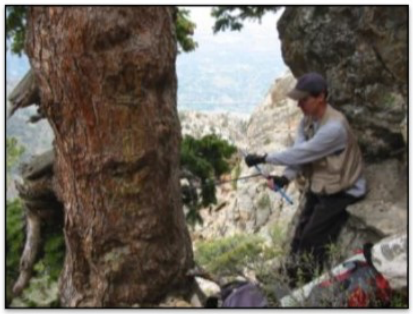
Integrating paleo-drought information with water management in the Wasatch Front

Seth Arens
Western Water Assessment
10/25/16

Wasatch Dendroclimatology Research group (WaDR)

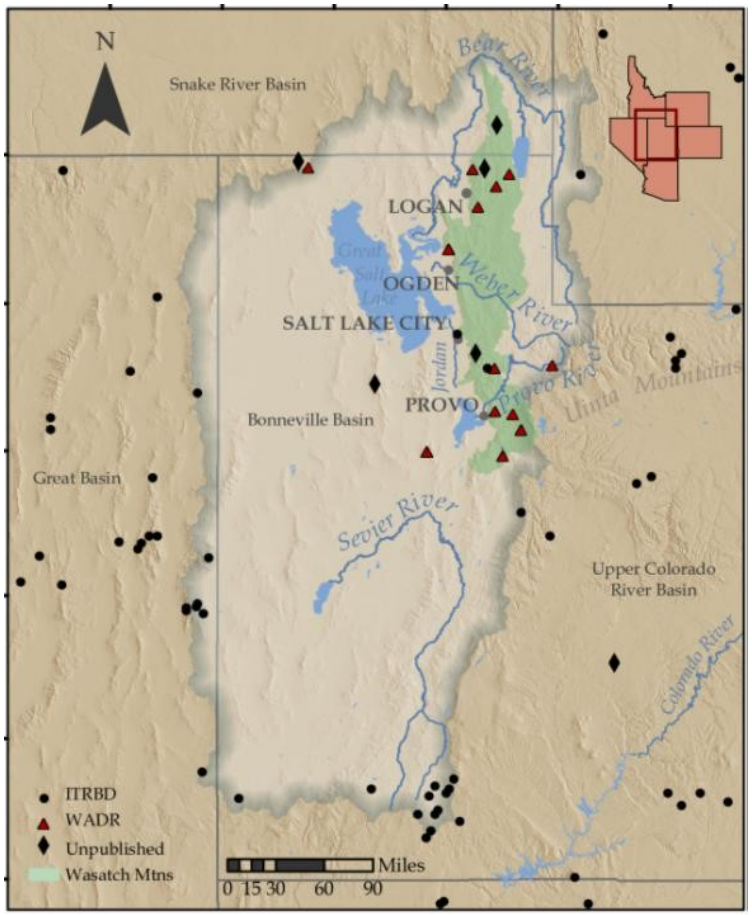
- Reconstruct hydrology and climate of Utah using tree rings
- Stream flow reconstructions of Wasatch Front rivers
- Focus on create readily usable science for water managers

WAsatch Dendroclimatology Research (WADR) Group



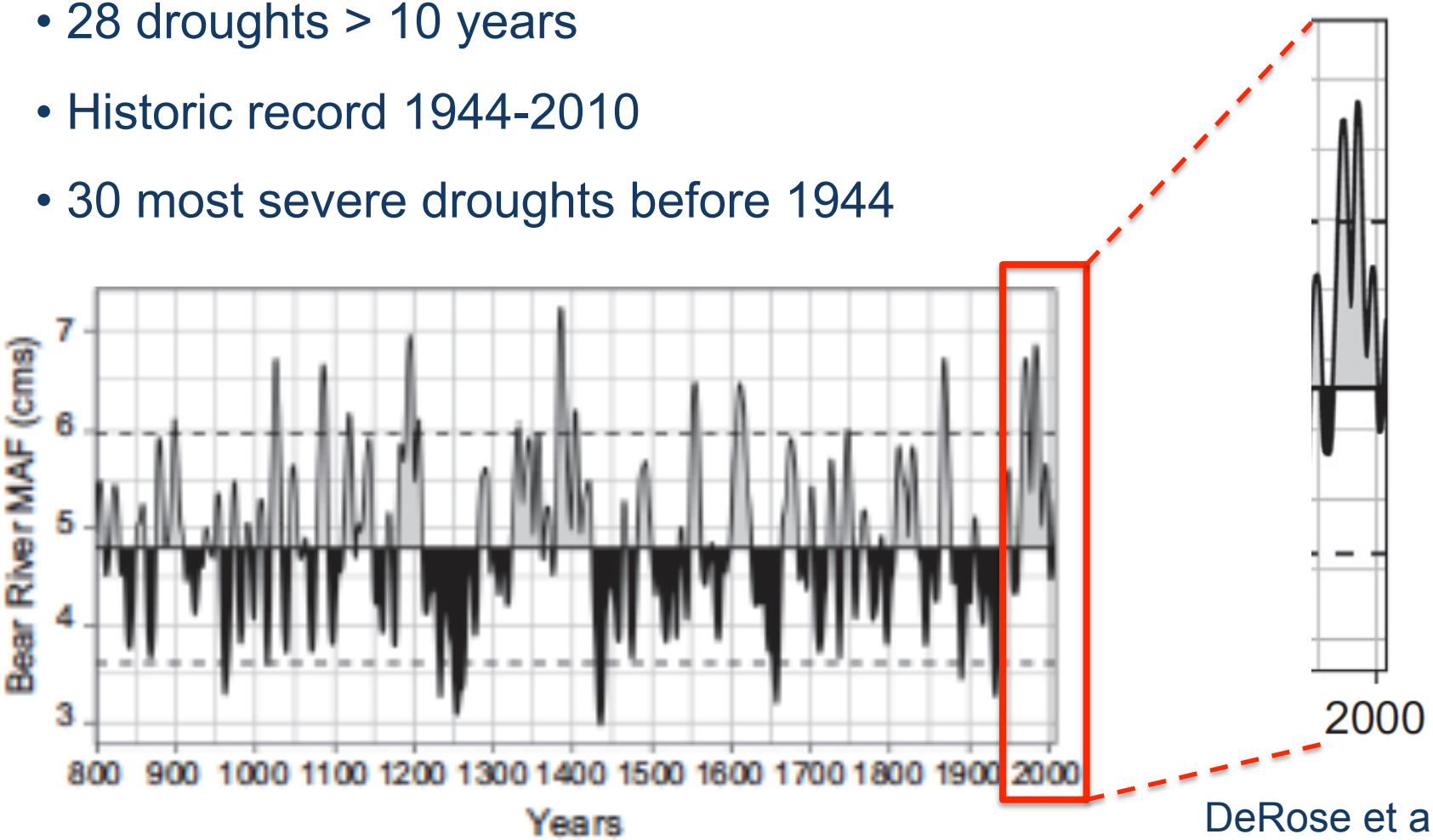
Utah stream flow reconstructions

- Logan River – 400 yrs
  - Allen et al. 2013
- Weber River – 576 yrs
  - Bekker et al. 2014
- Bear River – 1200 yrs
  - DeRose et al. 2015
- Rocky Mtn Juniper



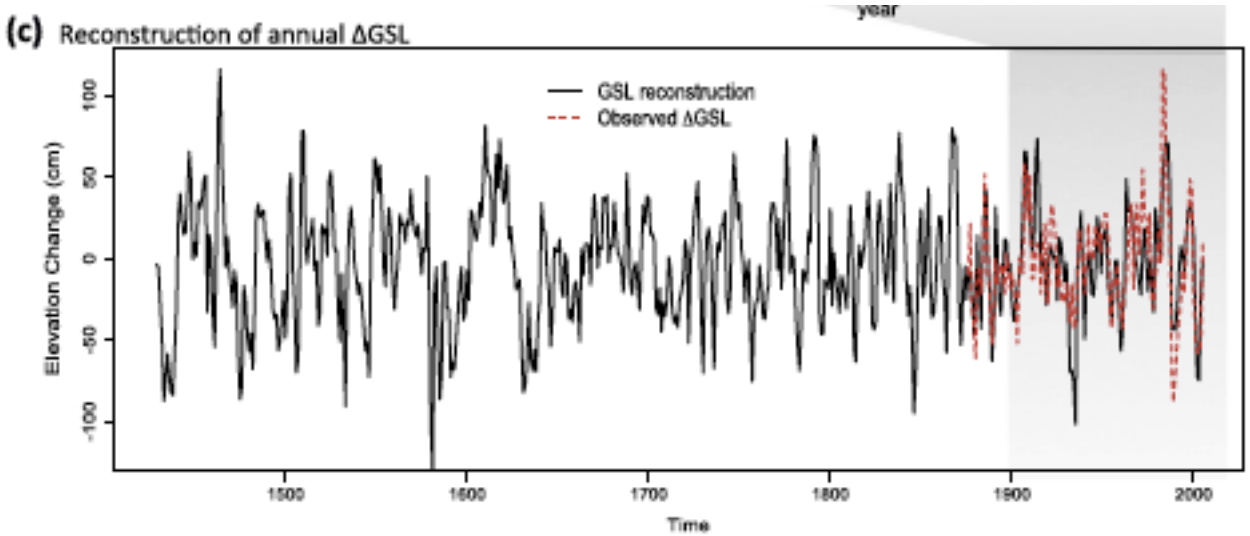
Bear River drought frequency

- 71 year drought of record (1200s)
- 28 droughts > 10 years
- Historic record 1944-2010
- 30 most severe droughts before 1944



DeRose et al. 2015

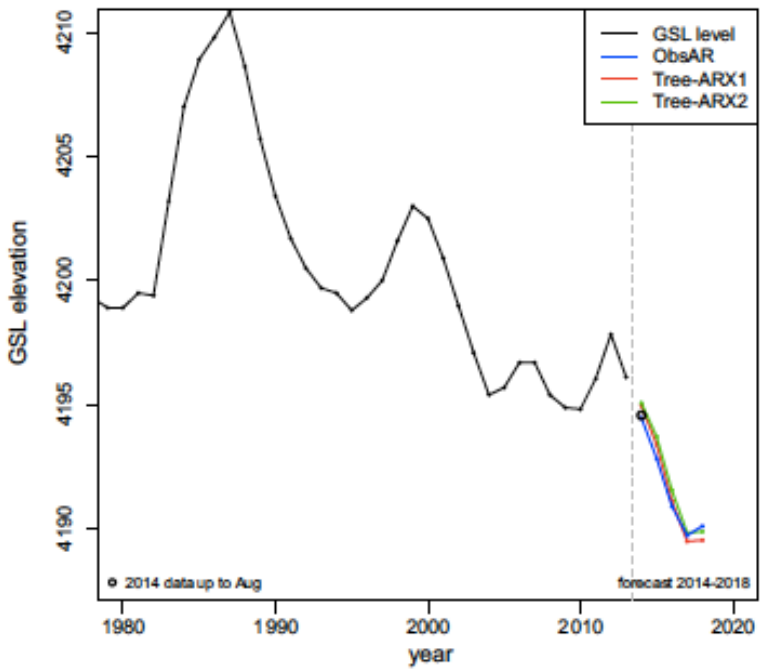
Great Salt Lake level



- 576 year lake level reconstruction
  - Weber River tree ring chronology
- > 2m variation in lake level
- Pacific Quasi-decadal oscillation

Gillies et al. 2011
Wang et al. 2010

Great Salt Lake level

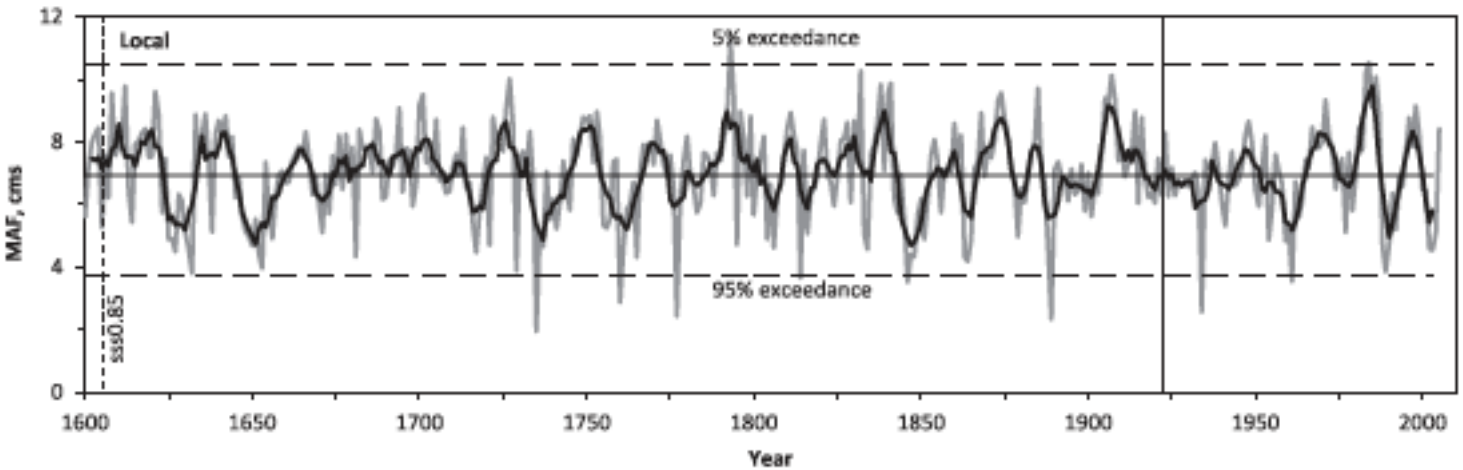


- Predictive model
- Underestimates lake level during wet periods
- Dry periods concurrent with paleo-stream flow

https://climate.usurf.usu.edu/GSL.php

Gillies et al. 2015

"What do I do with that?" (anonymous water manager)



Logan River stream flow reconstruction (Allen et al. 2013)

- Collaborative effort to work with Utah water managers
- Center for Water Efficient Landscapes (CWEL)
- Utah State University, Brigham Young University
- WaDR, WWA

Stakeholder engagement

- Wasatch Front water managers
- Forum to share new research
- Interviewed water managers 2012-13
- Meetings in 2014, 2015

Weber Basin Water Conservancy District

- USBR grant – Drought contingency planning
- Paleo-data used a input to systems model
- Annual water availability/ reservoir storage
- USU, State Div. of Water Resources, WWA

Questions