

USGS Streamgauge, Groundwater and Water Quality Data Networks



Duchesne River at Randlett, 2011

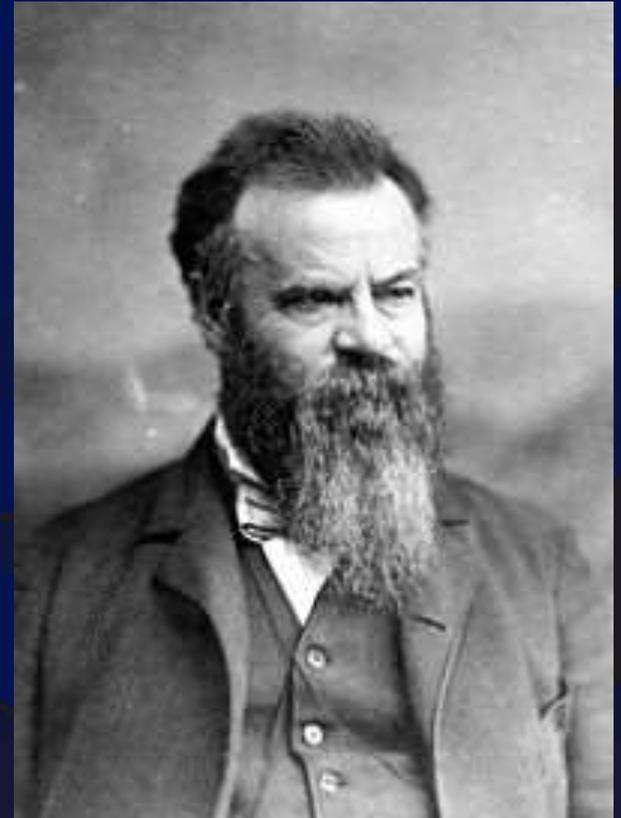
David Susong
USGS
Utah Water Science Center
May 16, 2017



Maps
Earthquakes/Volcanos
Energy/Minerals
Water
Biology

History of USGS Streamgaging

- Grand Canyon (1869).
- 2nd Director USGS (1881-1894).
- Birthplace of Systematic Stream Gaging (Professional Paper 778)
- Started USGS Streamflow and water quality monitoring.
- Rio Grande River at Embudo, NM Dec 9, 1888



John Wesley Powell



Historic Streamflow Monitoring in Utah

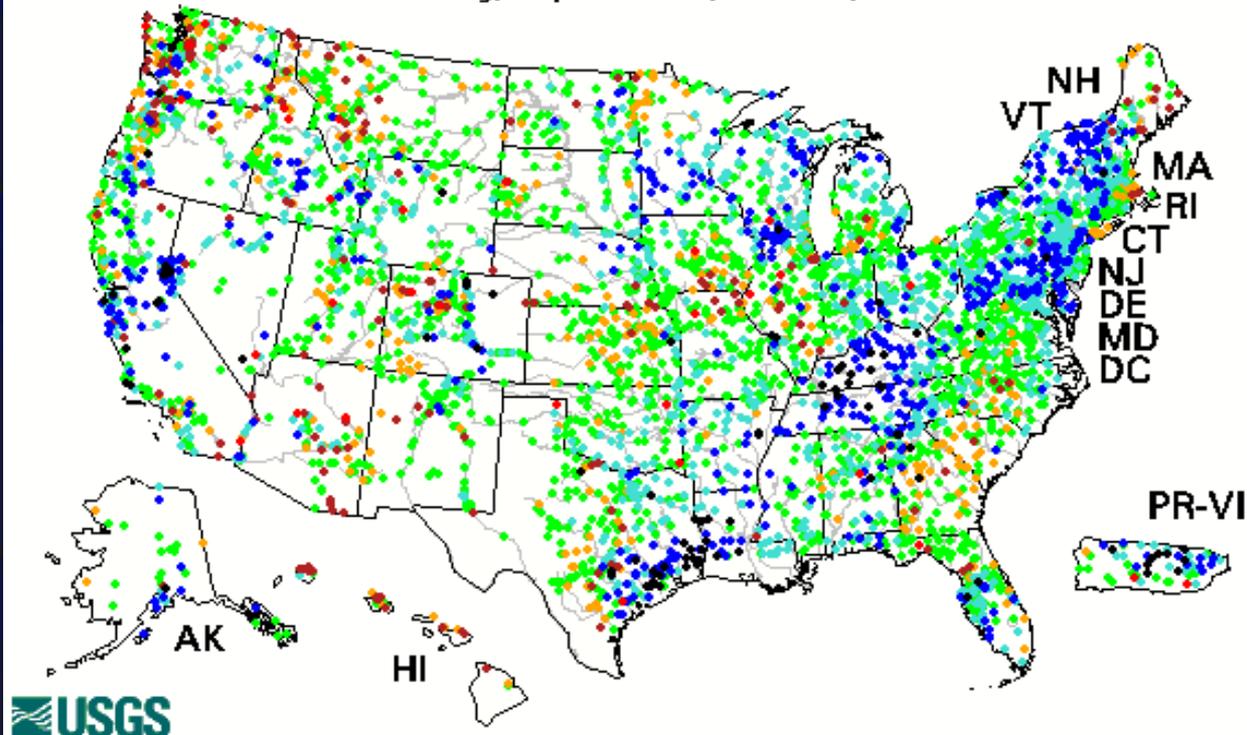
Utah Gages

- Grand (Colorado) at Cisco, 1895
- Green River at Green River, WY – May 2, 1895
- Weber at Gateway, 1889
- Weber near Oakley, Oct 1904 (continuous)
- Duchesne at Myton, 1899
- Virgin at Virgin, 1909
- San Juan near Bluff, Oct 1914 (continuous)



National Streamflow Network

Wednesday, September 06, 2017 12:30ET



Search USGS streamgage

Choose a data retrieval option and select a location on the map
 List of all stations in state, State map, or Nearest stations

Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

Utah Streamflow Network

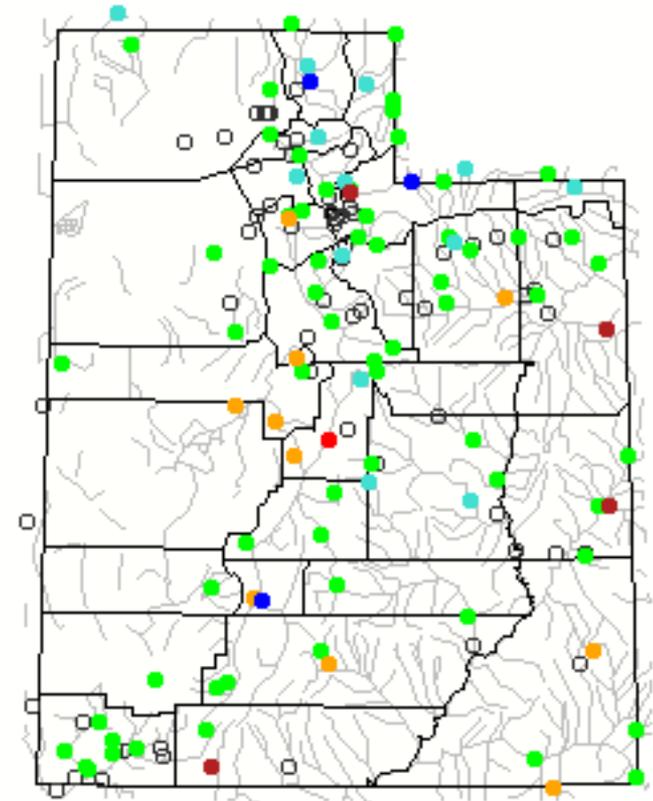
- Currently 151 gages
- Includes gages in other states
- Federal, State, local funding
- \$630,000 funding from State agencies (FY2017)



Water Resources of Utah

Real-Time Streamflow Sites

Hednesday, September 06, 2017 12:30ET



Explanation - Percentile classes

Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not ranked

Cooperative Funding Partners

- Utah Department of Natural Resources
 - Division of Water Rights
 - Division of Water Resources
- Utah DEQ
- Central Utah Water Conservancy District
- Bear River Commission
- National Stream Flow Information Program (USGS)
- U.S. Bureau of Reclamation
- BLM
- 13 Local entities

USGS Streamgaging



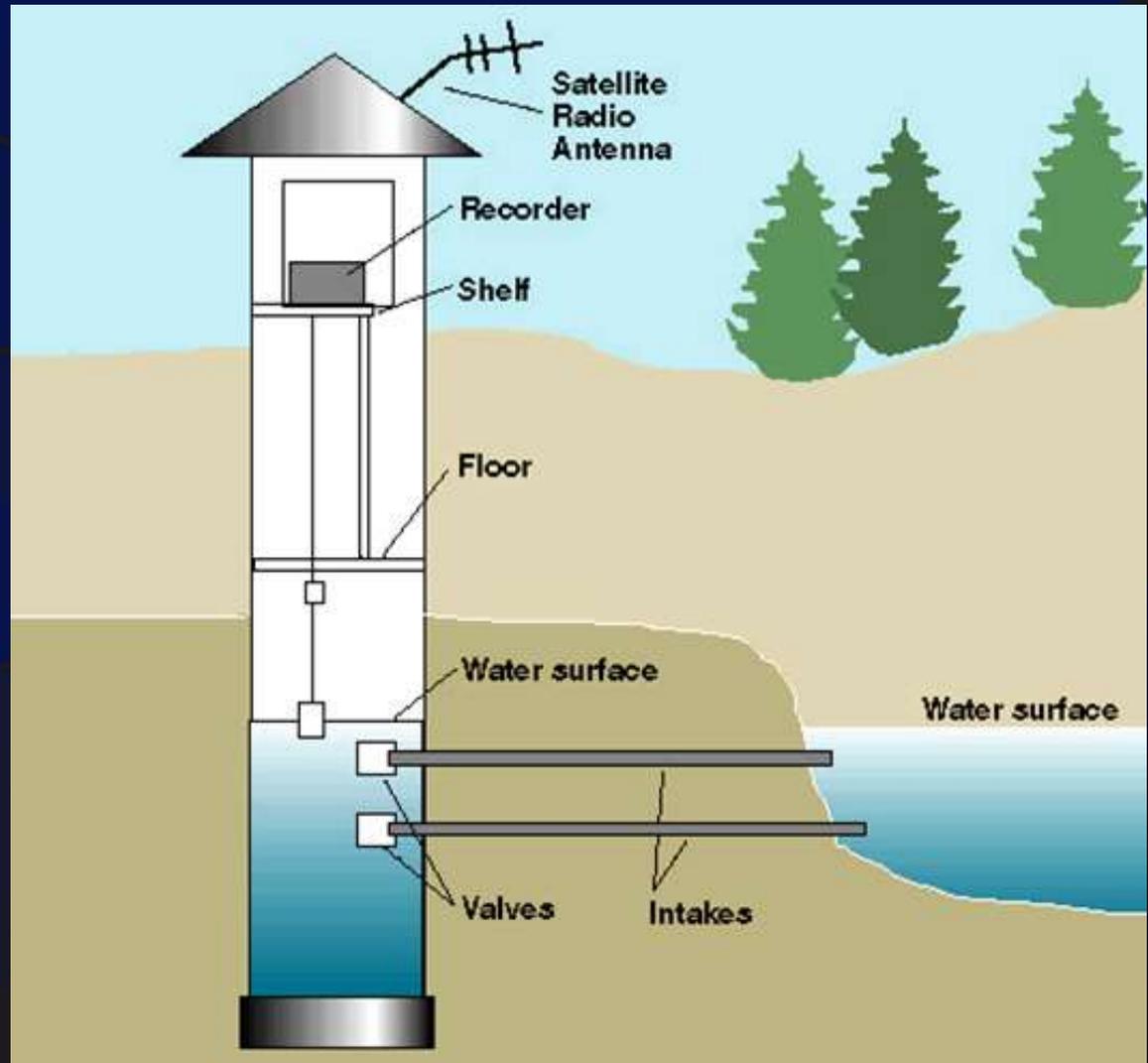
- Consistent methods nationwide
- Long-term archival
- Information is freely available!
- USGS operates on behalf of all, relied upon national infrastructure

HOW GAGES WORK



Streamgauge – Measures River Stage

- Different methods:
 - Float/pulley
 - Pressure
 - Transducer
 - Radar
- Accuracy = +/- .01 ft or 0.2% of effective range.
- Datum controlled to nearest 0.015 ft



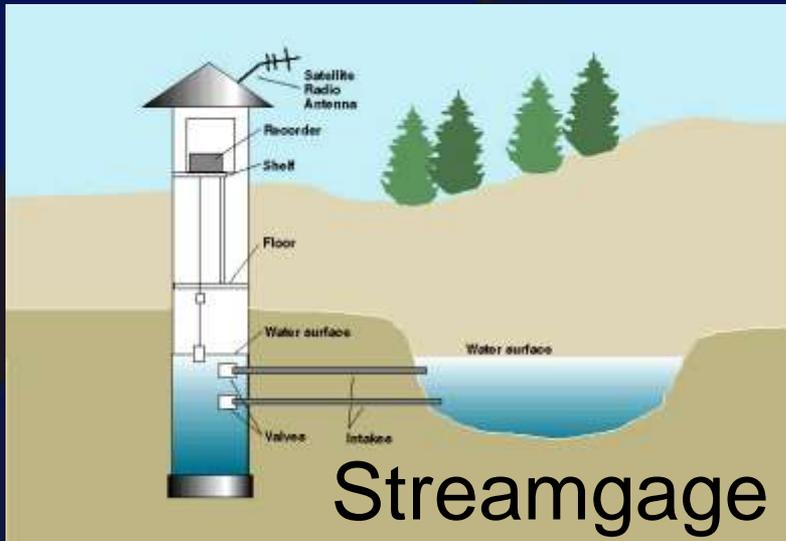
Streamgage Operation



- Gage height (not discharge) is collected every 15 minutes.
- Reference Gage
- Transmitted once an hour via GOES



Streamgaging Process



Flow
Measurements



Rating

Stage

Flow



Flow Record

Measuring Flow

Measurements made by:

Wading

Bridge

Cableway

Boat

Ice

Acoustic

Volumetric

Flume

Indirect

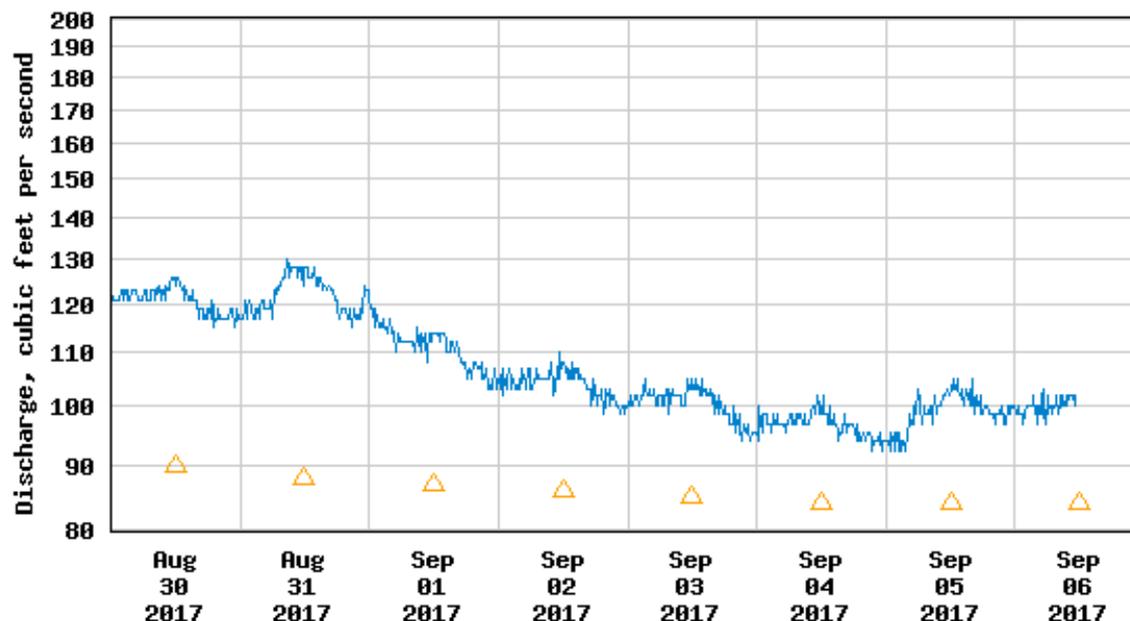


Weber River at Oakley, Utah Sept. 6, 2017

Discharge, cubic feet per second

Most recent instantaneous value: 102 09-06-2017 11:15 MDT

USGS 10128500 WEBER RIVER NEAR OAKLEY, UT



----- Provisional Data Subject to Revision -----

△ Median daily statistic (112 years) — Discharge

Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P000

[Share this graph](#) | [f](#) [t](#) [g+](#) [e](#)

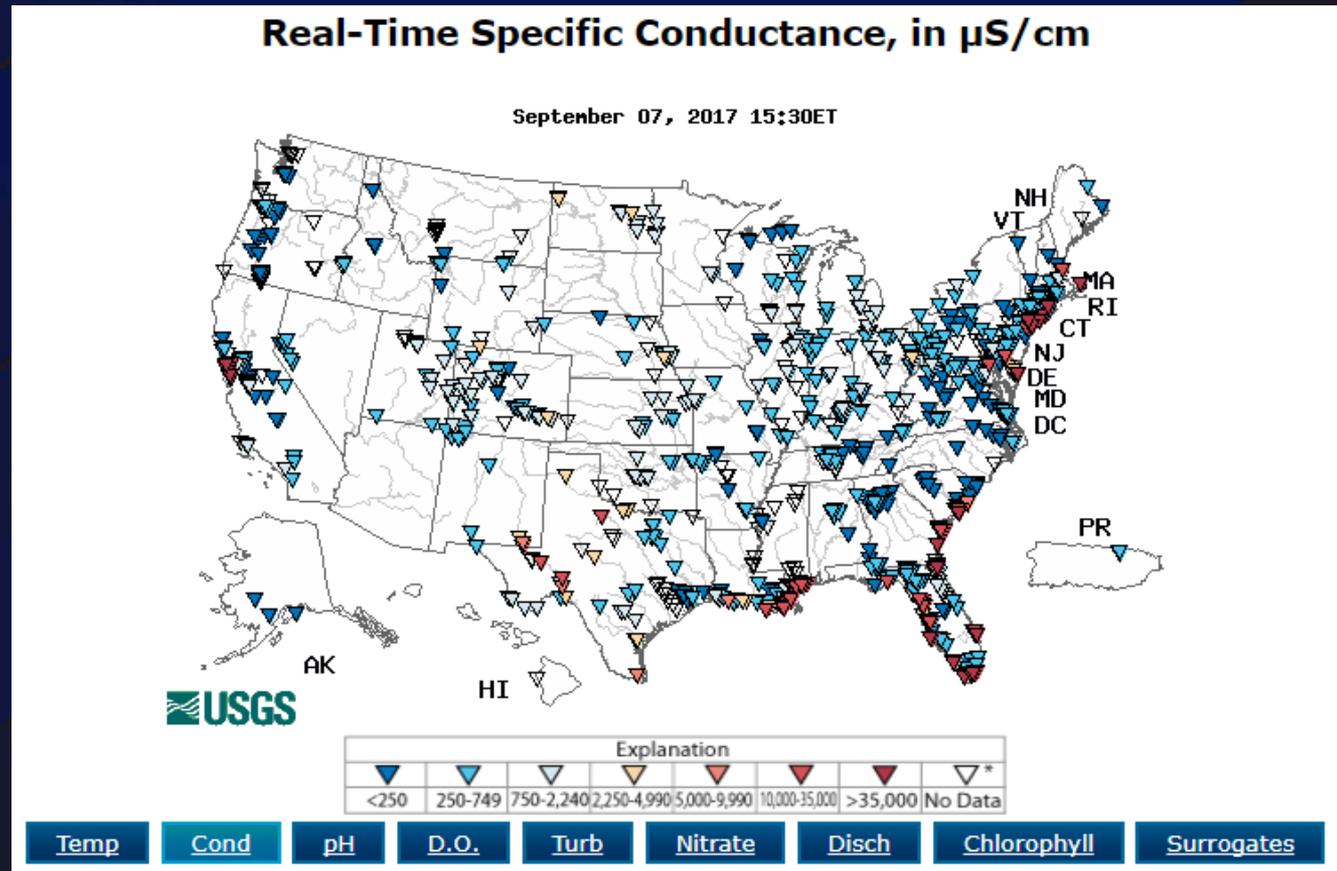
Daily discharge, cubic feet per second -- statistics for Sep 6 based on 112 years of record [more](#)

Min (1931)	25th percentile	Median	Mean	Most Recent Instantaneous Value Sep 6	75th percentile	Max (1983)
31.0	64	84	92	102	115	252



Surface Water QW Data Network

- 22 Water Quality sites
- Temperature, Conductance, Turbidity, Sediment
- Periodic sampling at 8 gages



Users



COLORADO NATIONAL WEATHER SERVICE

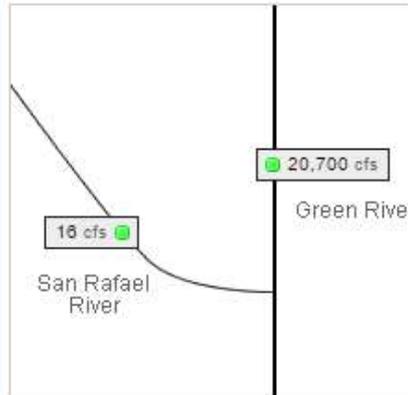


Emery Water Center

Home Reservoirs Rivers

Home Rivers Green

Green



05/06 05/07

Observed — Forecast (Historical Exceedance Probability)

2016-10-01

4 Conceptual Model of the Great Basin Carbonate and Alluvial Aquifer System

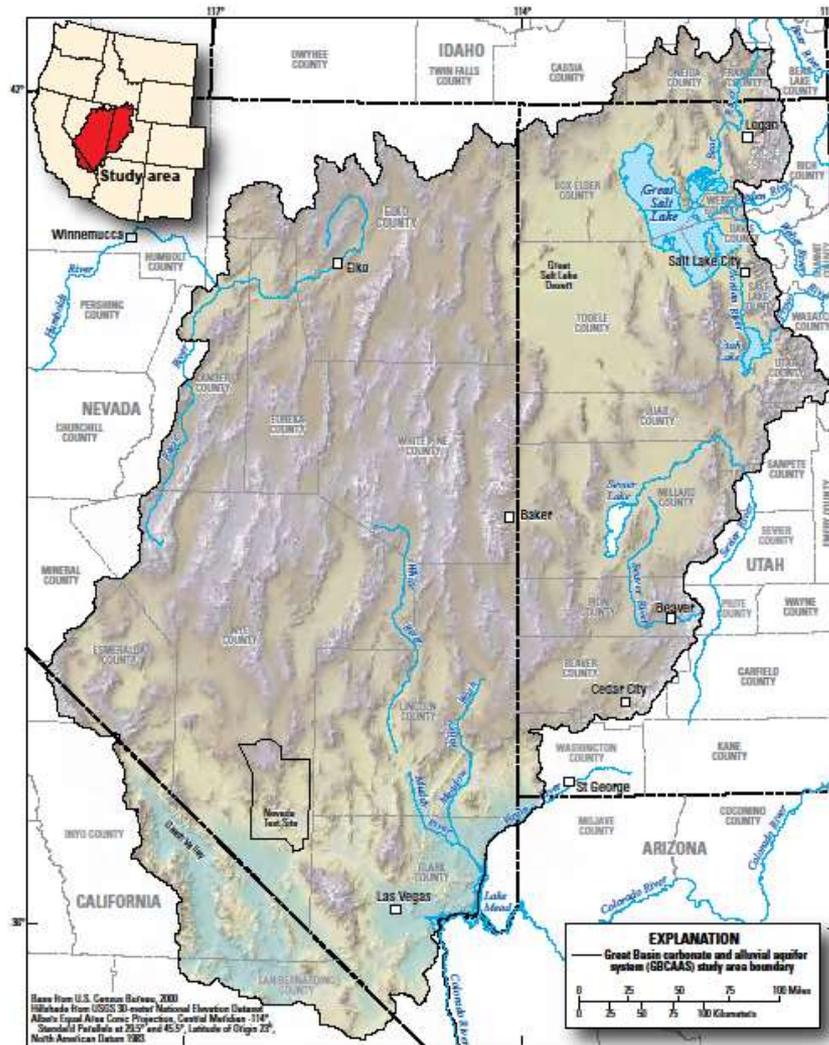


Figure A-1. Location map of the Great Basin carbonate and alluvial aquifer system study area.

about

Last Reading	Value
05/15/2017 04:00PM MDT	20,700cfs
05/15/2017 04:30PM MDT	16cfs

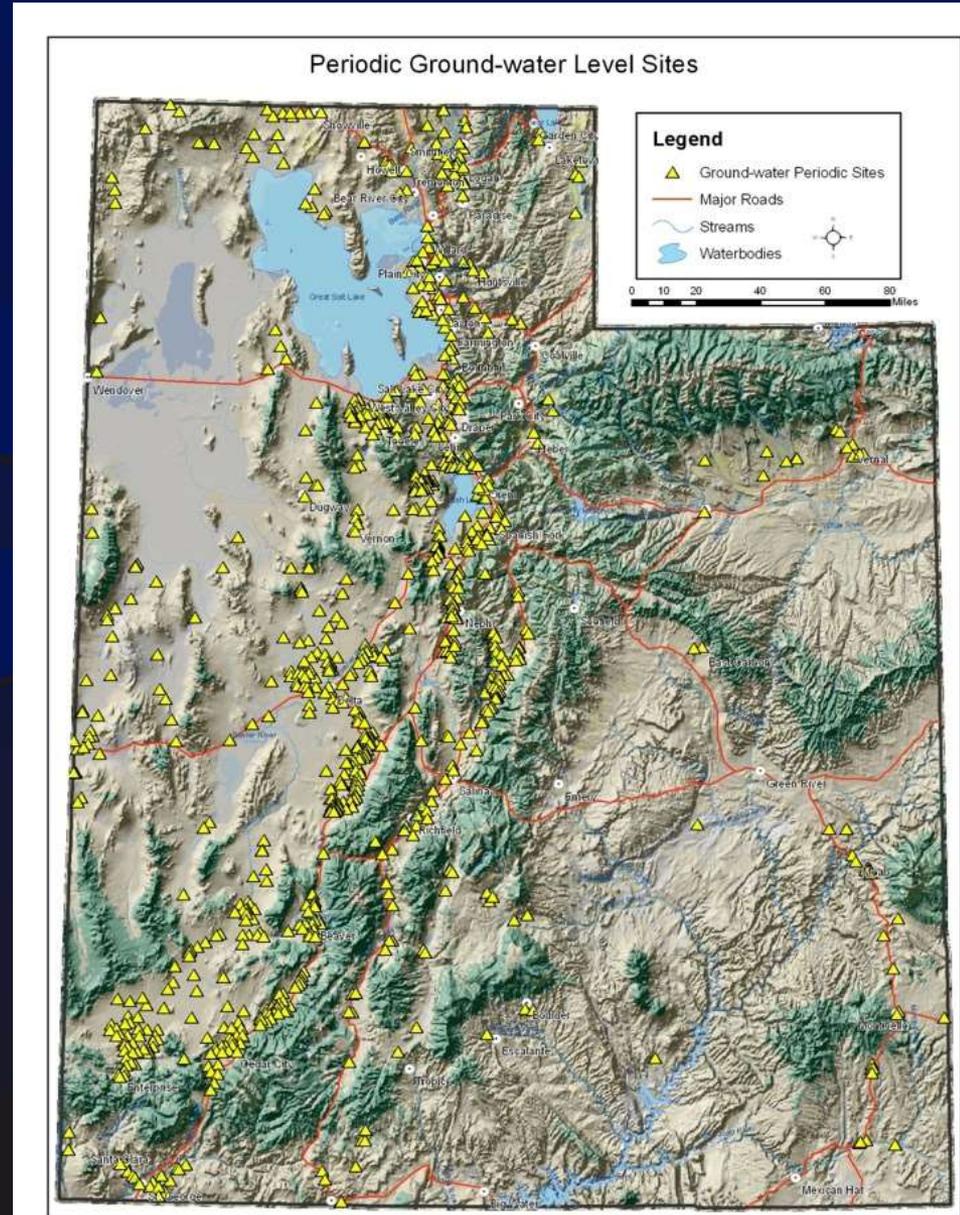


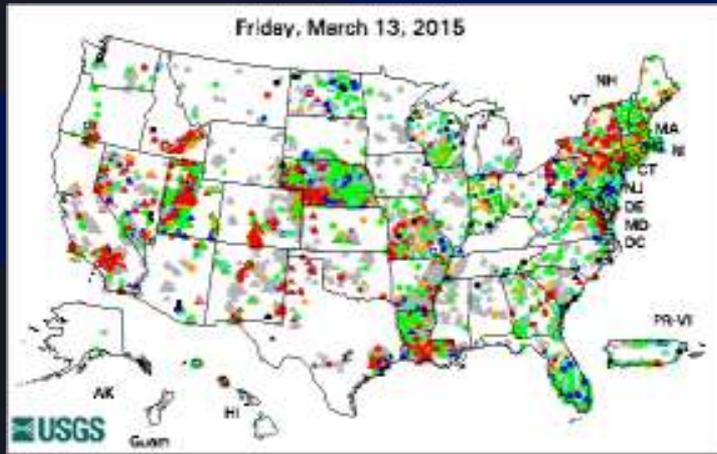
Groundwater monitoring in Utah

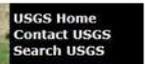
- Ground Water Level Monitoring
- Ground Water Withdrawal Estimation
- Ground Water Quality Monitoring

Utah Groundwater State-Wide Monitoring Network

- Program began in 1962
- Annual water-level measurements in about 1,000 wells
- Measured in March to capture “unstressed” conditions
- Cooperatively funded by DNR and USGS

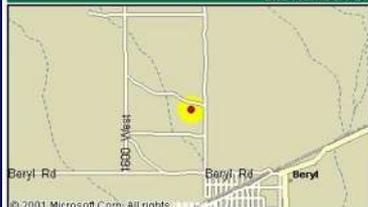




Ground-Water Watch

Site Number: 375429113403901 - (C-33-16)30aac-1



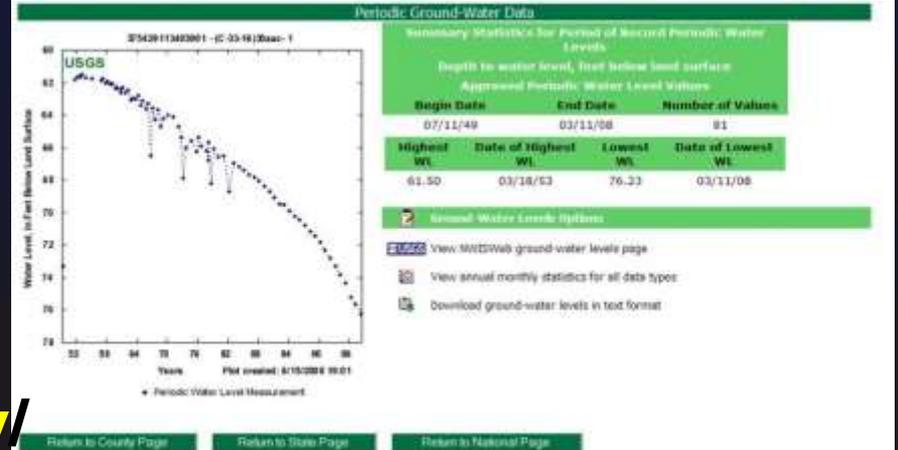
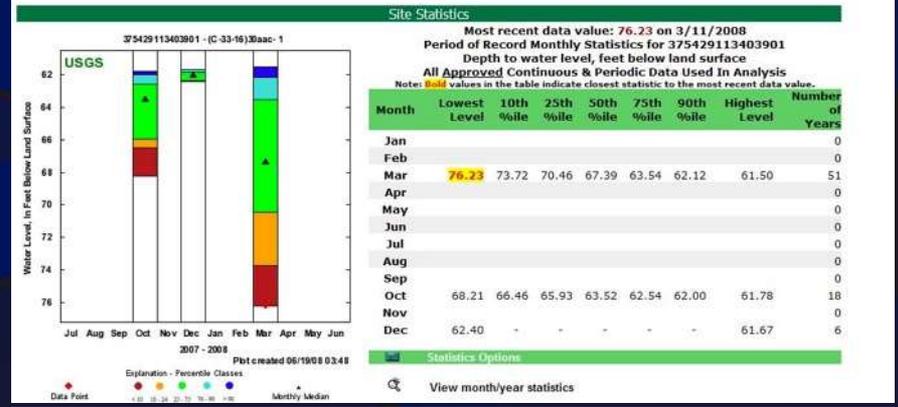
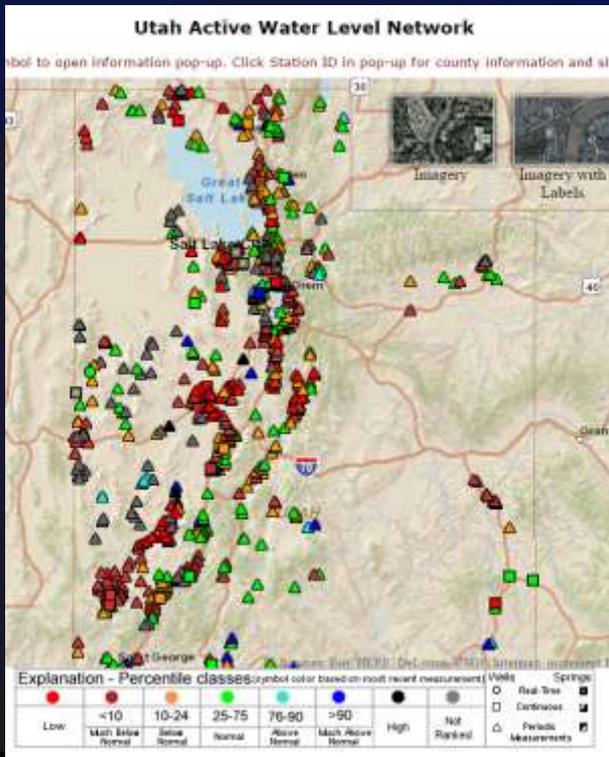
LOCATION
Latitude 37°54'29", Longitude 113°40'39" NAD27
Iron County, Utah, Hydrologic Unit 16030006

DESCRIPTION
Well depth: 150 feet
Hole depth: 154 feet
Land surface altitude: 5,200.00 feet above sea level
NGVD29.

AVAILABLE DATA FROM NWISWeb:
Field ground-water-level measurements

OPERATION:
Record for this site is maintained by the USGS Utah Water Science Center
Email questions about this site to Utah Water-Data Inquiries

[Ground-Water Watch Help Page](#)



**GROUNDWATER
CONDITIONS
IN UTAH**

SPRING OF 2014

**COOPERATIVE INVESTIGATIONS
REPORT NO. 55**



UTAH DEPARTMENT OF NATURAL RESOURCES and
UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

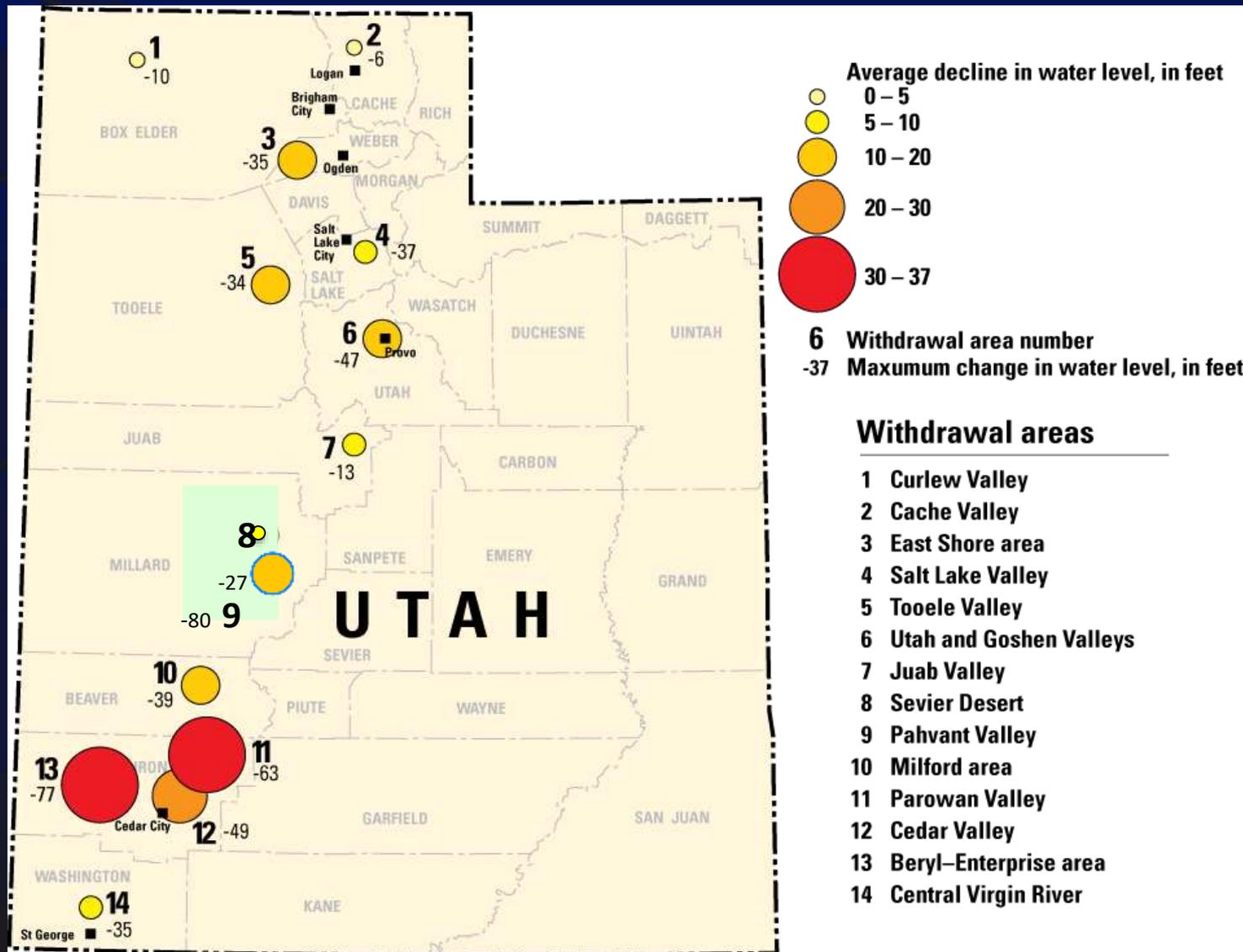
U.S. GEOLOGICAL SURVEY

- Published annually since 1963
- Available electronically since 2003
- Not interpretive
- Data is also available from NWIS Web

<http://ut.water.usgs.gov>

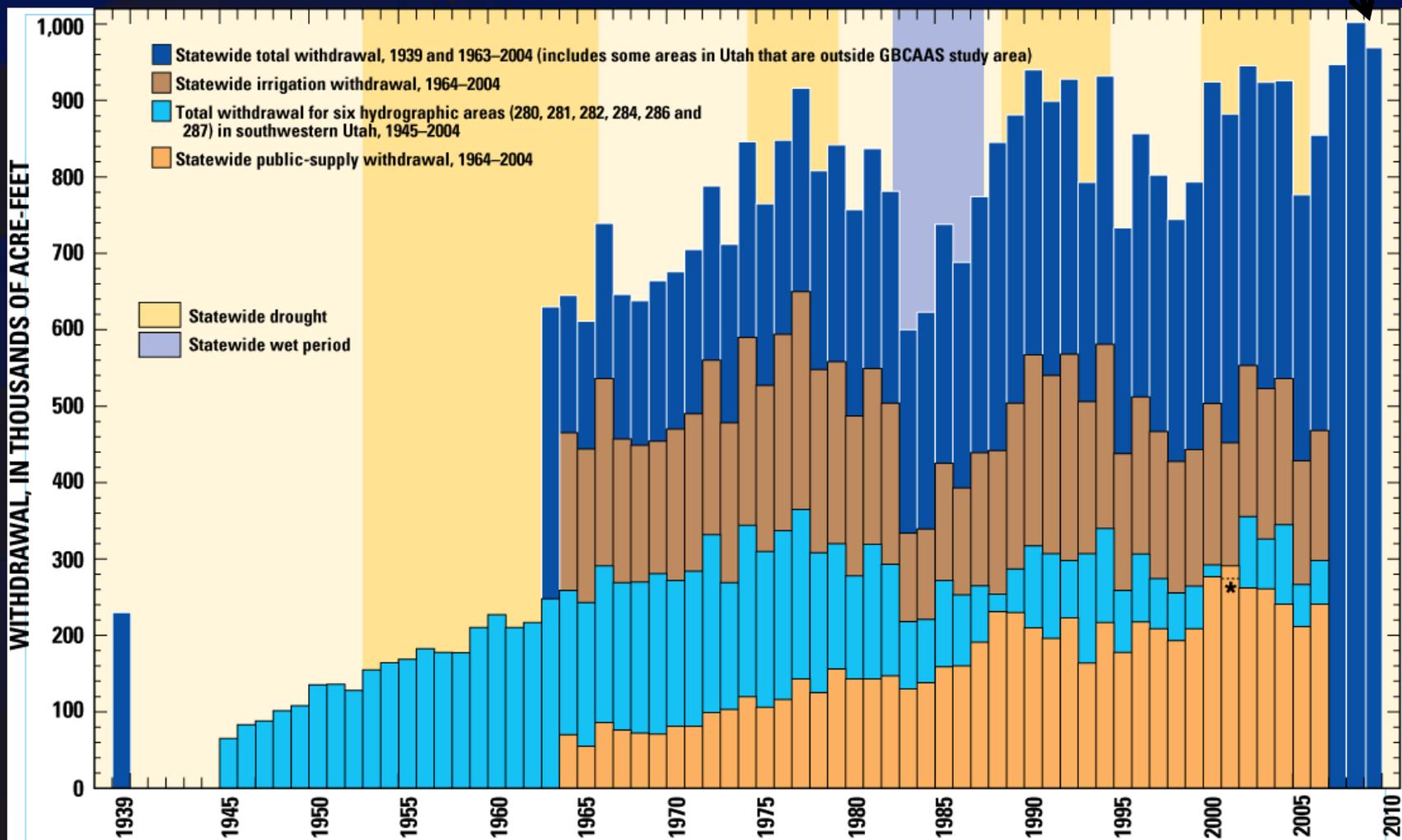
Groundwater Level Trends

Average declines in water levels in major groundwater basins – March 1980 to March 2010



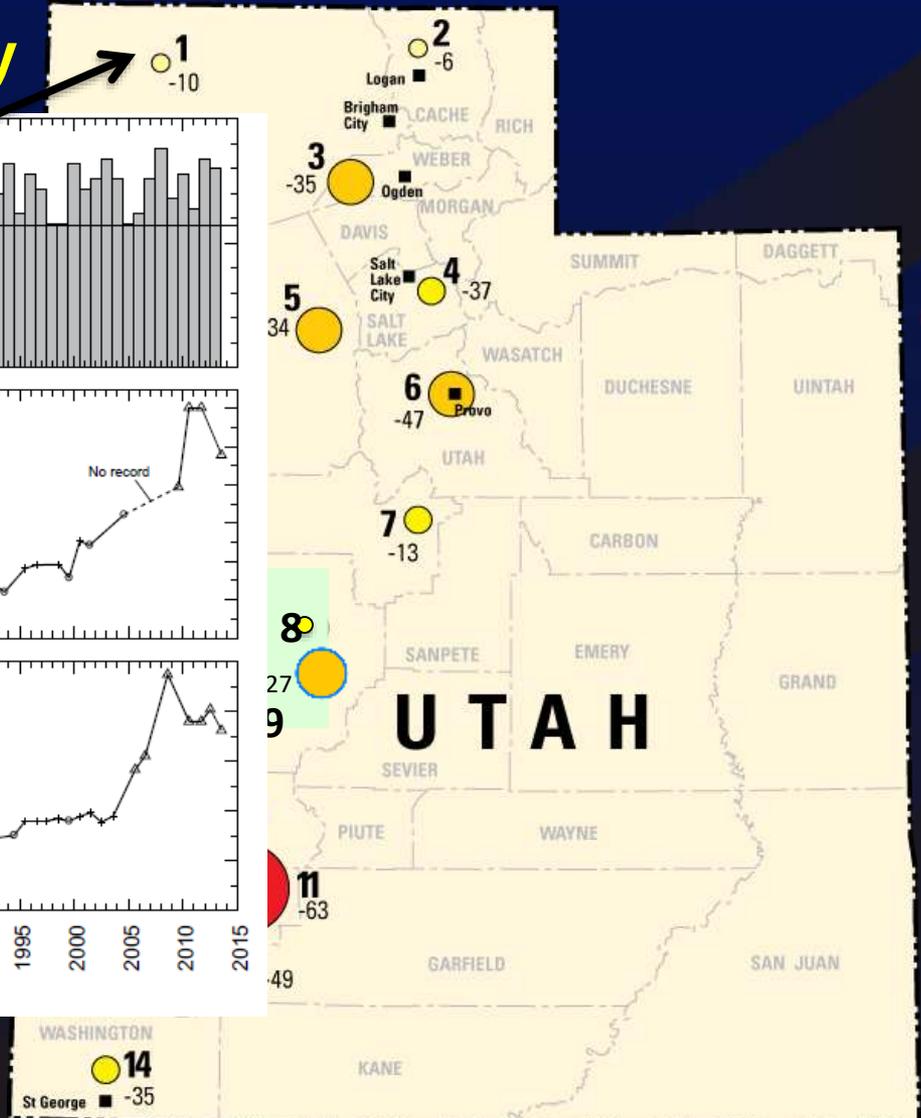
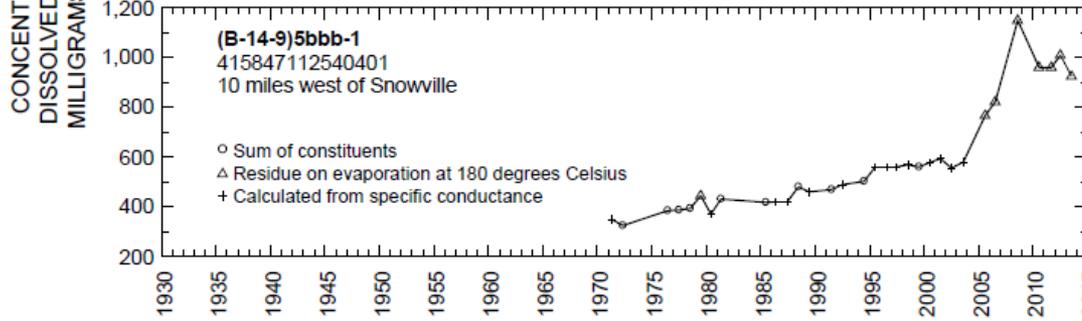
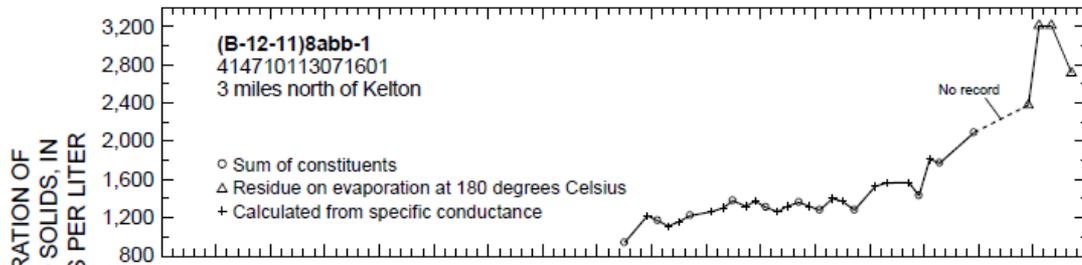
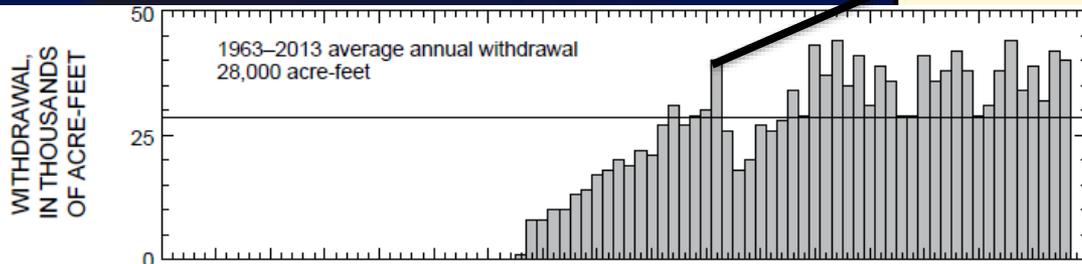
Trends in groundwater use in Utah

2009 estimated withdrawals from wells = 969,000 acre-ft



Trends in chemical quality of groundwater

Curlew Valley





Cataract Canyon - 1948



Cataract Canyon - 1948



Cataract Canyon - 2015

Questions?



O.E. Meinzer
USGS Groundwater Division Chief, 1912-1946

