WESTERN WATER ASSESSMENT
A NOAA RISA TEAM

# Building Climate Resilience by Design

Western Water Assessment
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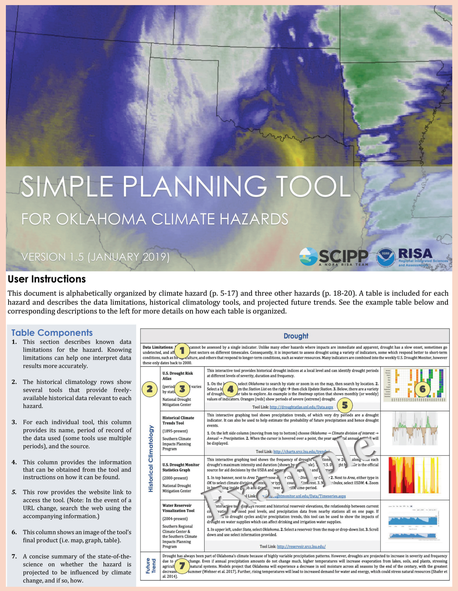
**ABSTRACT** **Western Water Assessment** is advancing a range of projects that build community and water system resilience and advance usable science in the region. Our approach utilizes social science research methods to increase understanding of resilience and how to better support communities in climate adaptation, and physical science research on topics such as snowpack, hydrology, and climate change. In this poster, we will share more about a selection of our recent and ongoing projects.

## UTAH HAZARD PLANNING TOOL

WWA is collaborating with the Southern Climate Impacts Planning Program (SCIPP) to build the capacity of state and local hazard mitigation efforts to incorporate climate into their natural hazards planning efforts, and to use those planning efforts to support actionable climate adaptation. Climate change planning has not yet been undertaken broadly by state-level organizations in Utah, and there is a need for tailored climate information. SCIPP's award-winning Simple Planning Tool provides a tested model for compiling and sharing trusted information about climate hazards in a usable format. WWA is currently adapting the Simple Planning Tool to reflect the key hazards that Utah emergency managers face, and to incorporate summaries of climate impacts for each hazard.




An example page from SCIPP's Simple Planning Tool. The full Simple Planning Tool is available at: http://www.southernclimate.org/documents/SPTOK.pdf.

WWA's Seth Arens developed a draft Utah Hazard Planning Tool in early 2021, and hosted a stakeholder workshop to share the tool with emergency managers and other decision-makers from communities, counties, and state agencies in Utah. Stakeholders provided input on the usability of the tool, the context in which they will use it, and suggestions for improvements. We expect the final version of the tool to be released in Fall 2021.

The Colorado River cuts through sediment deposited on the bed of Lake Powell near Hite Marina, Utah.

## FLOODING IN THE INTERMOUNTAIN WEST AND GREAT LAKES

Flooding across the Front Range in September 2013 claimed 10 lives and caused more than $2 billion in damages.

Flooding is the second deadliest weather-related hazard in the US (Ashley and Ashley 2008) and one of the most pressing issues for small and mid-sized cities in the Great Lakes and Intermountain West regions.

Yet, there has been relatively limited understanding of the interplaybetween population shifts, economic growth, policy governance, equity, and climate impact, especially flooding, in small and mid-sized cities in both regions. In both regions, small and mid-sized cities face difficult choices about how to shape their urban form to best manage flood risk in a changing climate, especially because they often have a limited tax base to support infrastructure changes, and cannot afford costly mistakes about development choices that could further exacerbate vulnerability, risk and inequity. In addition, outdated design standards, lack of capacity to mitigate climate-related risks and slow economic recovery pose a new set of challenges to these cities in the short and long-term.

In this cross-RISA collaborative project, WWA and Great Lakes Integrated Sciences and Assessments (GLISA) are conducting pilot work to test and co-develop a usable spatially-explicit model of urban development in the context of flood patterns and existing socio-political variables for small and mid-sized cities across our two regions. WWA's Liz Payton and Lineke Woelders are also collaborating with GLISA researchers on an analysis of specific case study communities that face high flood risk in both regions. This summer, WWA will also be evaluating flooding risk and experiences in manufactured housing communities, which are often particularly vulnerable to flooding and have limited resources to adapt.

A man sits outside his home, destroyed by floods, in Lyons, Colorado in 2013.

## WEBER RIVER BASIN CLIMATE VULNERABILITY ASSESSMENT

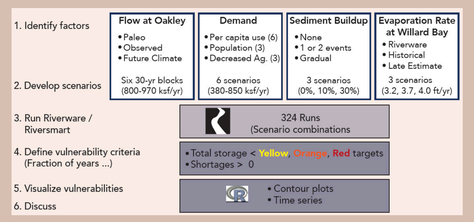
In January 2021, WWA released the *Weber River Basin Climate Vulnerability Assessment*. Weber Basin Water Conservancy District (WBWCD) is a wholesale water provider in northern Utah with over 600,000 customers. It is the first water provider in Utah to address climate change directly through a climate vulnerability assessment, which will be used to inform water management decisions in the region.

WWA's Seth Arens led development of the assessment, which was generated through a unique collaboration between climate scientists, hydrologists, modelers, and the WBWCD. It provides a detailed review of historical climate and hydrology, downscaled projections of future precipitation, temperature and hydrology, and a vulnerability analysis of the WBWCD water system to inform water supply planning in the Weber River basin.

Climate modelers at the University of Utah and Utah State University used multiple modeling techniques to investigate future climate scenarios and impacts to water supply. The primary goal of delivering multiple projections of future climate was to provide WBWCD the information necessary to evaluate and plan for multiple future climate scenarios based on the range of future climate projections.

| PARAMETER | METHOD | LOCATION | RCP4.5 | | RCP6.0 | | RCP8.5 | |
|---|---|---|---|---|---|---|---|---|
| | | | 2050 | 2085 | 2040 | 2090 | 2050 | 2085 |
| T | LOCA | Basin-wide | +4° | +7° | - | - | +6° | +12° |
| T | Dynamic | Ben Lomond | - | - | +2.7° | +5.3° | - | - |
| T | Dynamic | Thaynes Cyn | - | - | +2.3° | +4.6° | - | - |
| T | Dynamic | Trial Lake | - | - | +2.4° | +4.8° | - | - |
| P | LOCA | Basin-wide | 0% | +5% | - | - | 0% | +5% |
| P | Dynamic | Basin-wide | - | - | +5% | +10% | - | - |
| P | Dynamic | Ben Lomond | - | - | +4% | +7% | - | - |
| P | Dynamic | Thaynes Cyn | - | - | +8% | +13% | - | - |
| P | Dynamic | Trial Lake | - | - | +9% | +17% | - | - |
| Snow-level | LOCA | Basin-wide | +1200' | +1200' | - | - | +1800' | +3600' |
| Snow | Dynamic | Ben Lomond | - | - | 2% | -7% | - | - |
| Snow | Dynamic | Thaynes Cyn | - | - | +1% | -0.4% | - | - |
| Snow | Dynamic | Trial Lake | - | - | +2.3% | +3% | - | - |
| PET | MACA | Ogden | +5% | +9% | - | - | +8% | +16% |
| Water use | MACA | Ogden | +6% | - | - | - | +10% | - |
| Evaporation | Dynamic | Willard Bay | - | - | +1565 | +3368 | - | - |

Multiple, plausible scenarios of climate, streamflow, demand, reservoir sedimentation and reservoir evaporation were then used in a vulnerability analysis of WBWCD's water system to understand how changing climate, demographics, and drought can stress the system. As expected, shortages increase substantially as inflows decrease and demand increases.




**Read the *Weber River Basin Climate Vulnerability Assessment* at:**
**https://wwa.colorado.edu/publications/reports/weber_basin_report.pdf**

Conducting innovative research in partnership with decision makers in the West US, helping them make the best use of science to manage for climate impacts

http://wwa.colorado.edu

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