

Rainfall-runoff modeling Utah's Wasatch Front: Sensitivity to Climate Change

Jamie Vawdrey, Utah State University

Research Mentor: Dr. Sarah Null, Utah State University

Goals

- Understand how Utah can better plan for the effects of climate change on water resources in the Bear, Weber, and Jordan-Provo Rivers.

Since Utah is semi-arid, water resource planning has always been required because annual rainfall is not sufficient for crops or municipal use. It is essential to know which regions within Utah are most sensitive to anticipated climate change to provide for Utah's needs.



<http://ilovehistory.utah.gov/topics/water/irrigation.html>

Figure 1. The Logan Hyde Park Smithfield Canal in Cache Valley, Utah in the late 1800s.

RESEARCH QUESTION: Which regions in northern Utah are most susceptible to expected climate change in the next century?

Methods

- Evaluate 407 sub-basins in Utah's Bear, Weber, and Jordan-Provo watersheds using the Water Evaluation and Planning (WEAP21) model.
- Use climate data ranging from 1985-2015 to estimate historical (undeveloped) streamflows.
- Estimate climate warming using WEAP21 with uniform temperature changes of 2°, 4°, and 6° C.
- Input GIS land cover data into WEAP21 for each region. Types of land cover include: agricultural, barren, grasslands, shrubs, trees, urban, wetlands, open water, and unidentified regions.

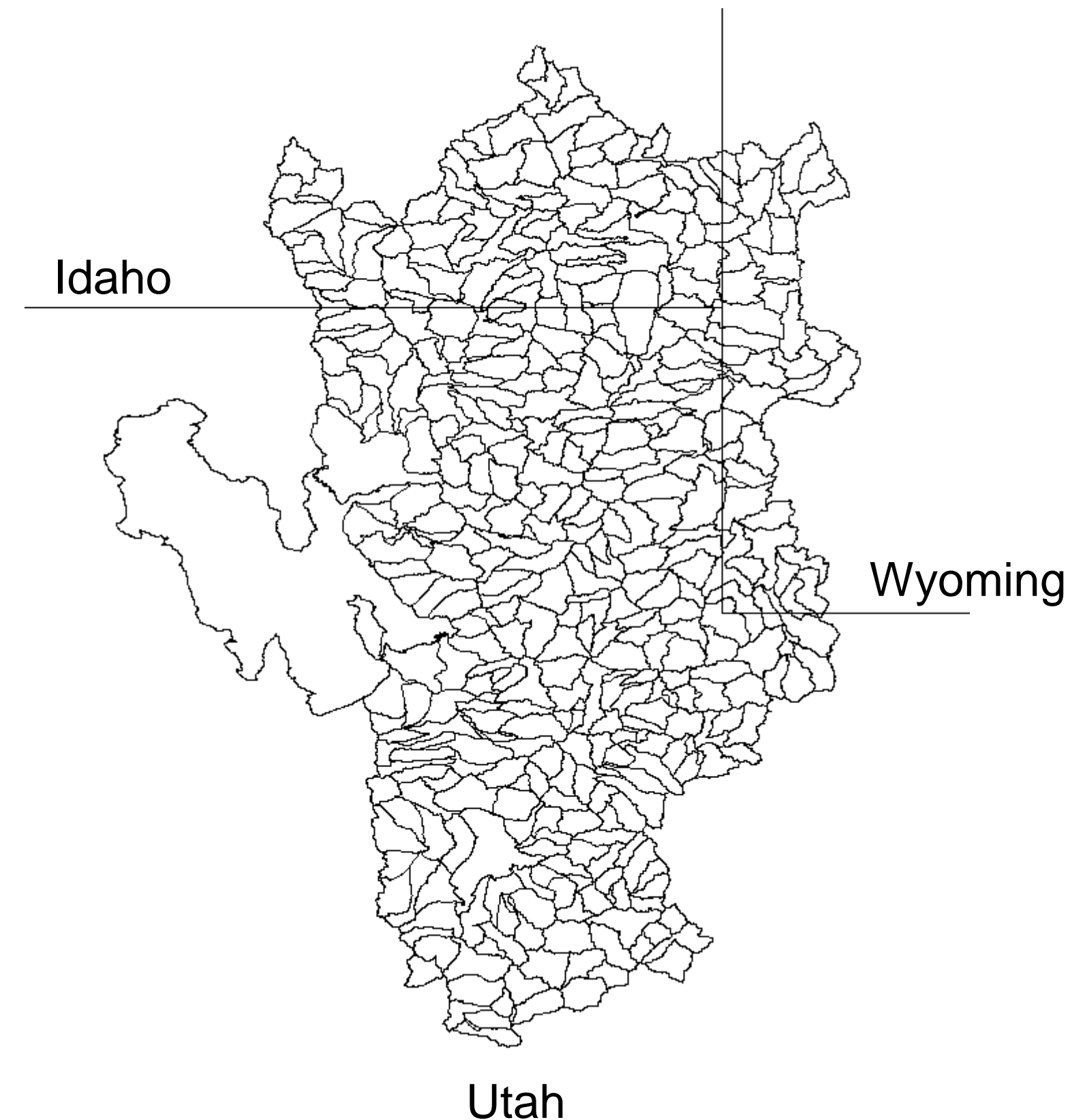
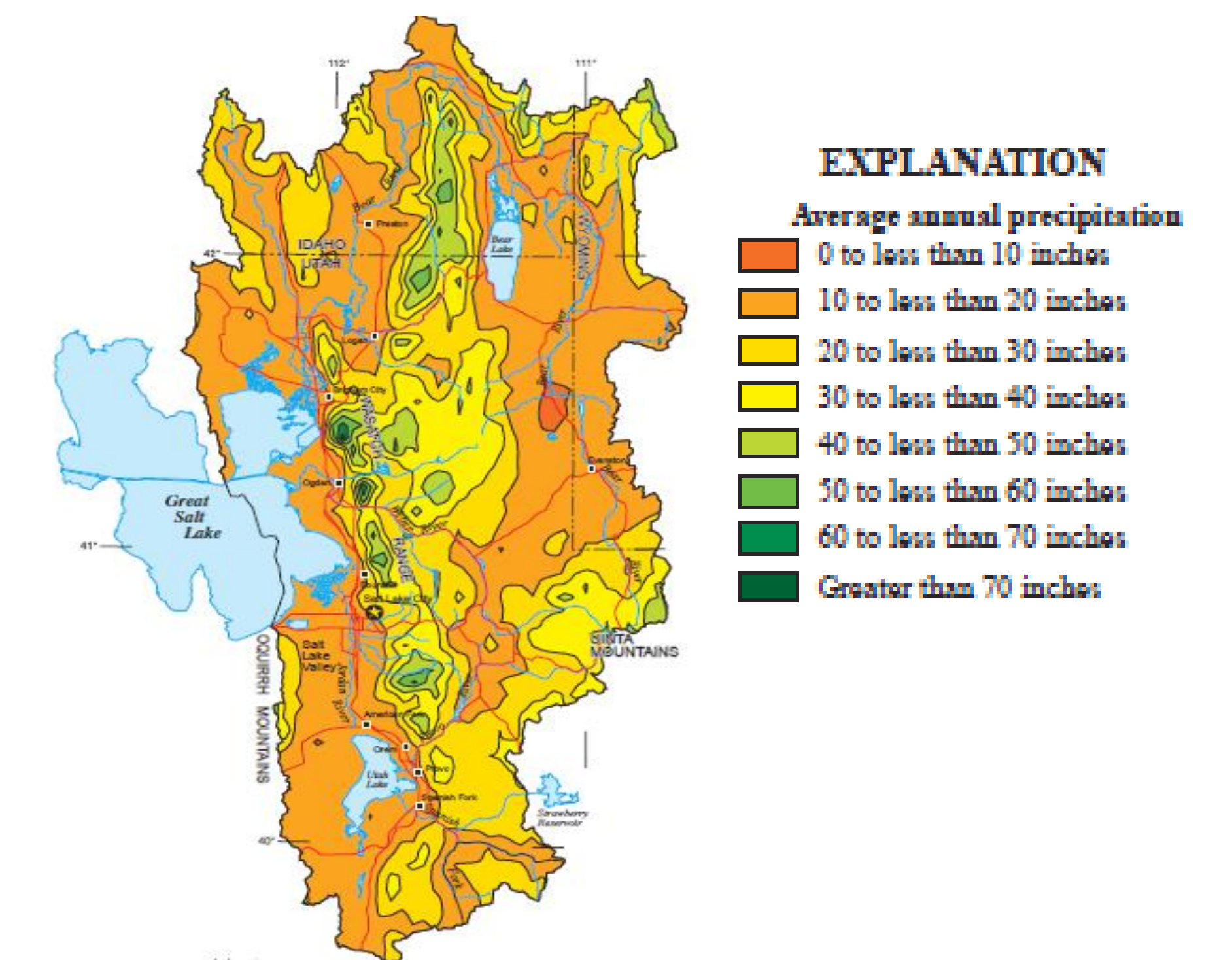


Figure 2. The 407 different sub-basins modeled in northern Utah's Bear, Weber, and Jordan-Provo watersheds.

Impacts

- Determine which regions are most sensitive to climate-induced hydrological change.
- As climate temperatures increase, there will be a decrease in snowfall in regions that require snow to sustain themselves.



<http://pubs.usgs.gov/wri/wri024115/pdf/wri024115.pdf>

Figure 3. Average annual precipitation in northern Utah indicating regions that may be more susceptible to climate change.

Results of this study will allow specific regions in northern Utah to better plan and prepare for changes in water availability regarding climate change in the next century.



Jamie.vawdrey@aggiemail.usu.edu

IFELLOWS UNDERGRADUATE RESEARCH PROGRAM



<http://iutahepscor.org>

