



# Low Water Response 2012 Drought

## Water Management on the Mississippi River System

2012 Drought Workshop

January 12, 2013

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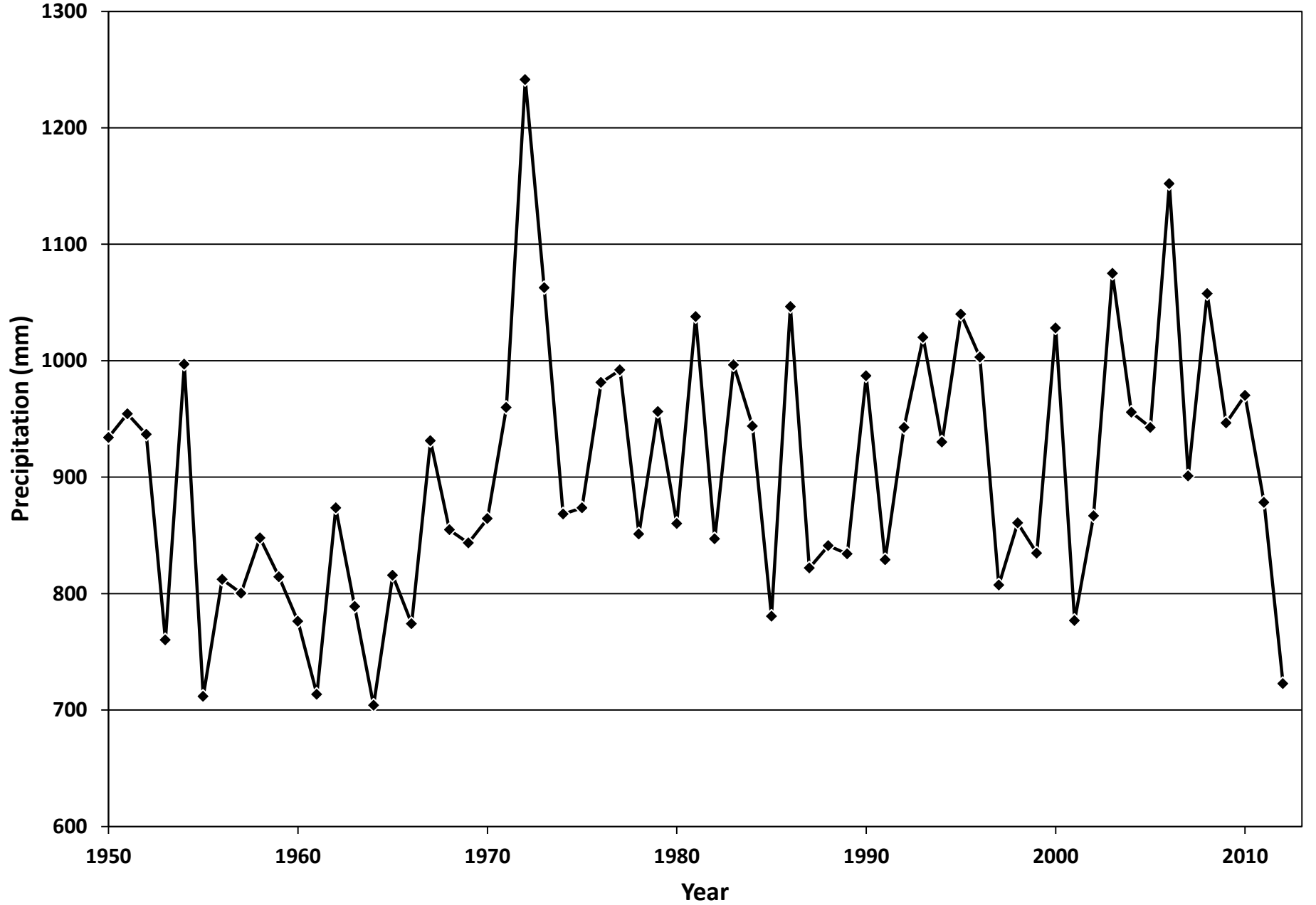


Mississippi Valley Conservation

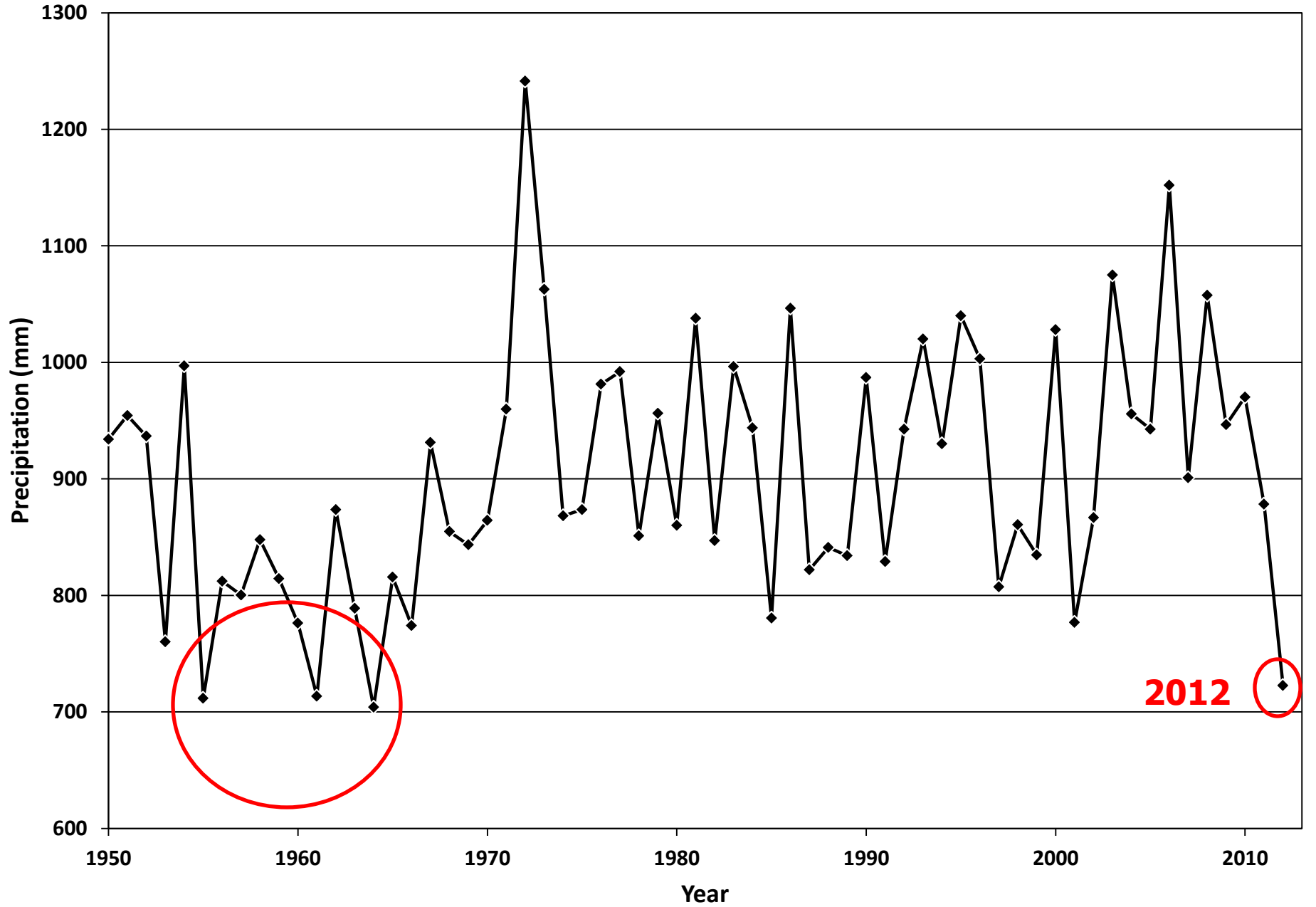
# Overview

- Weather conditions and contributing factors
- Provincial Low Water Response Program
- Water management response

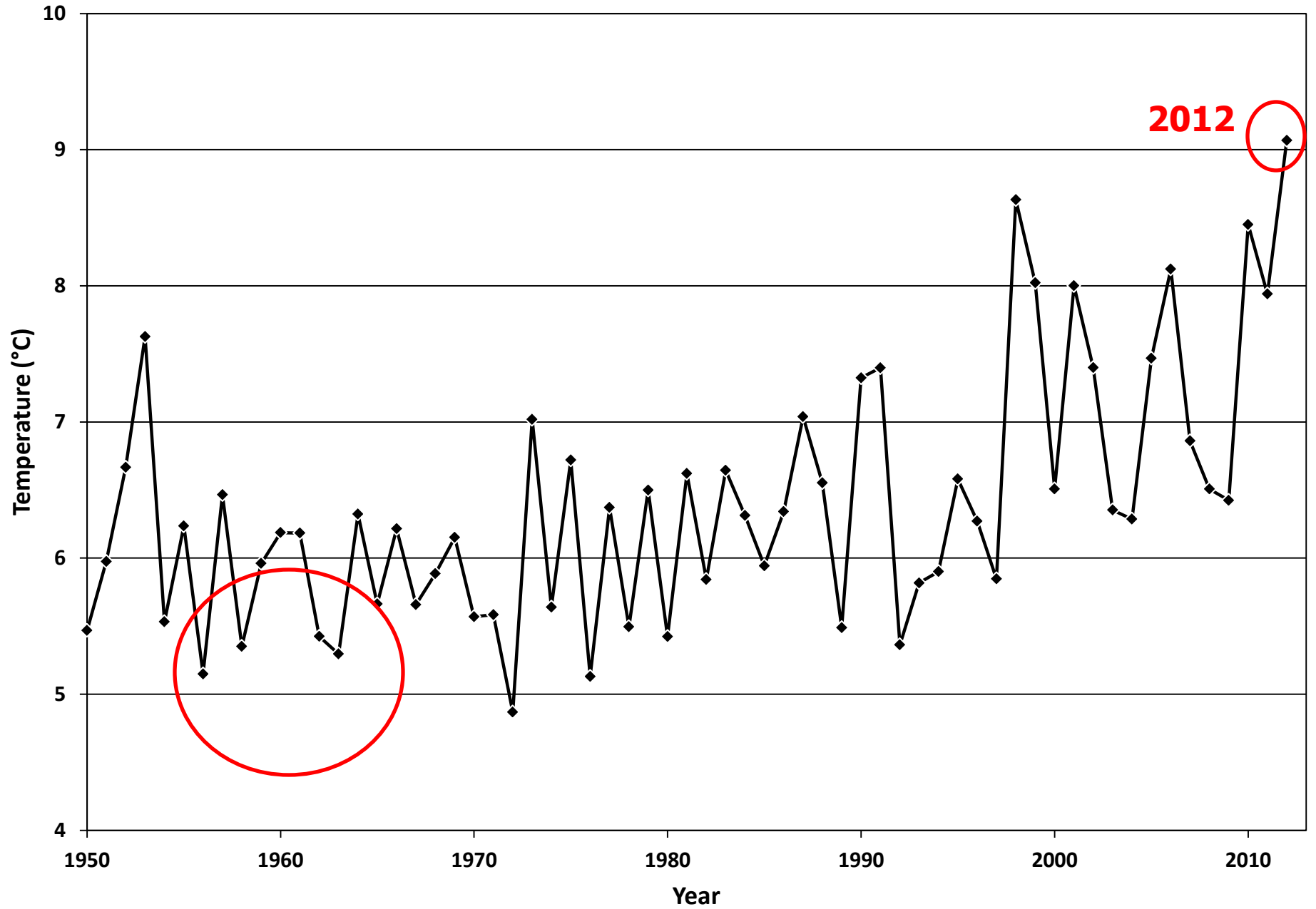
# Annual Precipitation Ottawa CDA



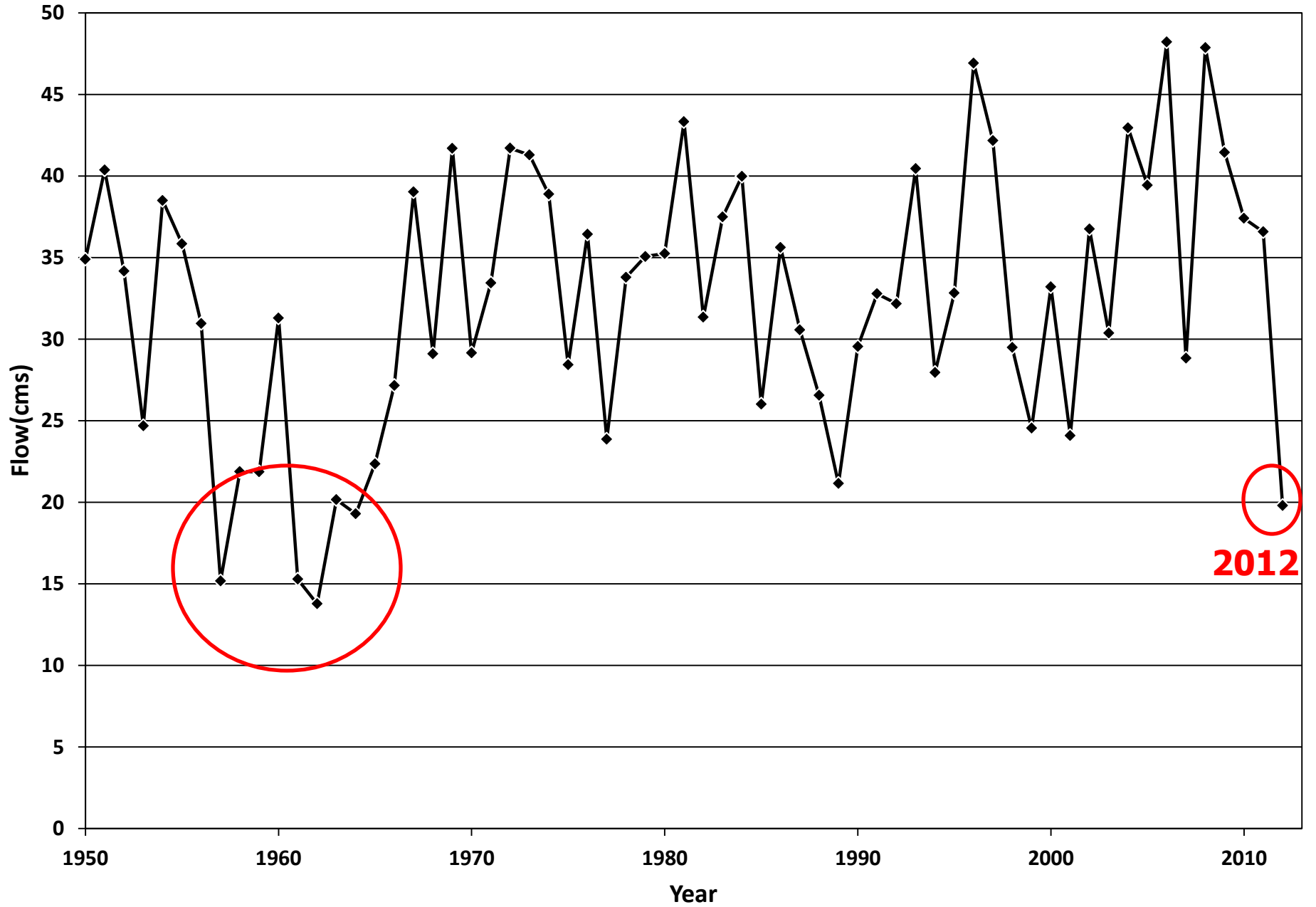
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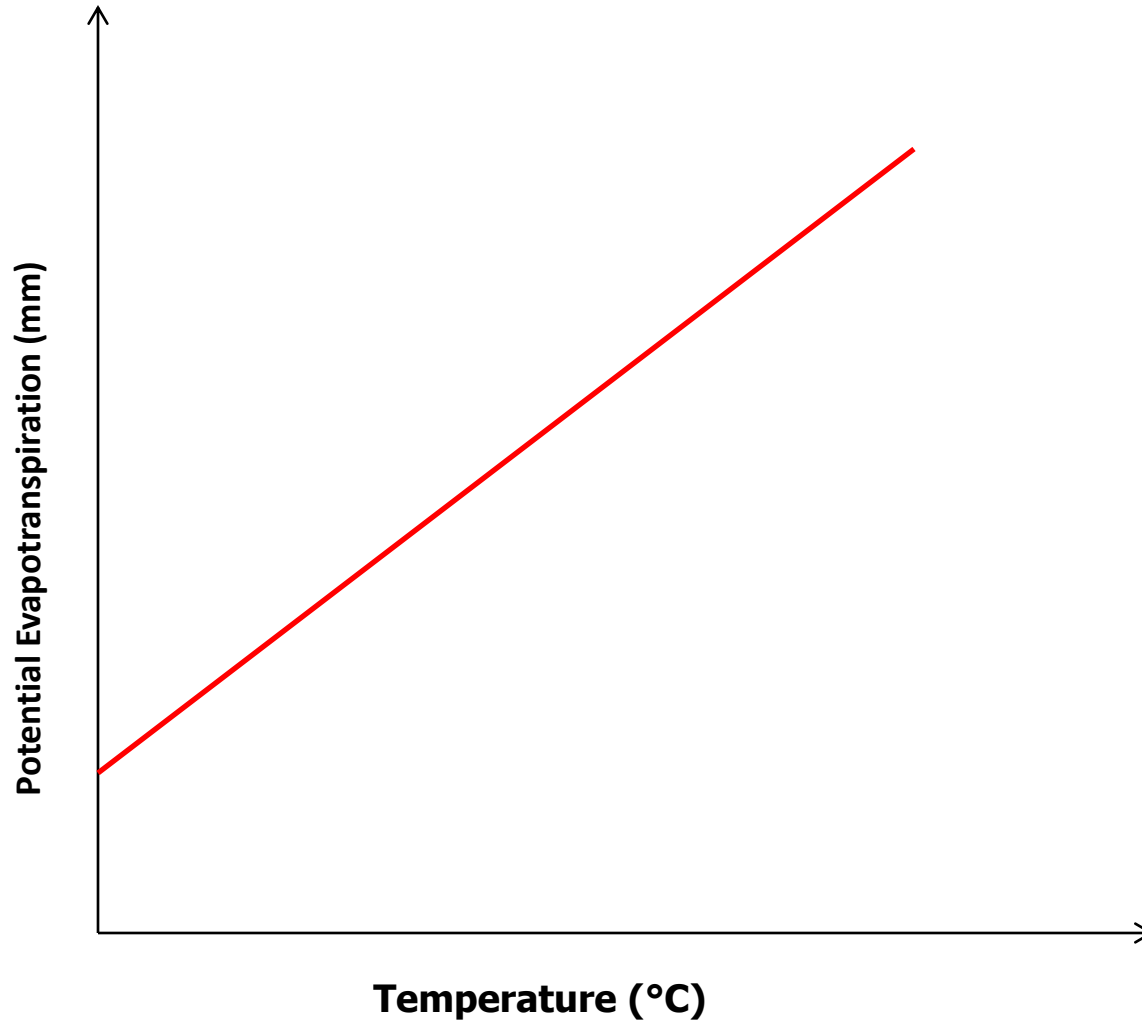
# Mean Annual Temperature Ottawa CDA



# Mean Annual Streamflow Mississippi River @ Appleton (02KF006)

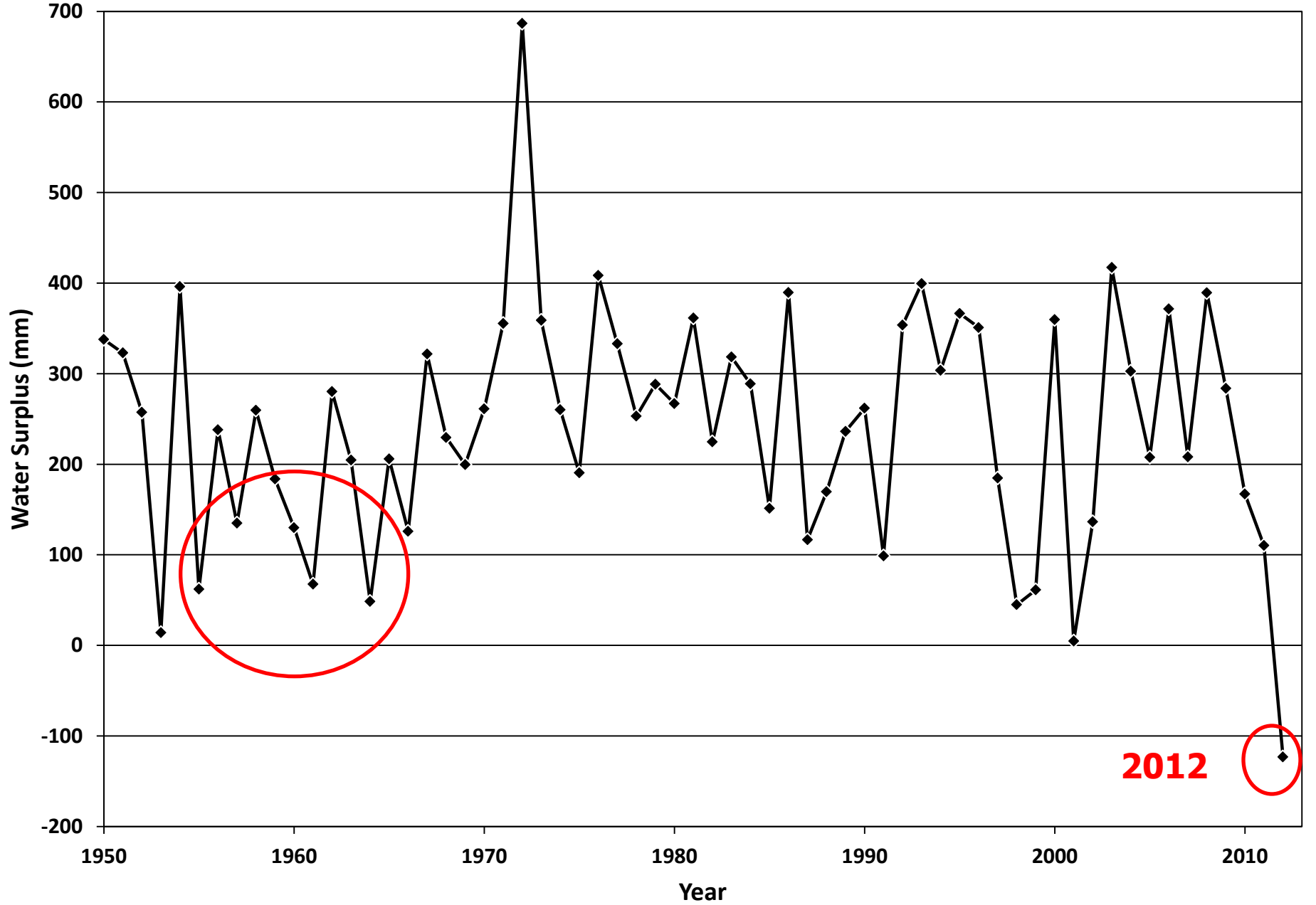


# Potential Evapotranspiration vs Temperature



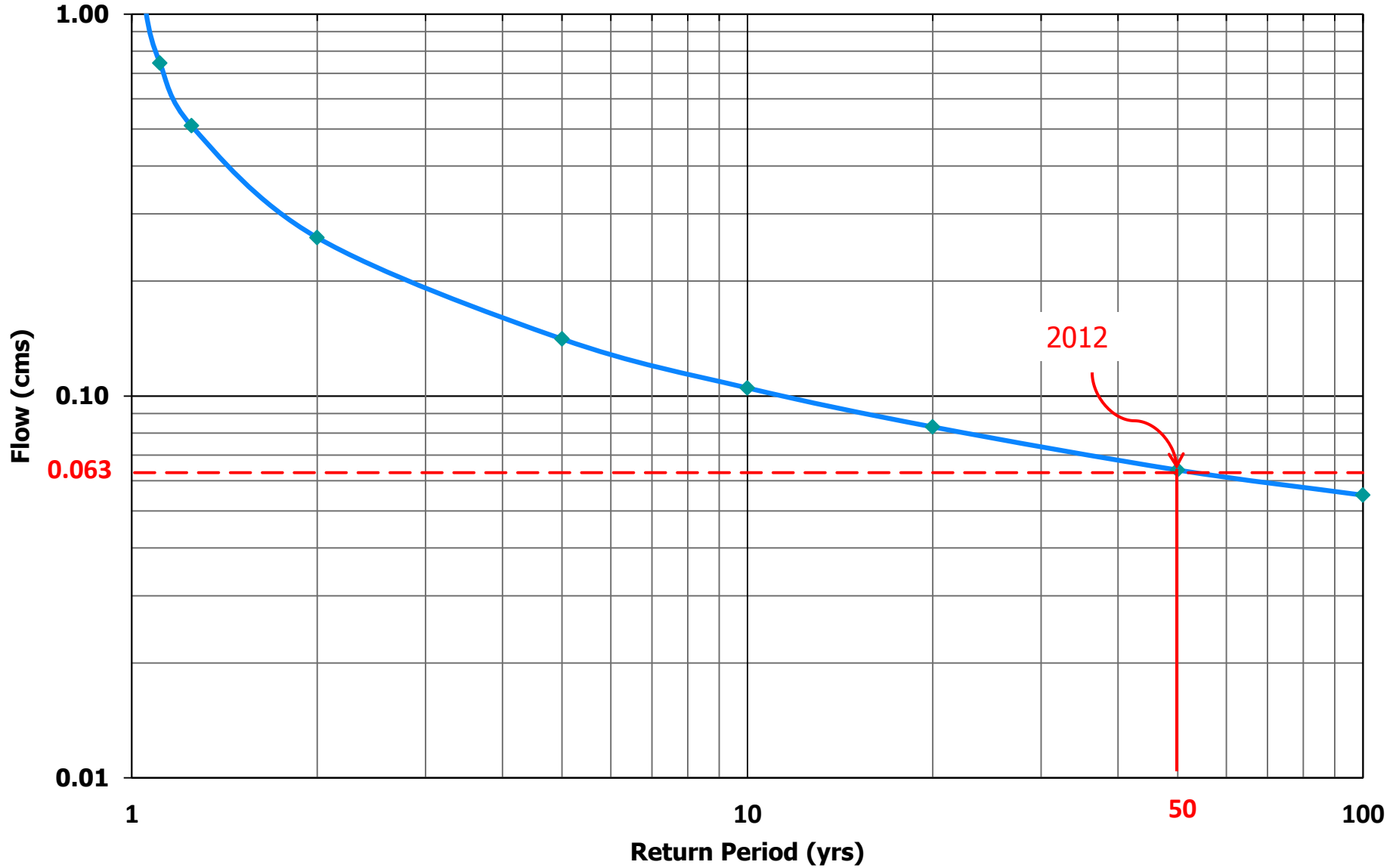
$$\text{Water Surplus} = \text{Precipitation} - \text{Potential Evapotranspiration}$$

# Mean Annual Water Surplus Ottawa CDA





# Low Flow Frequency Clyde River - 90 Day Duration



# **Ontario Low Water Response Program**

# ONTARIO LOW WATER PROGRAM

- Released May 2001
- Ensure provincial preparedness
- Assist in coordination and to support local response in the event of a drought.
- Provide a definition and means of quantifying drought and low water conditions.( 3 Levels)

# Summary of Levels and Thresholds

Condition	Indicator	Goal
<b>Level I – potential water supply problems</b>	<b>Precipitation:</b> <80% long or midterm average <b>Streamflow:</b> <70% lowest average summer month	<b>Voluntary conservation</b> <b>- 10% reduction in water use</b>
<b>Level II – Minor problems, potential major supply problems</b>	<b>Precipitation:</b> <60% long or midterm average <b>Streamflow:</b> <50% lowest average summer month	<b>Voluntary conservation and restrictions</b> <b>- Additional 10% reduction</b>
<b>Level III – Supply fails to meet usual demand, social and economic impact</b>	<b>Precipitation:</b> <40% long or midterm average <b>Streamflow:</b> <30% lowest average summer month	<b>Mandatory restrictions will be dealt with at the Provincial Level.</b>

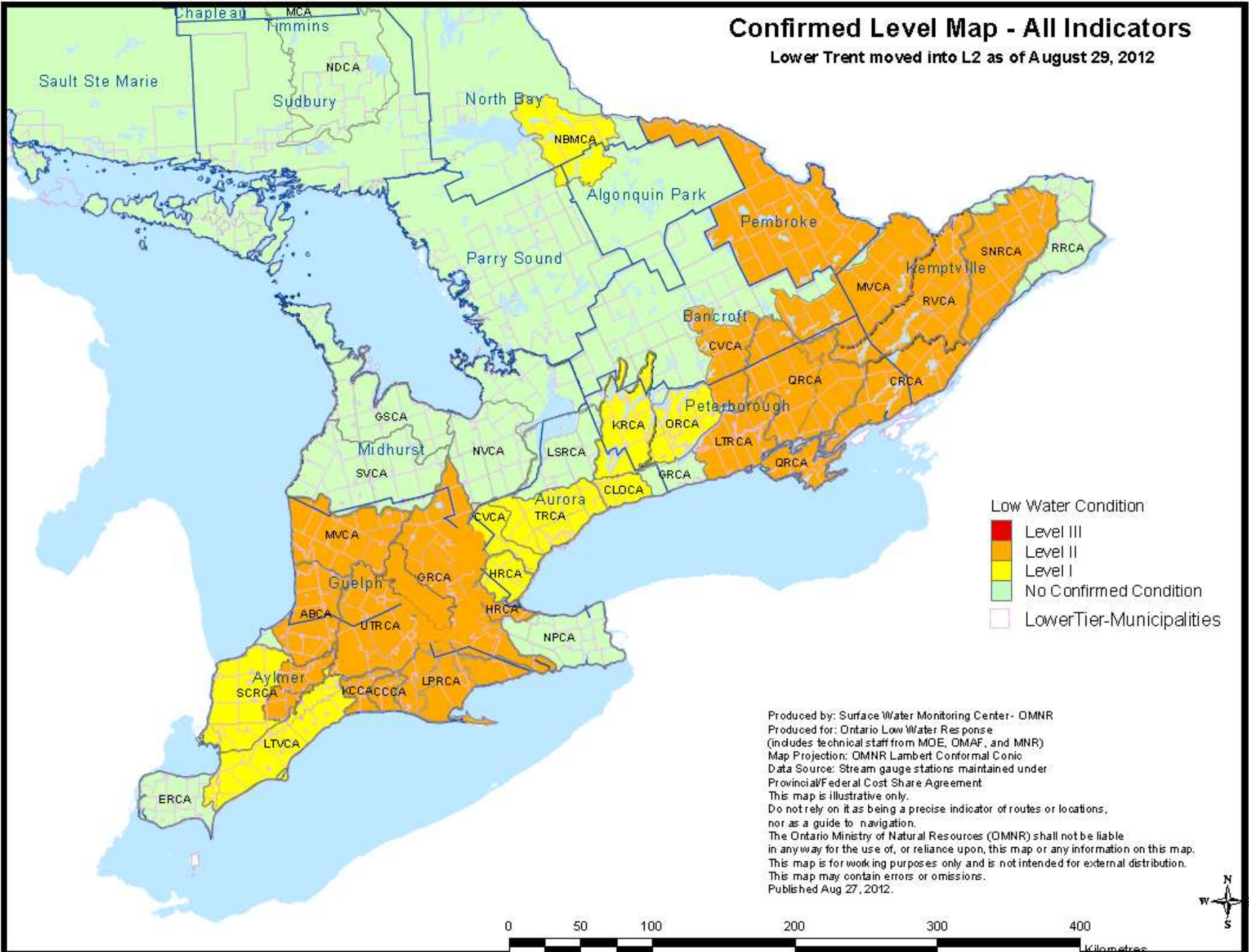
- Note:
  - A watershed can only enter a Level II from an existing confirmed Level I or Level III.
  - A watershed can only enter a Level III from an existing confirmed Level II.

# Ontario Low Water Response Plan

- Response framework:
  - Conservation Authority will confirm and declare a Level I low water condition and establish local Water Response Team (WRT)
  - Local WRT will provide a coordinated response and share information and resources to deal with Levels I & II.
  - Once a Level II has been declared, the Ontario Water Directors' Committee will establish a Low Water Committee directed by MNR.
  - A Level III designation is made by the Low Water Committee and requires the recommendation from the WRT as well as documentation of social, environmental and economic impacts.

# Confirmed Level Map - All Indicators

Lower Trent moved into L2 as of August 29, 2012

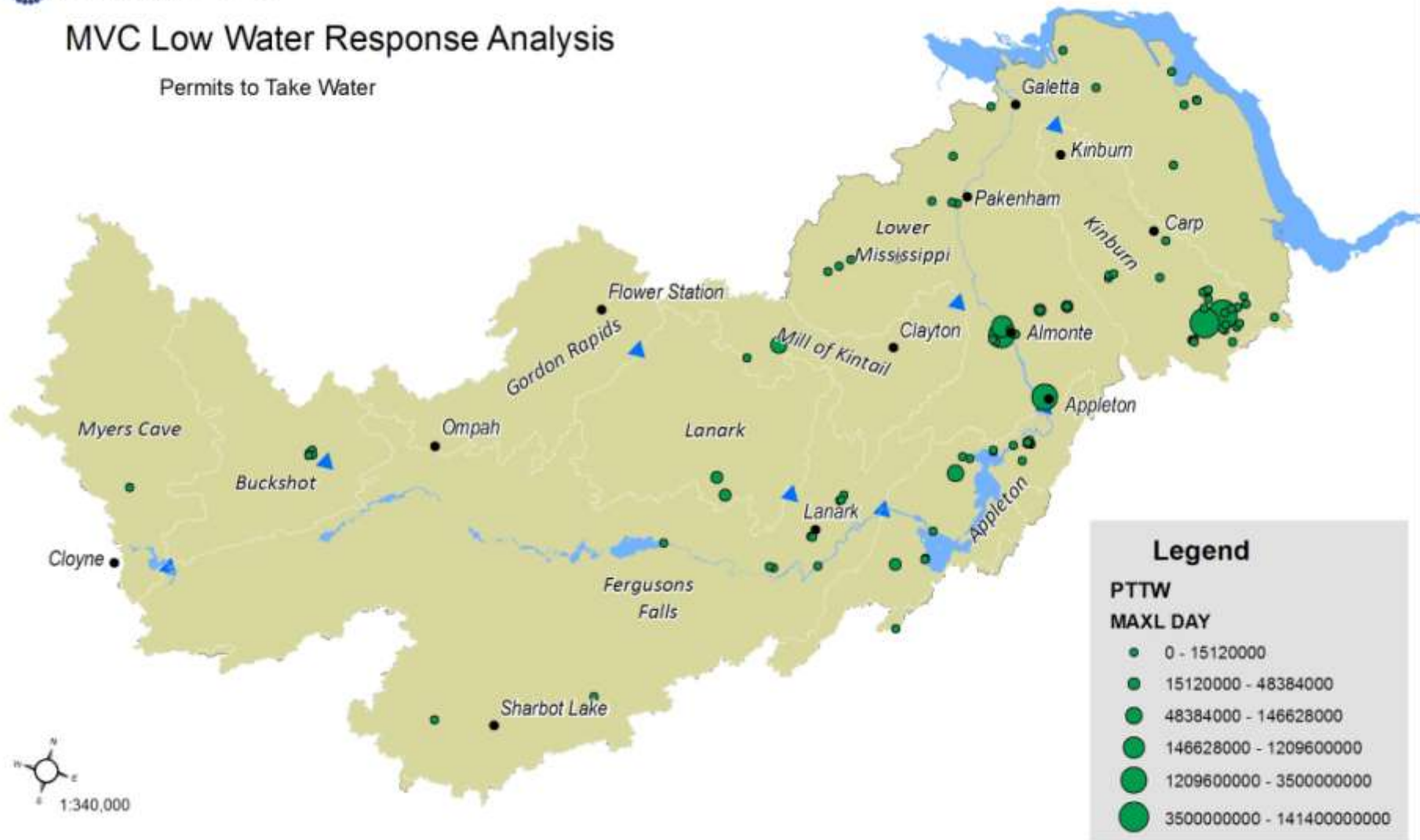




Mississippi Valley Conservation

# MVC Low Water Response Analysis

Permits to Take Water



# 2012 – What We Observed

Fall River, Sharbot Lake outlet, August 2012





# Background

- August 2011 was the start of the drought of 2012
- By September, flows in most tributaries were at or near record low water conditions for that time of year.
- Fewer logs than normal were removed from some of the upper lakes during drawdown.
- MVC issued 5 Conditions statements through the fall of 2011 indicating low water conditions existed throughout the watershed.

# 2012 – What We Observed

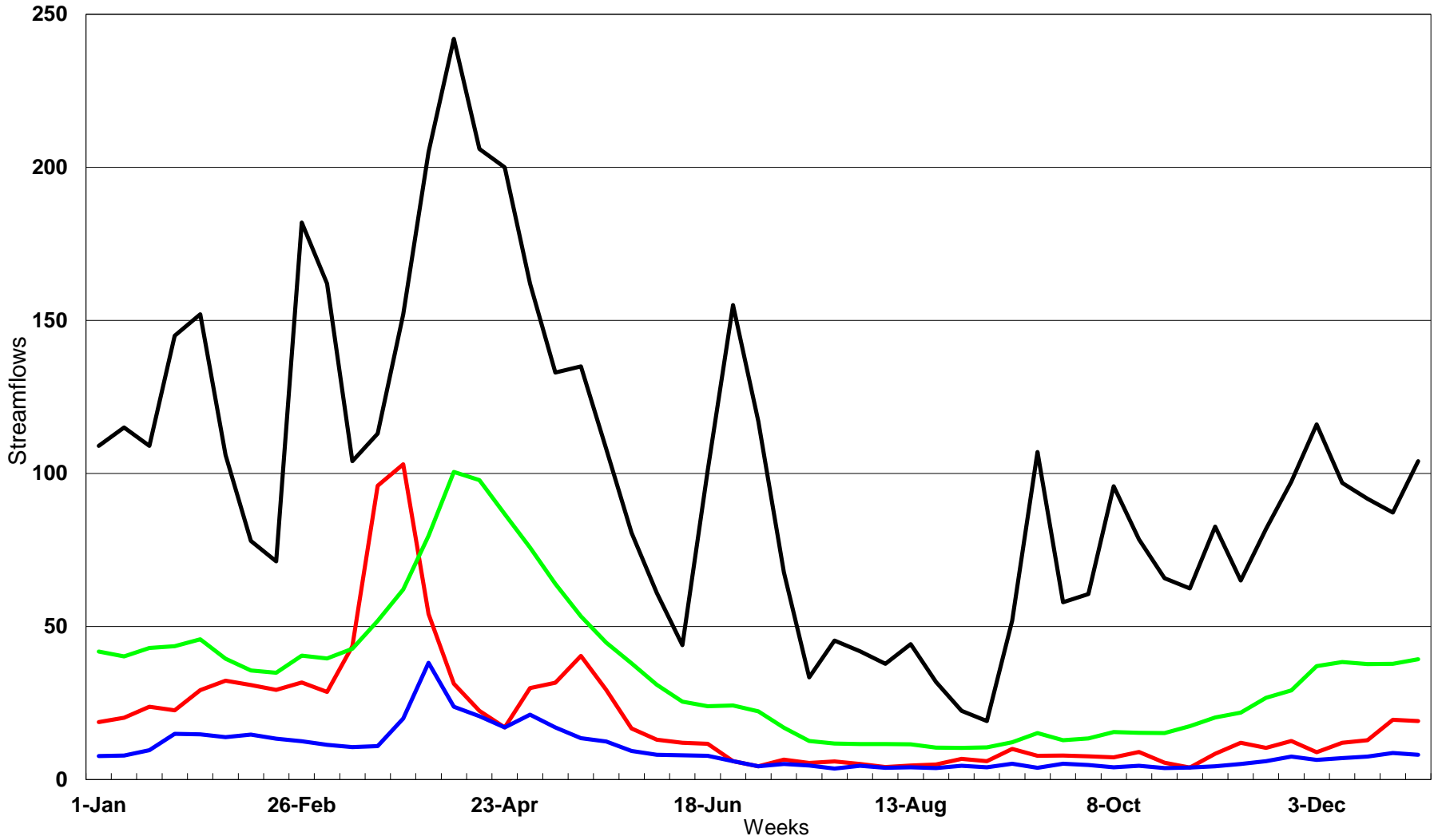
- Well below average snow/rain accumulations through January and early February resulted in MVC beginning to refill the upper lakes by mid February.
- In March, MVC issued a warning that flows in the smaller creeks were beginning to increase and ice was deteriorating on the lakes.
- Peak flows on all tributaries occurred in late March and were well below normal spring conditions.

# 2012 Peak Flows

2012 Peaks			Historical		
Location	Flow	Date	Flow	Date	2012 Flow
Myers Cave	19.1	March 22	21.5	April 20	1.31
Buckshot Cr	9.22	March 20	11.4	April 8	2.15
Ferguson Falls	108	March 21	138	April 13	17.7
Appleton	118	March 22	152*	April 15*	23.2
Gordon Rapids	20.3	March 20	28	April 8	2.9
Lanark	52.1	March 21	63	April 9	6.99
Indian River	15.8	March 19	20	April 17	1.91
Carp River	29.1	March 14	44	April 2	2.58

\* Appleton peak date and flows from 1970 to present

# Mississippi River @ Appleton

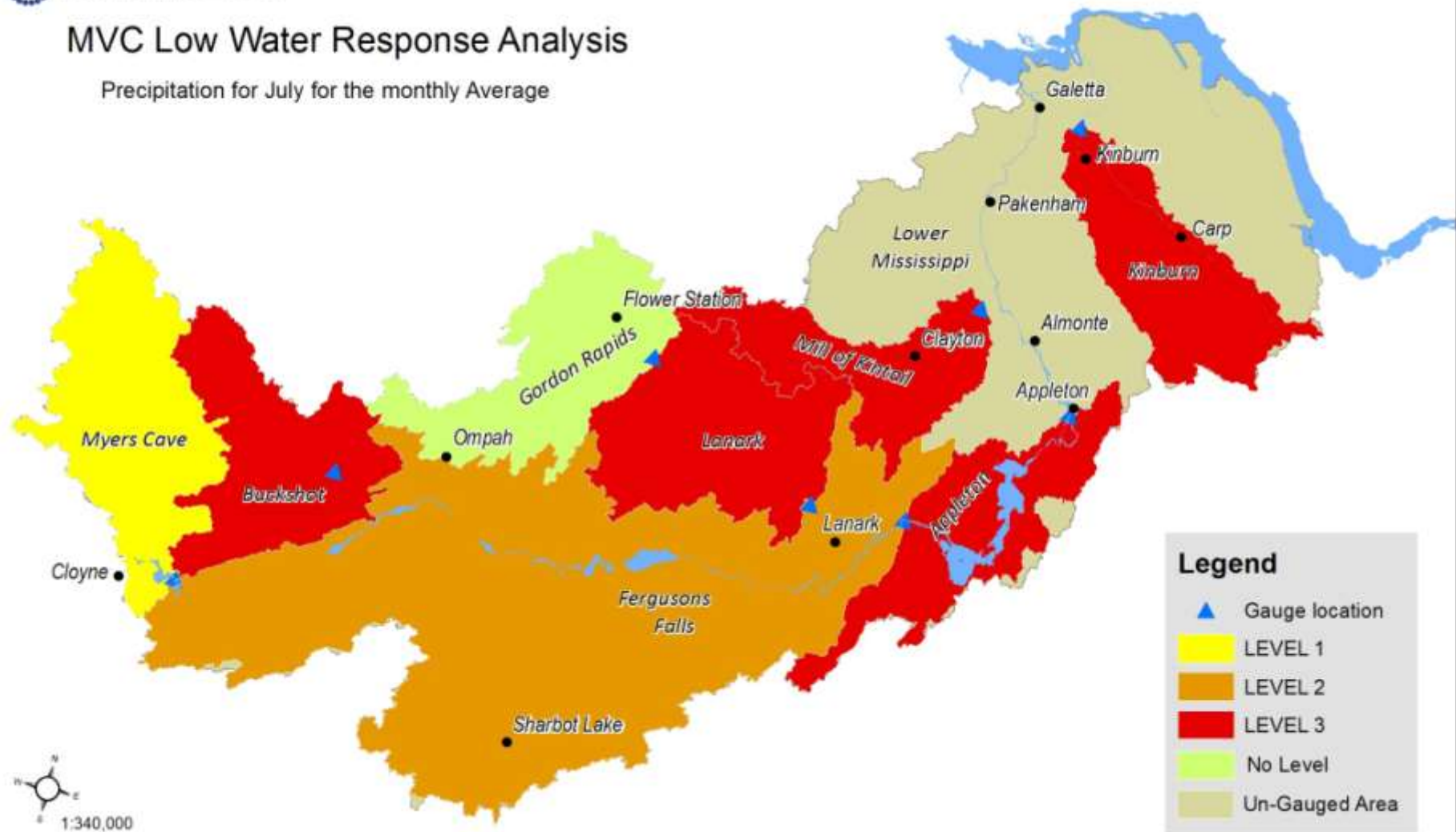


— 2012 Flow      — Historical Avg      — Historical Minimum      — Historical Maximum

- MVC issued Watershed Conditions Bulletins around Low Water instead of Flooding in April for the first time in the history of the CA.
- Cottagers opened up buildings in April/May and boating season began almost a full month ahead of schedule.
- May provided an average amount of rainfall and all major reservoirs were at optimal operating level by the 1<sup>st</sup> of June.
- Flows, however, were well below normal and MVC declared a Level I low water condition on June 1 for the watershed
- All dams were closed off as much as possible, with all logs in all dams by the 29<sup>th</sup> of May.

# MVC Low Water Response Analysis

Precipitation for July for the monthly Average

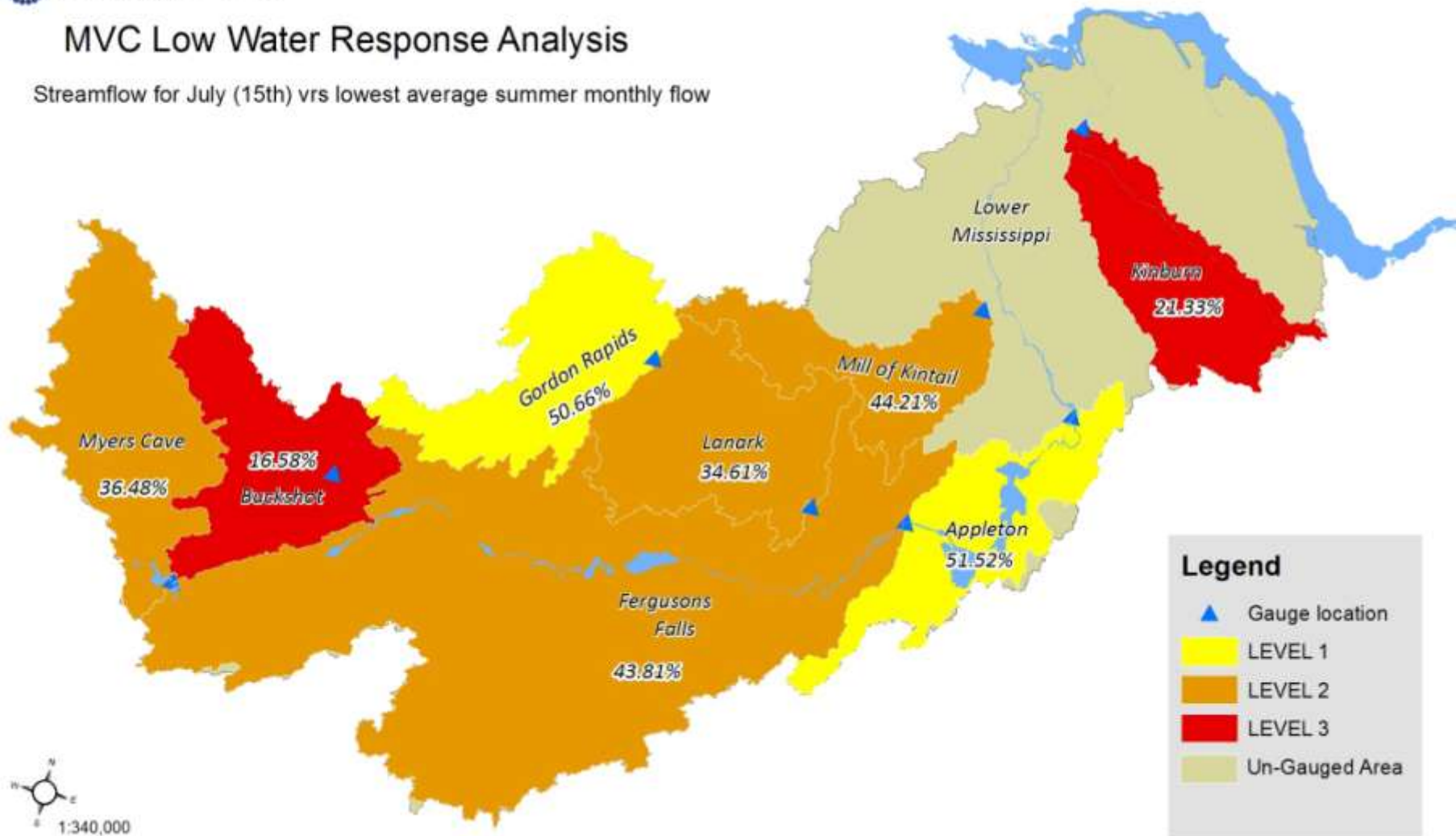


**Legend**

- ▲ Gauge location
- LEVEL 1
- LEVEL 2
- LEVEL 3
- No Level
- Un-Gauged Area

# MVC Low Water Response Analysis

Streamflow for July (15th) vrs lowest average summer monthly flow



# 2012 – What We Observed

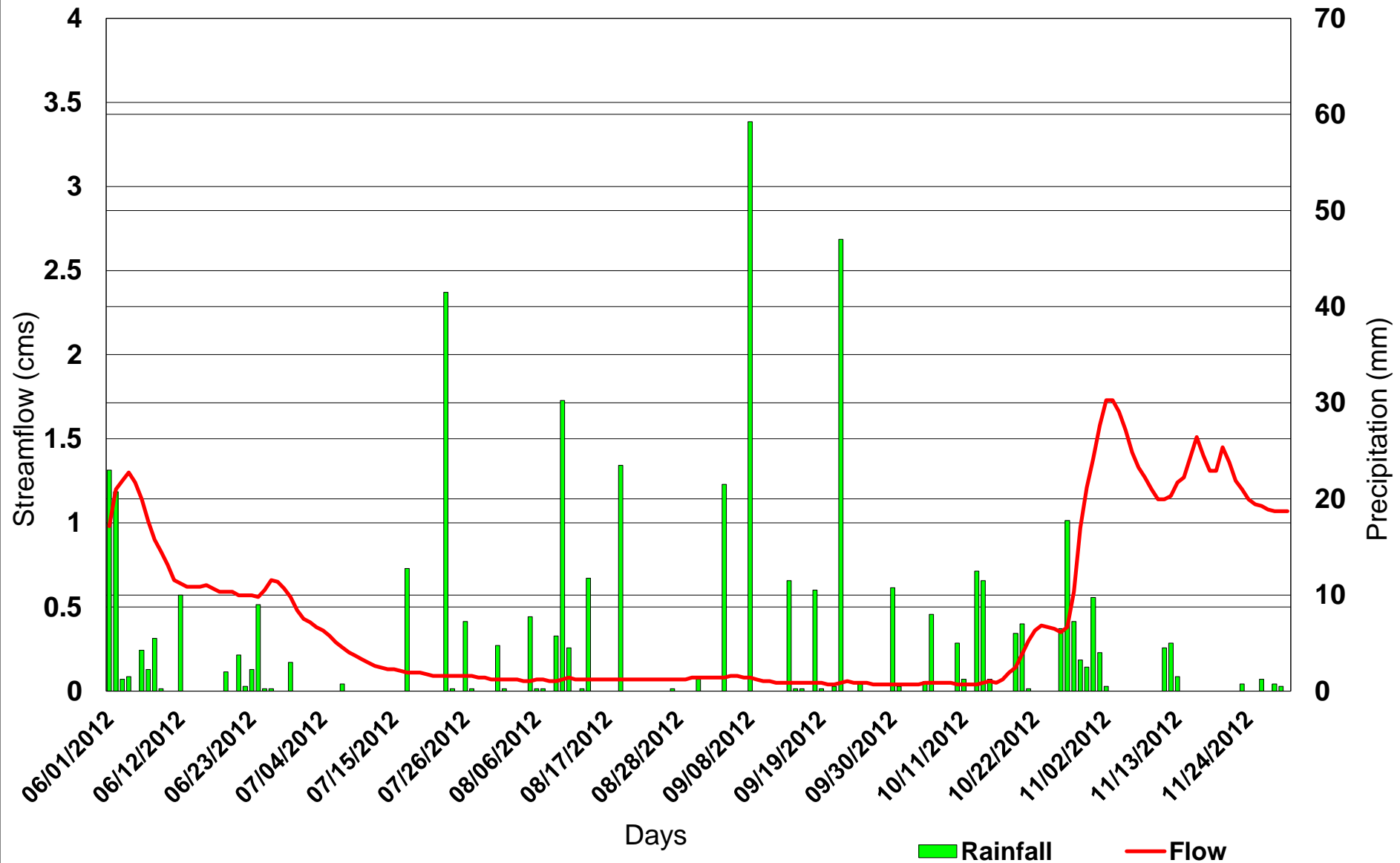
Clyde River, Joes Lake outlet @ Gordon Rapids stream gauge, August 22, 2012





- Major tributaries – Buckshot Creek, Clyde River, Fall River and Indian River – of the Mississippi River were close to establishing new record low values by end of June
- MVC declared a Level II condition on the 17<sup>th</sup> of July (and remained there until November 15)
- From July 1 through the end of October Crotch lake provided almost 100% of flow for the lower Mississippi river.

# Clyde River at Gordon Rapids June through November 2012



- In the Fall the decision was made to draw down the lakes as usual but over a longer period of time and remove fewer logs than normal again in some of the upper lakes.
- Although the flow parameter for declaring Low Water no longer indicates low water, flows were still near or below 50 % of normal for this time of year so the WRT declares a move from Level II to Level I but remained in a Level I throughout the remainder of the year.
- With the recent snowfalls, current conditions have since returned to normal and the WRT ended the Level I condition as of Jan 10, 2013.