, Rain

Potential/Expected Impacts of Winds, Waves, Rain



### US Army Corps of Engineers

Great Lakes Water Levels

Measuring, Reporting, Forecasting

Record Keeping - Declaring Record Levels

<https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/>



### Michigan Department of Environment, Great Lakes & Energy

Shoreline Protection

<http://michigan.gov/ShoreLands>

# Storms

- Weather systems typically get stronger and more frequent during the fall and winter months
- The first two impactful storms of the season occurred on October 16 and Oct 22
- The October storms were NOT unusually strong
- The strongest storm of the year so far occurred on Nov 27
  - Stronger than “normal”, but definitely not unprecedented



# Storm Frequency

40-60 MPH / 10 ft waves	60+ MPH / 15+ ft waves
Usually 12-20 times during the fall/winter	Typically 0-2 per year
So far this year: 16+  Sep 3, Sep 27, Oct 16, Oct 22, Oct 31, Nov 21, Dec 1, Dec 7, Dec 12, Dec 17, Dec 30, Jan 5, Jan 7, Jan 15, Jan 18, Jan 21	So far this year: 1  Nov 27



**Storms this winter have been very typical for Michigan**

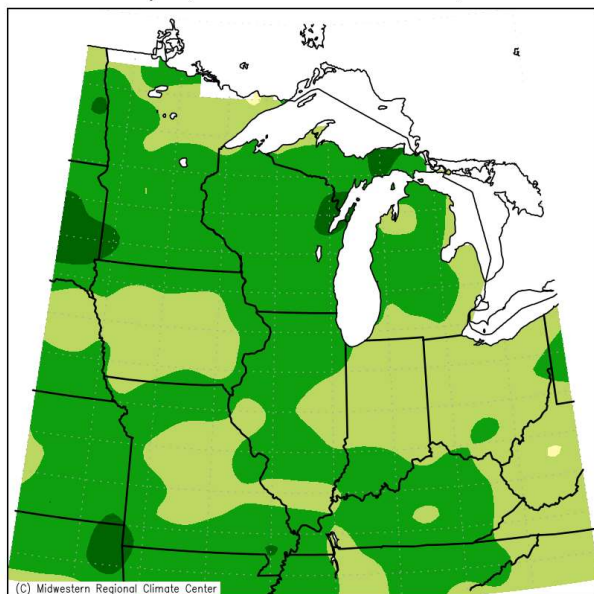
# Why is there so much water?

- Overall, the last 10 years have been MUCH wetter than normal across the Great Lakes states.
- As a whole, the state of Michigan is in the middle of the wettest 1 year period, 3 year period, and 5 year period since records began over 120 years ago.

# It Has Been Awfully Wet Recently...



Accumulated Precipitation: Percent of Mean  
January 1, 2019 to December 31, 2019

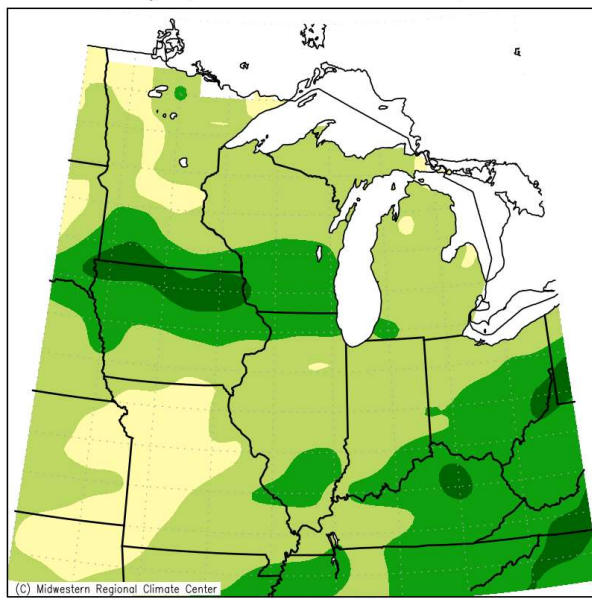


50 75 100 125 150 175 200

Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 1/7/2020 6:28:56 AM CST

## 2019

Accumulated Precipitation: Percent of Mean  
January 1, 2018 to December 31, 2018

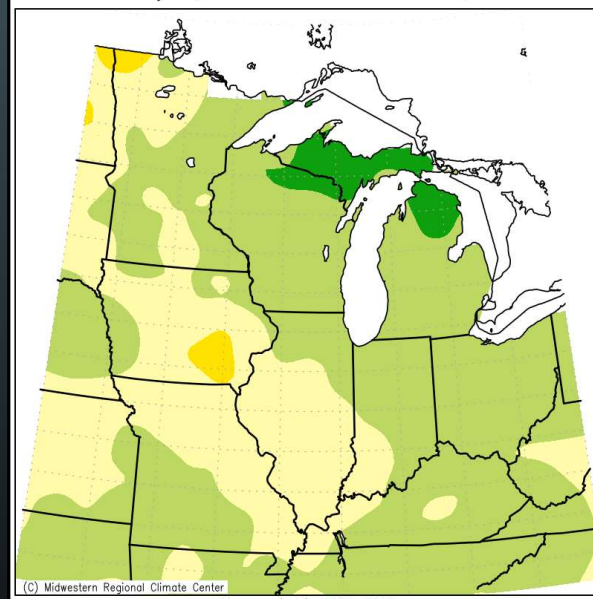


50 75 100 125 150 175 200

Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
Generated at: 12/16/2019 12:12:56 PM CST

## 2018

Accumulated Precipitation: Percent of Mean  
January 1, 2017 to December 31, 2017



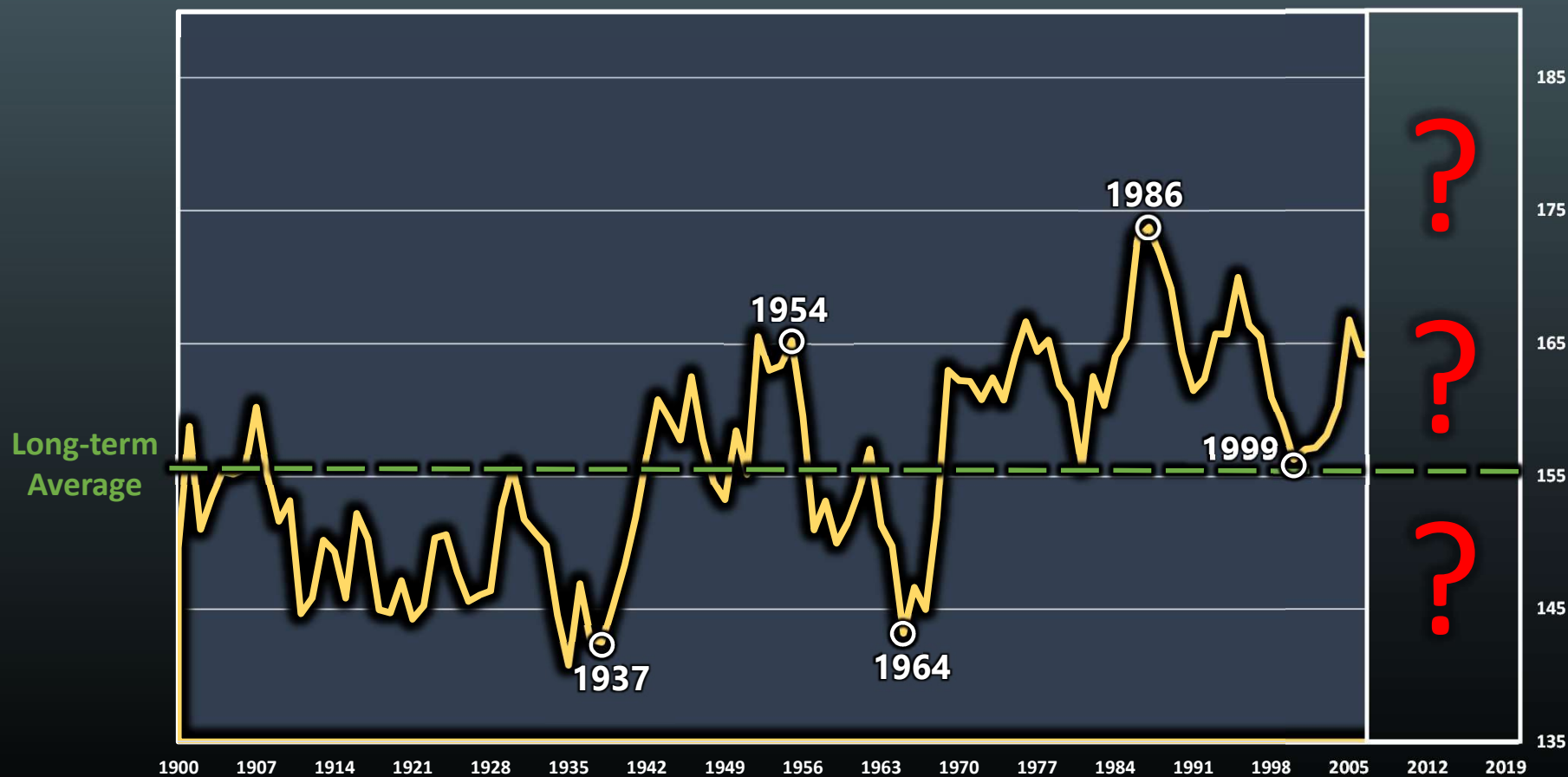
25 50 75 100 125 150 175 200

Midwestern Regional Climate Center  
cli-MATE: MRCC Application Tools Environment  
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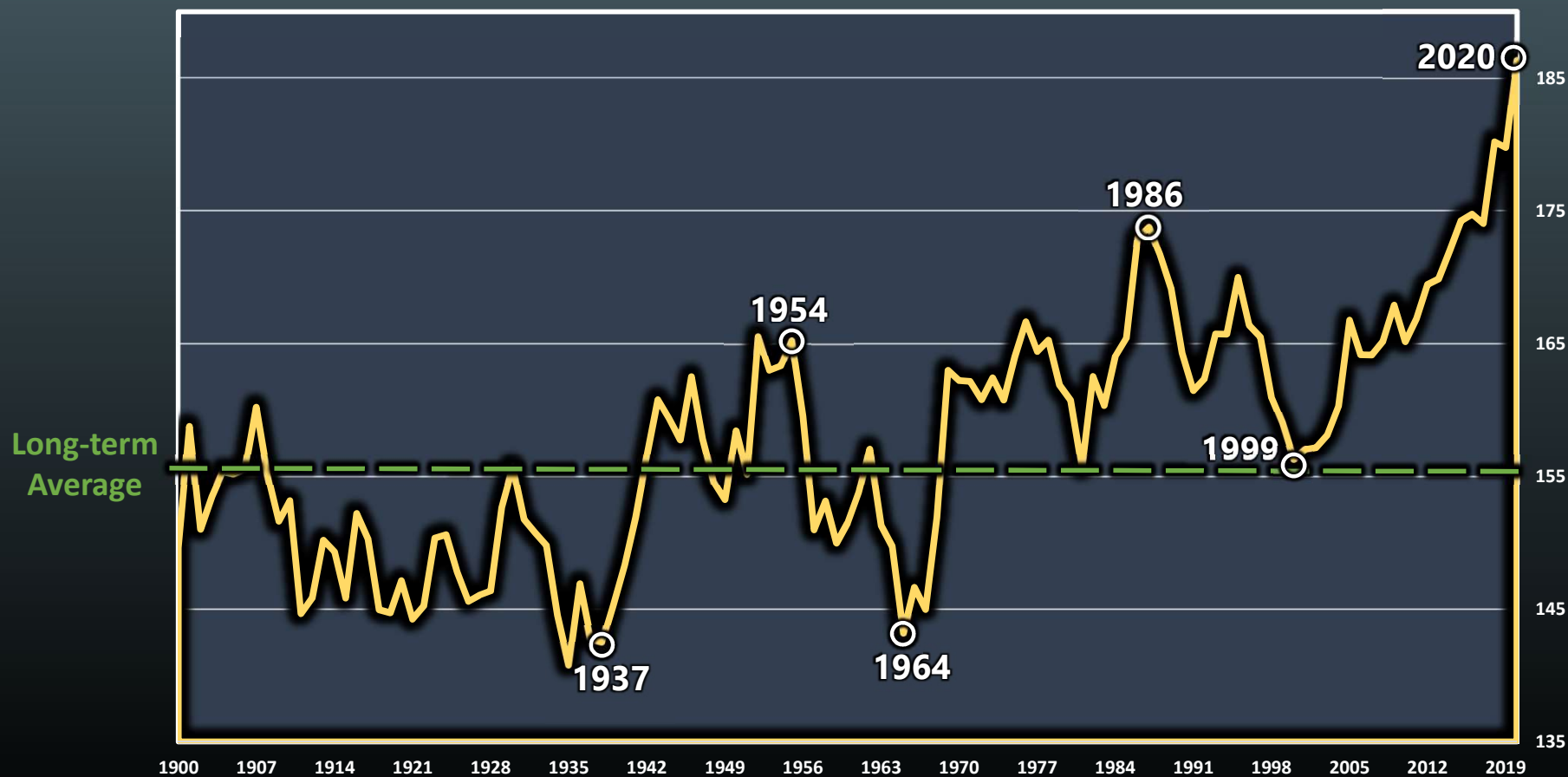
## 2017



# Michigan 5-Year Rolling Total Precipitation

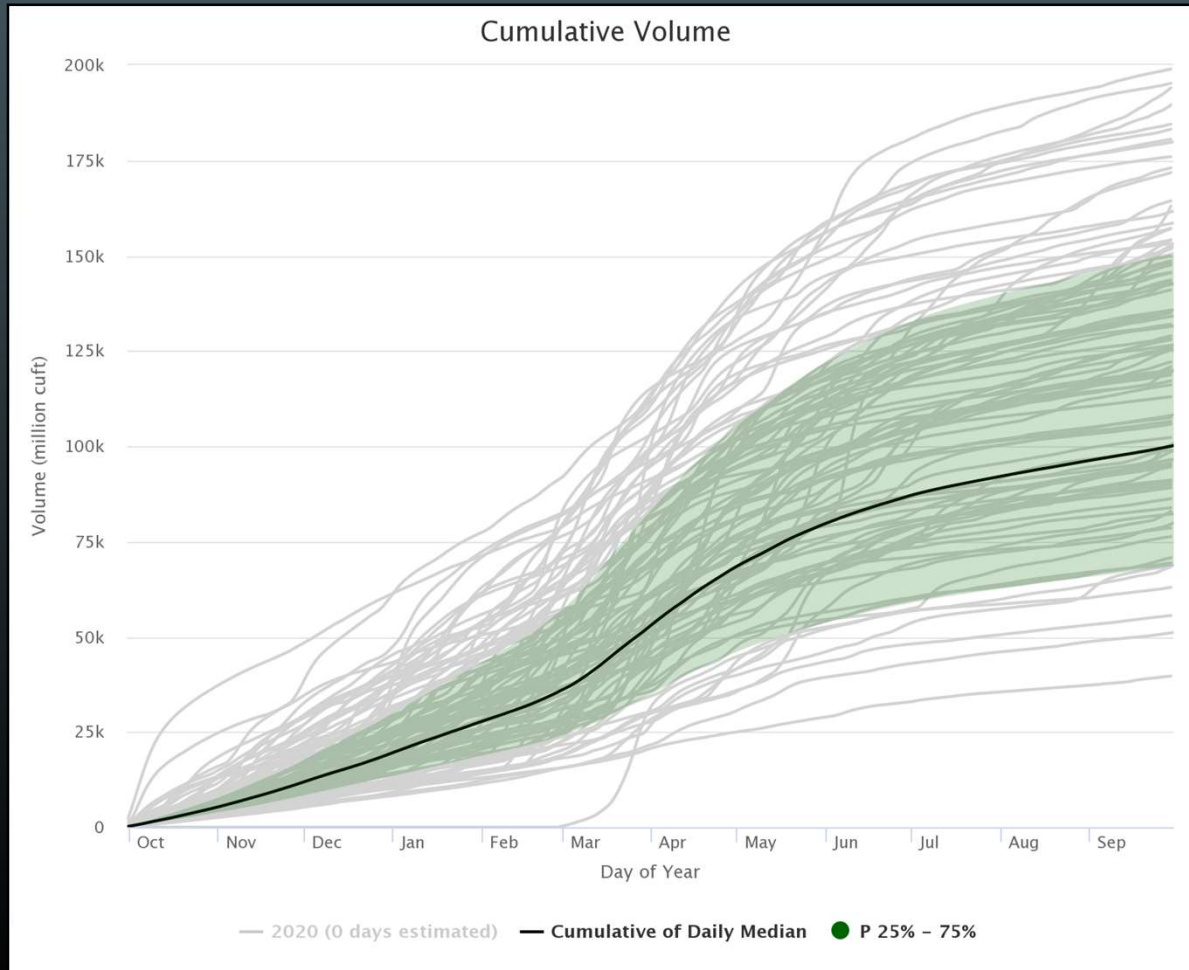


# Michigan 5-Year Rolling Total Precipitation





# Grand River at Grand Rapids – All Years on Record



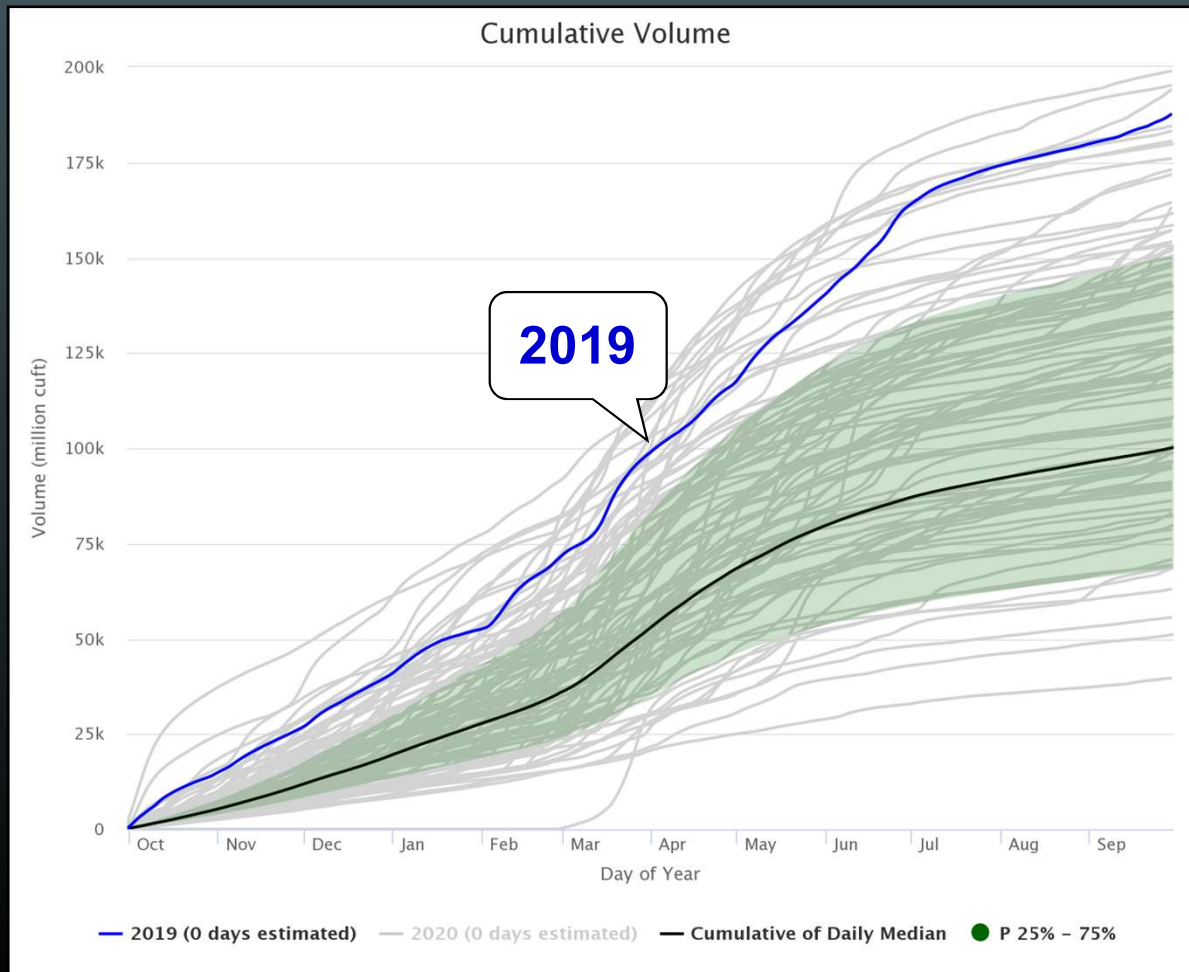
**Water Year: Oct 1 – Sept 30**

**Each Water Year is a Line Showing How Much Water Flowed Through the Site**

**Black Line**  
**50<sup>th</sup> Percentile**

**Green Shaded Area**  
**25<sup>th</sup> to 75<sup>th</sup> Percentile**

# Grand River at Grand Rapids – All Years on Record



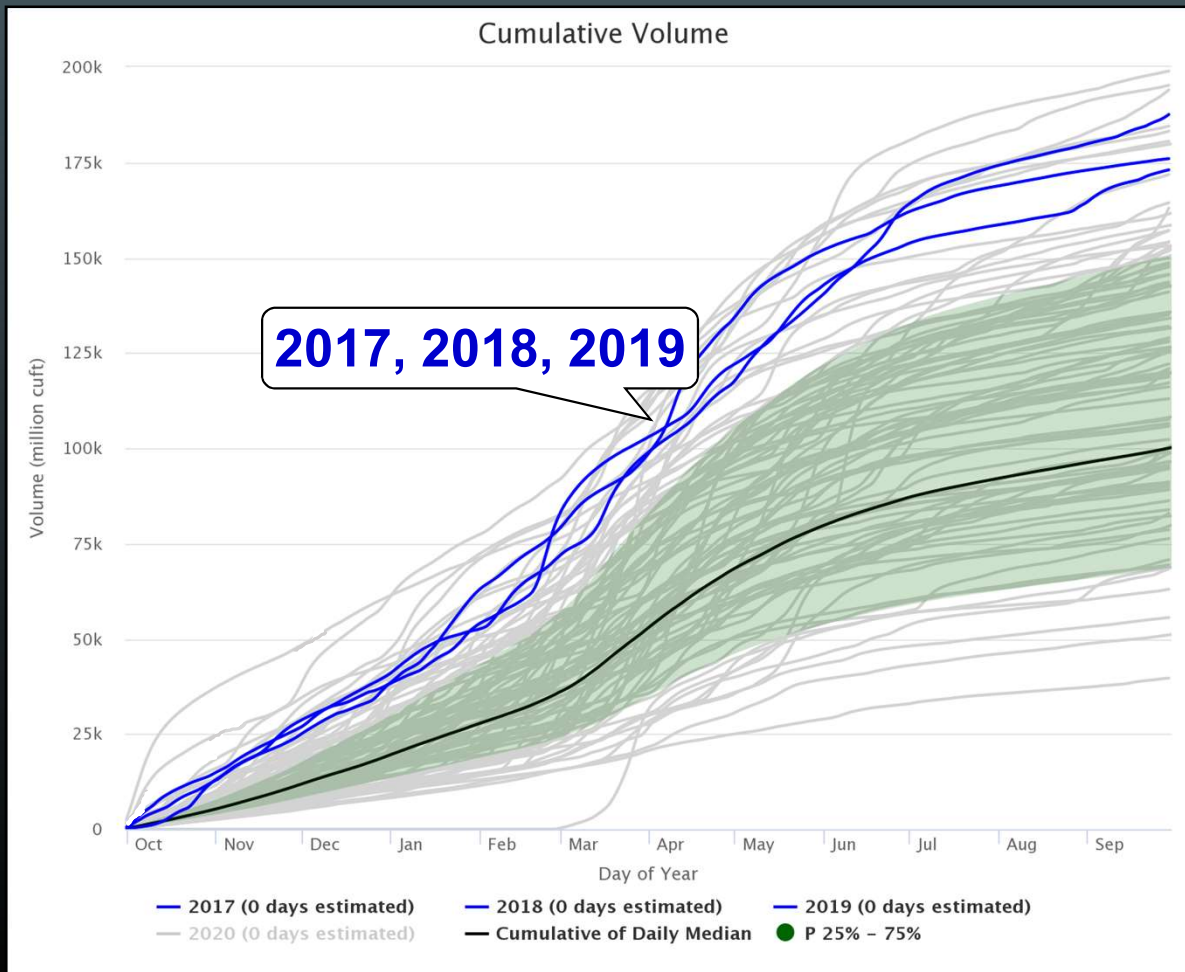
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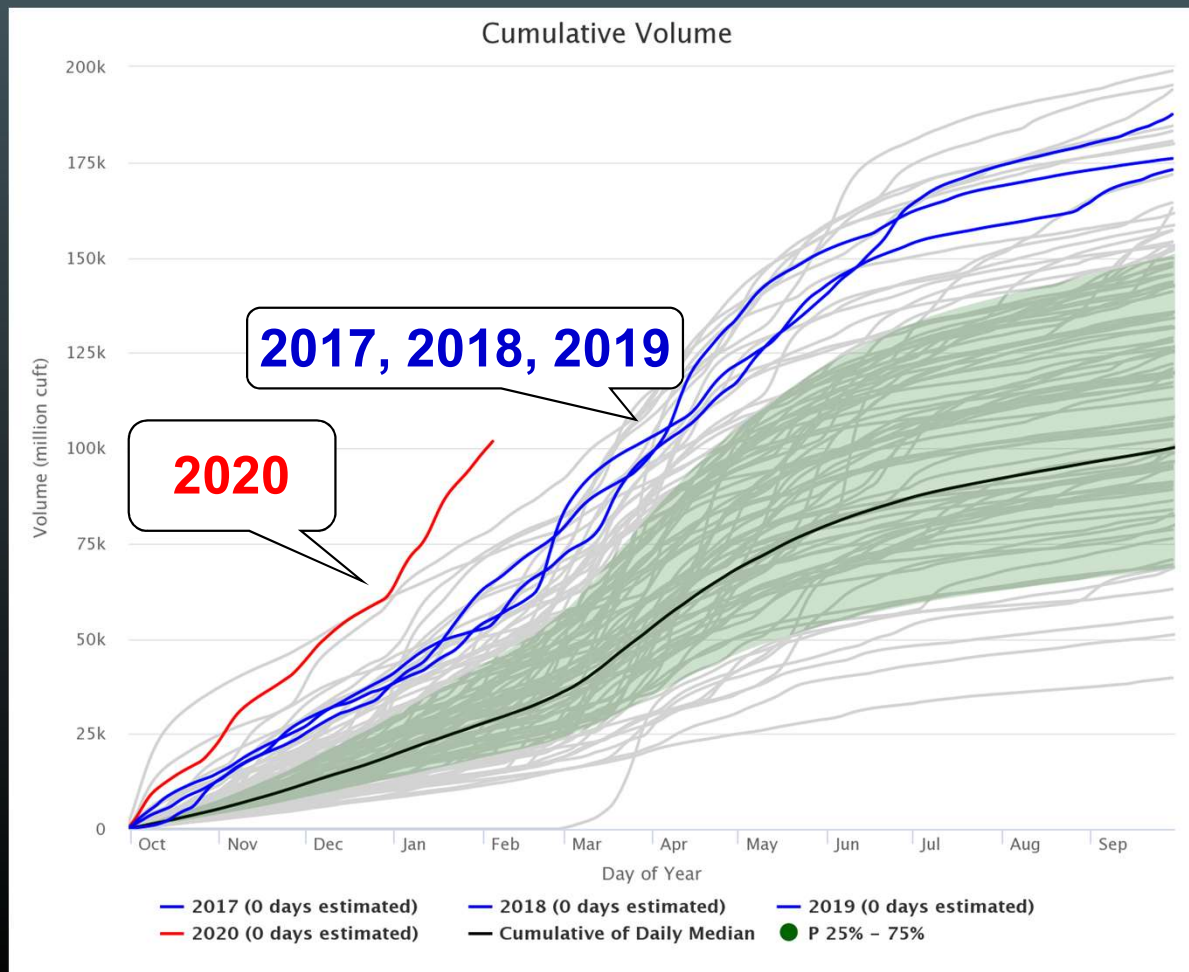
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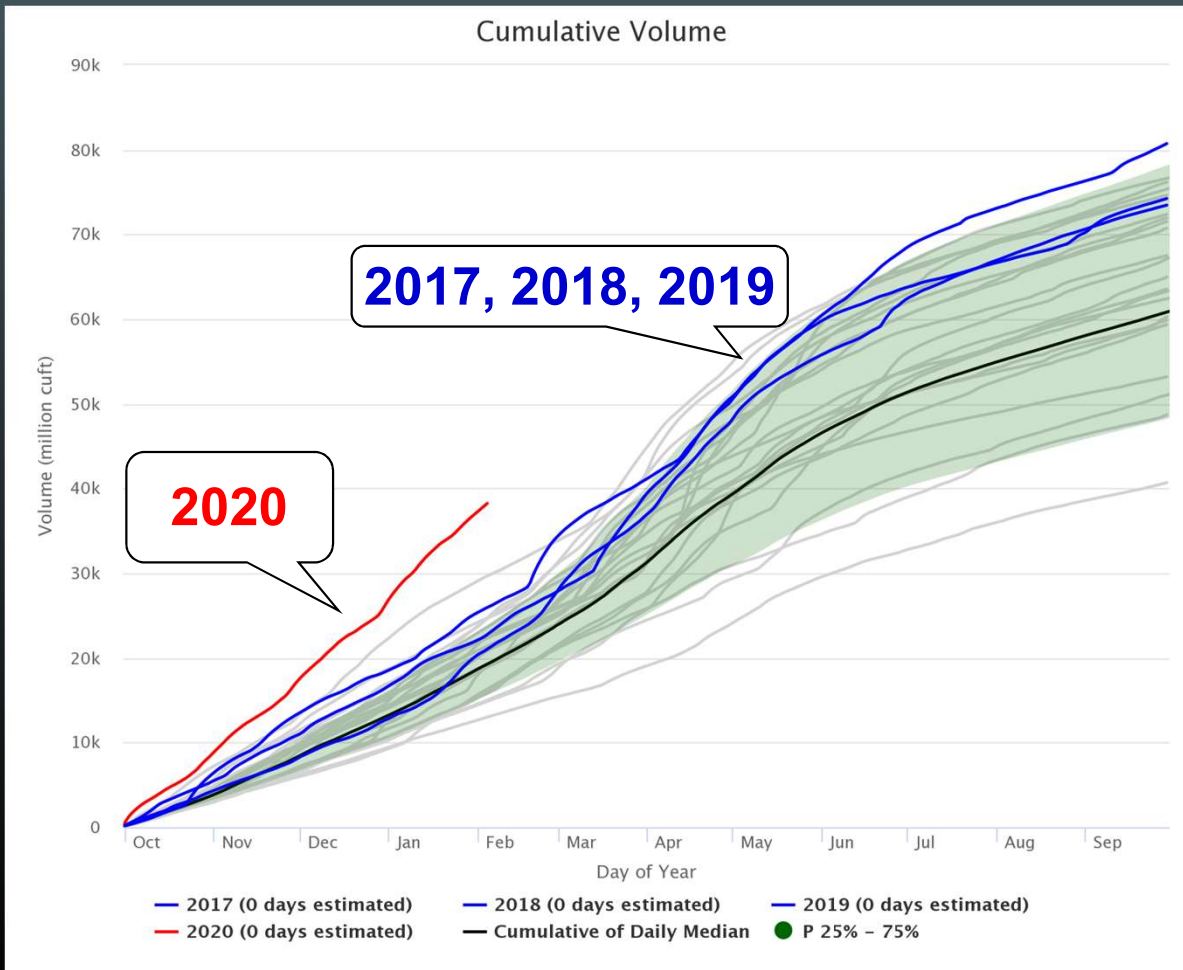
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# Muskegon River at Croton Dam – All Years



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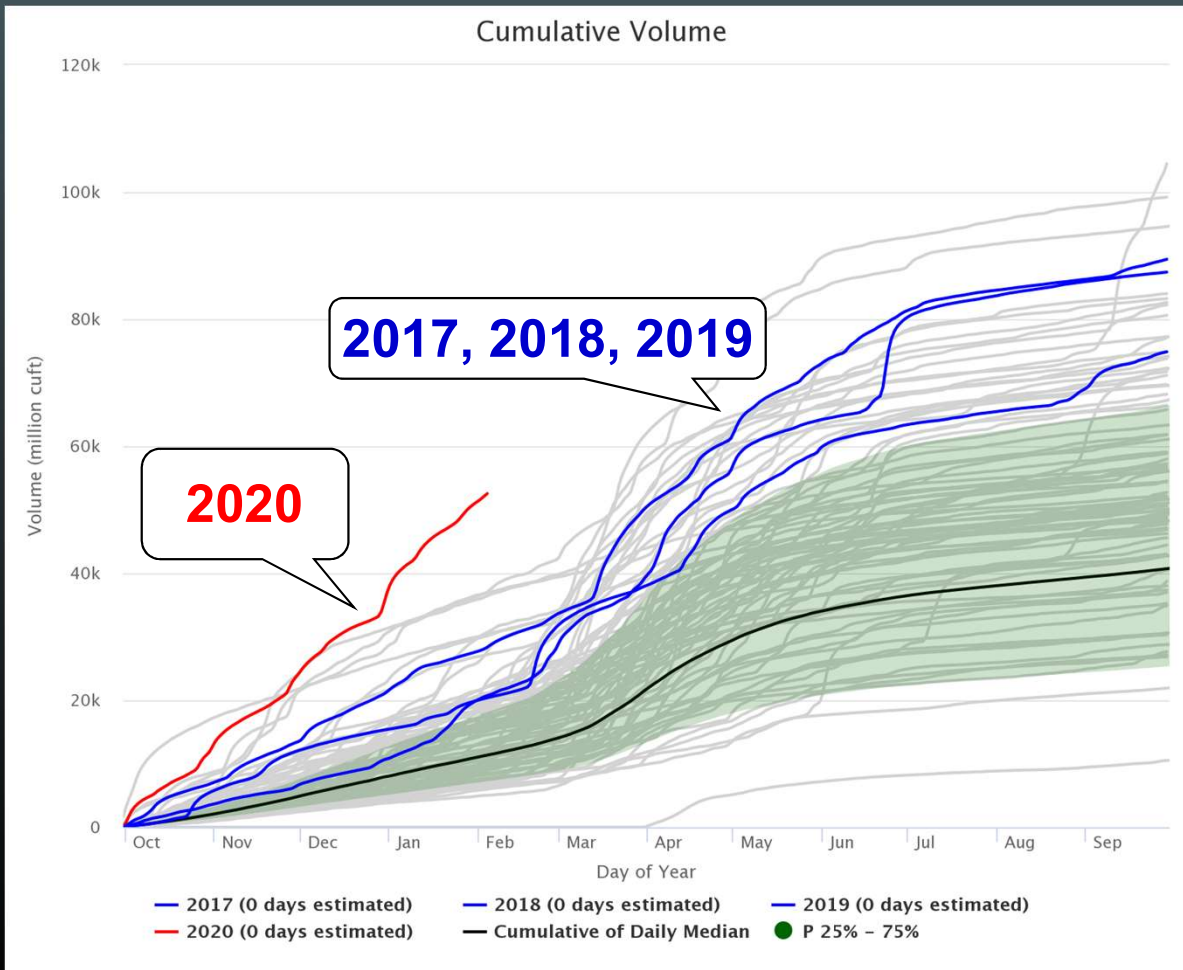
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**25<sup>th</sup> to 75<sup>th</sup> Percentile**



# Tittabawasse River at Midland – All Years



**Water Year: Oct 1 – Sept 30**

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**Black Line**  
**50<sup>th</sup> Percentile**

**Green Shaded Area**  
**25<sup>th</sup> to 75<sup>th</sup> Percentile**

# **Spring River Flooding: Risk Factors**



**Not possible This Year to say what parts of Michigan are most likely to flood**  
**The Unusual Situation We Are In Means Everyone is Vulnerable**

**Fall & Winter Weather**

**Winter Snowpack**

**Spring Weather**

**Great Lakes Levels**



# Spring River Flooding: Risk Factors

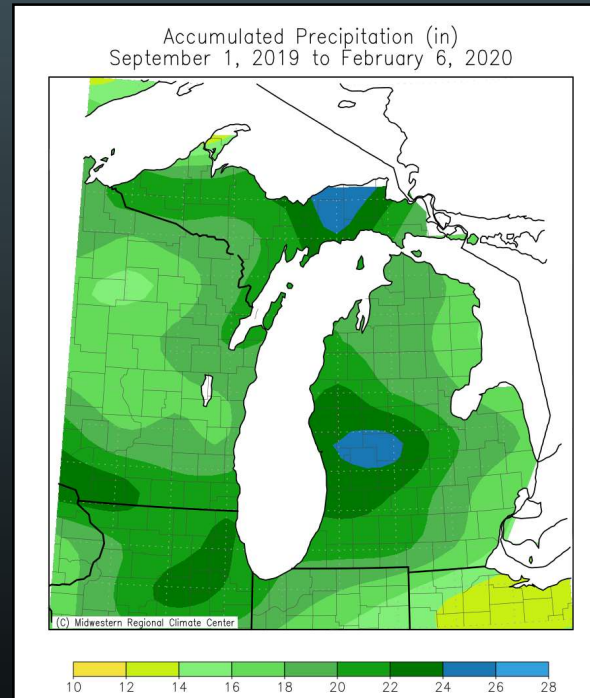


**Fall & Winter Weather**

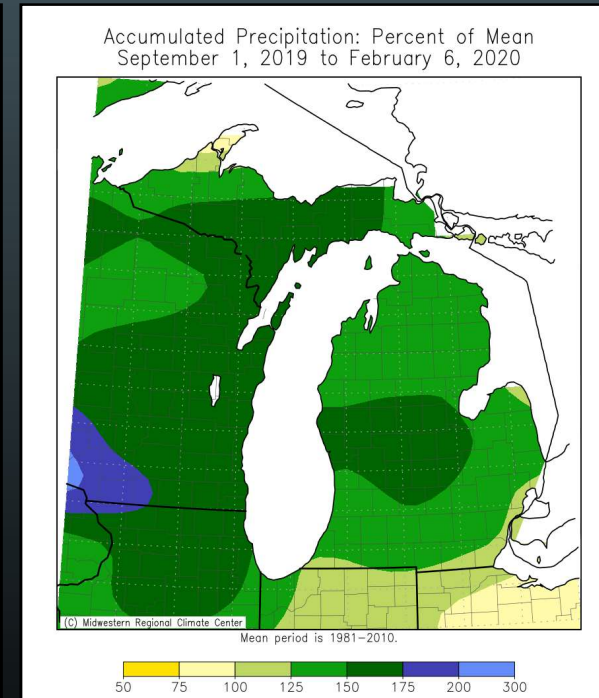
**Wettest Sep thru Dec  
On Record for Michigan**

**Soil Holding Much More Water  
Than Typical at this point**

**Ground Absorption Will Be  
Lower or None This Spring**



**Generally 15 to 25 Inches  
Of Rain Since September 1**



**Nearly Double of what is  
Typical Since September 1**

# Spring River Flooding: Risk Factors



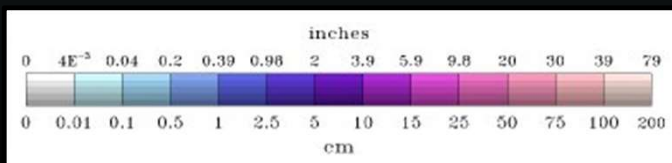
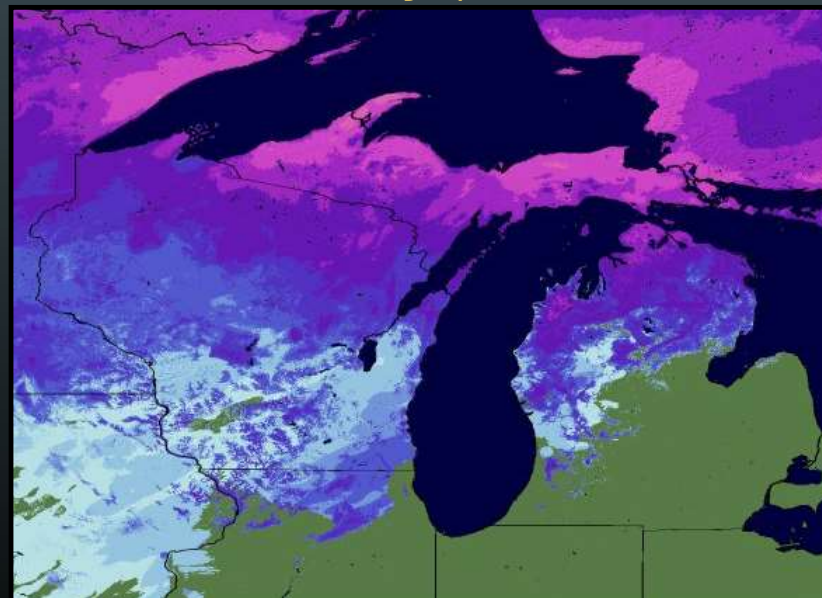
## Winter Snowpack

U.P. : **More Water in Snow Now**  
Lower P. : **Slightly less this year**

February 6, 2020



February 6, 2019



# Spring River Flooding: Risk Factors



## Spring Weather

### Still a Bit Too Early to Tell

**Recent Year Trends = Wetter Than Normal**

**No Signal Suggesting This Will Change  
But Too Early to Really Know**

# Spring River Flooding: Risk Factors



## Great Lakes Levels

**High Lake Levels Mean Higher Water Levels at River Mouth Lakes and Lower Portions of Some Rivers**

**Some Places on Michigan Rivers that Typically Do Not Have Spring Flooding May Be At Risk in Spring 2020**

**Ice-Jam Prone Areas Should Be More Vulnerable to Flooding Due to High Water Levels**

**US Army Corps Predicts  
Record or Near Record Levels for Spring & Summer 2020  
on all the Great Lakes**

# Spring River Flooding: Risk Factors



## Fall & Winter Weather

Wet Fall and Early Winter  
**Increased Risk**  
For Spring River Flooding

## Winter Snowpack

**Too Early to Tell** if Spring River Flood  
Risk is Higher Due to Snowpack

**Increased Risk** in the U.P.  
So Far

## Spring Weather Pattern

**Too Early to Tell** What Kind of Spring  
We Will Have And What Impact it  
Might Have on Spring River Flooding

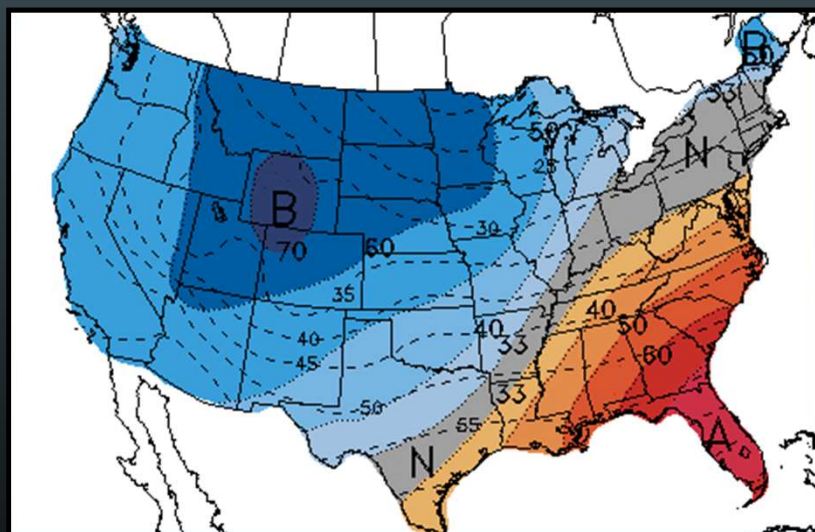
## Great Lakes Levels

Projected At or Near Record High Levels  
in Spring 2020  
**Increases Risk** for Spring River Flooding

# Week Two Outlook – February 14-20, 2020

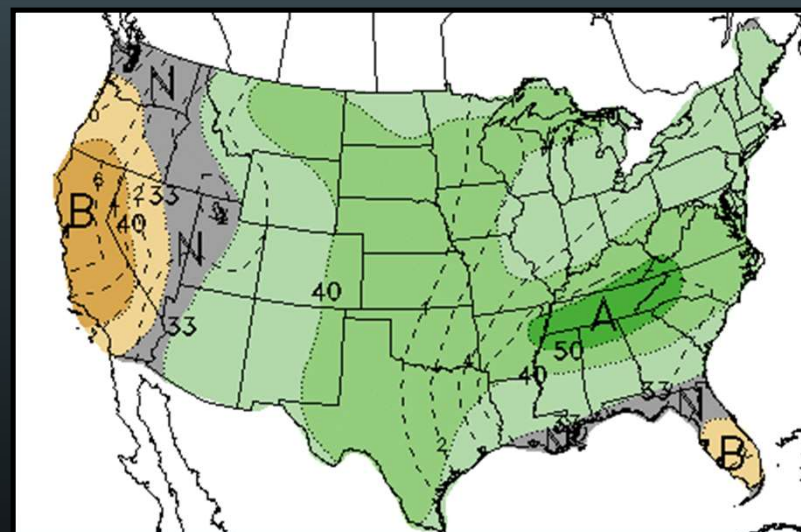


## Temperature



**Major cold air stays to our west**

## Precipitation



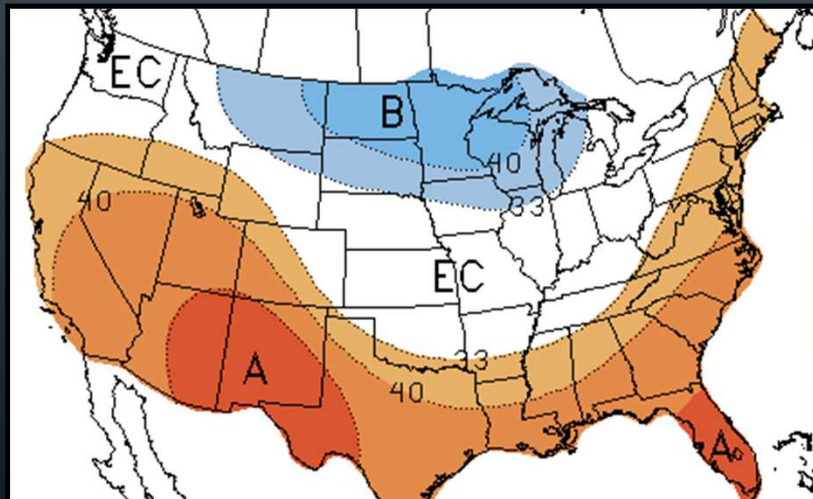
**Not Looking Drier ☹️**



# Three Month Outlook – February/March/April

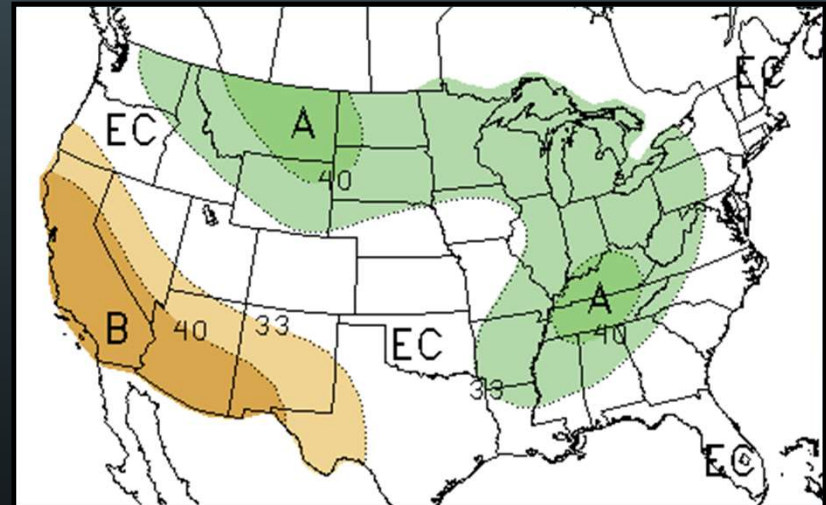


## Temperature



**Perhaps a cool and wet  
spring?**

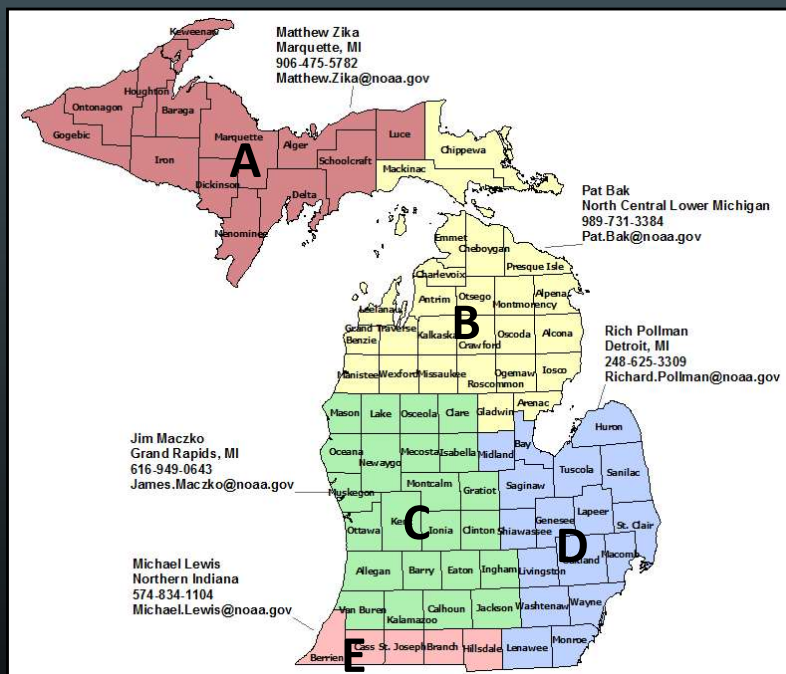
## Precipitation



**Active Weather Pattern  
Continuing ☹**



# National Weather Service - Michigan



**A: Marquette**  
**906-475-5212**

**B: Gaylord**  
**989-731-3384**

**C: Grand Rapids**  
**616-949-0643**

**D: Detroit**  
**248-620-9804**

**E: Northern Indiana**  
**574-834-1104**



**Winter Weather Safety Information**  
<https://go.usa.gov/xPuVB>