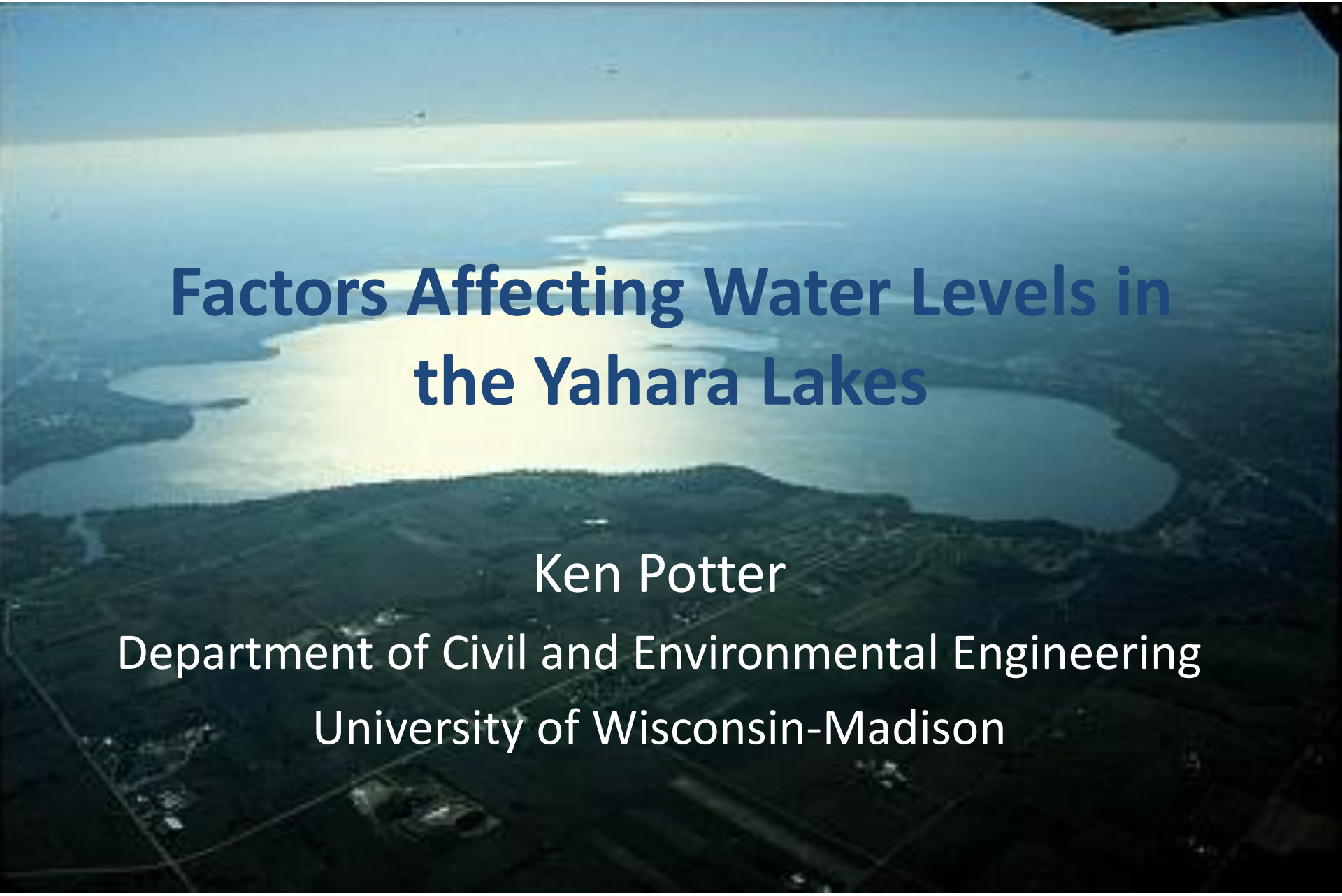


Factors Affecting Water Levels in the Yahara Lakes

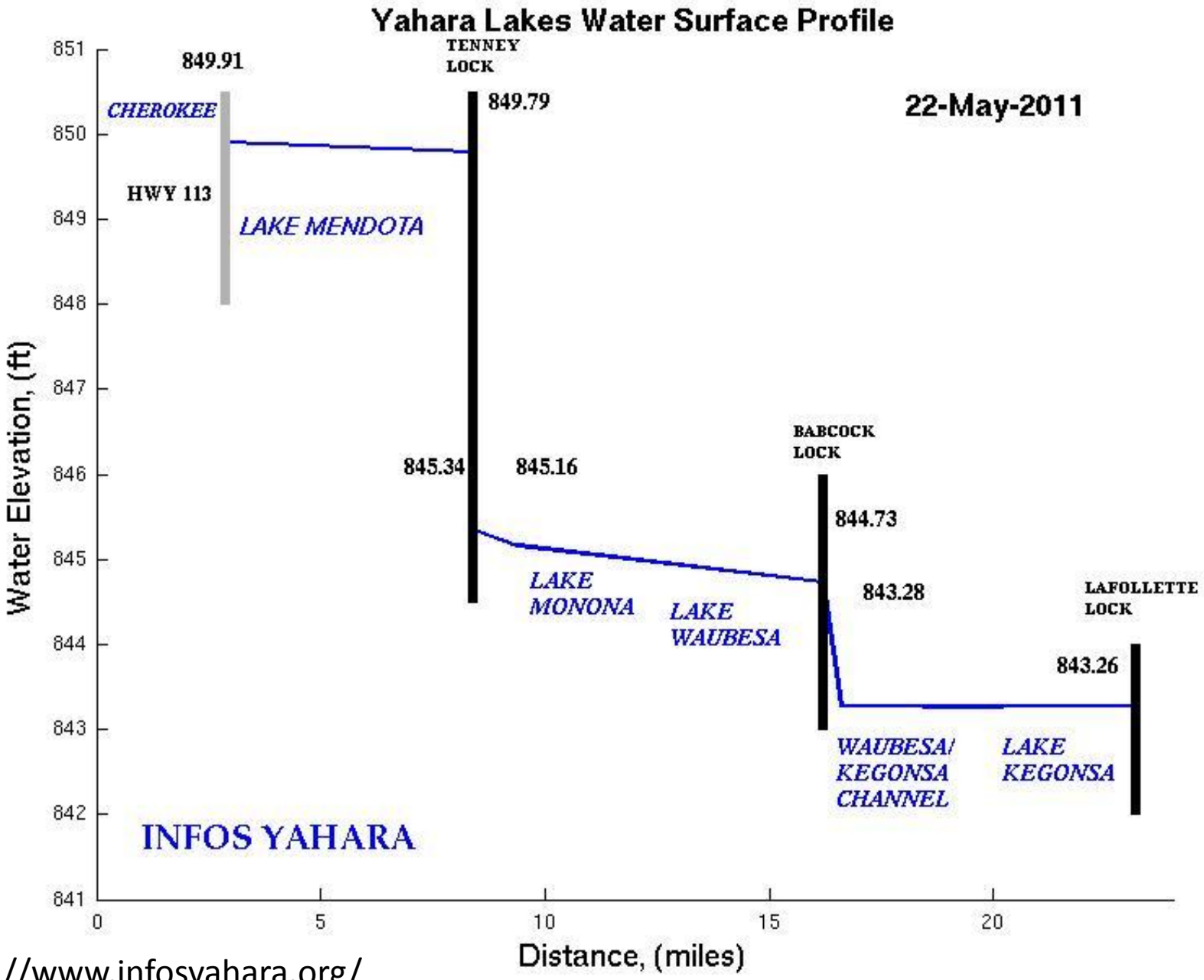
Ken Potter
Department of Civil and Environmental Engineering
University of Wisconsin-Madison

Yahara Lakes Watershed

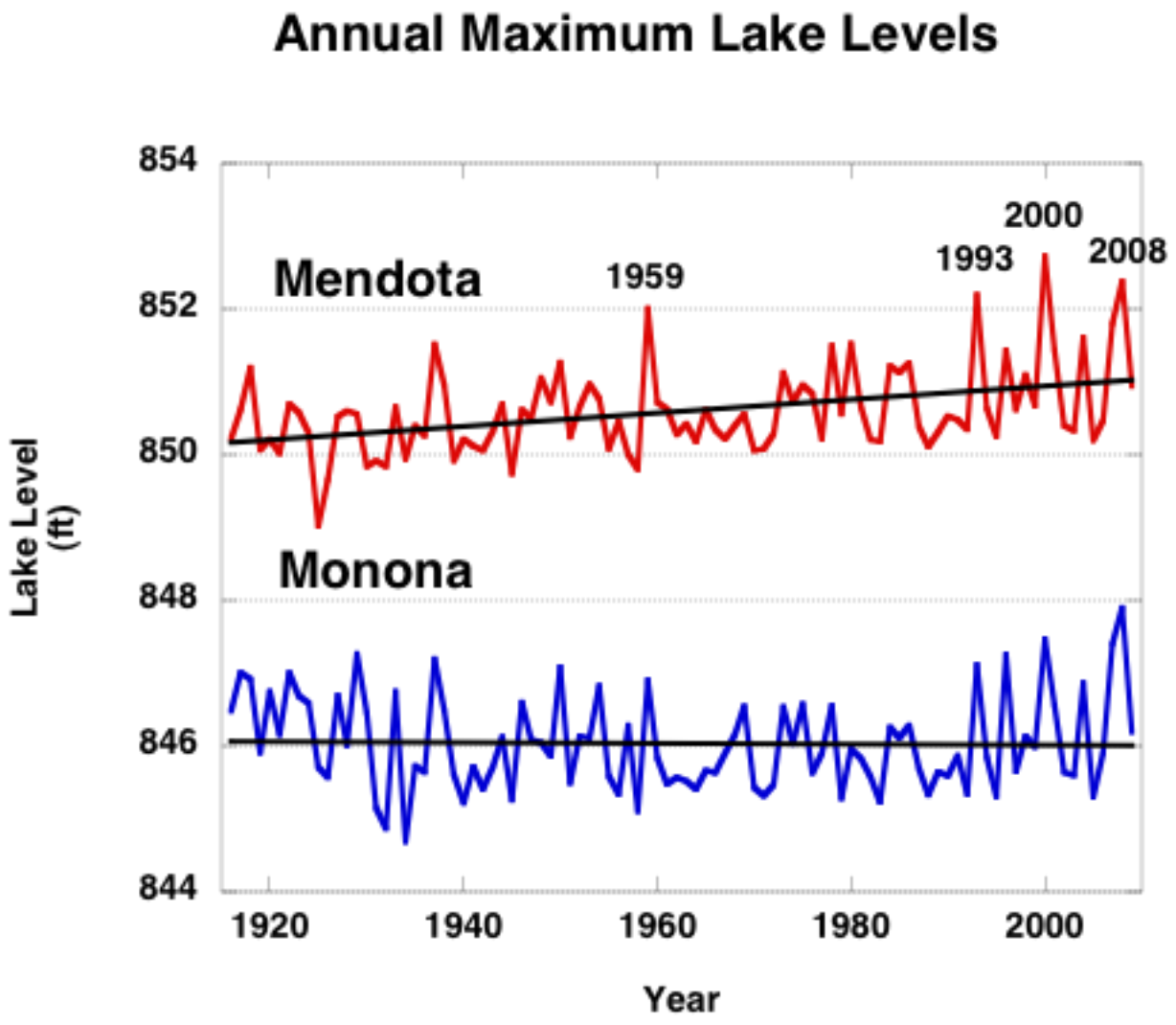
Drainage Area: 327 mi^2

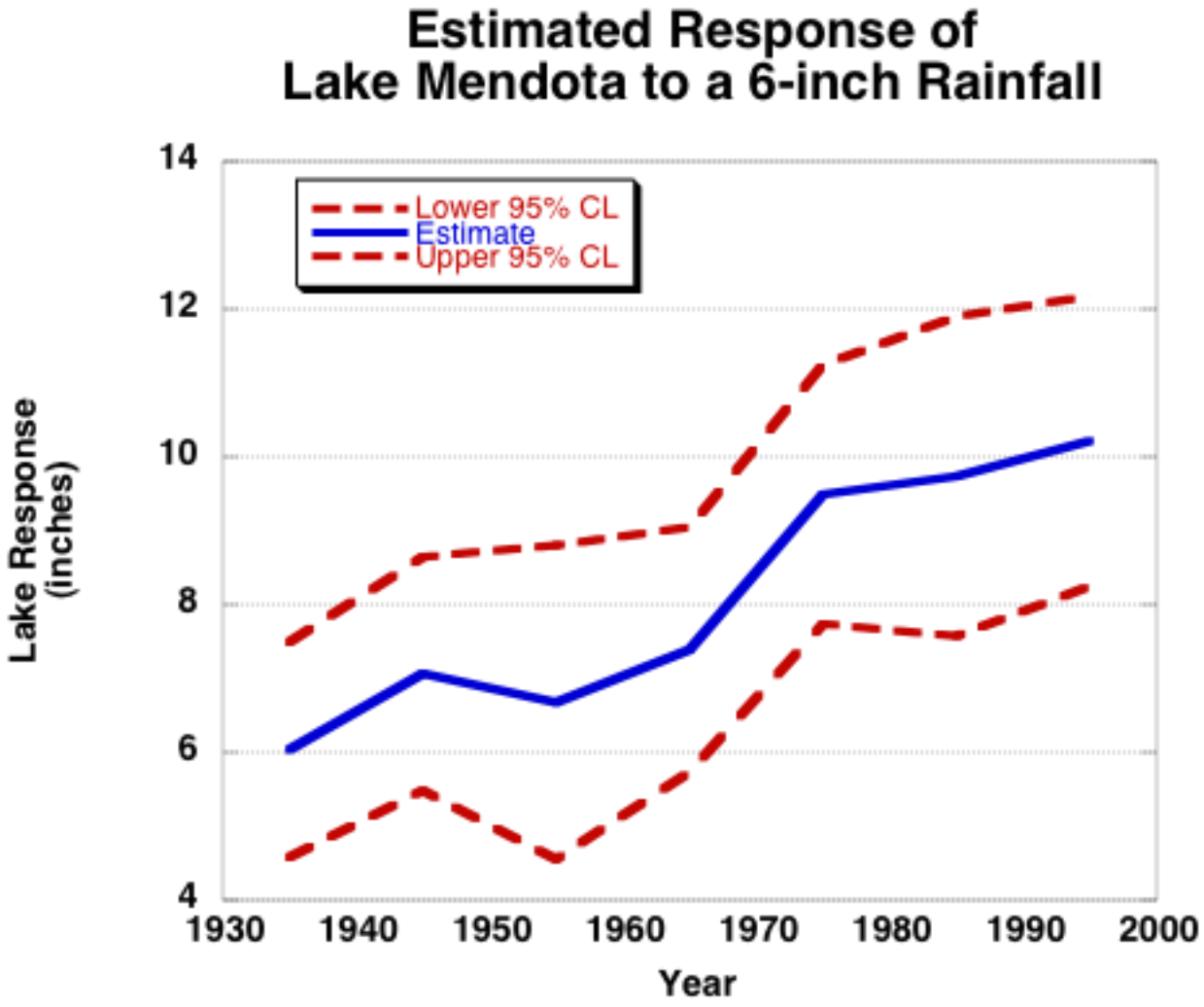
Dams at outlets of Mendota, Waubesa, and Kegonsa

Slope between Monona and Kegonsa of only 3 inches/mile

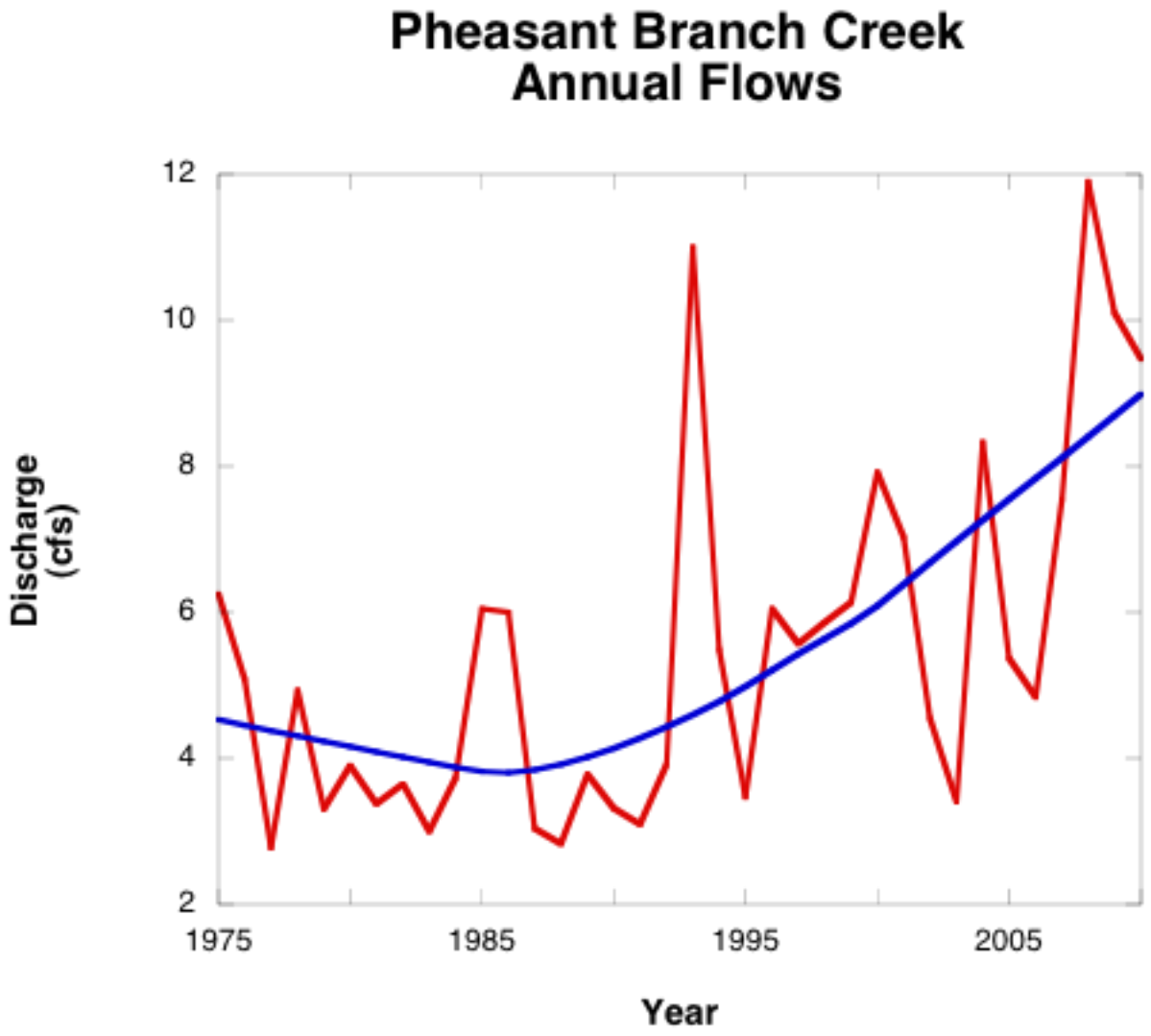


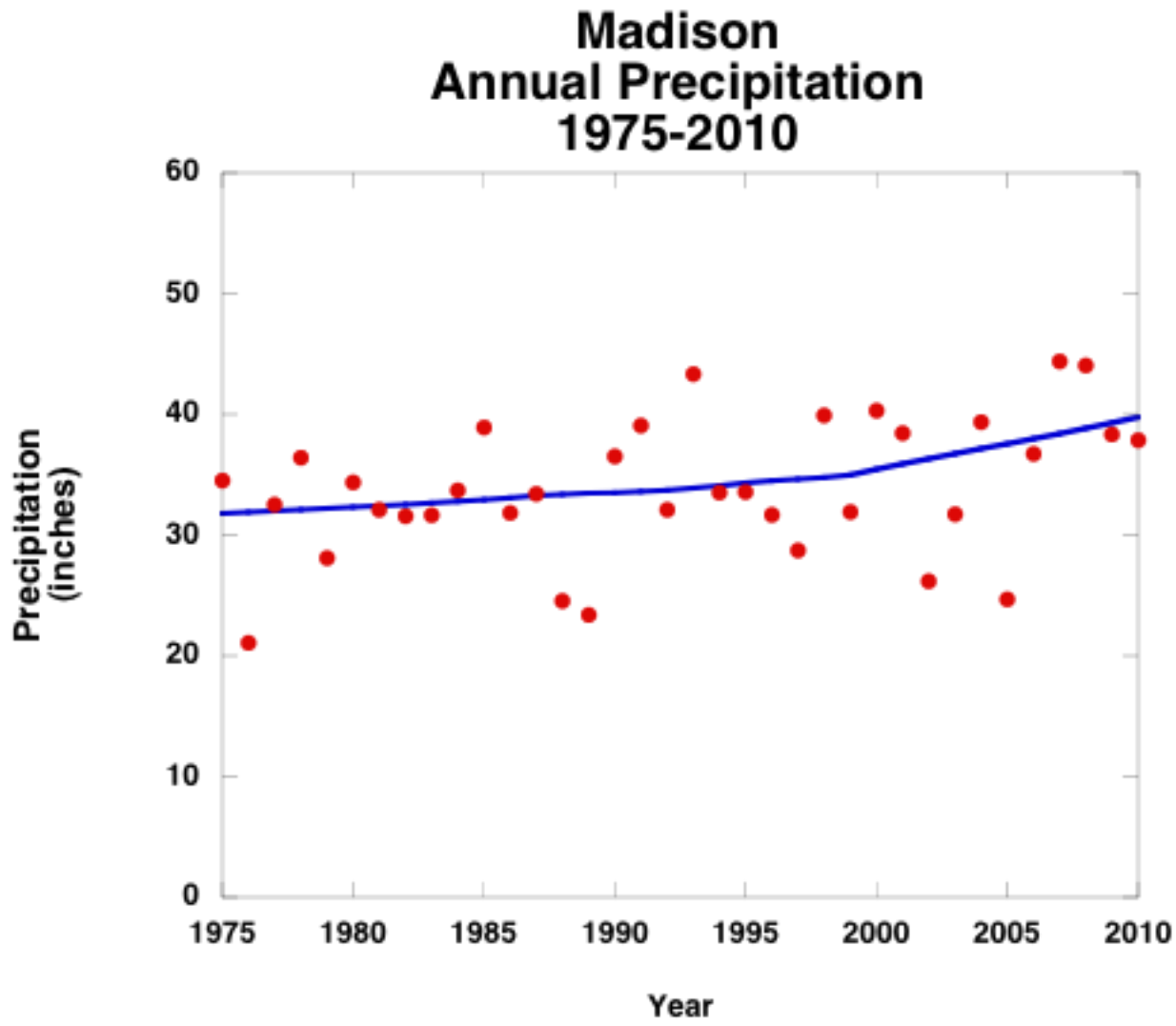
http://www.infosyahara.org/

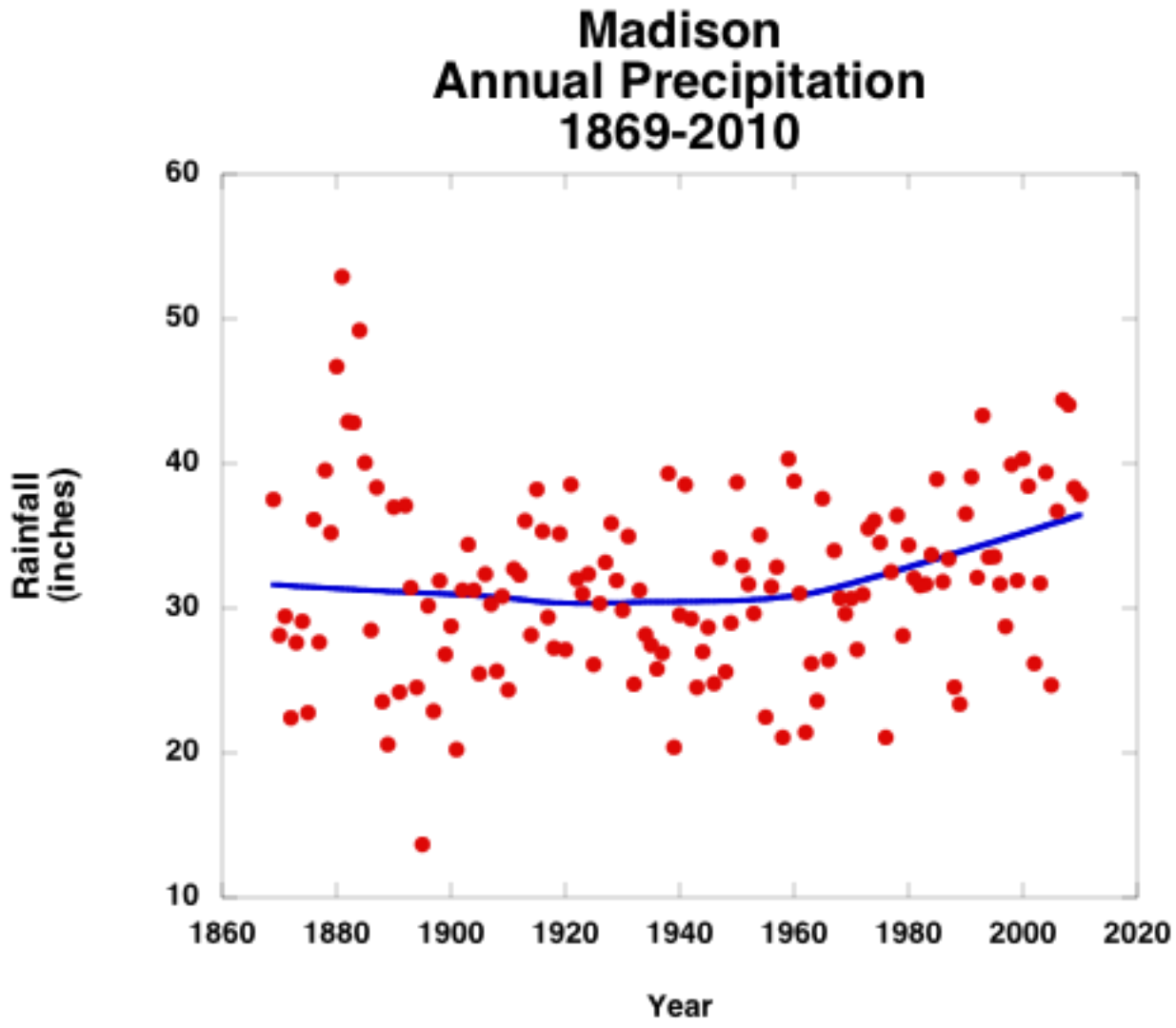

Annual Maximum Lake Levels
Lake Level (ft)
854
852
850
848
846
844
Mendota
Monona
1959
1993
2000
2008
1920
1940
1960
1980
2000
Year

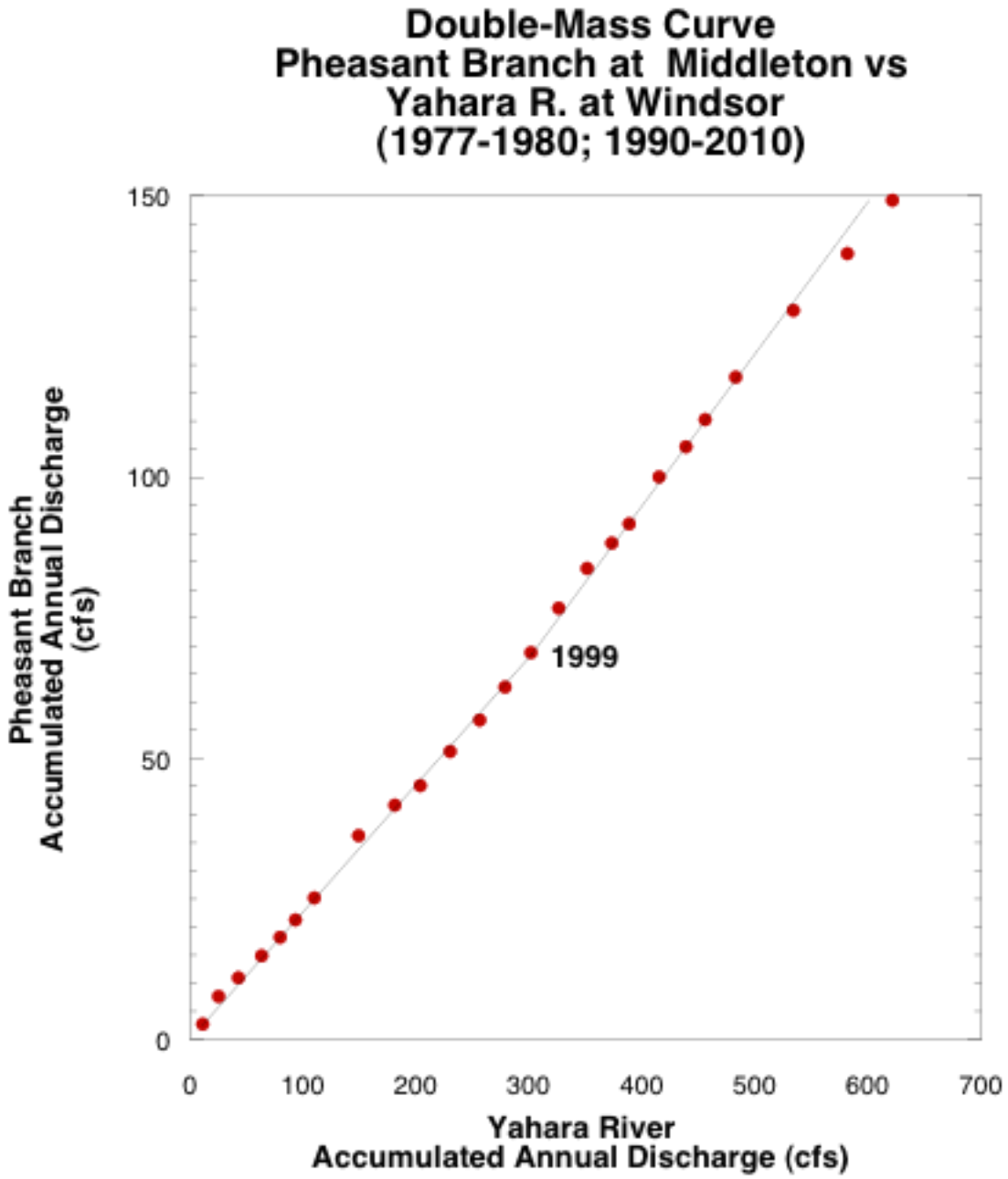


Note: Lake Mendota levels depends on runoff and water-level management.


Pheasant Branch Creek
Annual Flows
Discharge
(cfs)
12
10
8
6
4
2
1975
1985
1995
2005
Year


Madison
Annual Precipitation
1975-2010
Precipitation (inches)
60
50
40
30
20
10
0
1975
1980
1985
1990
1995
2000
2005
2010
Year


Madison
Annual Precipitation
1869-2010
Rainfall
(inches)
60
50
40
30
20
10
1860
1880
1900
1920
1940
1960
1980
2000
2020
Year



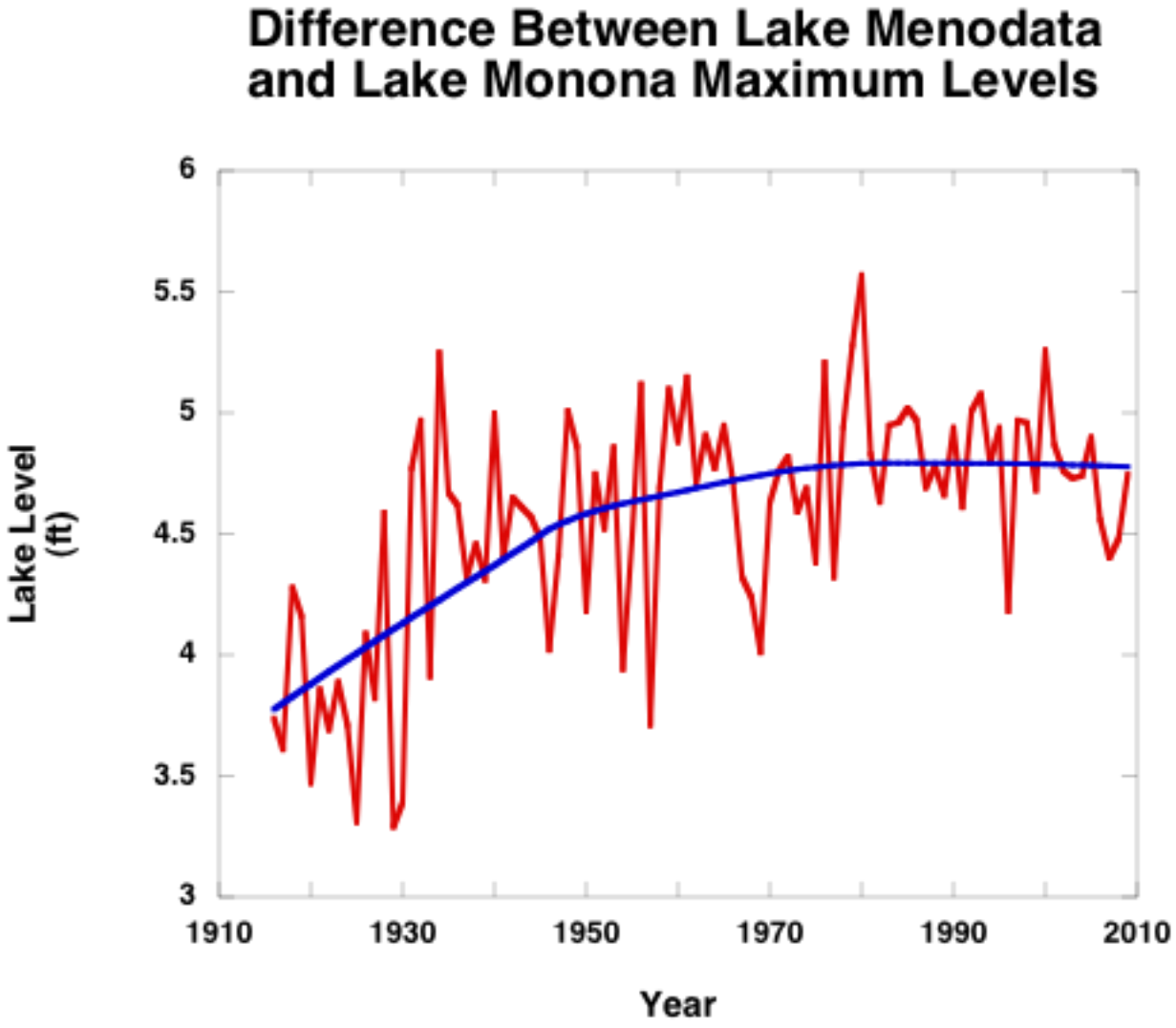
Note missing years:
1981-1989

Mendota Water Levels

Mendota water levels are rising because

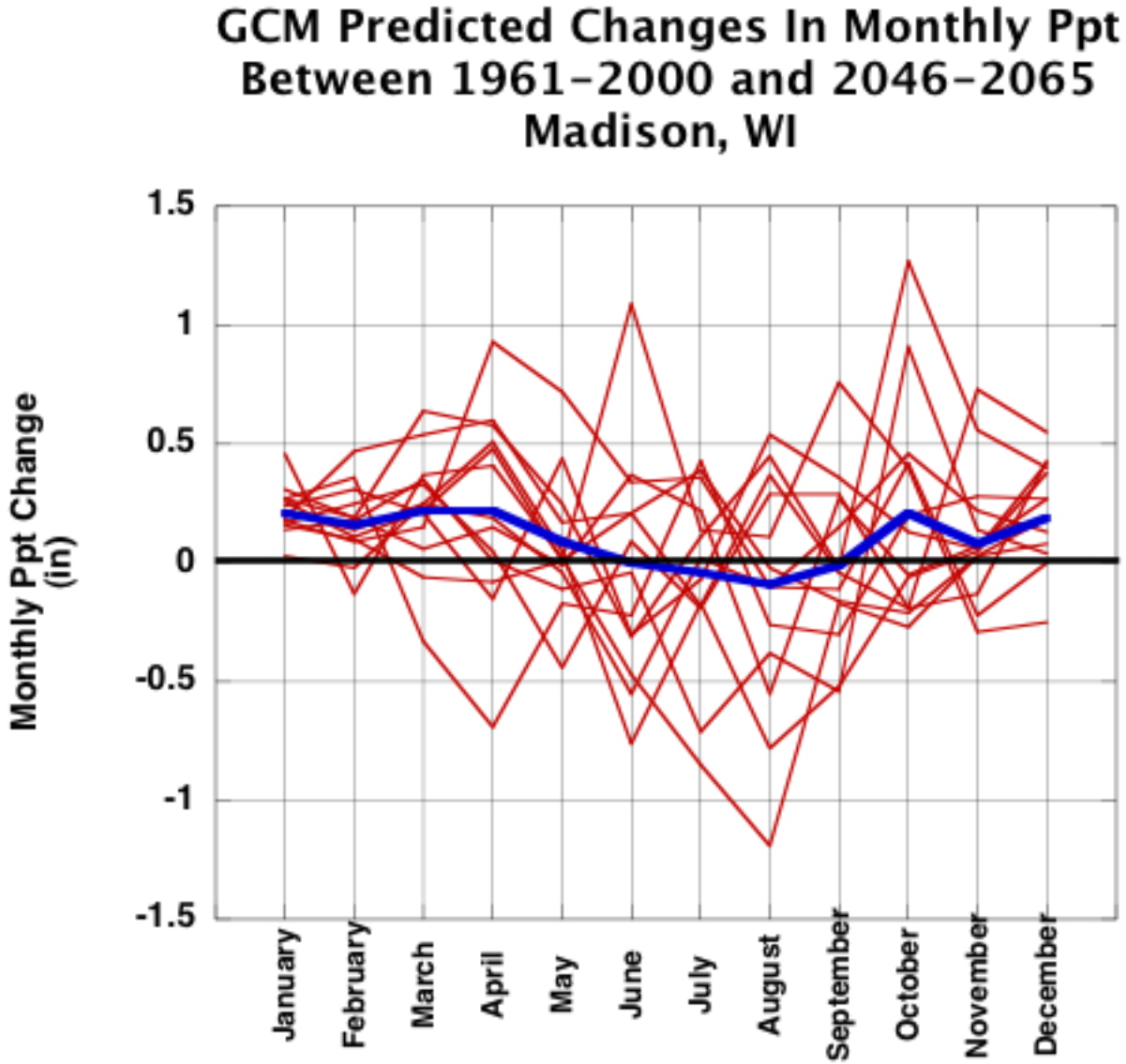
- Precipitation has been increasing
- The watershed has been urbanizing
  - Increased impervious area
  - Connection of previously unconnected areas (e.g., Stricker and Tiedeman ponds)

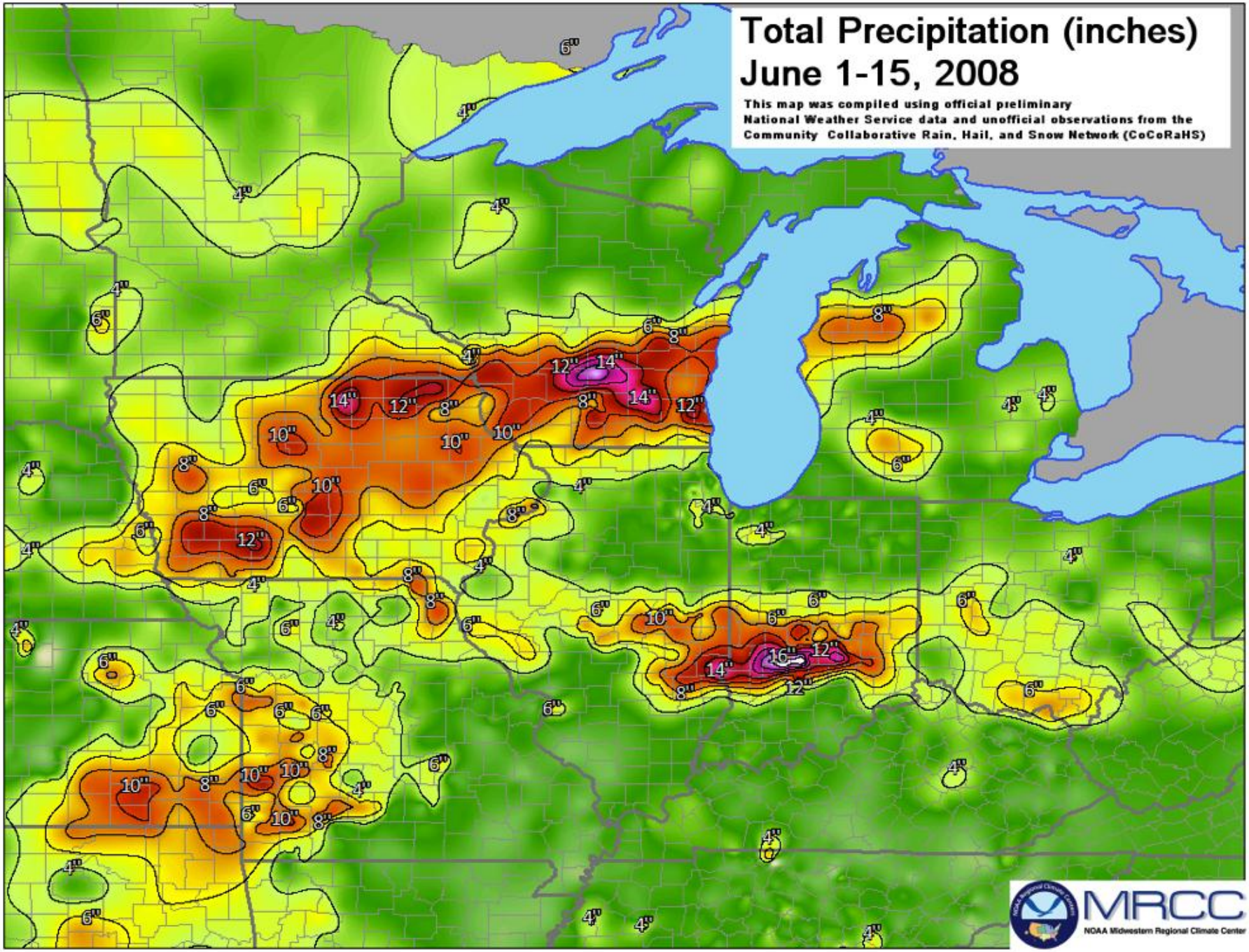
But why hasn't Lake Monona been rising?

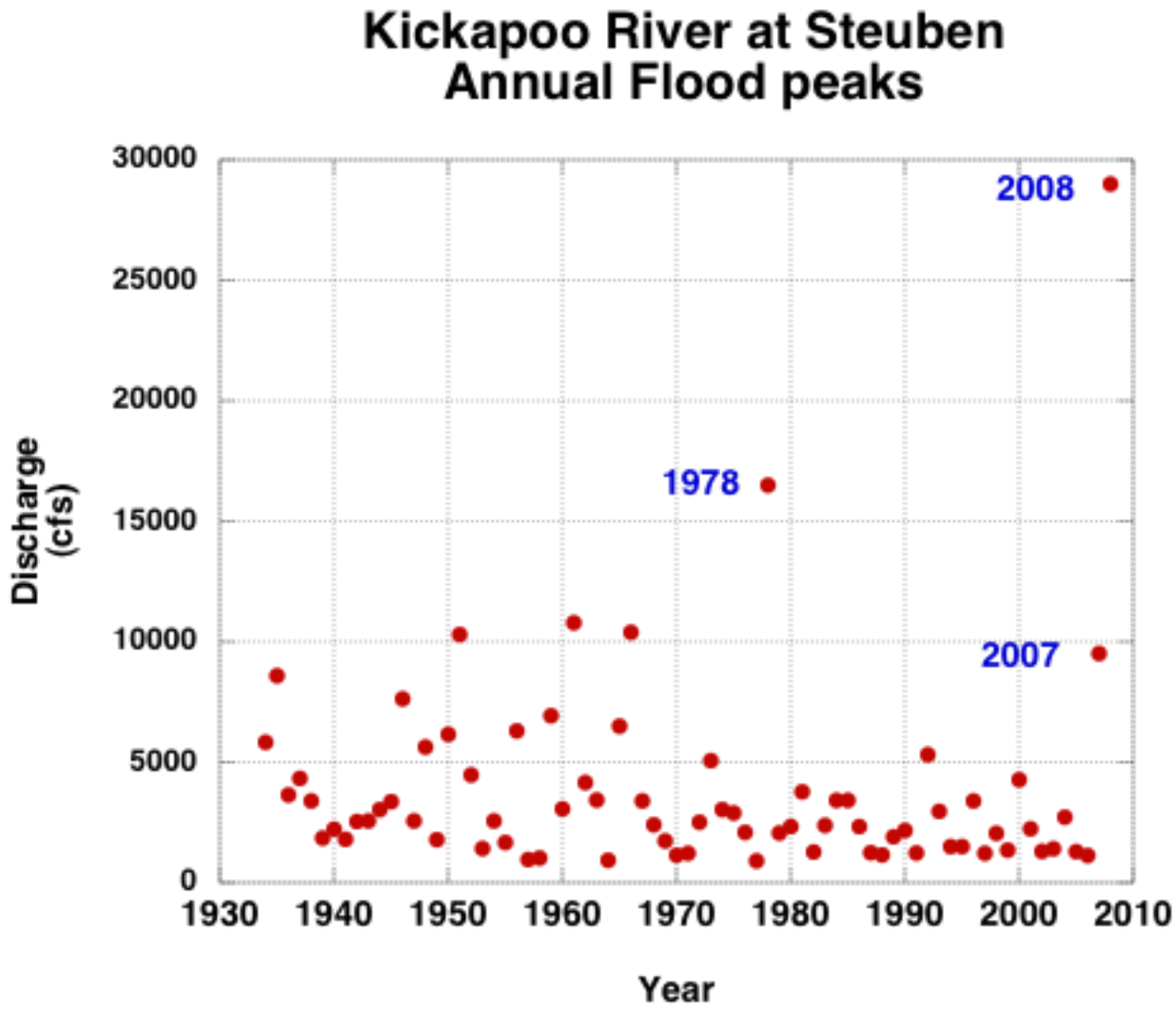


If runoff continues to increase, it will no longer be possible to use Lake Mendota to protect residents of Lake Monona.

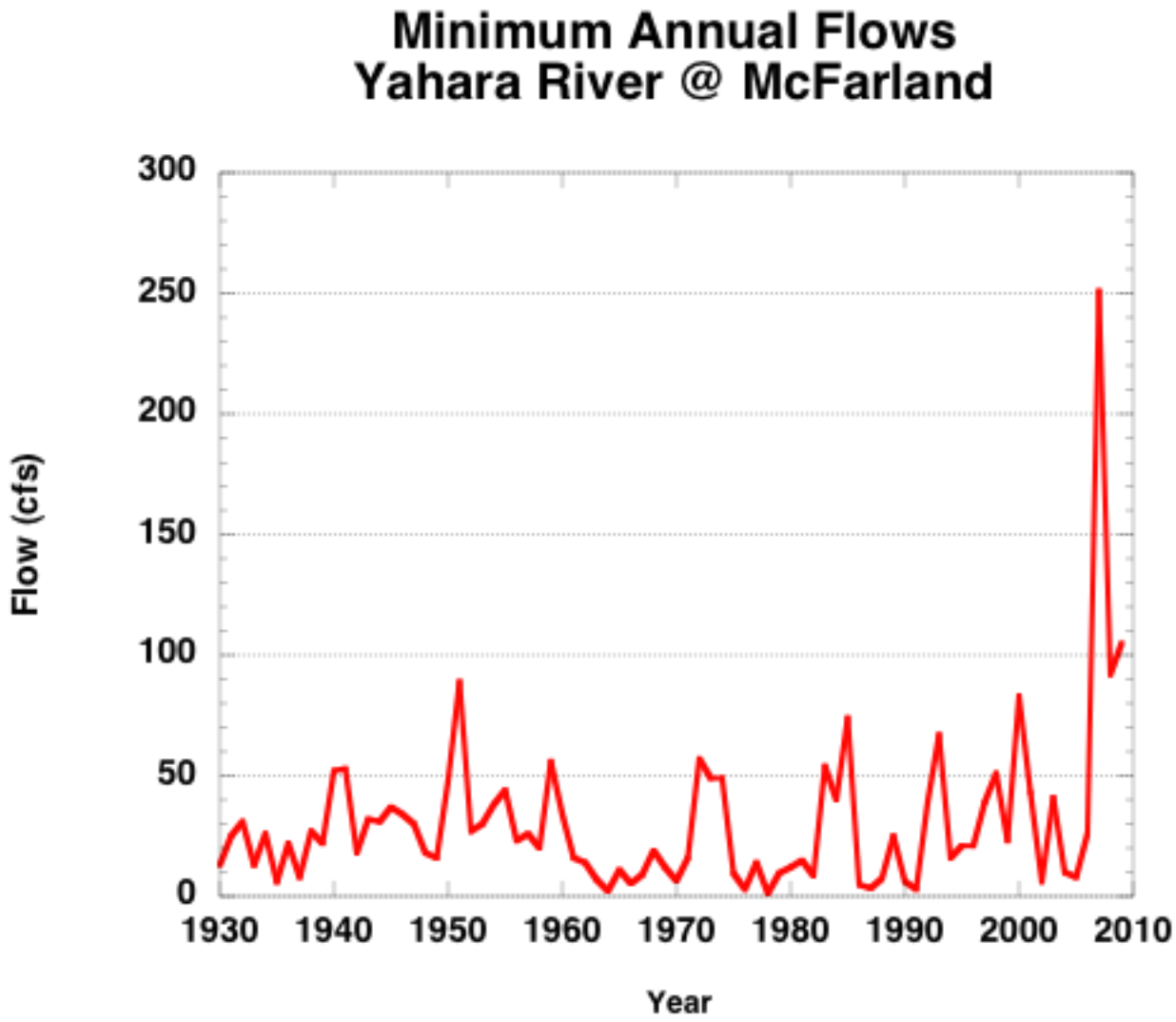
What about climate change?


GCM Predicted Changes In Monthly Ppt
Between 1961-2000 and 2046-2065
Madison, WI
Monthly Ppt Change
(in)
1.5
1
0.5
0
-0.5
-1
-1.5
January
February
March
April
May
June
July
August
September
October
November
December


Total Precipitation (inches)
June 1-15, 2008
This map was compiled using official preliminary
National Weather Service data and unofficial observations from the
Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS)
MRCC
NOAA Midwestern Regional Climate Center


Kickapoo River at Steuben
Annual Flood peaks
Discharge (cfs)
30000
25000
20000
15000
10000
5000
0
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year
2008
1978
2007

Spring Green, 2008


Minimum Annual Flows
Yahara River @ McFarland
Flow (cfs)
300
250
200
150
100
50
0
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year

Prerequisites for Better Management

- Better understanding of the tradeoffs associated with different lake level management policies
  - Need a hydrologic model of watershed to go with the UW hydrodynamic model
  - Need improved precipitation coverage (more rain gages coupled with radar) to calibrate a hydrologic model and perhaps provide predictive capacity.
- Effective stormwater management
  - Are the requirements of the Dane County stormwater sufficient to prevent increases in runoff with future urbanization?
    - What about closed watersheds?
  - Are infiltration practices working?
- Better understanding of the potential impacts of climate change?