# iUtah EPSCoR: Building Scientific and Human Infrastructure to Sustain Utah's Water Resources

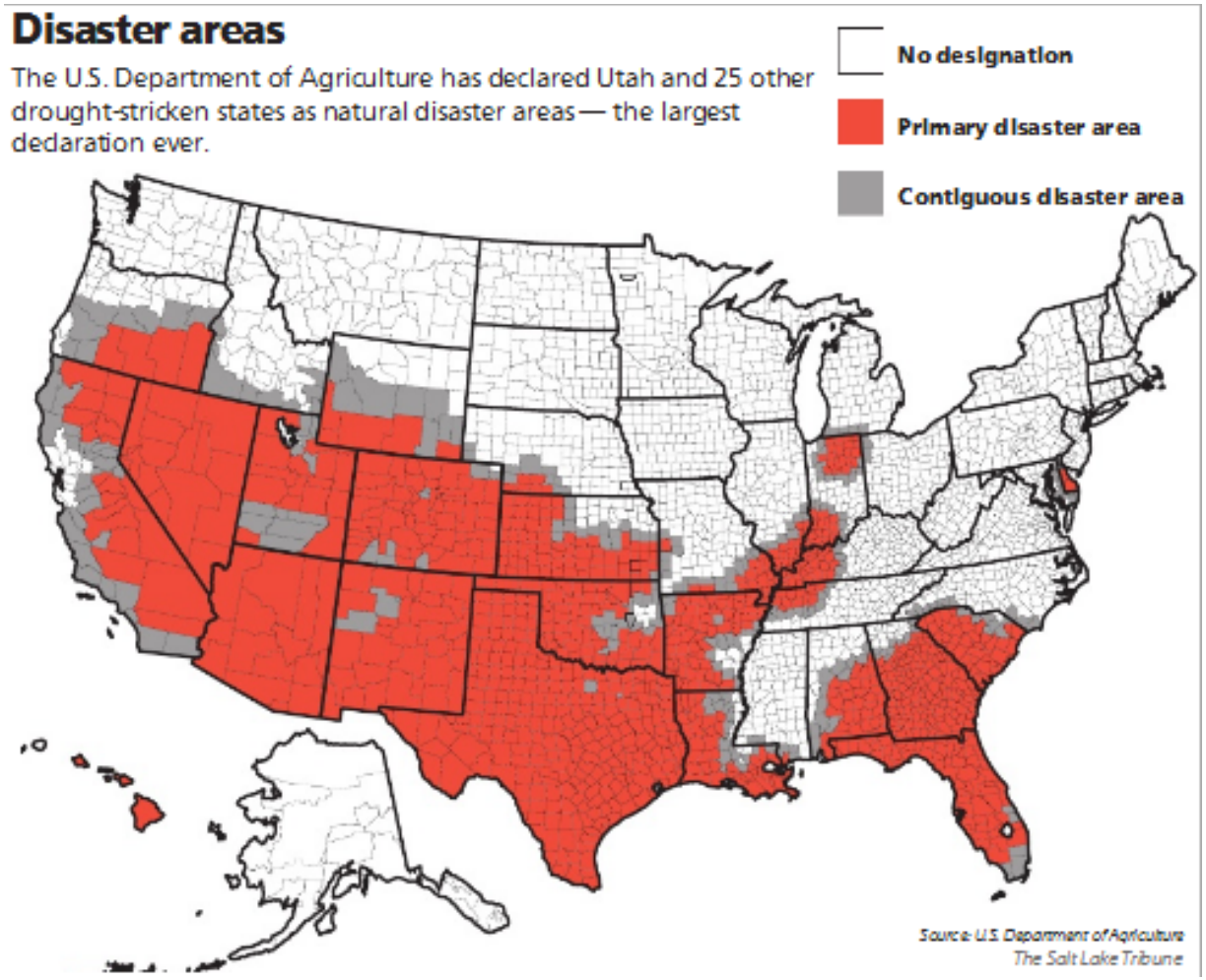
Intermountain Sustainability
Weber State University
Feb. 28, 2013

Todd A. Crowl
Utah State University & iUTAH Director



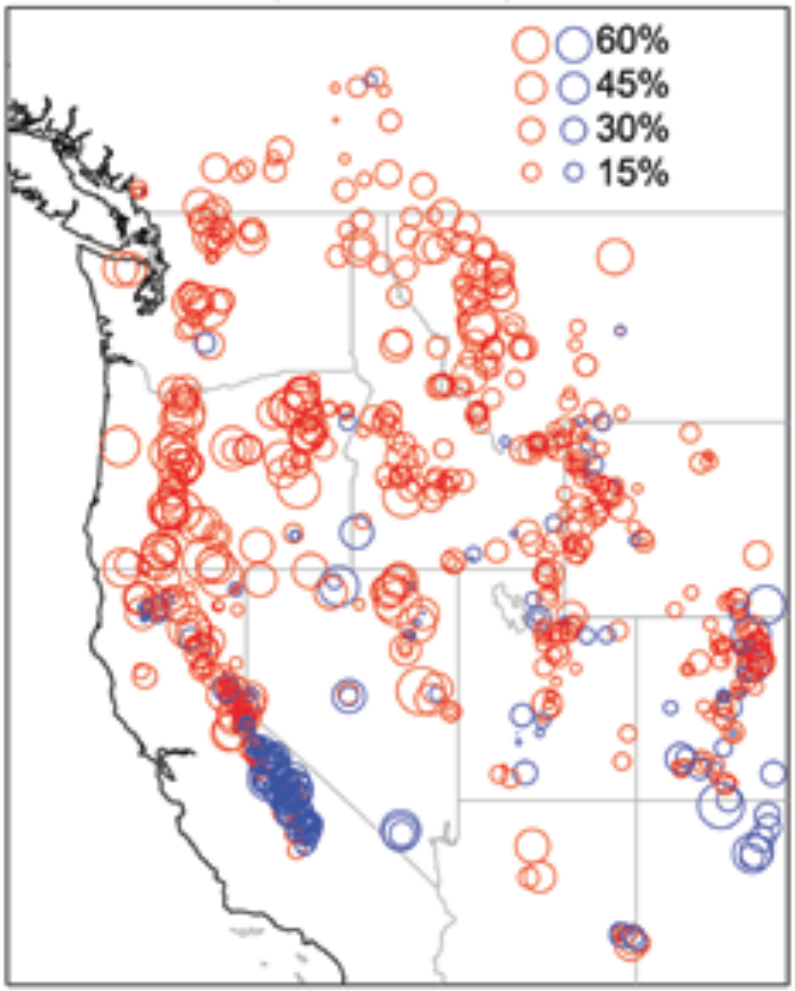
# WHAT WE KNOW

# Utah is the 2nd driest state in the nation and the situation is getting worse

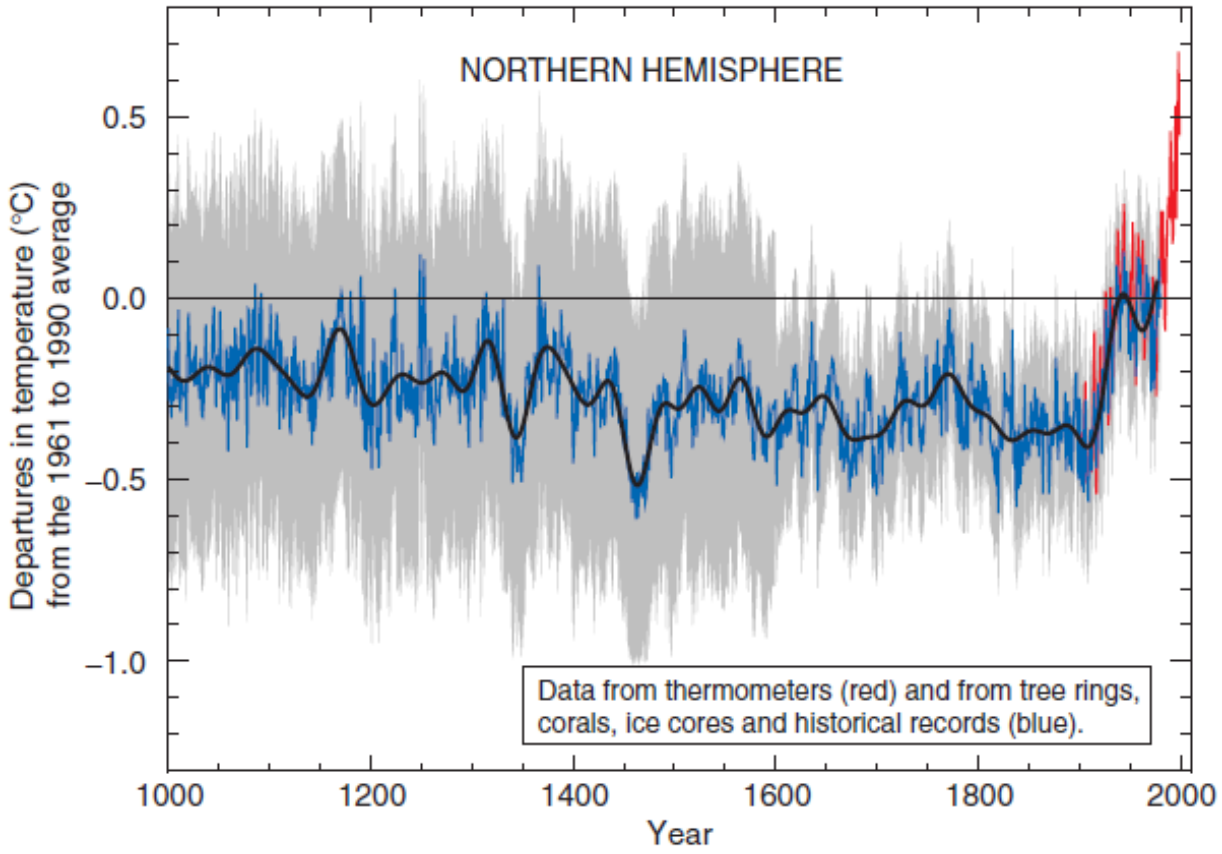



In 2012, over 20 Utah counties were declared drought disaster areas

# Great Basin – Southwest Patterns



# Water Resources




- Changing Climate
- Alter rain vs. snow mix.
- Snowmelt already starting earlier than average.

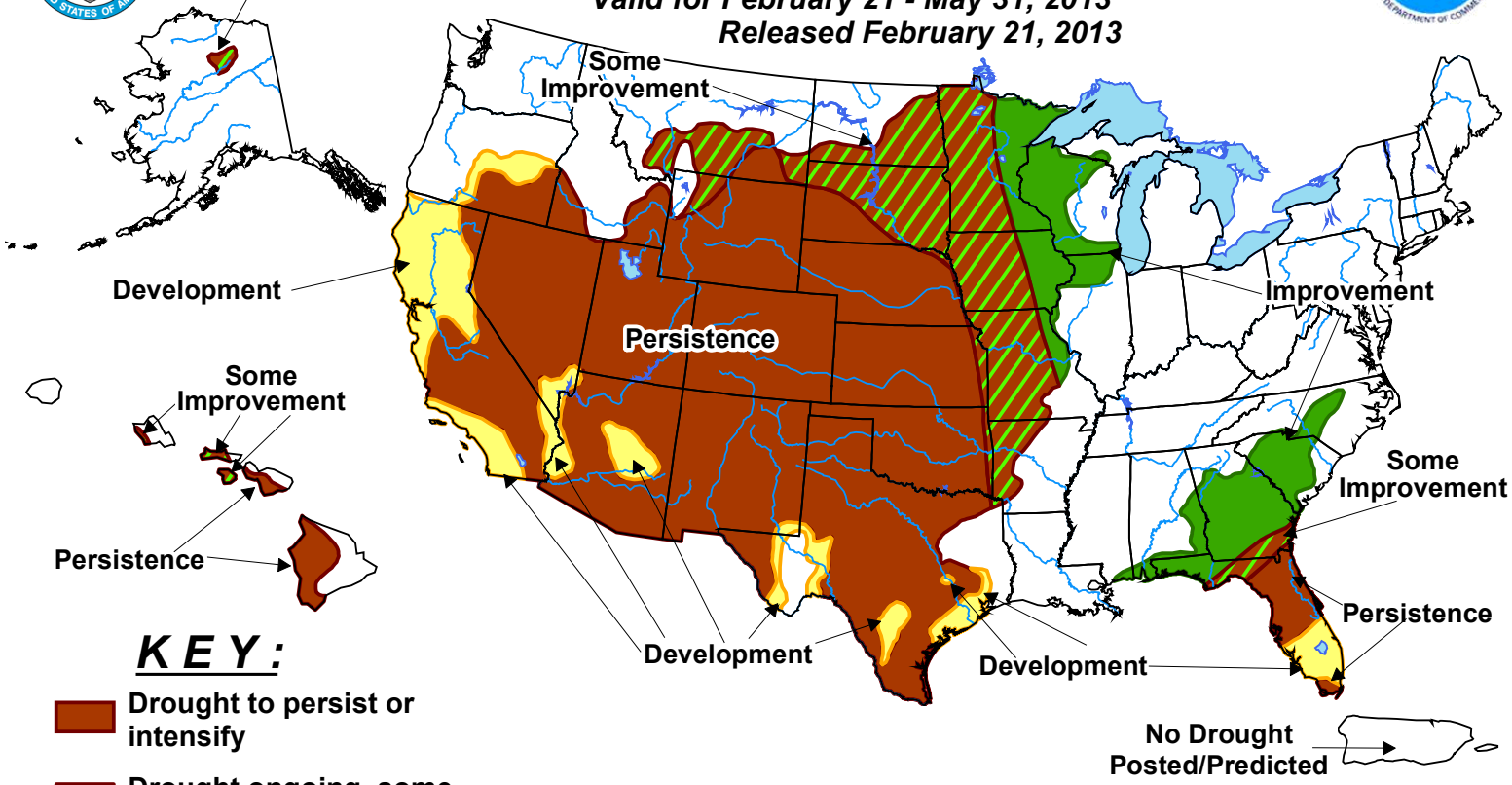
IPCC TAR 2001

# U.S. Seasonal Drought Outlook

## Drought Tendency During the Valid Period

*Valid for February 21 - May 31, 2013*

*Released February 21, 2013*




***KEY:***

- **Drought to persist or intensify**
- **Drought ongoing, some improvement**
- **Drought likely to improve, impacts ease**
- **Drought development likely**

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Short-term events -- such as individual storms -- cannot be accurately forecast more than a few days in advance. Use caution for applications -- such as crops -- that can be affected by such events. "Ongoing" drought areas are approximated from the Drought Monitor (D1 to D4 intensity). For weekly drought updates, see the latest U.S. Drought Monitor. NOTE: the green improvement areas imply at least a 1-category improvement in the Drought Monitor intensity levels, but do not necessarily imply drought elimination.

EPSCoR iUTAH

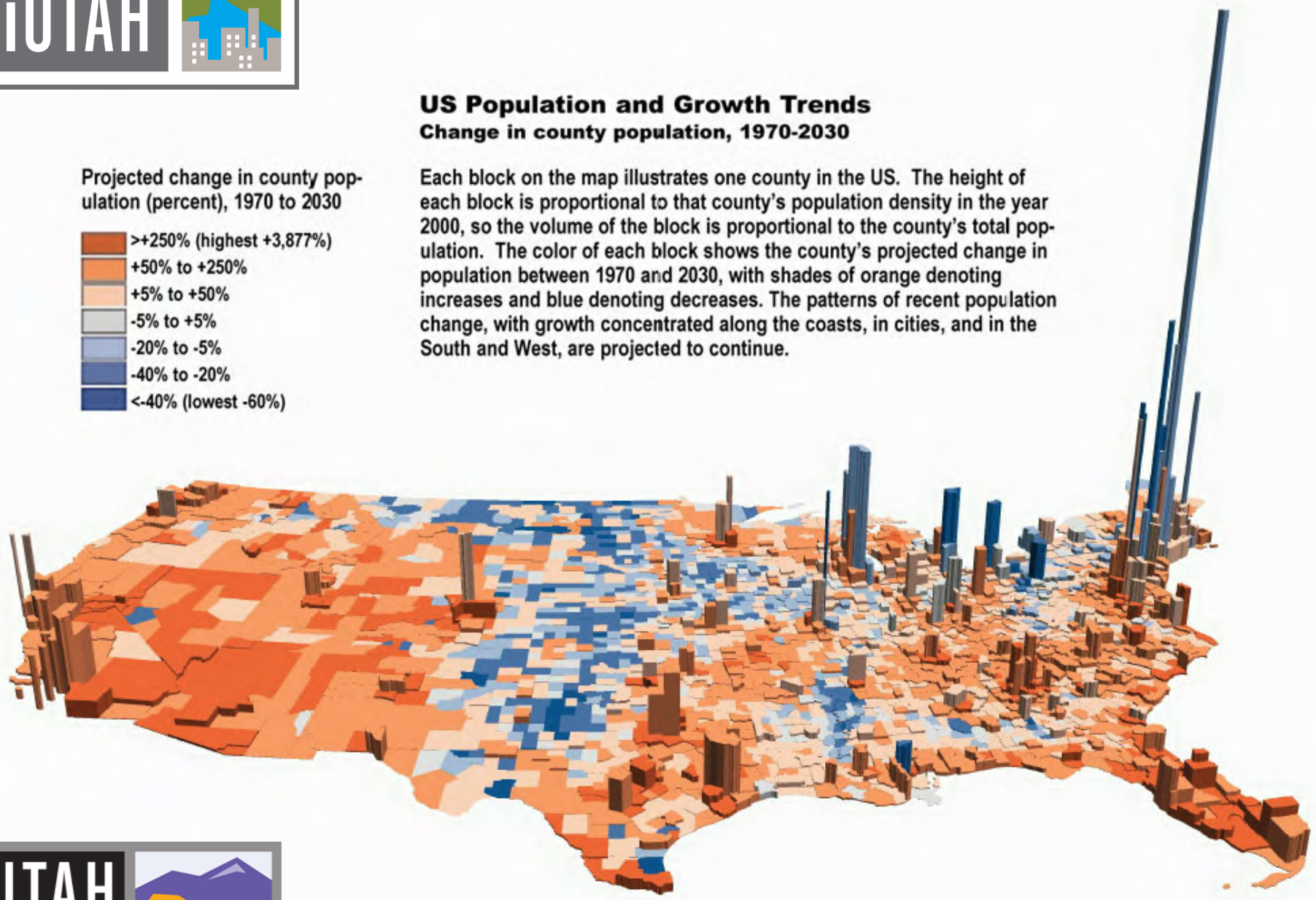
# US Population and Growth Trends

## Change in county population, 1970-2030

Projected change in county population (percent), 1970 to 2030

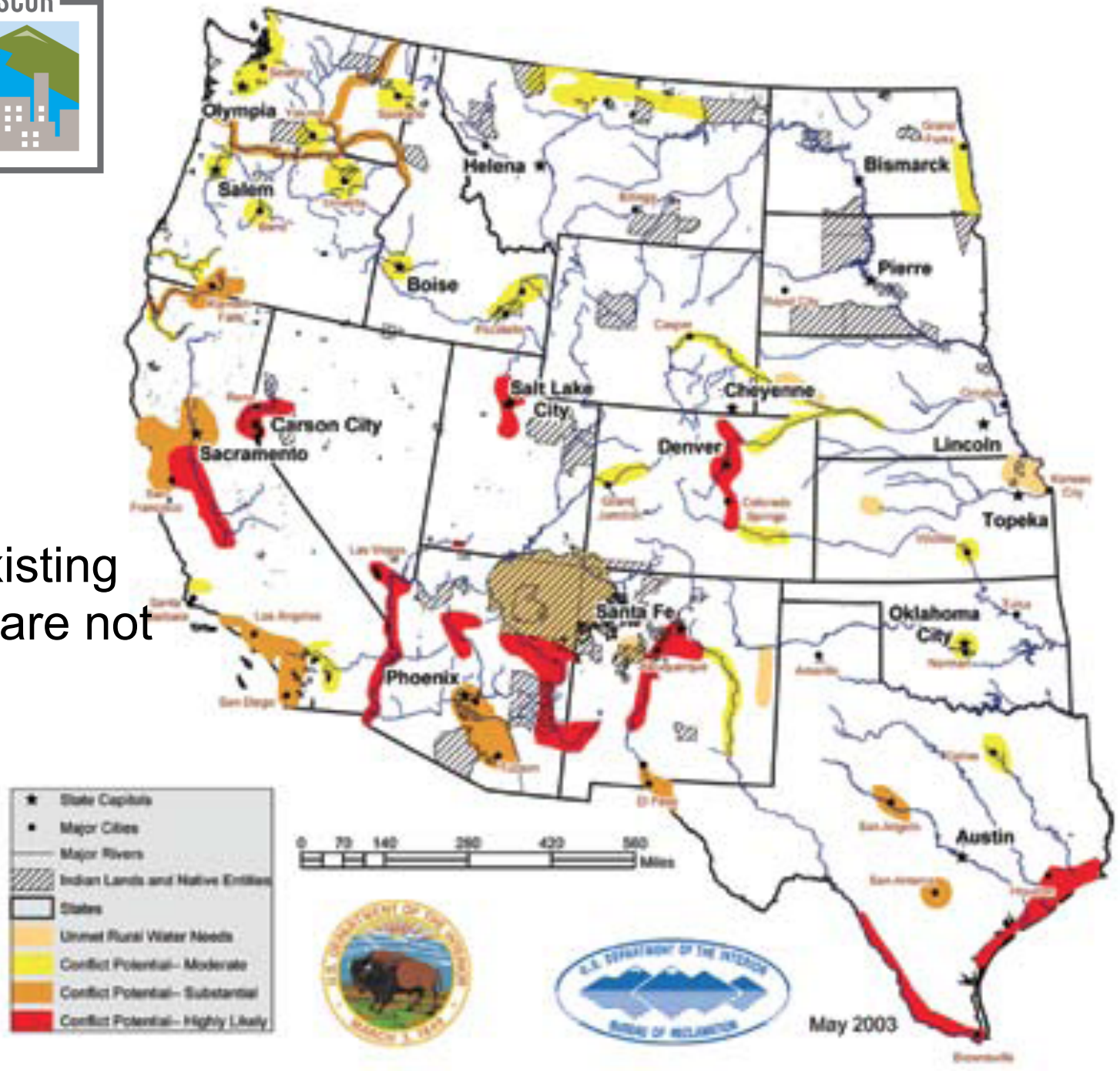
- >+250% (highest +3,877%)
- +50% to +250%
- +5% to +50%
- -5% to +5%
- -20% to -5%
- -40% to -20%
- <-40% (lowest -60%)

Each block on the map illustrates one county in the US. The height of each block is proportional to that county's population density in the year 2000, so the volume of the block is proportional to the county's total population. The color of each block shows the county's projected change in population between 1970 and 2030, with shades of orange denoting increases and blue denoting decreases. The patterns of recent population change, with growth concentrated along the coasts, in cities, and in the South and West, are projected to continue.



UTAH EPSCoR

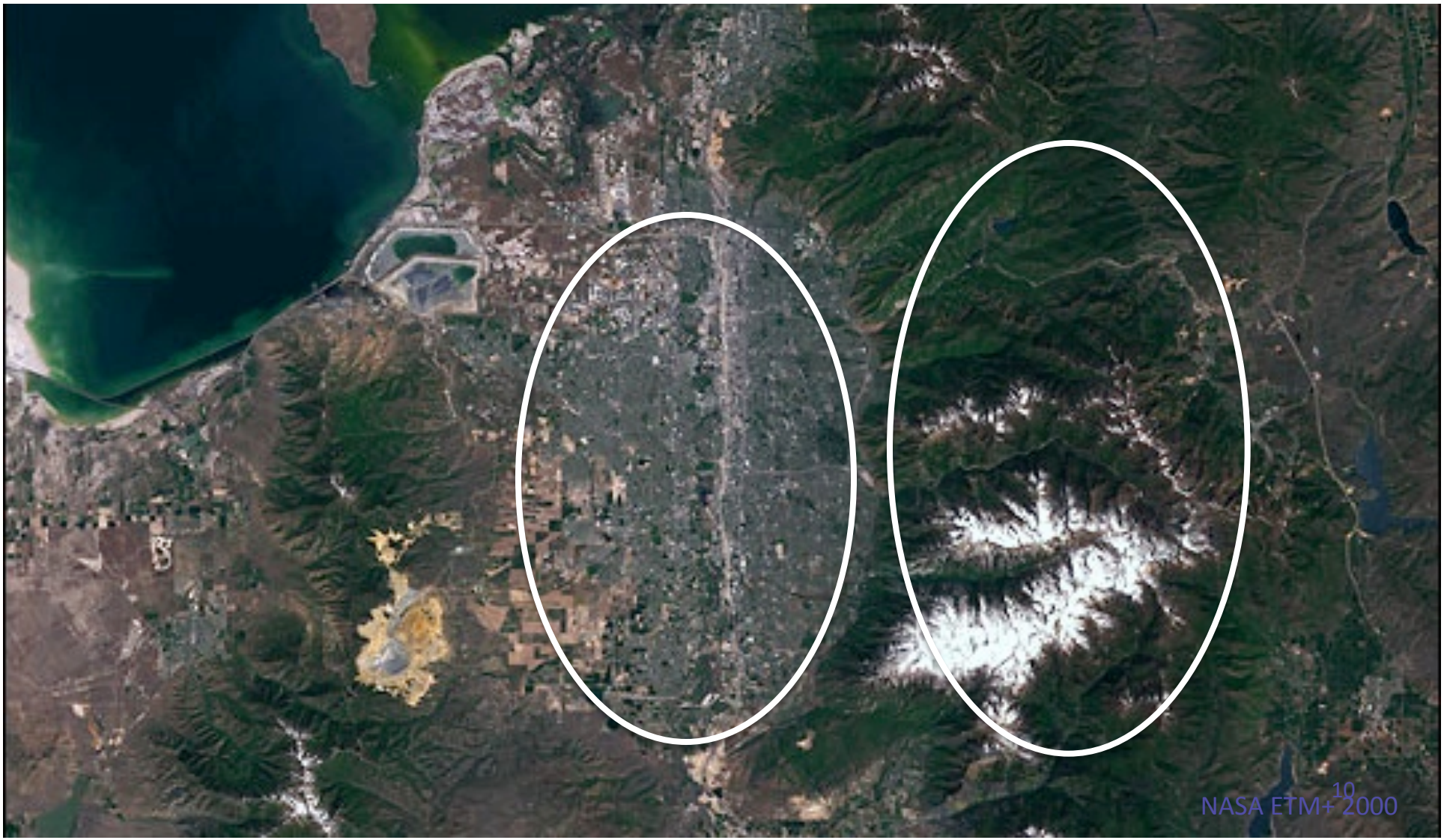
Areas where existing Water supplies are not Adequate (red=severe)



# Utah in a Nutshell:

- Utah is growing.
  - 5 million people by 2040.
- Utah has limited water.
  - 2nd driest state in the nation.
- Utah's climate is changing.
- Snowmelt and water quality are decreasing

# Utah's Sustainable Future



## WHAT WE NEED

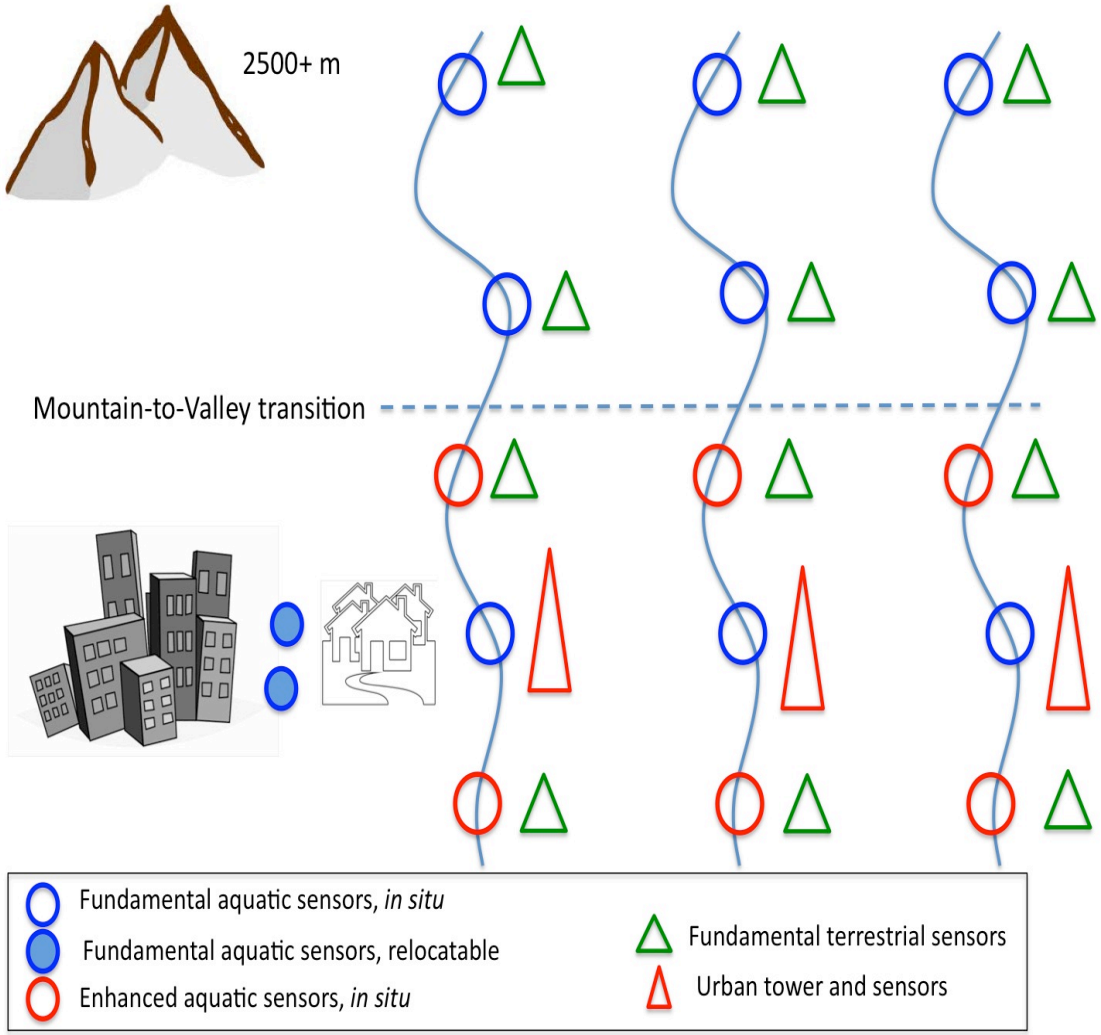
1. Better downscaled climate models to predict local and regional precipitation

2. Better snowmelt to surface water quality and quantity Models

3. Better understanding of the ‘urban’ hydrosystem

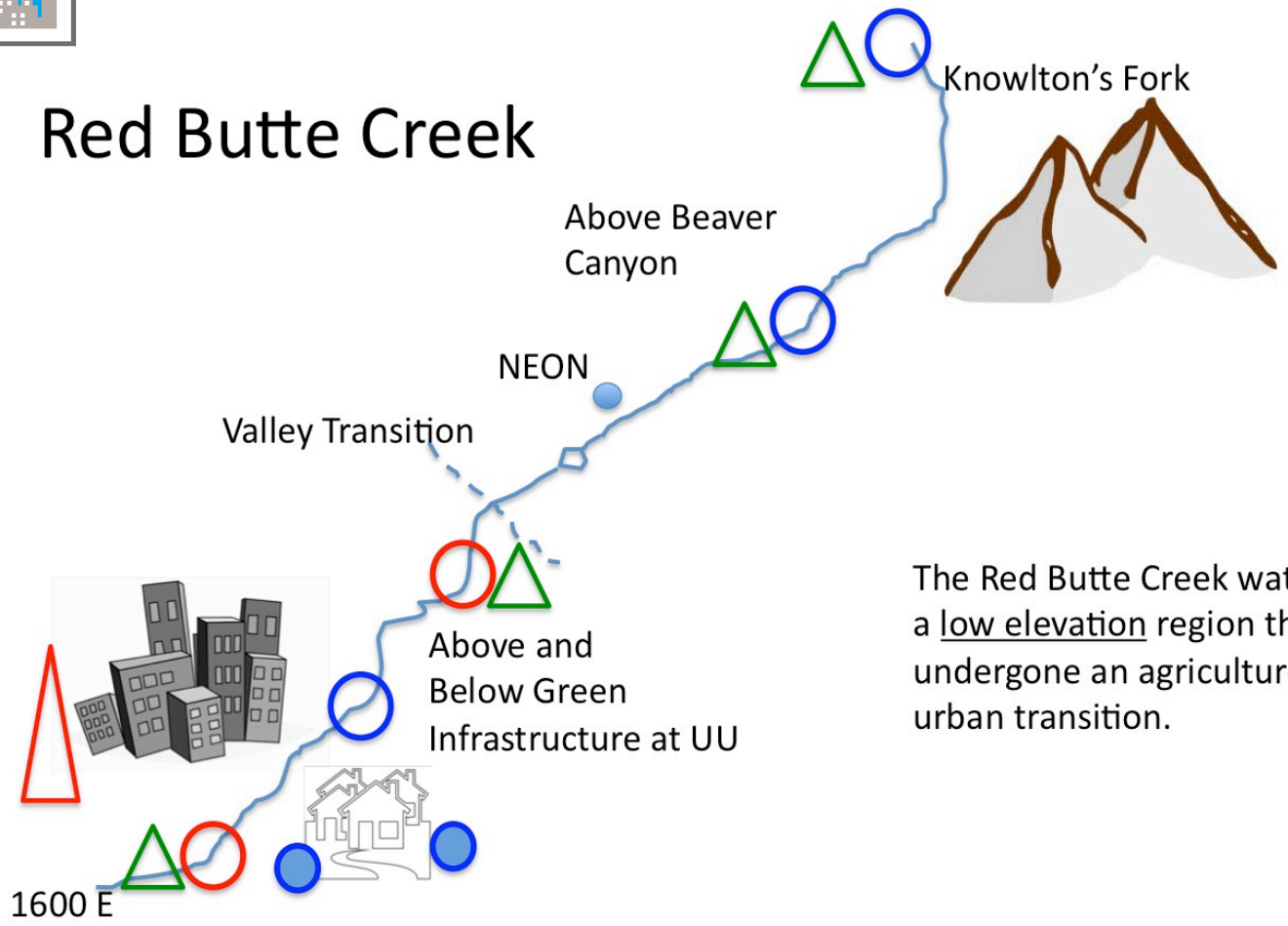
4. Understanding of valley form transformations, decisions, and policies on water quality

5. Better communication of science and data




Schematic of iUTAH GAMUT (**G**radients **A**long **M**ountain to **U**rban **T**ransitions). All sensors are connected to the internet via one of several options. Note that the network is a mix of fixed in situ sensors and several deployable or relocatable sensors.

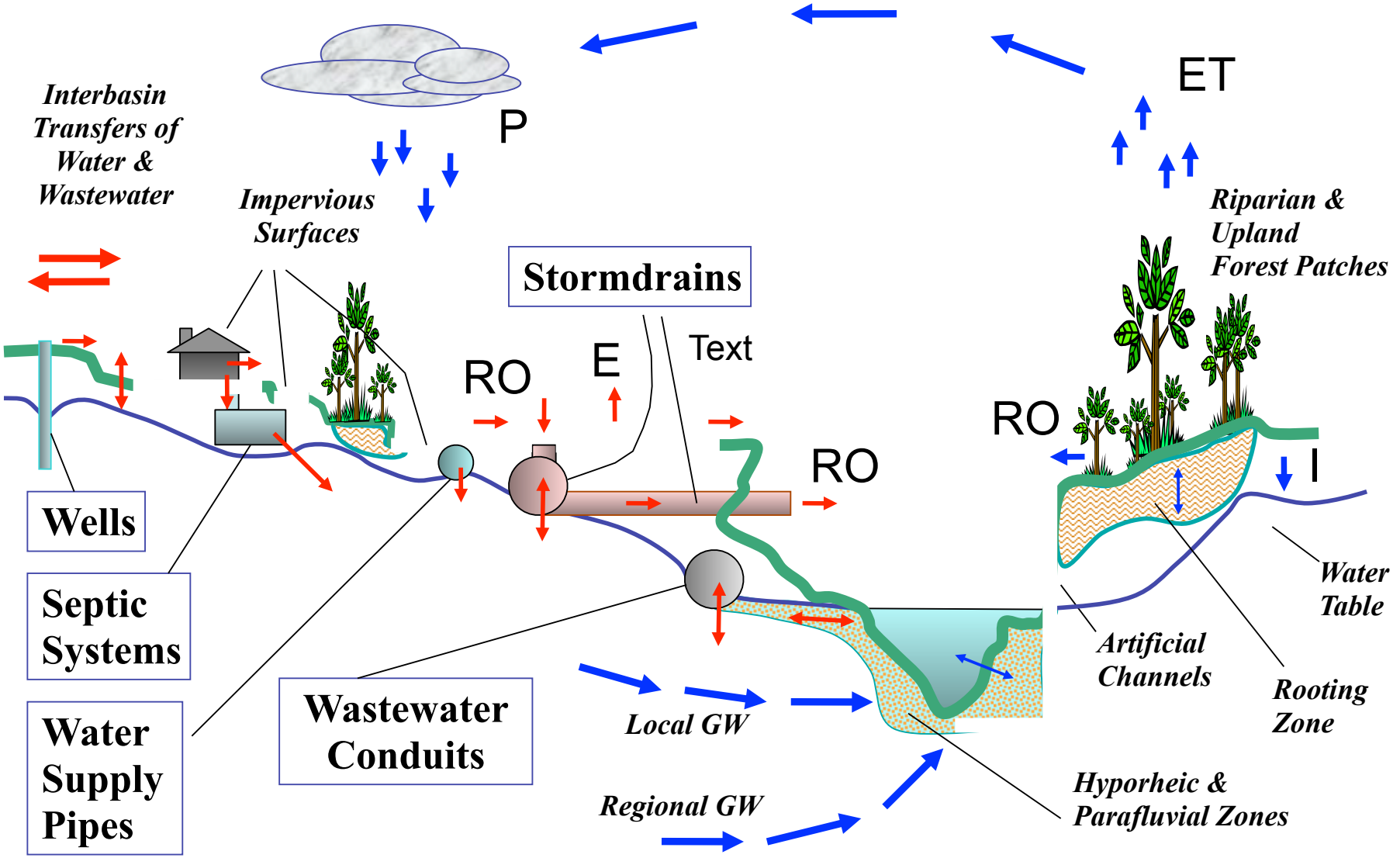
# Red Butte Creek



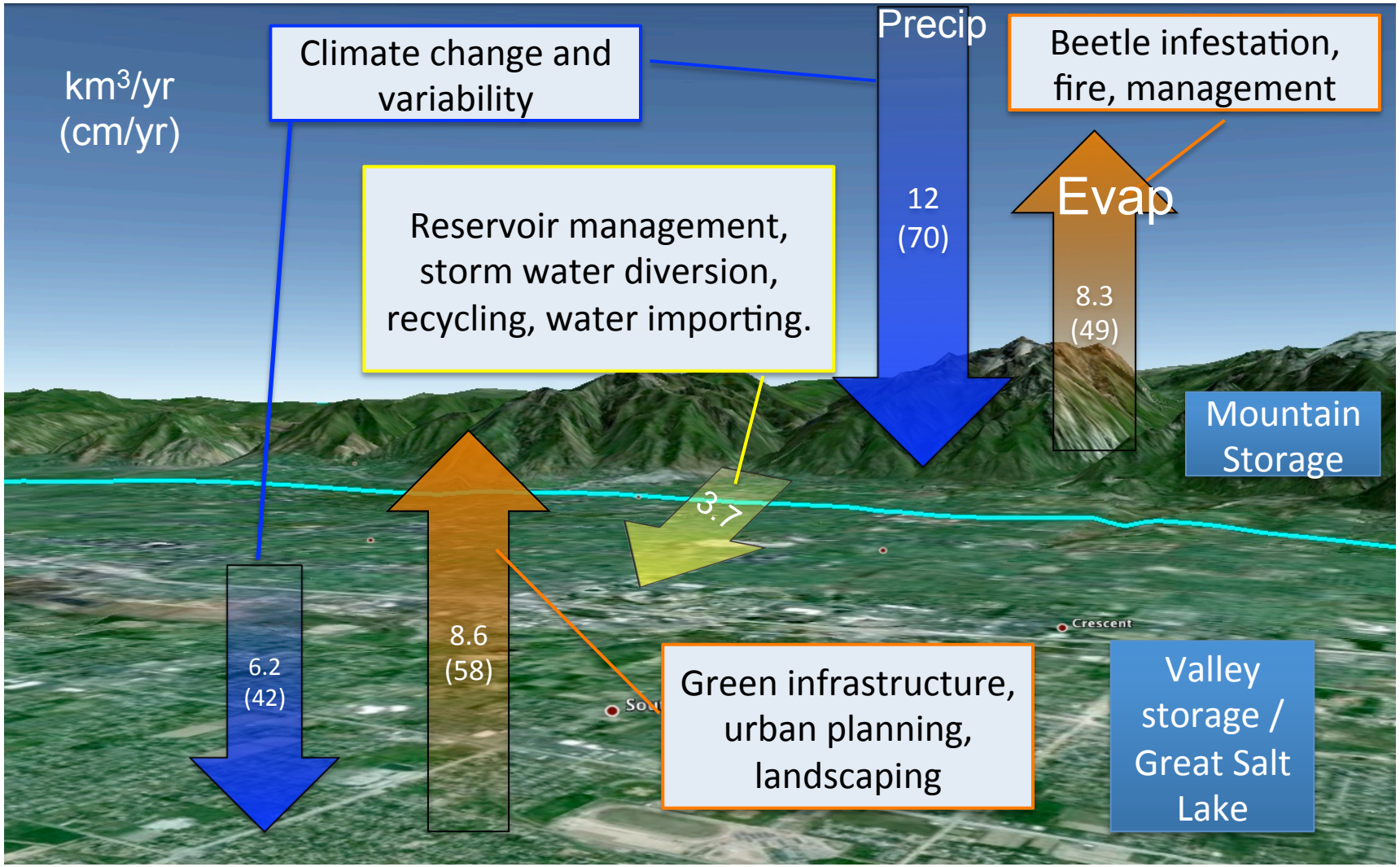

The Red Butte Creek watershed, a low elevation region that has undergone an agriculture to urban transition.

- Fundamental aquatic sensors, *in situ*
- Fundamental aquatic sensors, relocatable
- Enhanced aquatic sensors
- Fundamental terrestrial sensors
- Urban tower

# The Urban Hydrologic System: infrastructure driven pathways



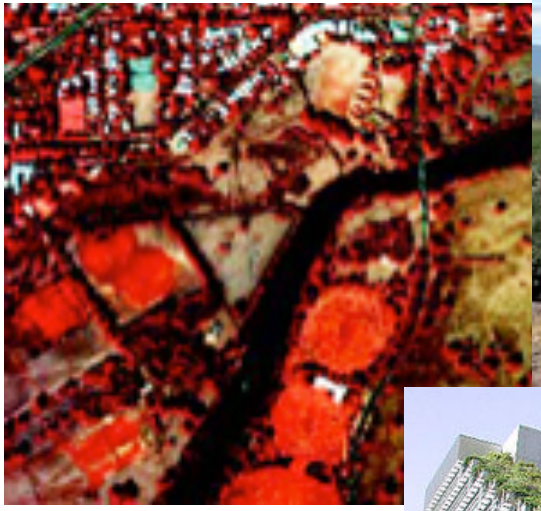
# Some of the iUTAH factors influencing these terms …




*What are the current, projected, and physically possible variations in the size of these budget terms, and what are the implications for water quantity and quality?*

# Environmental-Social Monitoring Network

- Integrated environmental-social monitoring network - from mountain top to city center
- Land use patterns
- Green infrastructure facility



# Questions?

dbedford@weber.edu
carlatrentelman@weber.edu
rita.teutonico@usu.edu
todd.crowl@usu.edu