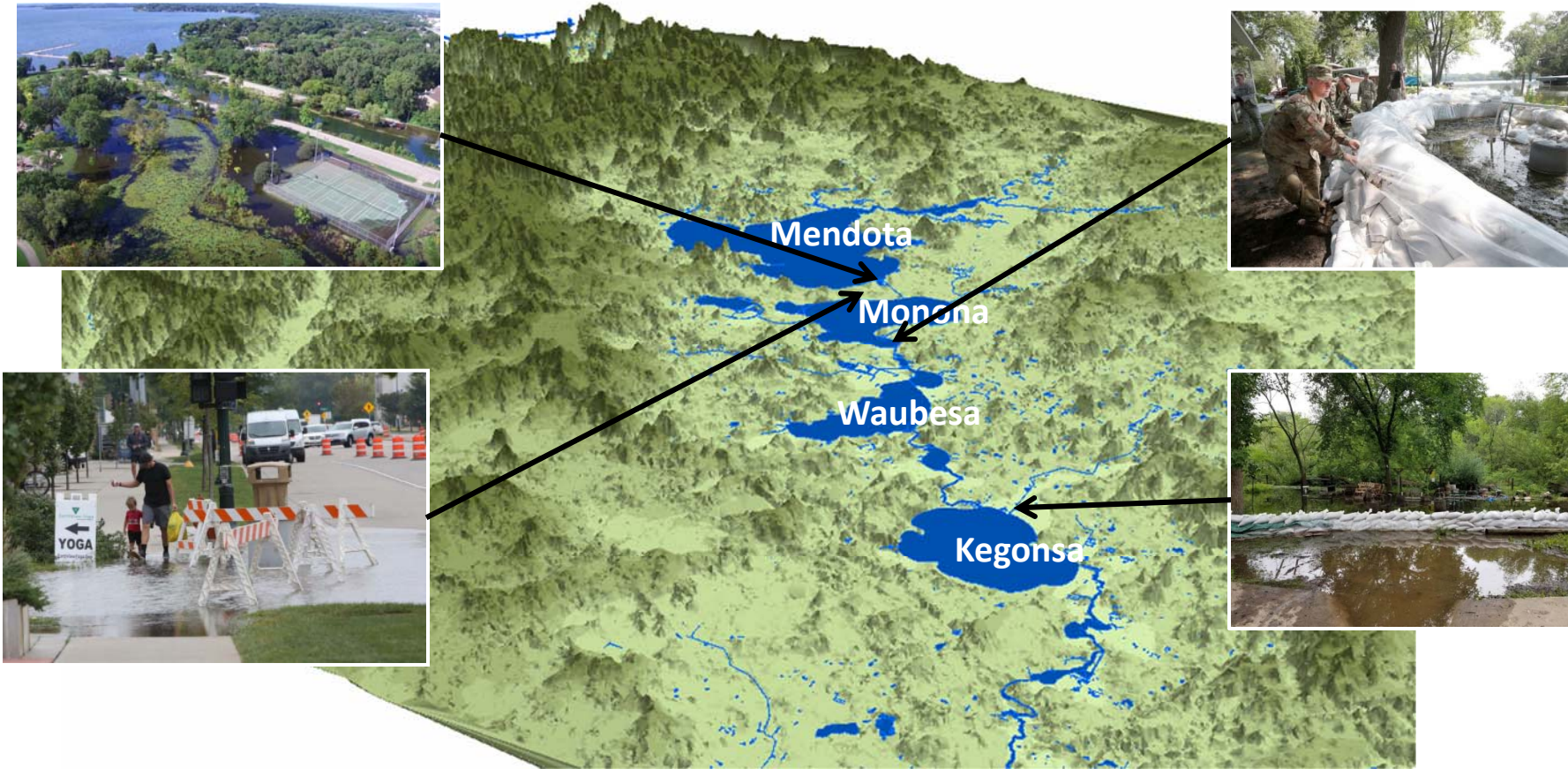


# Flooding in the Yahara Chain of Lakes



Lake Levels Task Force  
February 4, 2019



# 2018 County Board Resolution

- Technical work group – evaluate and model various scenarios to improve resiliency for future events.

Shelly Allness, Rob Davis: DNR

Jeremy Balousek, Josh Harder, John Reimer: Dane County

Greg Fries: City of Madison

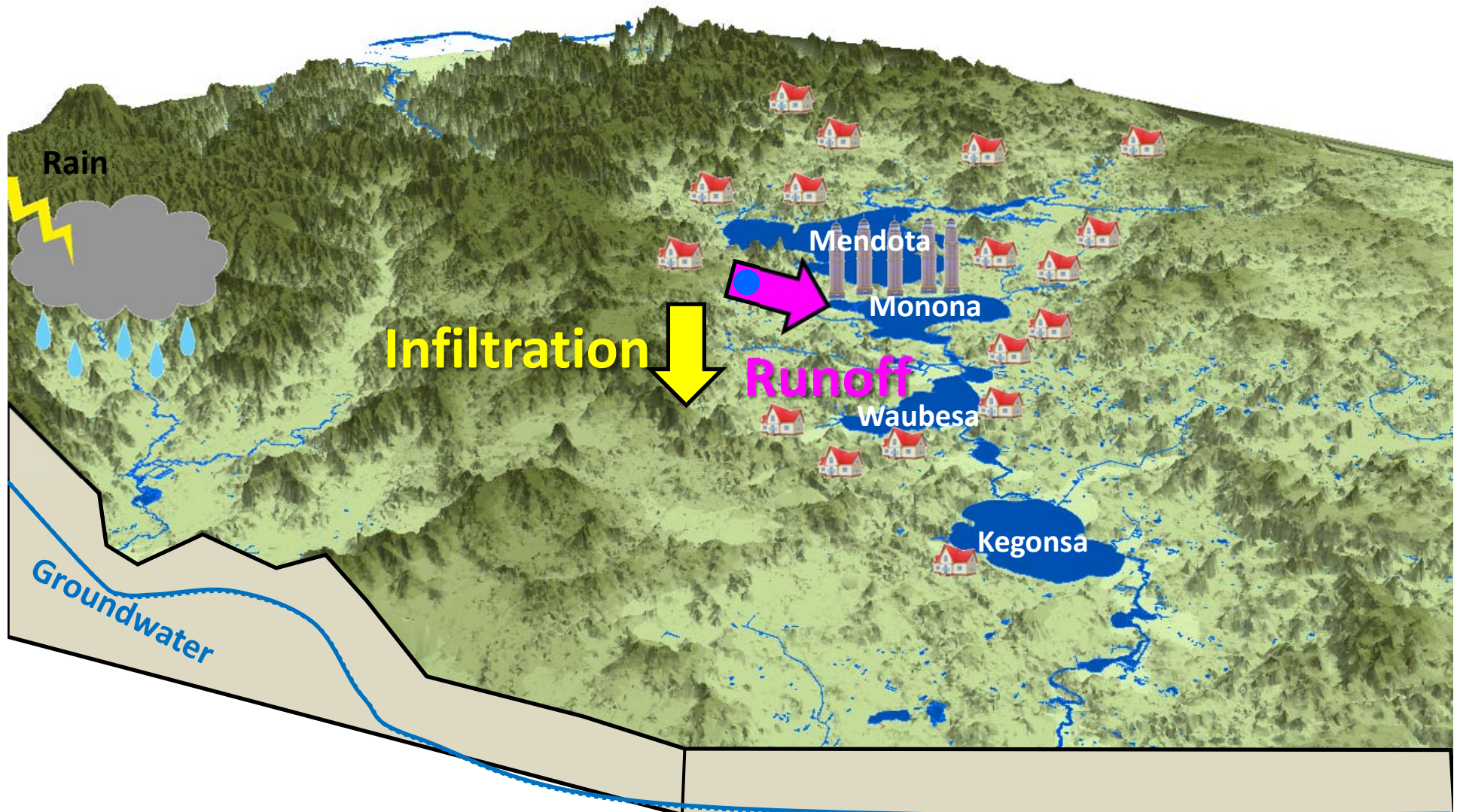
Dick Lathrop, Ken Potter, Chin Wu: UW Madison



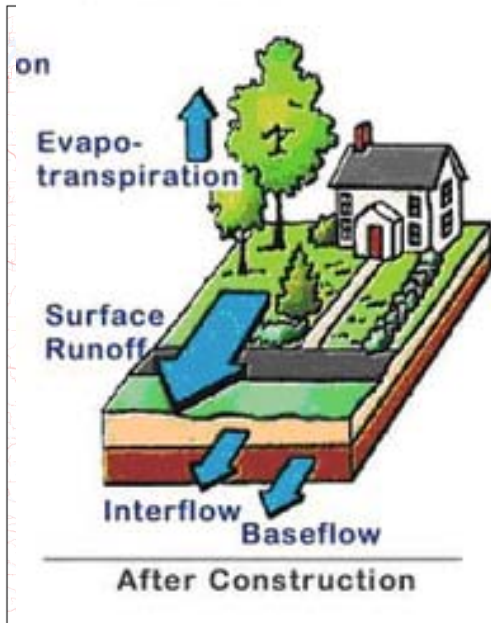
- Task force - review findings of the technical report and make policy recommendations



# Hydrology of the Yahara Lakes

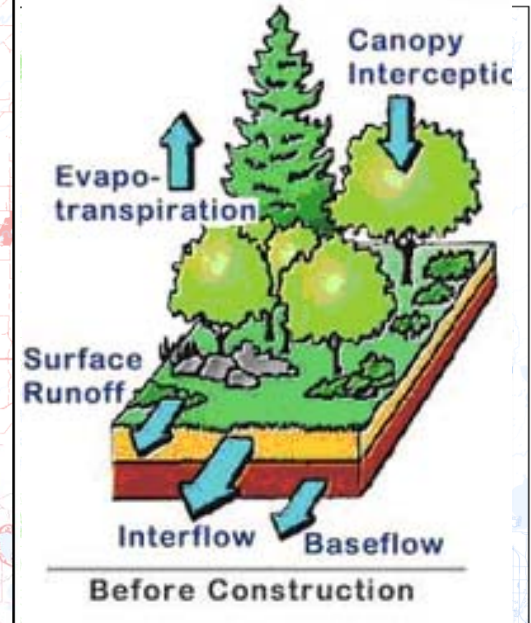
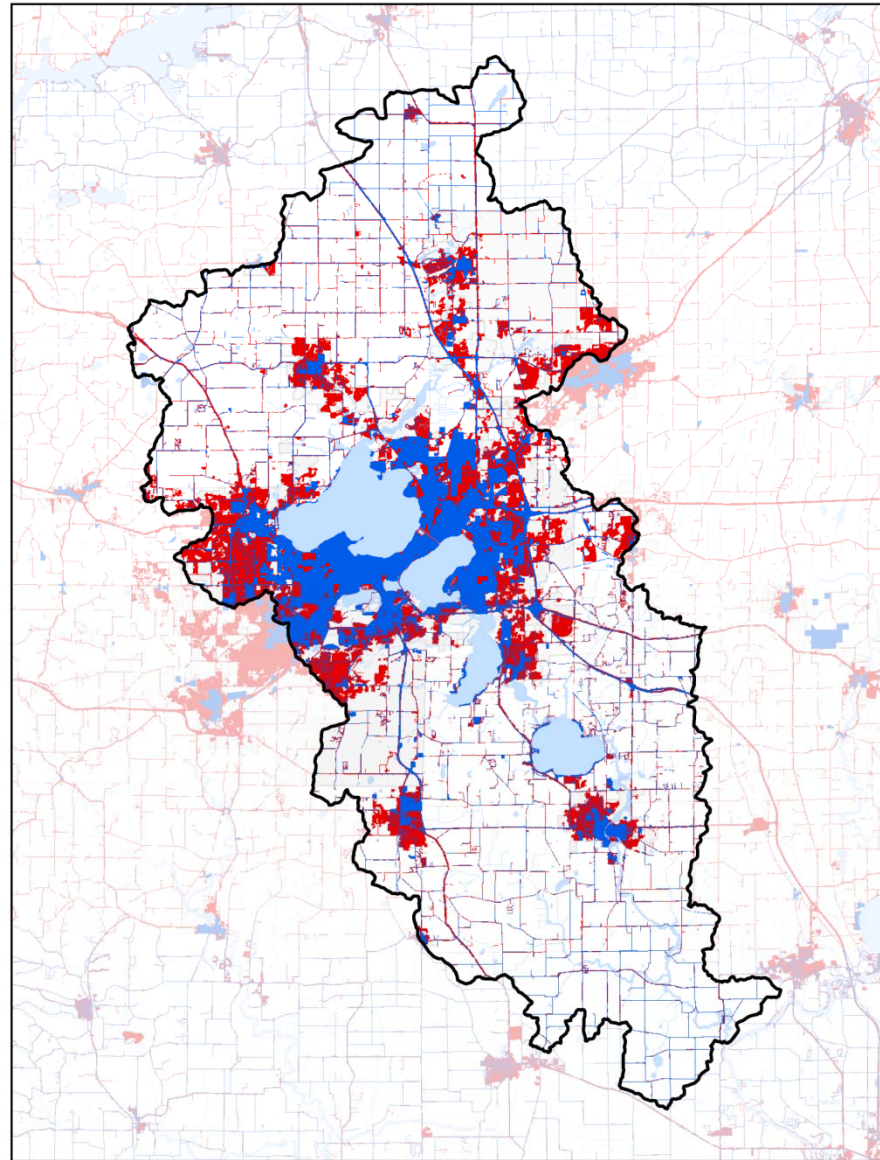


# Urban Development



**2018**

**75,000 Acres**

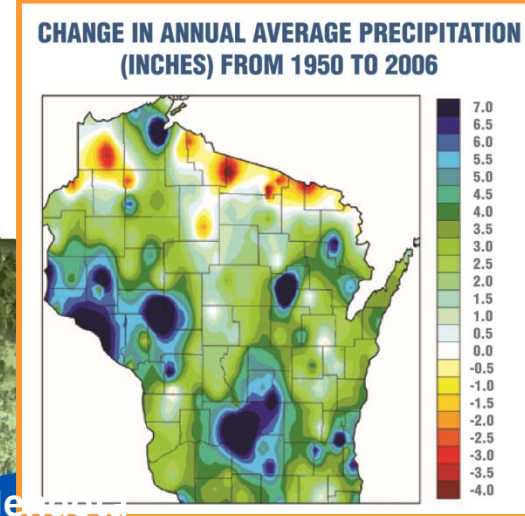
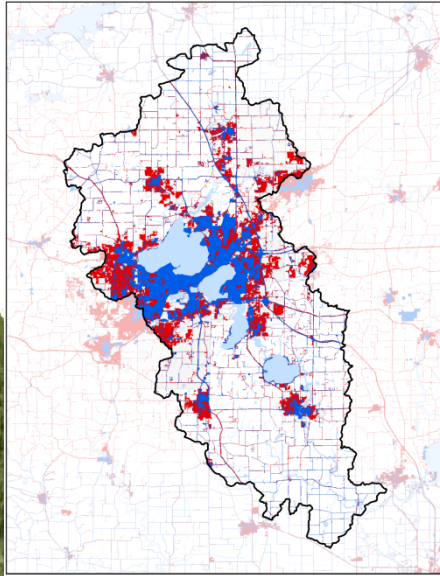


**1970**

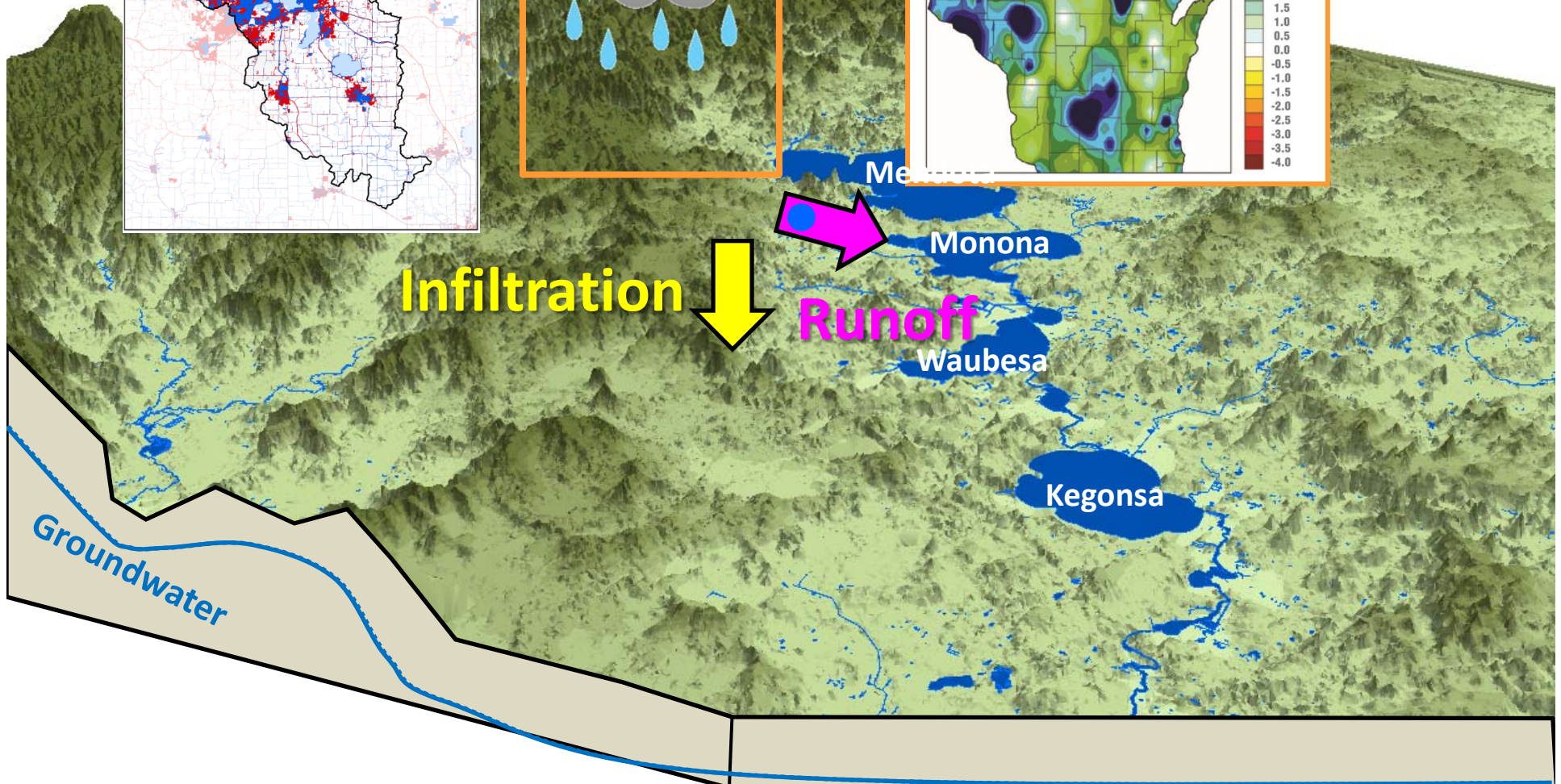
**41,000 Acres**

In **2018** there is **2** times more area of development than **1970**

# Hydrology of the Yahara Lakes

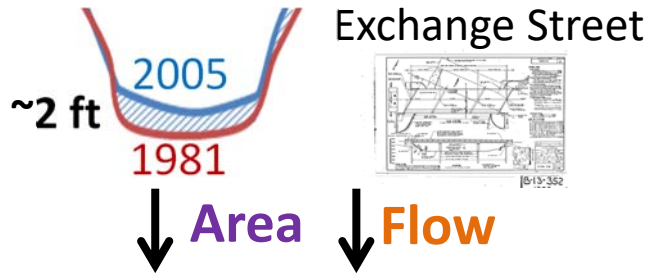


WISCONSIN  
INITIATIVE ON  
CLIMATE  
CHANGE  
IMPACTS



# Hydraulics of the Yahara Lakes

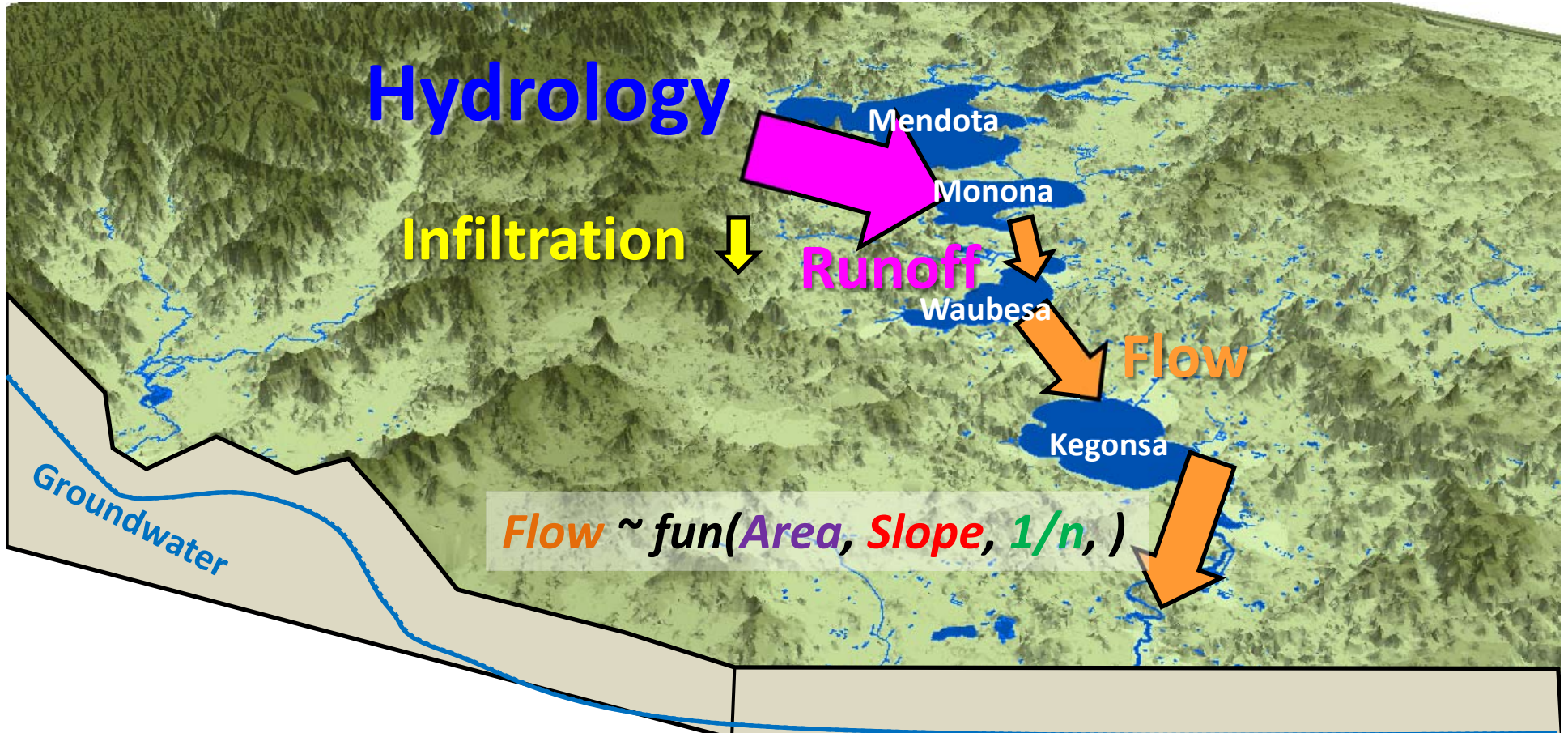
## Sediment Accumulation



## Constriction Points

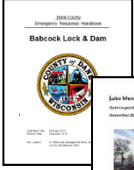


## Aquatic Plants

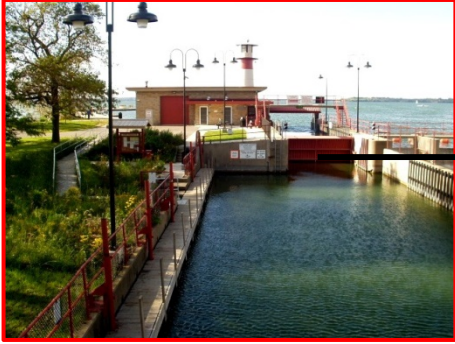
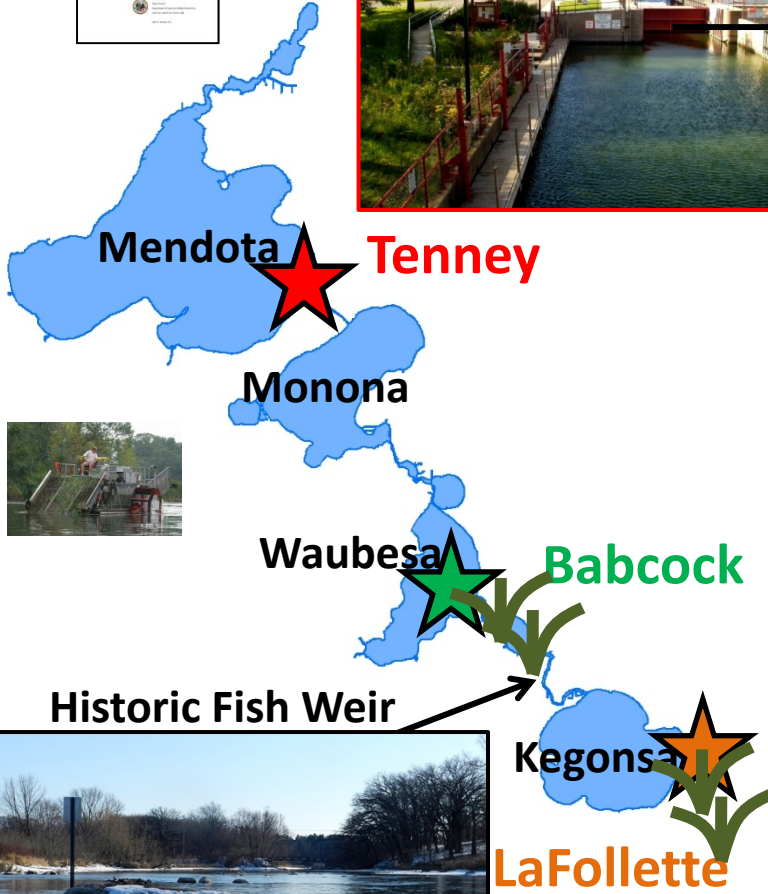


# Lake Level Management

EAP



IOM



**2017 Upgrades**



**Automation**



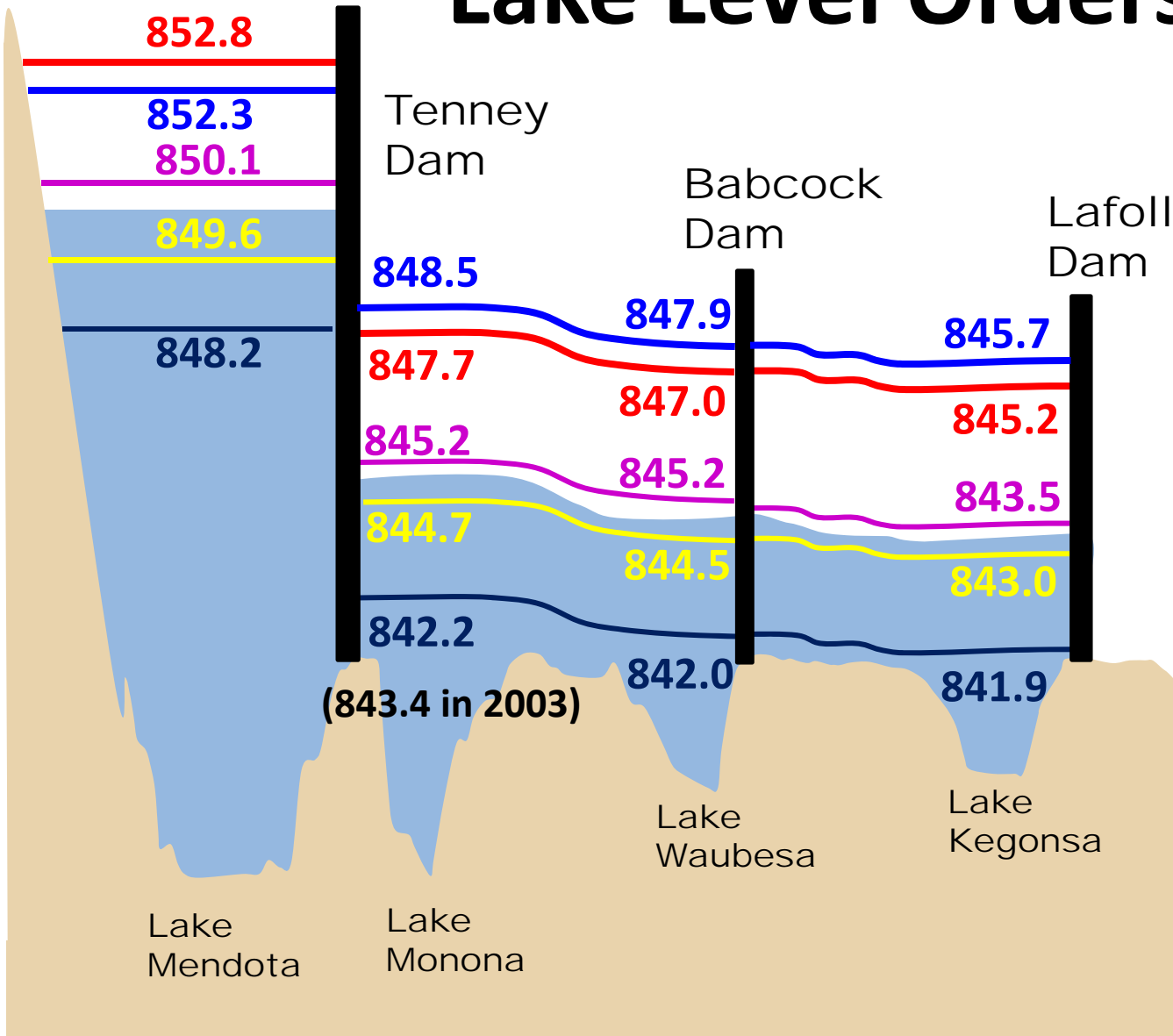
**2013 Rehabilitation**



**Historic Fish Weir**



# Lake Level Orders



**ORDER 101**  
 DEPARTMENT OF NATURAL RESOURCES  
 In the Matter of the Reestablishment of  
 Water Levels for Lake Mendota, City of  
 Madison, Wisconsin  
 3-20-17-010  
 ORDER OF WORK, ESTABLISHMENT OF NEW DAM DESIGN  
 The Department of Natural Resources proposes to reestablish water  
 levels adjacent to Section 31.01, Wisconsin, for Lake Mendota in the City  
 of Madison, Wisconsin. ORDER 101.

**PURPOSE OF PLAN**  
 1. The City of Madison and the State, Wisconsin, requested  
 the Department to reestablish water levels adjacent to Section 31.01,  
 Wisconsin, for Lake Mendota in the City of Madison, Wisconsin. The  
 Department, the City of Madison and the State have completed and all  
 necessary requirements of Section 31.01, Wisconsin.

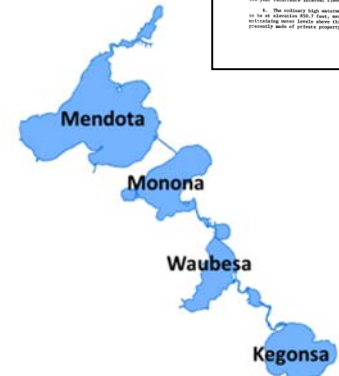
2. Lake Mendota is authorized by the State Park Law located on  
 the State Statute Code on the 10th of Section 17, 1961, Wisconsin  
 Statutes. The Act is read by the City of Madison, Wisconsin, Wisconsin  
 1961.

3. Levels were established for Lake Mendota by the National  
 Commission of Wisconsin in Madison, Wisconsin, 1916. The  
 Commission, the City of Madison and the State have completed and all  
 necessary requirements of Section 31.01, Wisconsin.

4. The State Park Law has been amended to authorize a  
 transfer of water levels from the State to the City of Madison, Wisconsin.  
 The Department of Natural Resources is authorized to transfer the  
 water levels from the State to the City of Madison, Wisconsin.

5. The State Park Law has been amended to authorize a  
 transfer of water levels from the State to the City of Madison, Wisconsin.  
 The Department of Natural Resources is authorized to transfer the  
 water levels from the State to the City of Madison, Wisconsin.

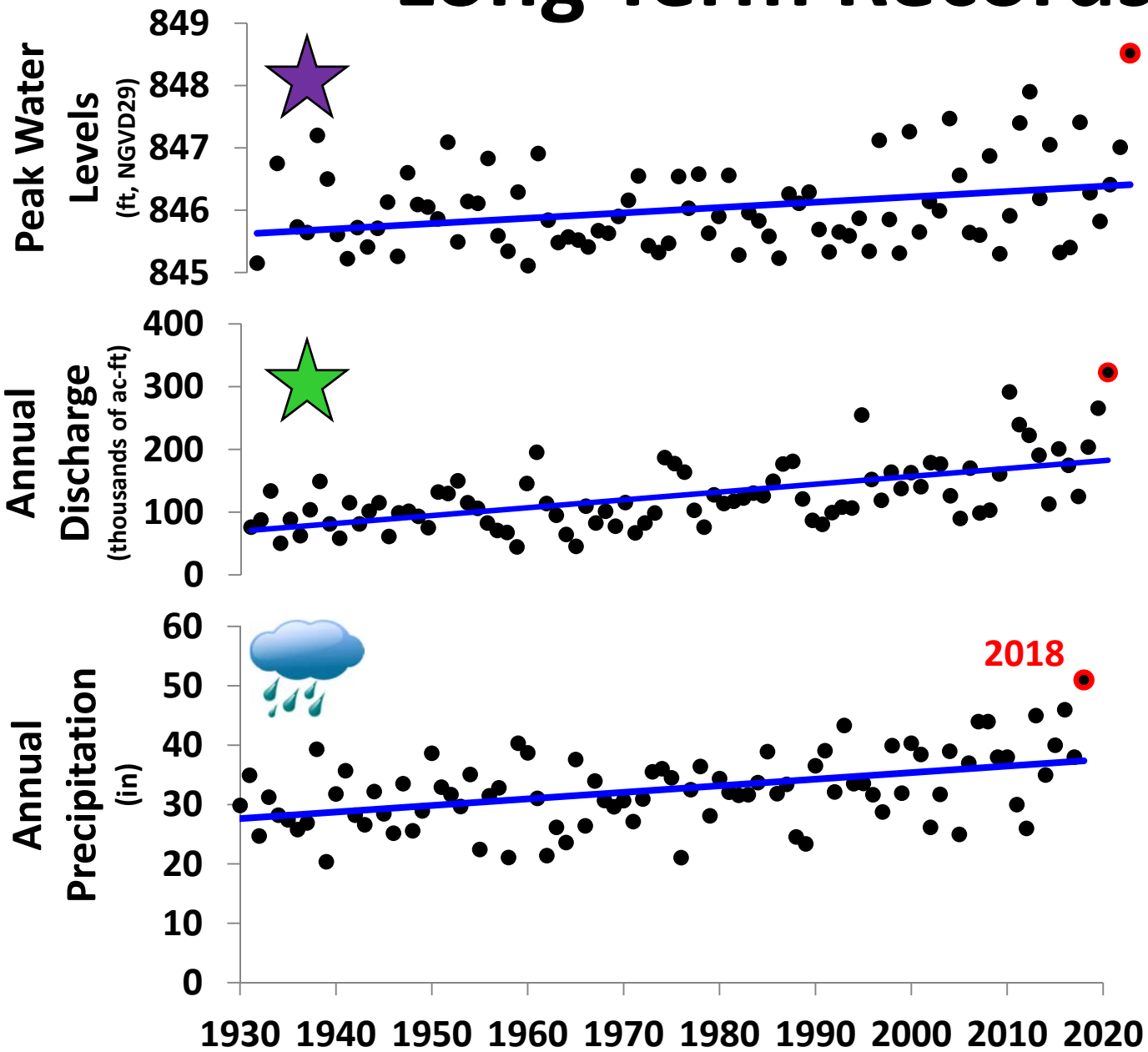
6. The necessary plan, including all details, including all  
 necessary requirements of Section 31.01, Wisconsin, for Lake Mendota in the  
 City of Madison, Wisconsin, is attached to this order.



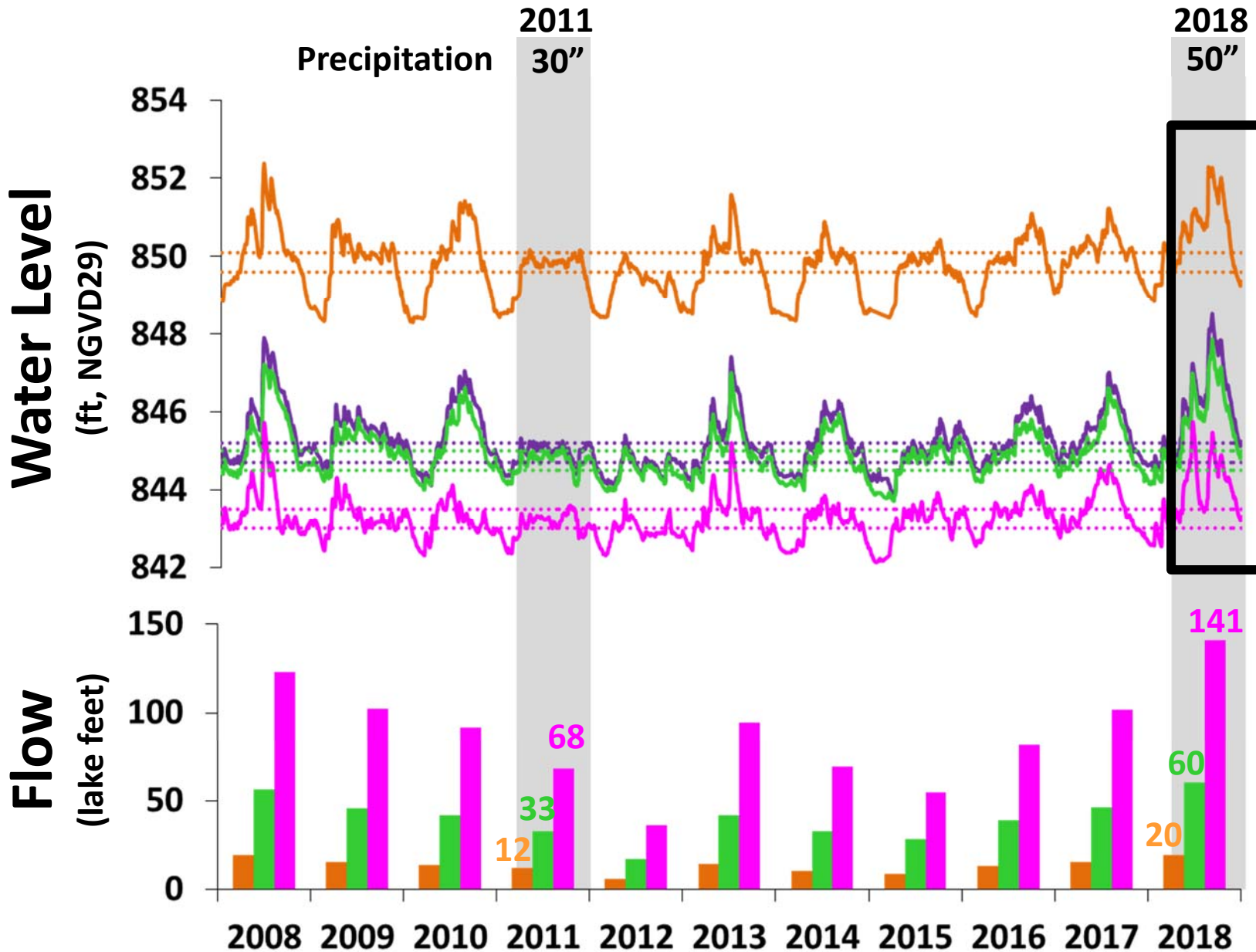
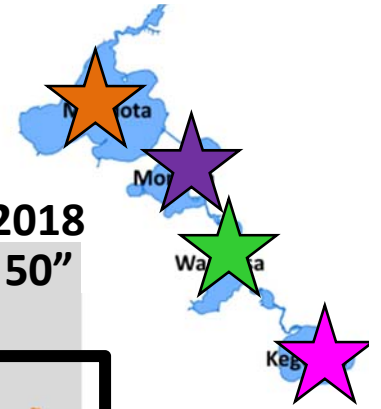
- 2018
- 100 Year
- Summer Max
- Summer Min
- Winter Min



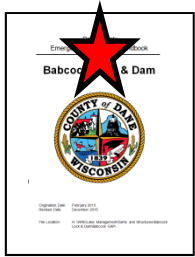
# Long Term Records



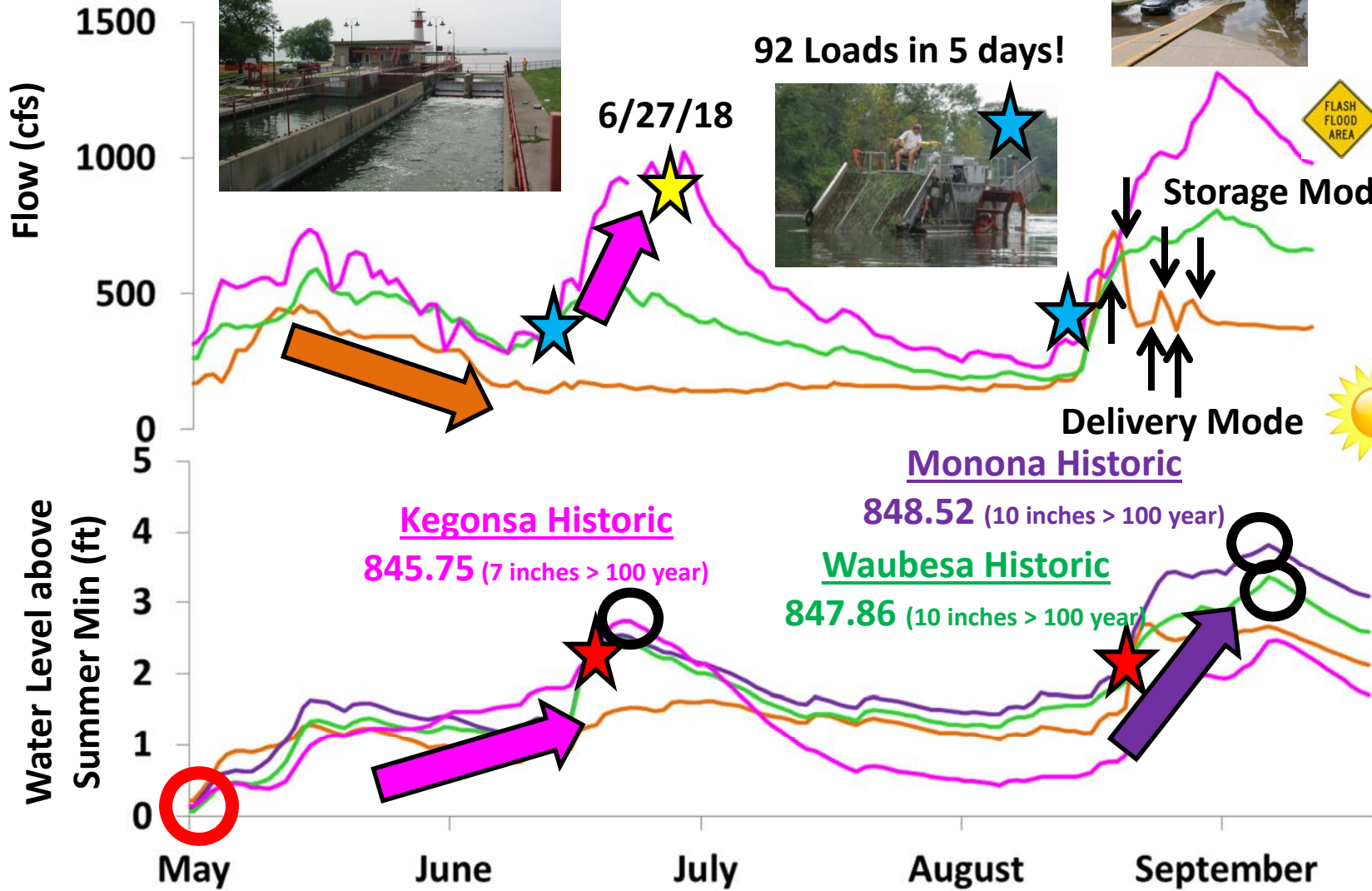
# Recent Lake Levels and Flows



# 2018 Water Levels & Management



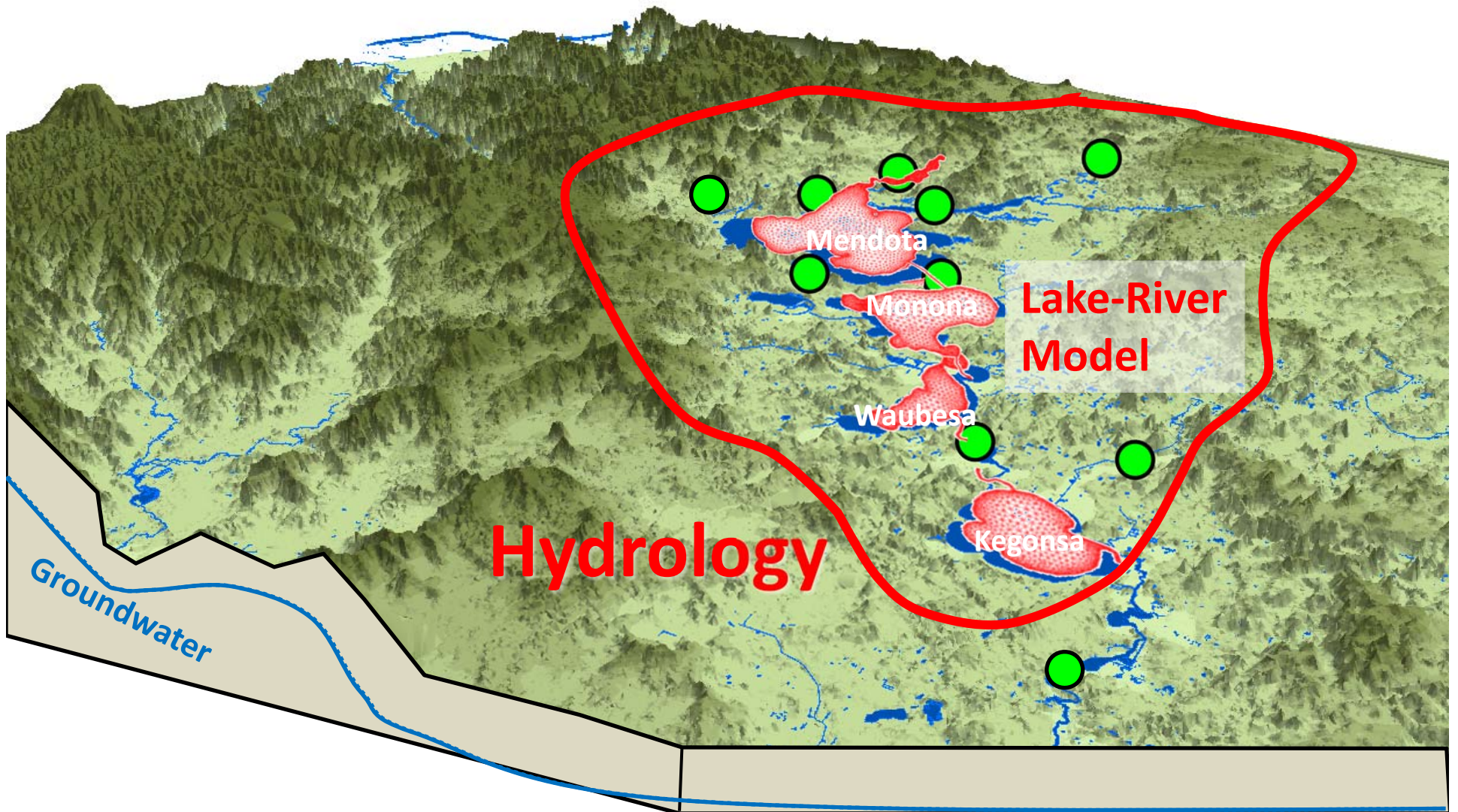
EAP





# Observations & Models

- Flow Gage
- ★ Lake Level Gage



# Integrated Nowcast/Forecast Operation System for Yahara Waters

Observations



Integration



Models

USGS Gauges

Wireless Buoys

AOSS

INFOS Gauges

Web Cam

**INFOS**  
Integrated Nowcast/Forecast Operation System for Yahara Lakes

Home About INFOS

**OBSERVATIONS**

- Surface Water
- Weather
- Rainfall
- Groundwater
- Beaches
- Water Levels

**MODELS**

- Nowcast
- Hydrologic
- Hydraulic
- Hydrodynamic
- Forecast
- Water Level & Discharge

**WATER QUALITY**

- Algae
- Sediment
- Nutrients

**WEBCAMS**

- Babcock Dam
- Cherokee Marsh
- Lafollette Dam
- Monona Outlet
- UW Soil Science

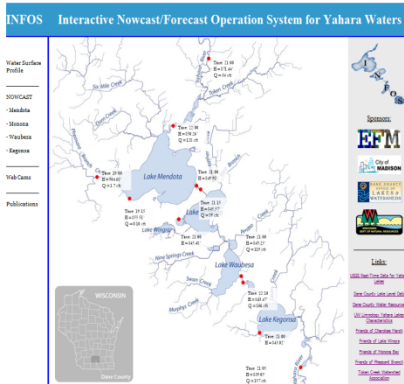
**MORE INFORMATION**

Links

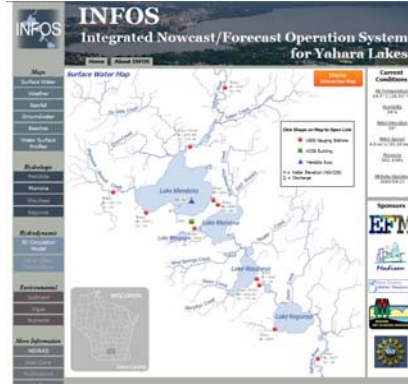
[www.infosyahara.org](http://www.infosyahara.org)

Hydrology (Runoff)  
Hydraulics (River/Lake)

# INFOS History



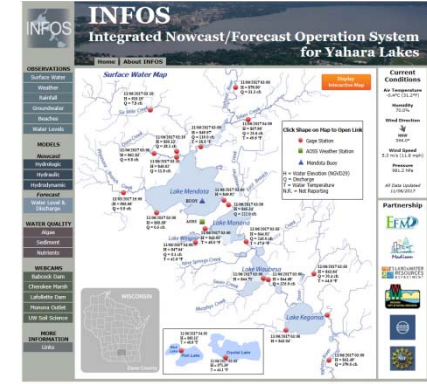
2009



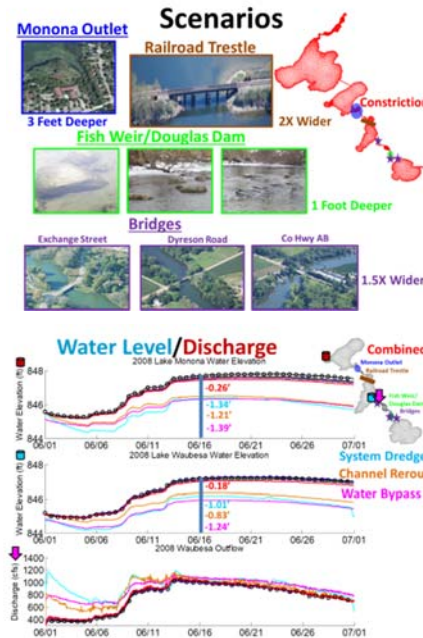
2010



2012



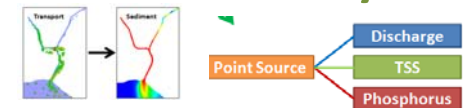
## YLAG2 – Water Levels



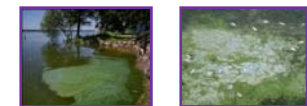
## Community Concerns



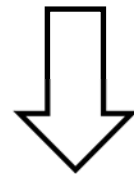
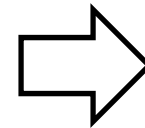
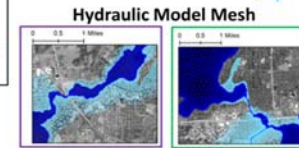
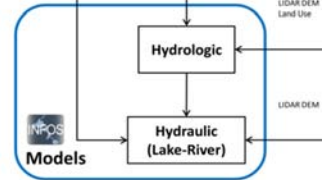
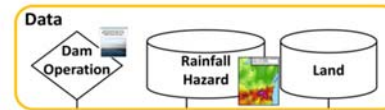
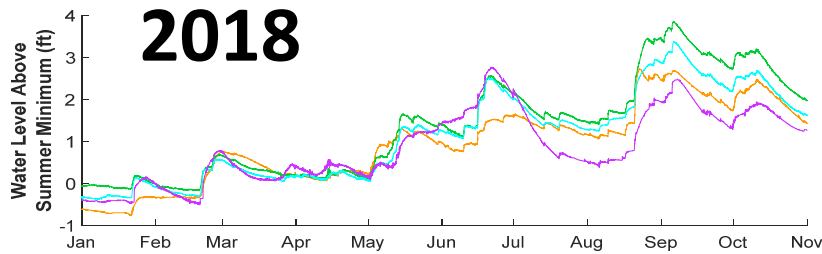
## Water Quality



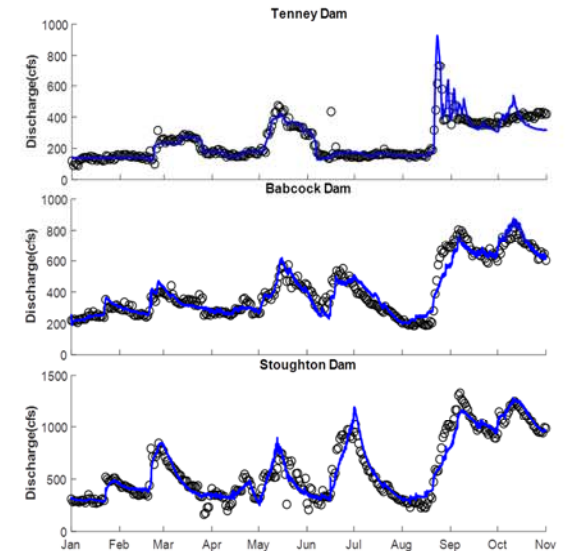
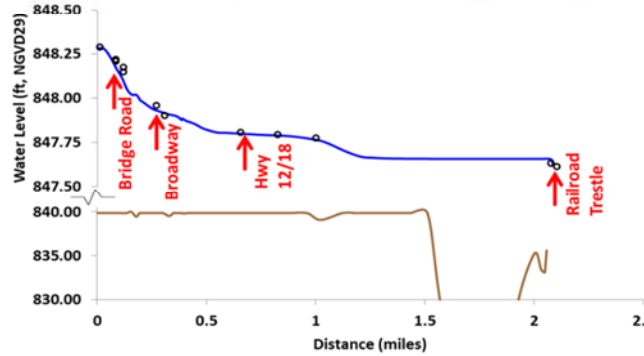
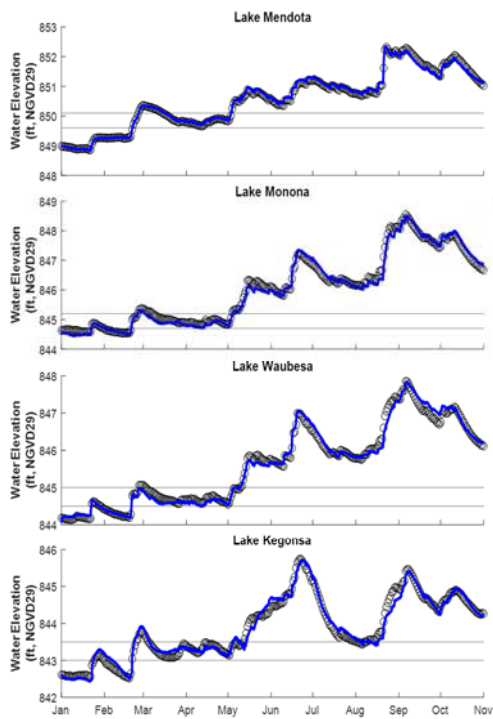
## Beach Management



# Technical Approach



## Model Performance



**Lake Levels**

**Water Surface Profile**

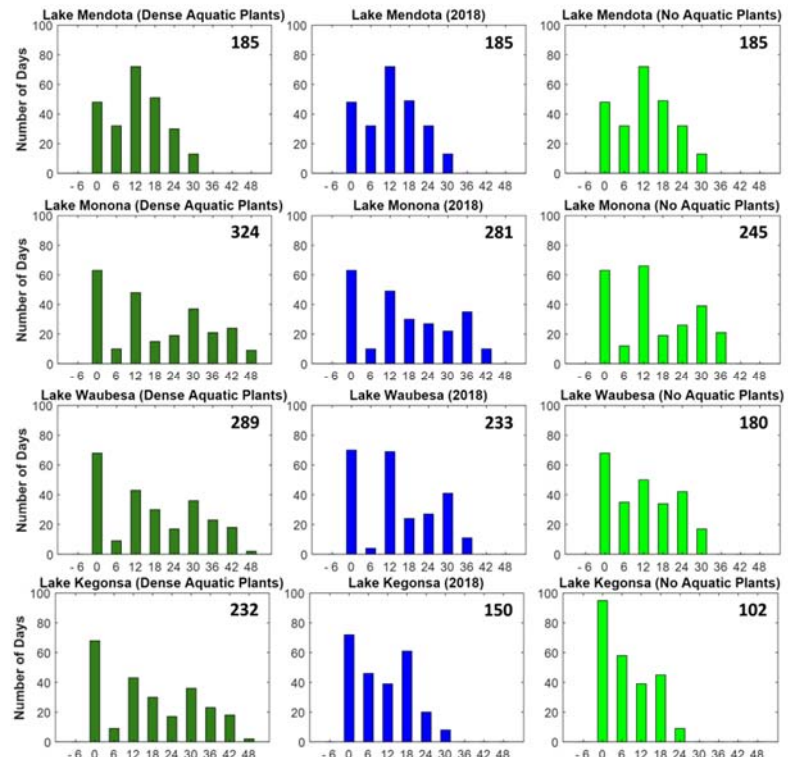
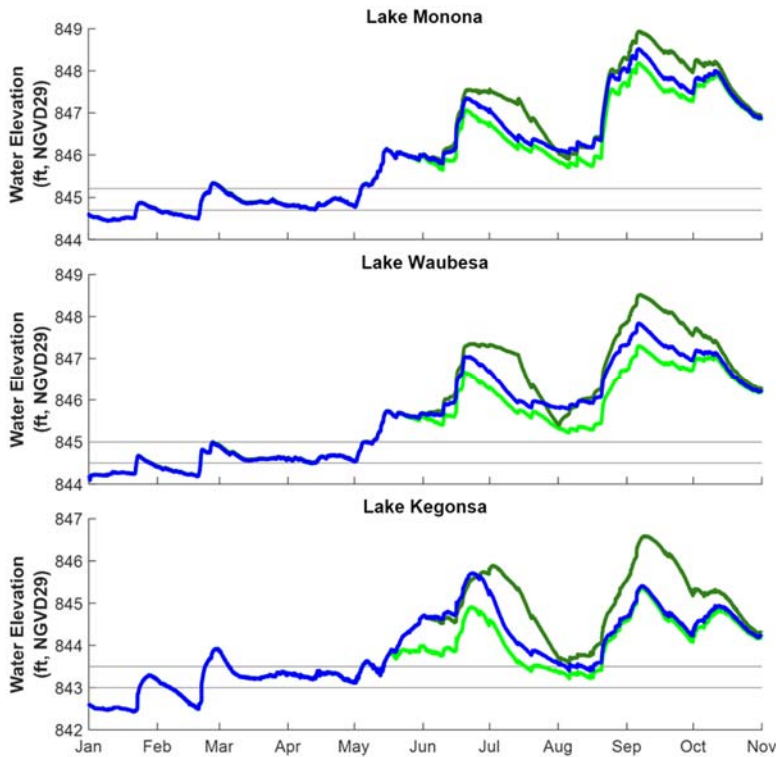
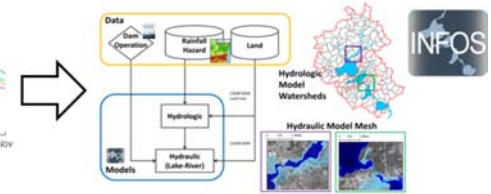
**Discharge**

# Scenarios

## Aquatic Plant Management

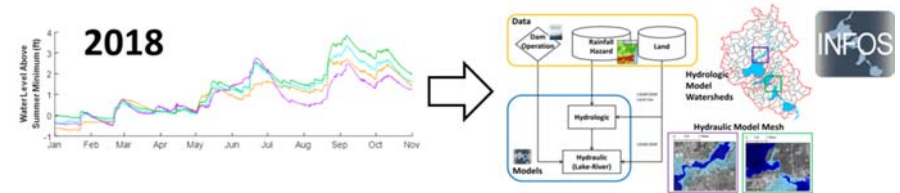


Abundant Plants  
 2018  
 No Plants





# Scenarios



## Adaptation

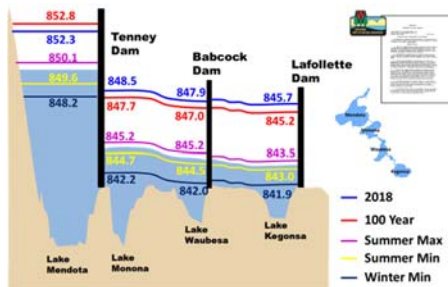
- a. Lower Lake Mendota one foot (flood storage or maintain lower)
- b. Safely Manage Lake Mendota at 100 year water level
- c. Remove all dams from the Yahara Lakes

## Mitigation

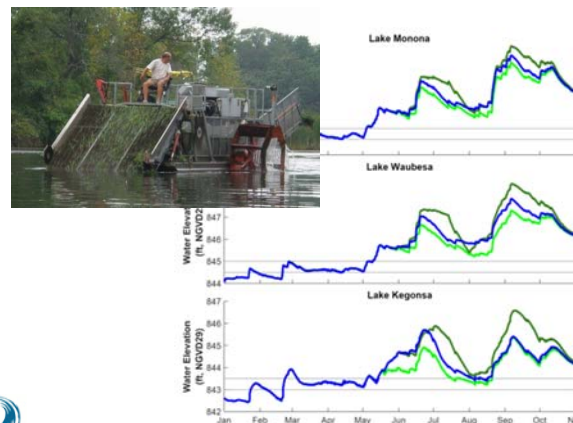
- a. Bridge Modifications
- b. Yahara River Dredging
- c. Flow Reroute and Pumping
- d. Combined (b) and (c)



# Questions?

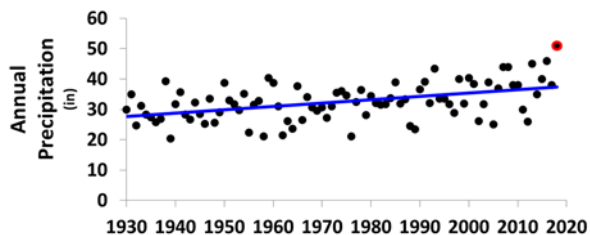


Water Level Management



Aquatic Plant Management

Lake Level Orders



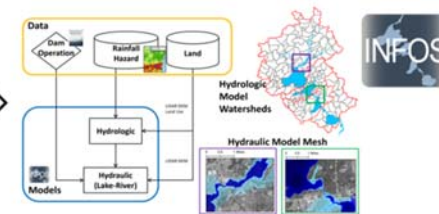
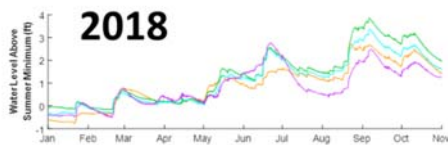
Long Term Trends



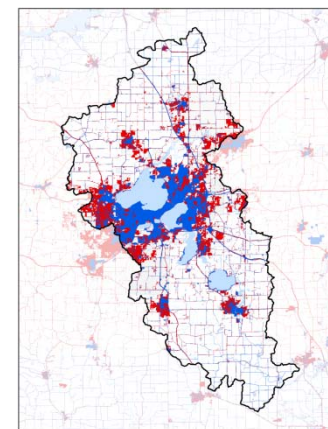
Pleasant Springs



Technical Work Group



INFOS Technical Approach



Urban Development

Thank you:

