

Cedar City Valley Groundwater Management Plan



Water Advisory Committee Update
October 25th, 2018

Prior Appropriation Doctrine



- Divert water to beneficial use
- Priority date
- First in time, first in right
- Loss of right

Role of the State Engineer



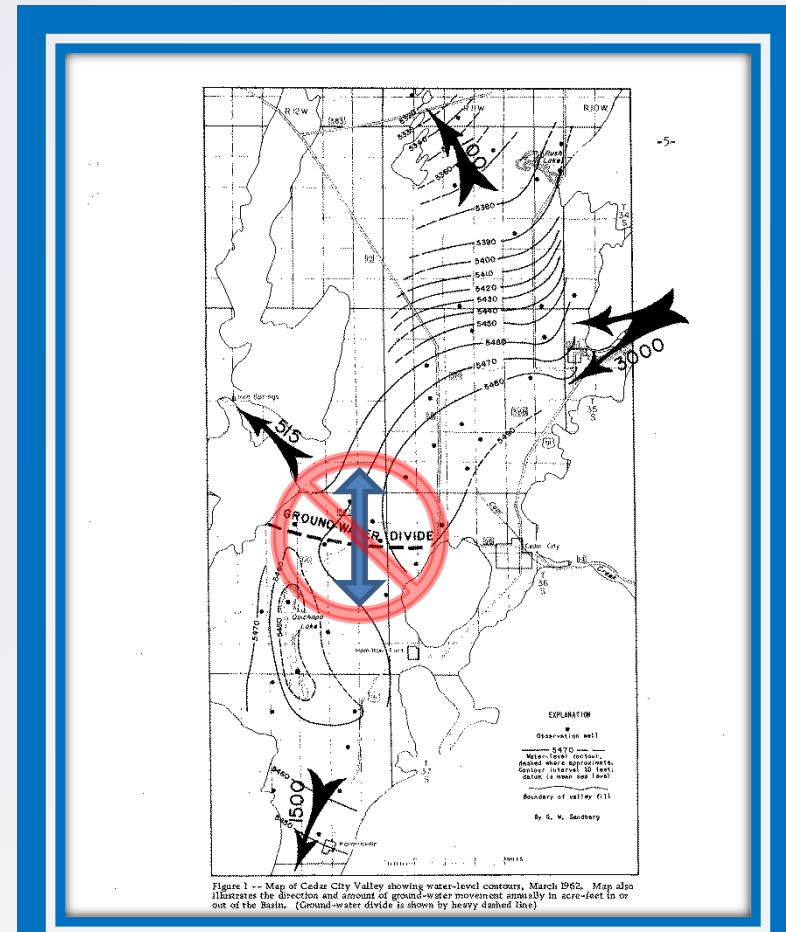
Role of the State Engineer

- Office of Record (Since 1903)
- Gatekeeper to provide order and certainty
 - Reduces conflict
 - Protects investments
 - Respect for existing rights
 - Public waters appropriated according to policy set by legislature
- Measures and Distributes water to entitled water right holders



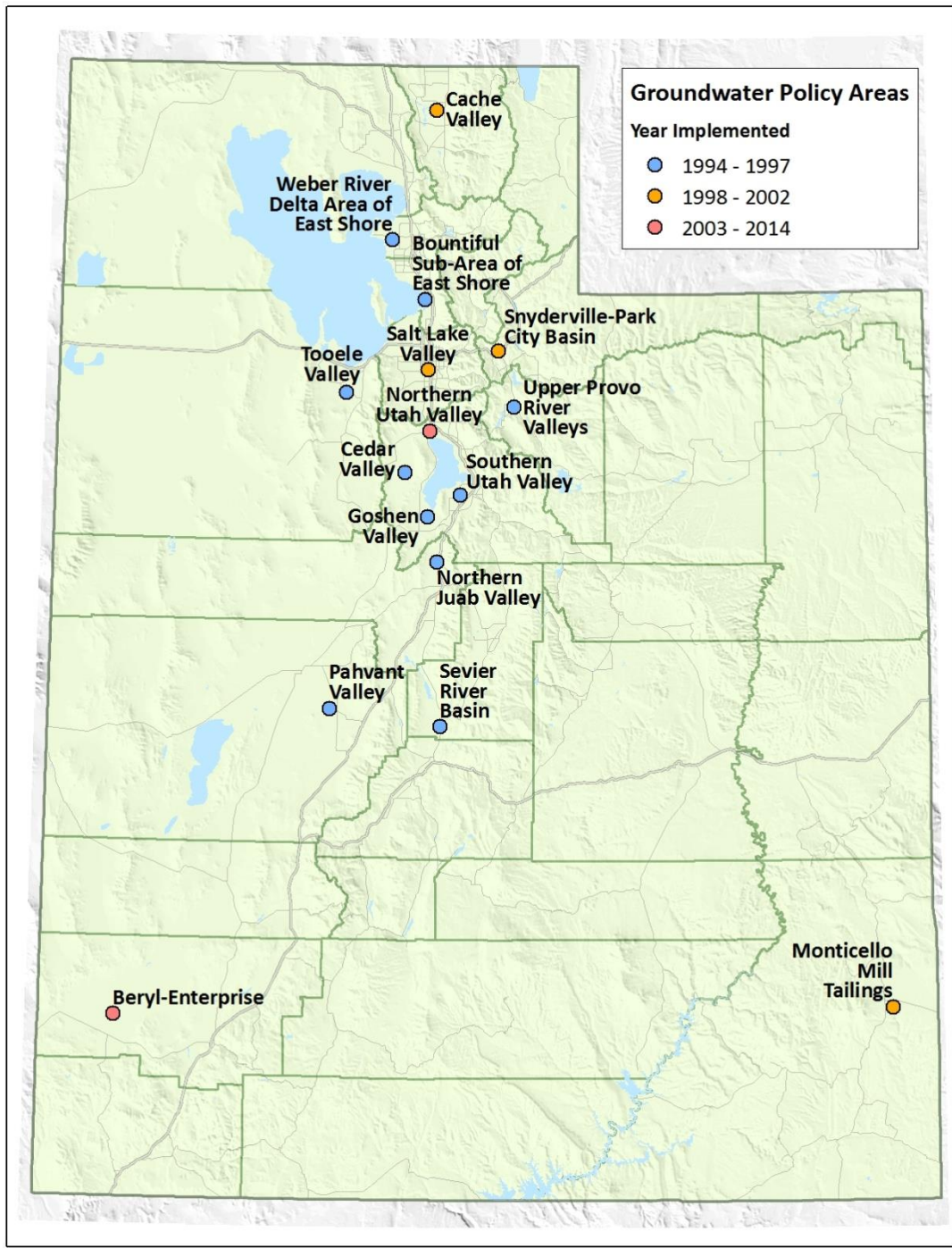
Cedar City Valley Policy Since 1966

- All pending unapproved applications on file will be rejected.
- All future applications to appropriate ground water from the Cedar City Valley will be rejected.
- Granting of additional extensions of time in which to submit proof on all pending applications will be critically reviewed.
- Divided Groundwater Valley into Separate sub basins



Groundwater Management Plans

- Legislation enacted in 2006
- Established Section 73-5-15 of Utah Code
- Tool to help the State Engineer distribute groundwater



Section 73-5-15

- (2)
 - (a) The state engineer may regulate groundwater withdrawals within a specific groundwater basin by adopting a **groundwater management plan** in accordance with this section for any groundwater basin or aquifer or combination of hydrologically connected groundwater basins or aquifers.

Section 73-5-15

- (2)
 - (b) The objectives of a groundwater management plan are to:
 - (i) limit groundwater withdrawals to safe yield;
 - (ii) protect physical integrity of the aquifer; and
 - (iii) protect water quality

Section 73-5-15

- (1) As used in this section:
 - (a) “**Critical management area**” means a groundwater basin in which the groundwater withdrawals consistently exceed the safe yield.
 - (b) “**Safe yield**” means the amount of groundwater that can be withdrawn from a groundwater basin over a period of time without exceeding the long-term recharge of the basin or unreasonably affecting the basin’s physical and chemical integrity.

Safe Yield

- Recharge is a starting point
- May be less than recharge to protect physical integrity of the aquifer and water quality
- Recharge is verified from a water budget
 - $\text{Inflows (recharge)} = \text{Outflows (discharge)} + \text{Change in storage}$

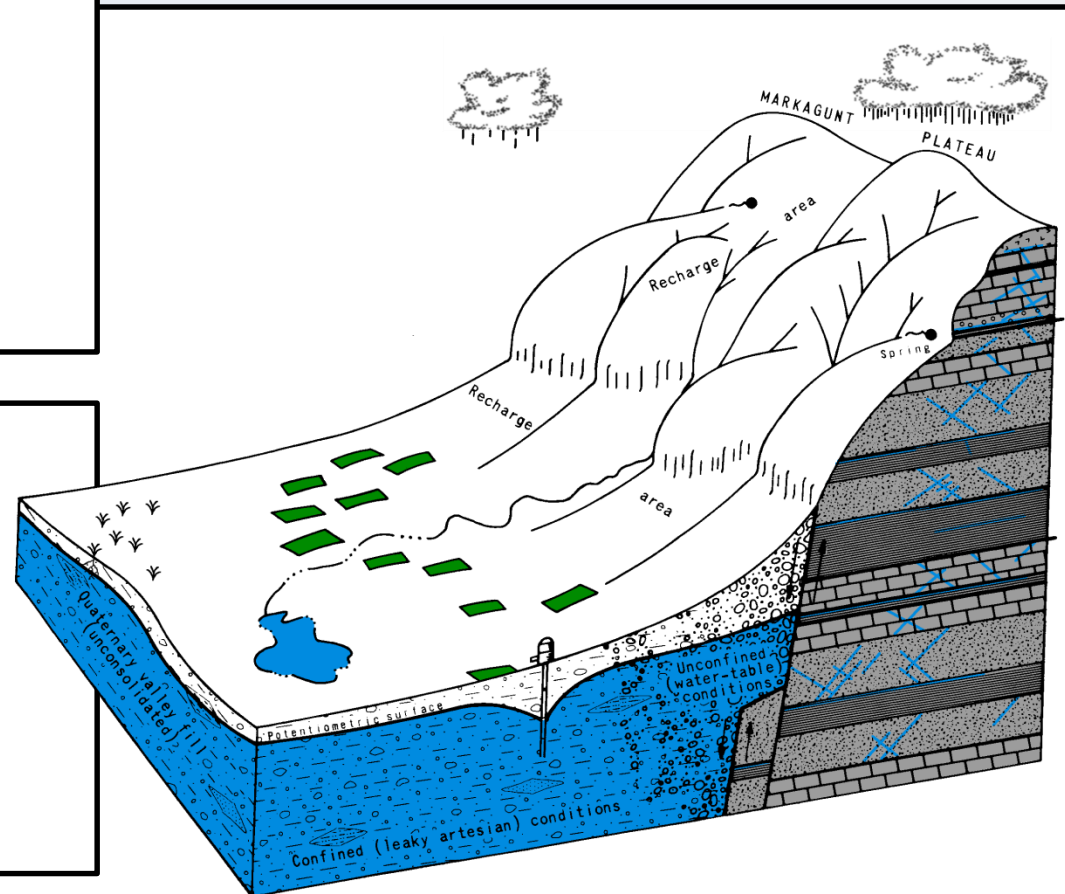
Groundwater Balance

Recharge

- Precipitation
- Seepage from irrigation
- Seepage from streams and canals
- Subsurface inflow

Discharge

- Well pumping
- Subsurface outflow
- Evapotranspiration (Lake evaporation and plant transpiration)
- Valley springs

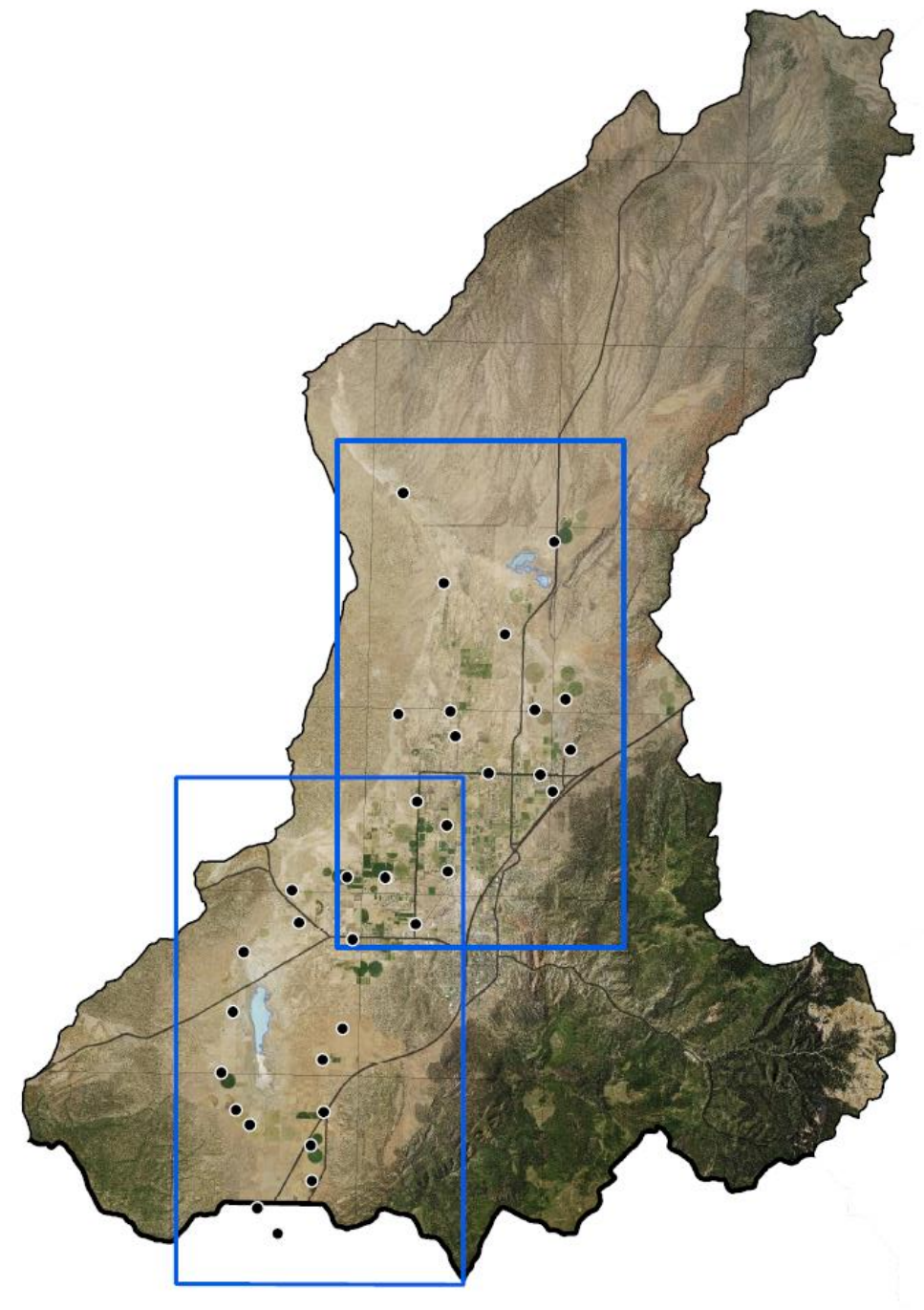


Section 73-5-15

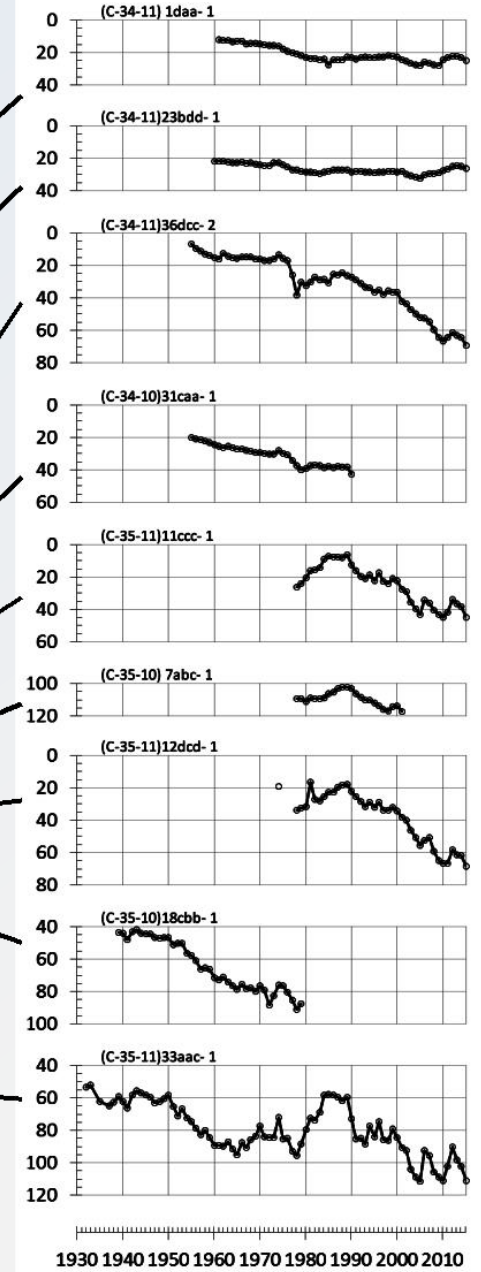
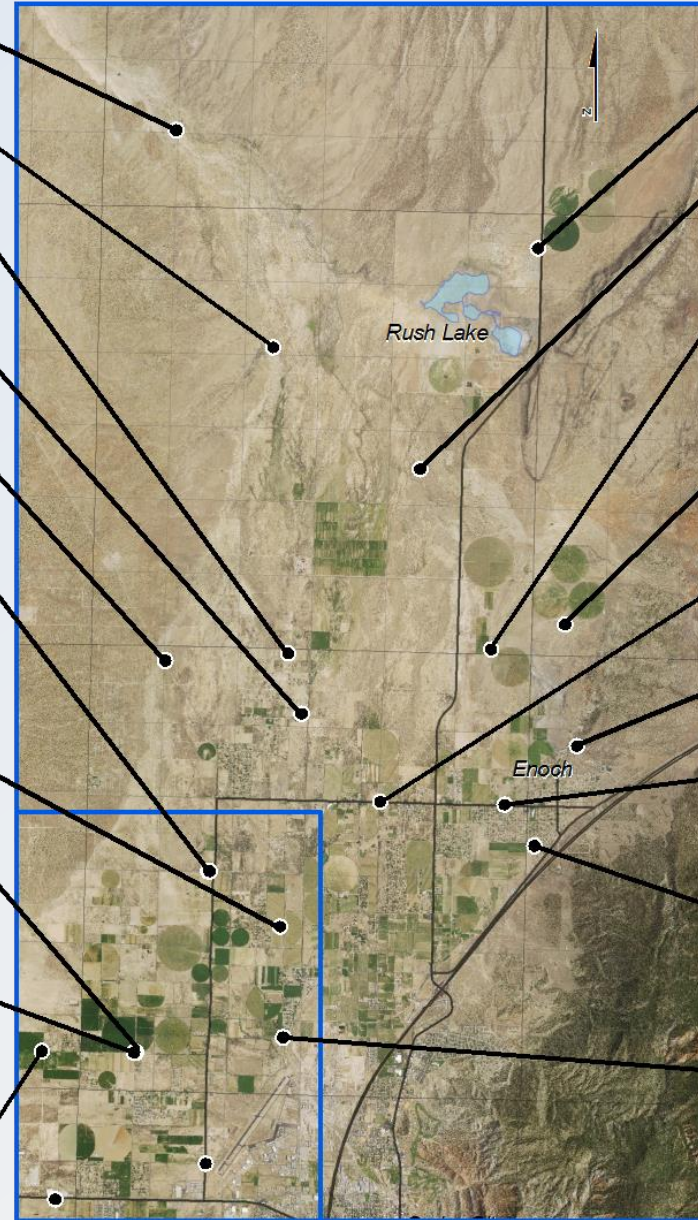
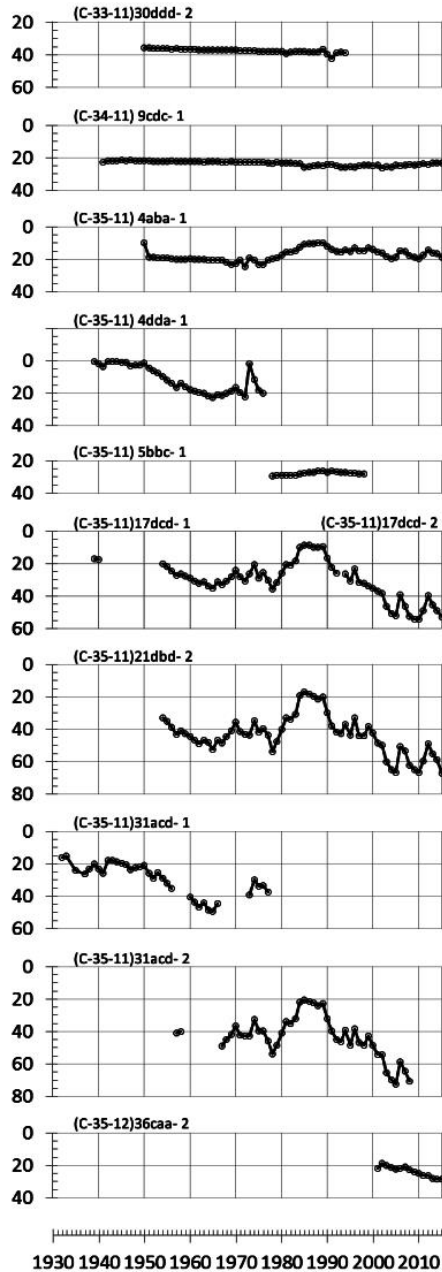
- (3)(b) The state engineer shall base the provisions of a groundwater management plan on the principles of **prior appropriation** (No consideration on the nature of use)
- (4)(c) but may consider voluntary arrangements

Hydrologic Data





Change in Water Levels – Northern Cedar City Valley

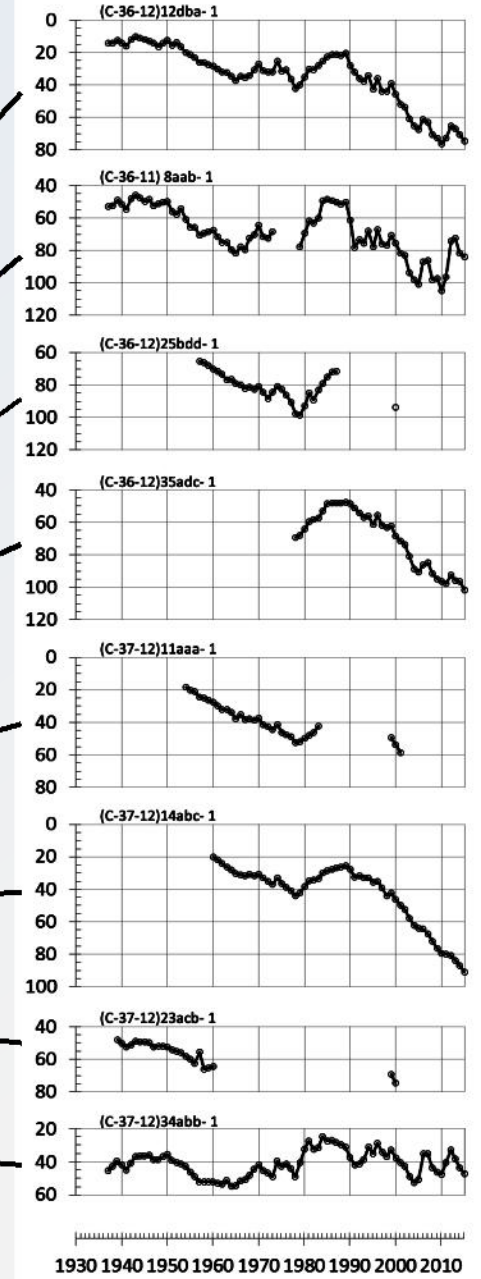
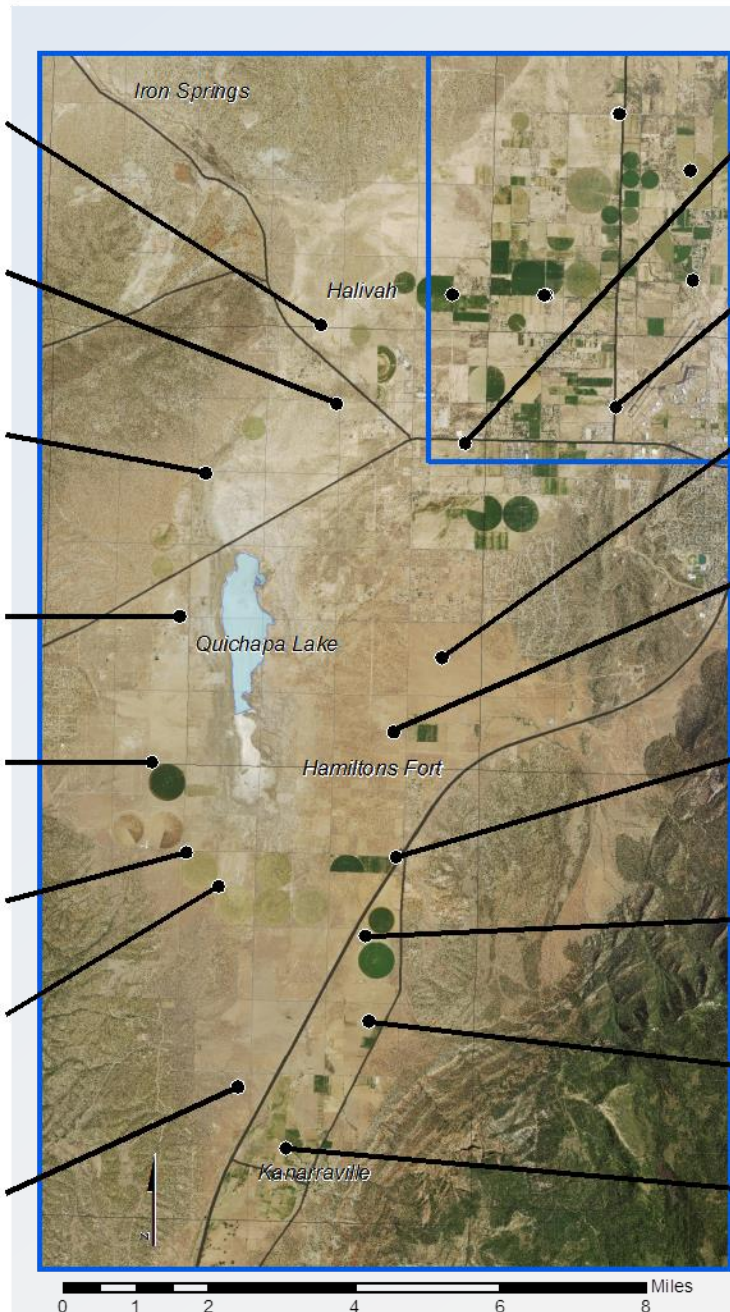
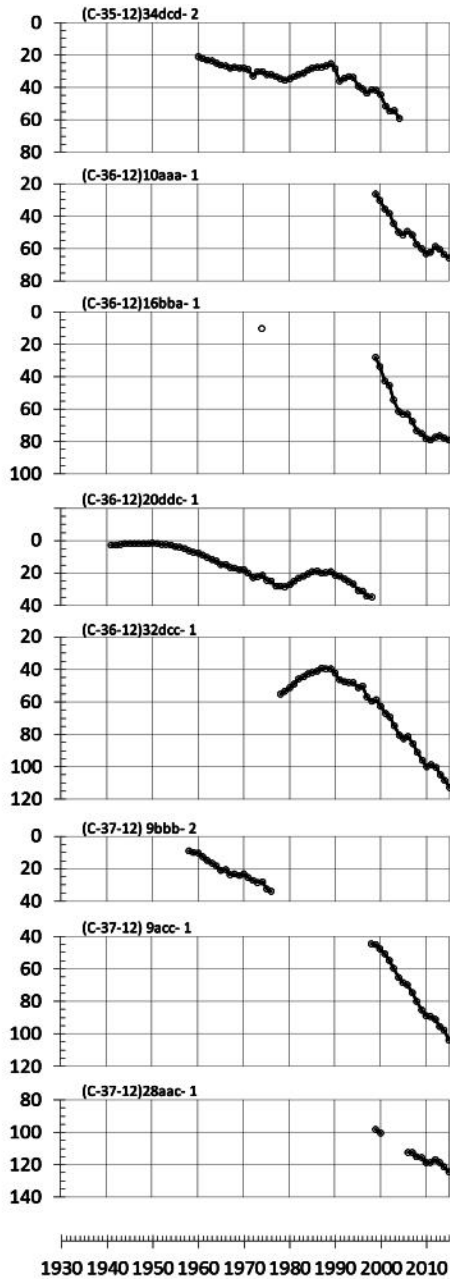


1930 1940 1950 1960 1970 1980 1990 2000 2010

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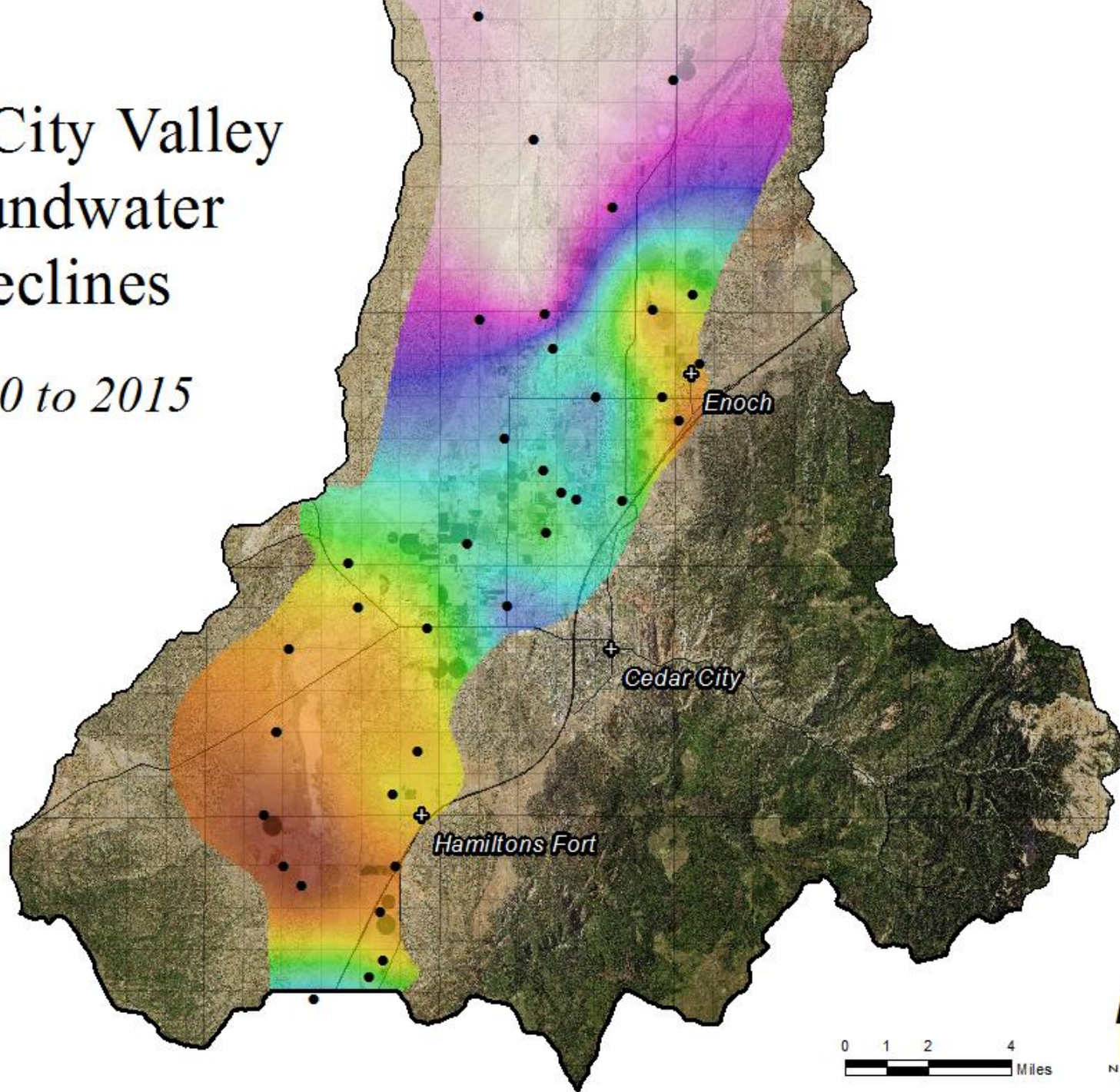
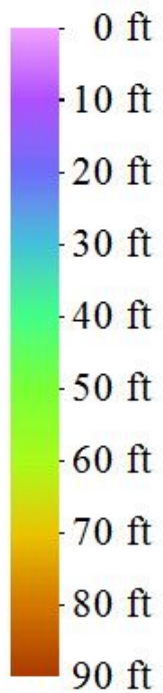
0 1 2 4 6 8 Miles

Change in Water Levels – Southern Cedar City Valley



Cedar City Valley Groundwater Declines

1940 to 2015



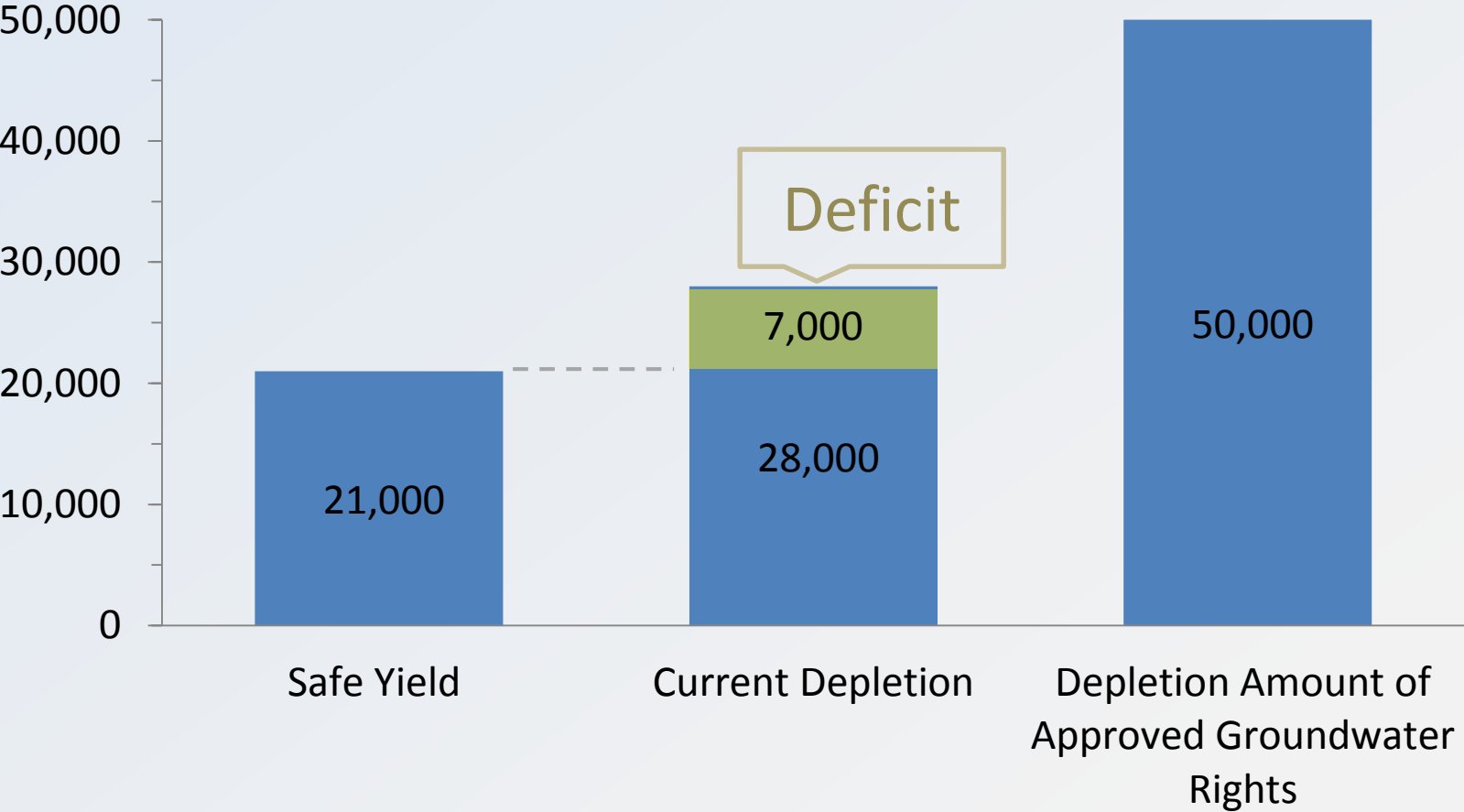
Hydrologic Studies

- Geology and ground-water resources of Cedar City and Parowan Valleys, Iron County, Utah. Thomas and Taylor (1946)
- Ground-water resources of the Parowan-Cedar City drainage basin, Iron County, Utah. Bjorklund, Sumison, and Sandberg (1978)
- The geology of Cedar Valley, Iron County, Utah, and its relation to ground-water conditions. Hurlow (2002)
- Hydrology and Simulation of Ground-Water Flow in Cedar Valley, Iron County, Utah. Brooks and Mason (2005)
- Investigation of land subsidence and earth fissures in Cedar Valley, Iron County, Utah. Knudsen, Inkenbrandt, Lund, Lowe, and Bowman (2014)

Safe Yield

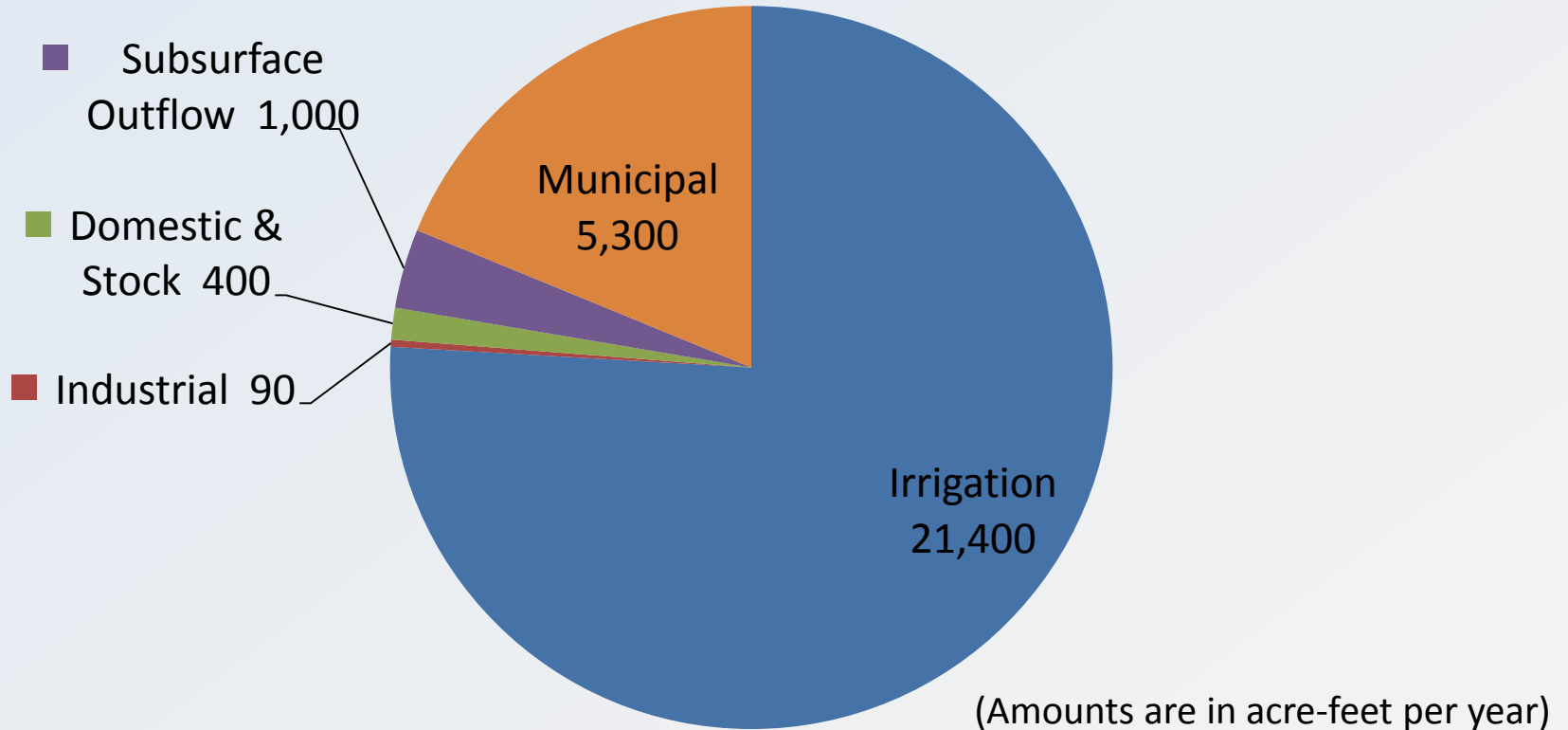
- Safe Yield: 21,000 AF/yr
- Current Well Depletion:
28,000 AF/yr
- Potential (approved) Well Depletion:
50,000 AF/yr

Safe Yield and Depletion Comparison



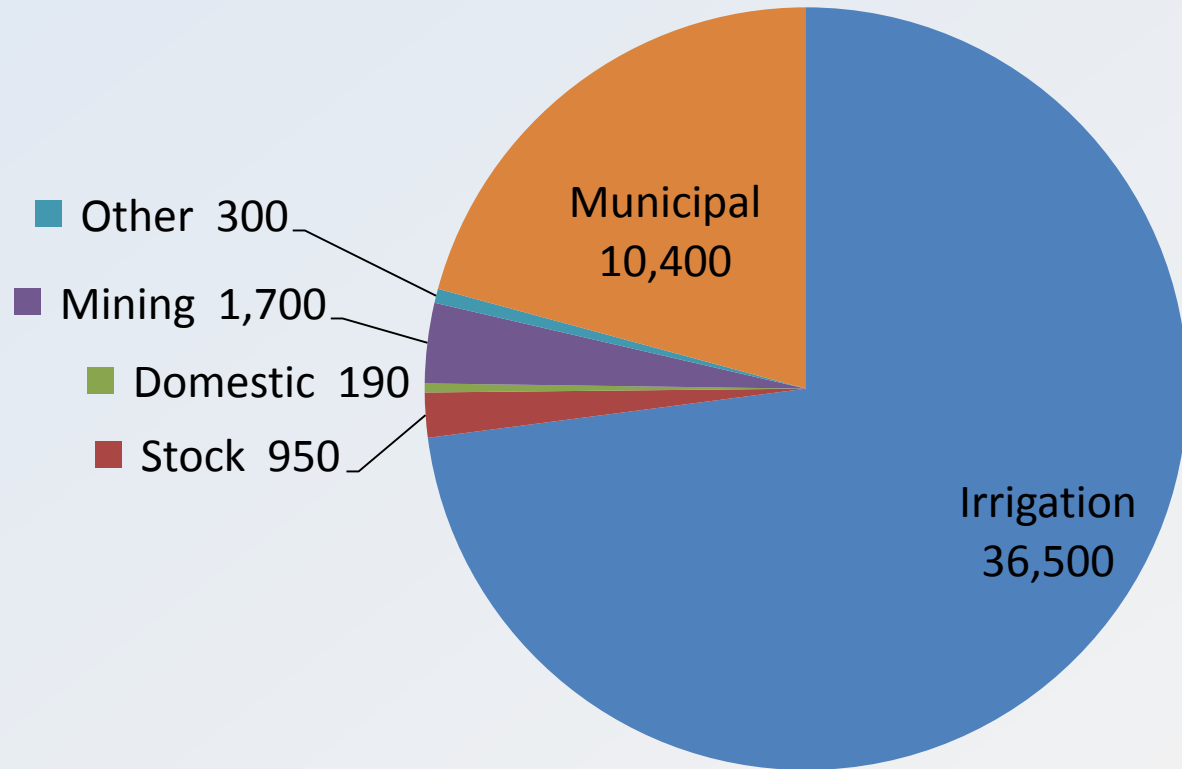
(Amounts are in acre-feet per year)

Current (2000-2013 Average) *Depletion* by Use



Total: 28,000 AF/yr

Depletion Amounts of Approved Groundwater Rights By Use



Total: 50,000 AF/yr

(Amounts are in acre-feet per year)

Approaches

- Augment groundwater supply
- Decrease depletions

- Groundwater Management Plan
 - Priority regulation
 - Other voluntary arrangements

Utah Code Section 73-5-15

- (4)(b) For critical management areas, the State Engineer shall allow for **gradual implementation** of the groundwater management plan
- (4)(c) but may consider voluntary arrangements

Priority Regulation Option

- List water rights and associated depletion amounts in order of priority
- Create a schedule of when water rights will no longer be distributed groundwater
- Start with most junior rights until depletion amounts for remaining rights equal safe yield

Draft Plan

- Reduction Schedule
- Use Reporting and Tracking
- Voluntary Arrangements
- Updated Change Application and Appropriation Policy

QUESTIONS?

