

**CLARK, LINCOLN, AND WHITE PINE COUNTIES
GROUNDWATER DEVELOPMENT PROJECT EIS**

WATER RESOURCES TECHNICAL REVIEW
MEETING 1 – BASELINE DATA
June 23-24, 2005

HYDROLOGY – GROUNDWATER – WATER LEVELS

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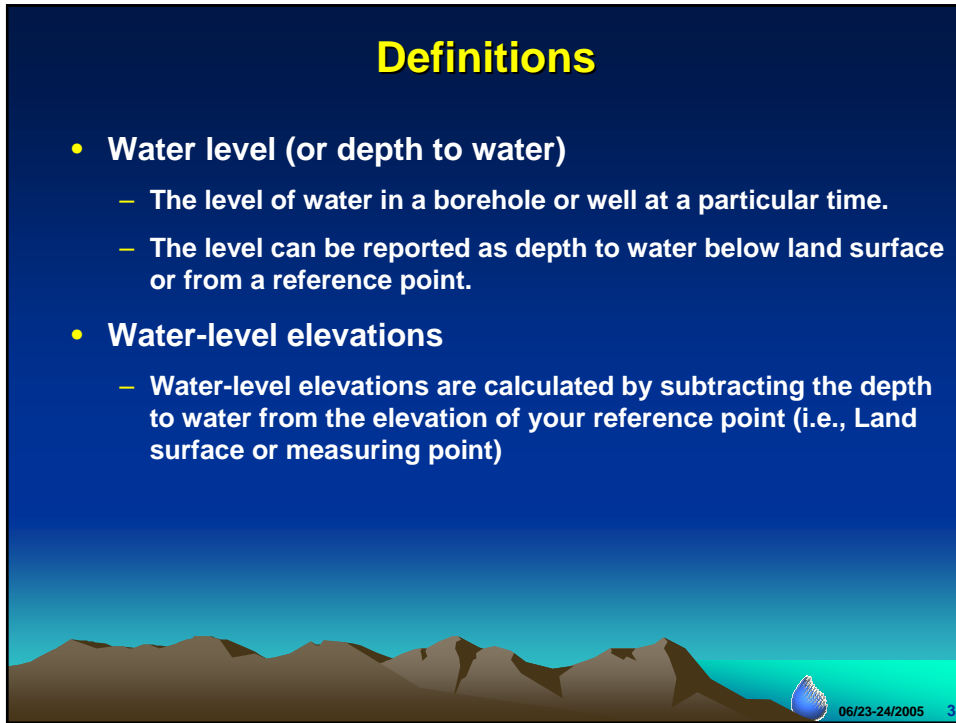
Presentation Organization

- Definitions
- Water-level data types
- Common methods of measurement
- Uses of water-level data
- Study area
- Sources of data
- Project basins observations
- Data Considerations
- How to access the data

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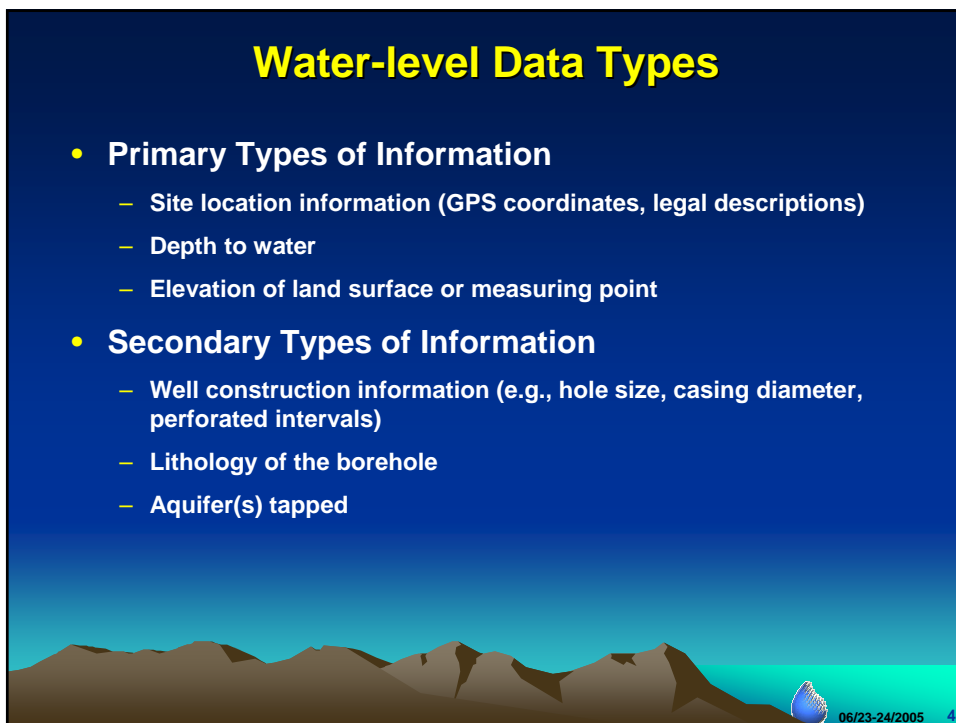
Definitions

- **Water level (or depth to water)**
 - The level of water in a borehole or well at a particular time.
 - The level can be reported as depth to water below land surface or from a reference point.
- **Water-level elevations**
 - Water-level elevations are calculated by subtracting the depth to water from the elevation of your reference point (i.e., Land surface or measuring point)



Water-level Data Types

- **Primary Types of Information**
 - Site location information (GPS coordinates, legal descriptions)
 - Depth to water
 - Elevation of land surface or measuring point
- **Secondary Types of Information**
 - Well construction information (e.g., hole size, casing diameter, perforated intervals)
 - Lithology of the borehole
 - Aquifer(s) tapped



Common Methods of Measurement



- Graduated steel tape
- Electrical methods
- Air line methods



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Uses of Water-Level Data

- Determination of steady-state conditions
- Construction of water-level contour maps
- Assessment of directions of groundwater flow
- Estimating hydraulic characteristics of an aquifer



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Study Area

- Data collected for an area slightly larger than the “General Hydrologic Study Area”
- Includes portions of Clark, Lincoln, and White Pine counties in Nevada
- Includes hydrographic areas in Utah (parts of Snake and Hamlin Valleys)



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Sources of Data

- U.S. Geological Survey’s (USGS) National Water Information System (NWIS) / Groundwater Site Inventory (GWSI) database
- Nevada Department of Water Resources (NDWR) “Well Log” database
- Southern Nevada Water Authority (SNWA) data
- Other Sources of Data
 - Published reports, maps, and online databases (including Utah data)



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USGS NWIS / NWISWeb Data

- NWIS/GWSI data obtained from the Henderson, NV USGS district office June 2, 2004
- Data included:
 - Site information (10,044 records)
 - Depth to water (94,269 records)
 - Borehole, casing, and open interval information
 - Discharge
 - Site remarks
 - Lithology
- Data obtained as a set of *.rdb files that were loaded into an Microsoft Access database



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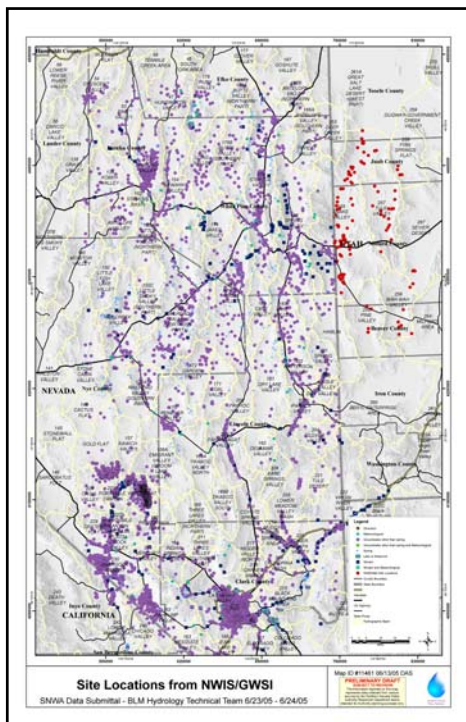
USGS NWIS / NWISWeb Data (cont'd)



- Data obtained from <http://waterdata.usgs.gov/nwis>
- Obtained from website to include locations in Utah
 - Contains only site location and depth to water data



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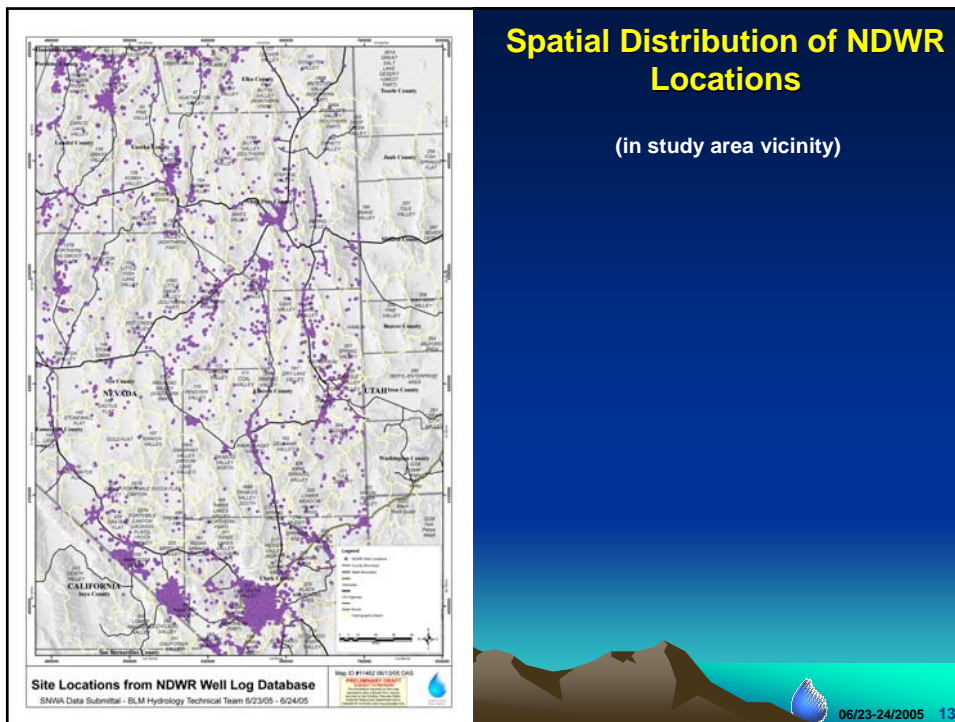
Spatial Distribution of NWIS Locations

- NWIS/GWSI period of record
 - 1905-2004
- NWISWeb period of record
 - 1850-2004
- Of the locations, over 4,200 had depth-to-water measurements

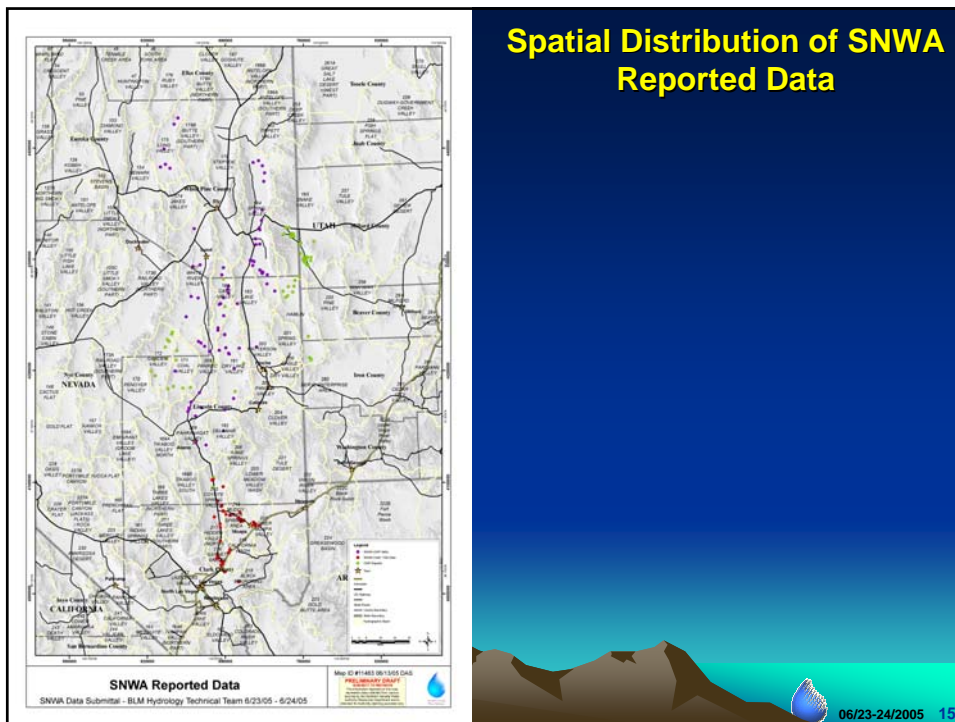
NDWR Well Log Database



- Obtained from URL <http://water.nv.gov/IS/wlog/wlog.htm>
- Contains 3 different tables
 - Contractor: 437 records
 - Driller: 2,274 records
 - WLOG: 83,868 records



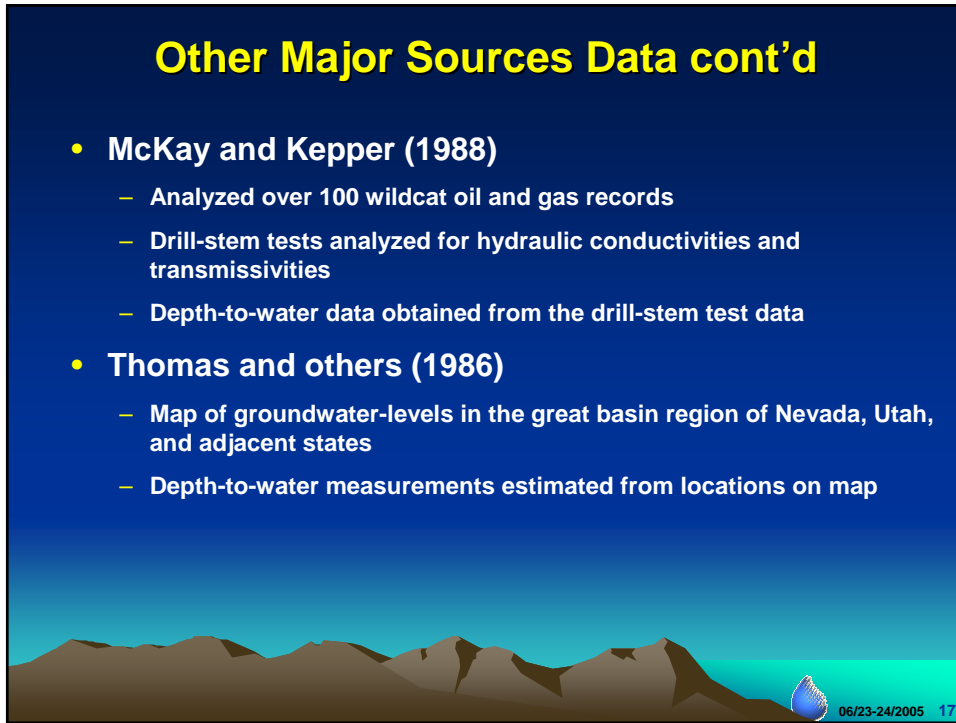
- ### SNWA Reported Data
- CWP data
 - Yearly field measurements of water levels since 1996
 - Water-level data compiled in support of NV State Engineer's Order 1169
 - Cooperative water project reports (1992-1995)
 - Report No. 03 – Coyote Spring Valley
 - Report No. 06 – Tikaboo North and South
 - Report No. 08 – Coal and Garden Valleys
 - Report No. 09 – Snake
 - Report No. 10 – Pahroc
 - Report No. 11 – Cave
 - Report No. 13 - Spring
- The figure has a blue gradient background with a mountain silhouette at the bottom and a water drop icon. The date '06/23-24/2005' and the number '14' are in the bottom right corner.



- ### Other Major Sources of Data
- **Ertec (1981) & Bunch and Harrill (1984)**
 - Documented hydrologic investigations in support of the MX-missile siting program.
 - Contained data on groundwater levels, spring and stream discharge, and water quality.
 - **Nevada ground-water resources-reconnaissance reports**
 - Published by the state of Nevada department of conservation and natural resources in conjunction with the USGS
 - 57 total reports investigating the groundwater resources of NV

Other Major Sources Data cont'd

- **McKay and Kepper (1988)**
 - Analyzed over 100 wildcat oil and gas records
 - Drill-stem tests analyzed for hydraulic conductivities and transmissivities
 - Depth-to-water data obtained from the drill-stem test data
- **Thomas and others (1986)**
 - Map of groundwater-levels in the great basin region of Nevada, Utah, and adjacent states
 - Depth-to-water measurements estimated from locations on map

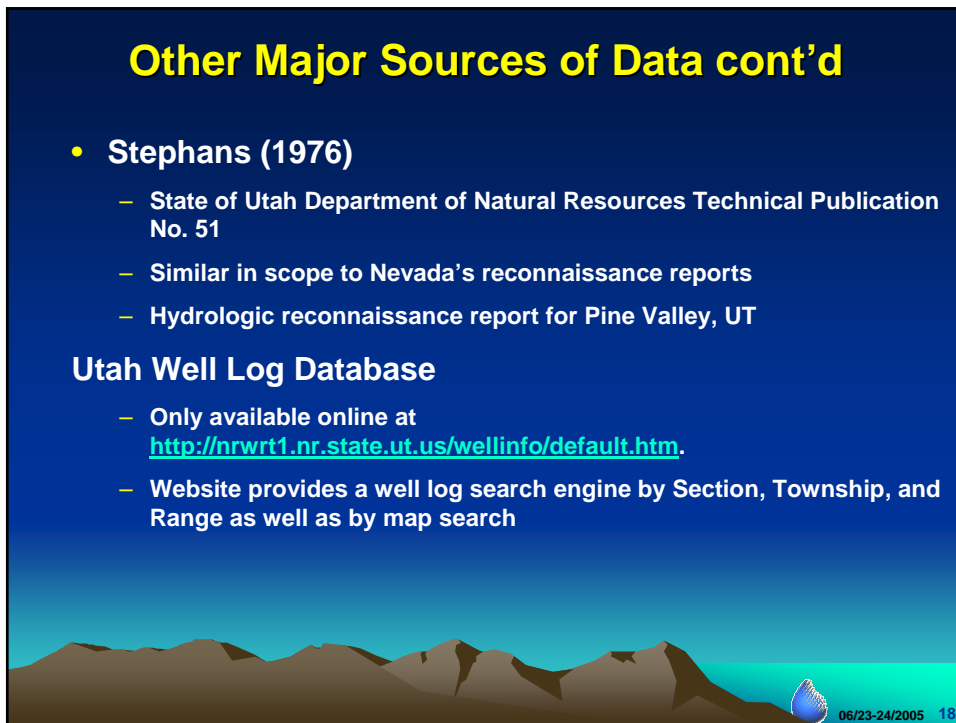


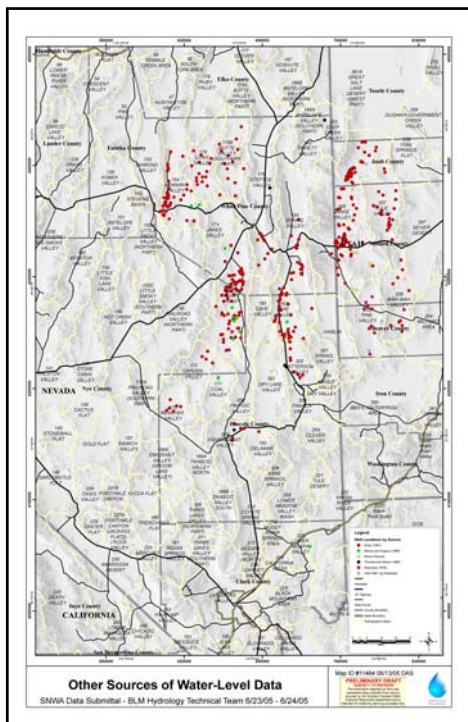
Other Major Sources of Data cont'd

- **Stephans (1976)**
 - State of Utah Department of Natural Resources Technical Publication No. 51
 - Similar in scope to Nevada's reconnaissance reports
 - Hydrologic reconnaissance report for Pine Valley, UT

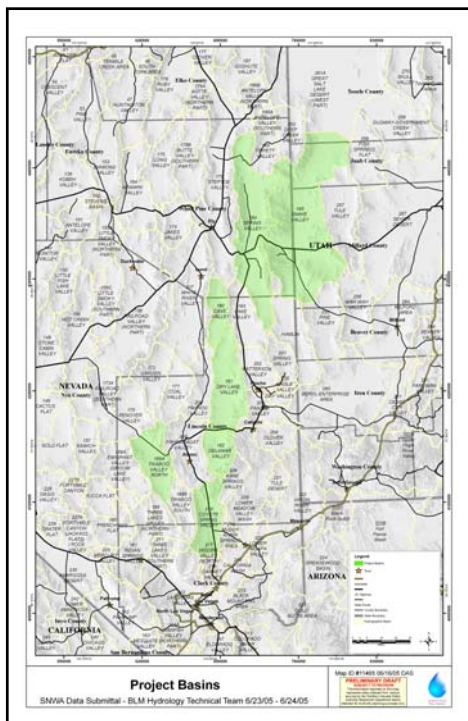
Utah Well Log Database

- Only available online at <http://nrwrt1.nr.state.ut.us/wellinfo/default.htm>.
- Website provides a well log search engine by Section, Township, and Range as well as by map search





**Spatial Distribution of Other
 Water-level Data**

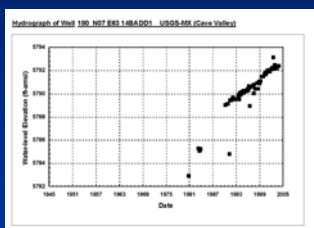


Project Basin Observations

- Number of sites with data
 - Delamar – 6
 - Dry Lake – 26
 - Cave – 28
 - Snake – 286
 - Spring – 175
 - Coyote Spring Valley – 26
 - Tikaboo North – 2
- There is also a great variability in the number of measurements for a given site



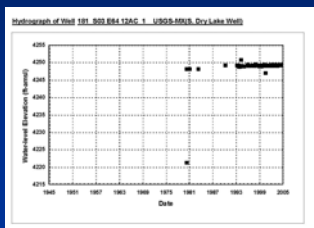
HA 180 - Cave Valley



- DTW measurements vary from 2 to 338' with an average value of 181' bgs
- Elevations range from 5749' to 7296' with an average value of 6061' amsl
- 9 wells have more than 5 depth-to-water records

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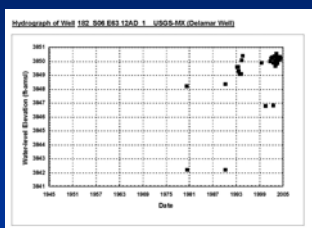
HA 181 – Dry Lake Valley



- DTW measurements vary from 3' to 869' with an average value of 266' bgs
- Elevations range from 4247' to 6630' with an average value of 5091' amsl
- 8 wells have more than 5 depth-to-water measurements

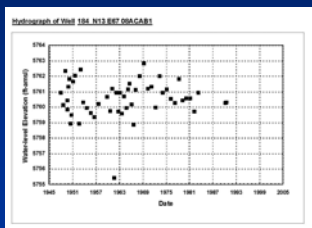
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HA 182 – Delamar Valley



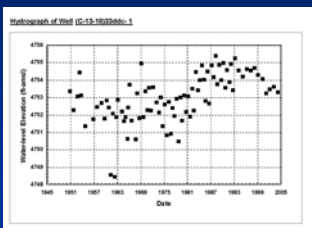
- DTW measurements vary from 220' to 871' with an average value of 652'
- Elevations vary from 3842' to 4533' with an average value of 4075' amsl
- 1 well has more than 5 depth-to-water measurements

HA 184 – Spring Valley



- DTW measurements vary from flowing to 564' with an average of 62' bgs
- Elevations vary from 5532' to 6862' with an average value of 5819' amsl
- 28 wells have more than 5 depth-to-water measurements

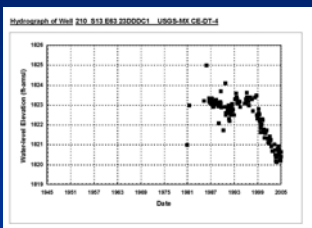
HA 195 - Snake



- DTW measurements vary from flowing to 750' with an average of 51' bgs
- Elevations vary from 4323' to 7175' with an average of 5057' amsl
- 43 wells have more than 5 depth-to-water measurements

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HA 210 – Coyote Spring Valley



- DTW measurements vary from 14' to 1087' with an average value of 404' bgs
- Elevations vary from 1817' to 2970' with an average value of 2088' amsl
- 14 wells have more than 5 depth-to-water measurements

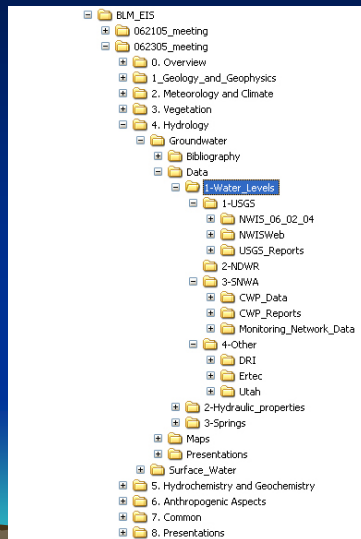
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Data Considerations

- Sparse data in certain hydrographic areas
- Limited historical data for many locations
- Location inaccuracies
- Depth-to-water measurements from the same reference point?
- Differing levels of confidence in reported values (NWIS vs. NDWR)
- Duplicate locations and depth-to-water measurements

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How to Access the Data



- Water-level data found in the “Hydrology” section
- Data is organized by the source of data described in this presentation

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Questions

Thank You

