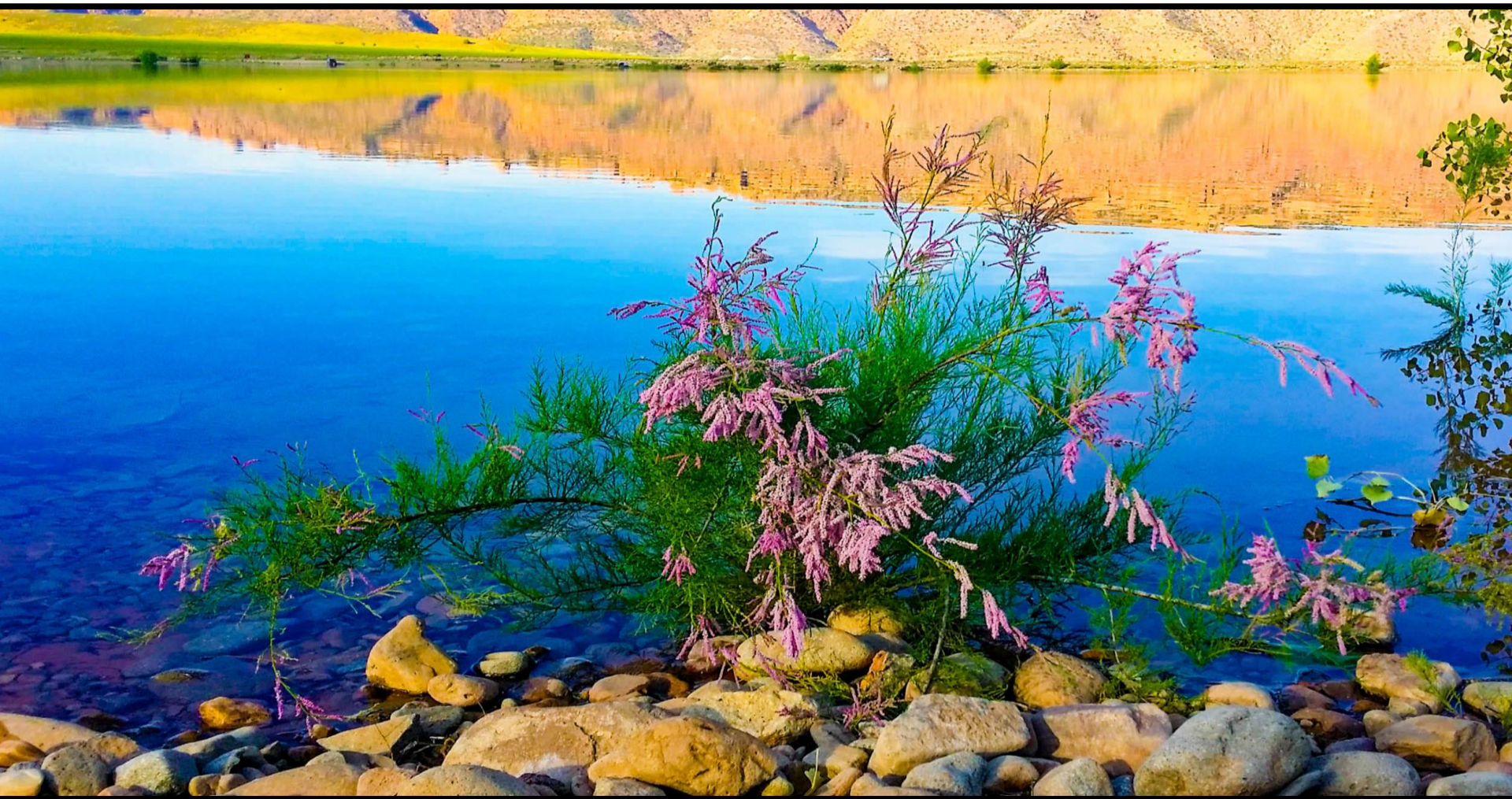


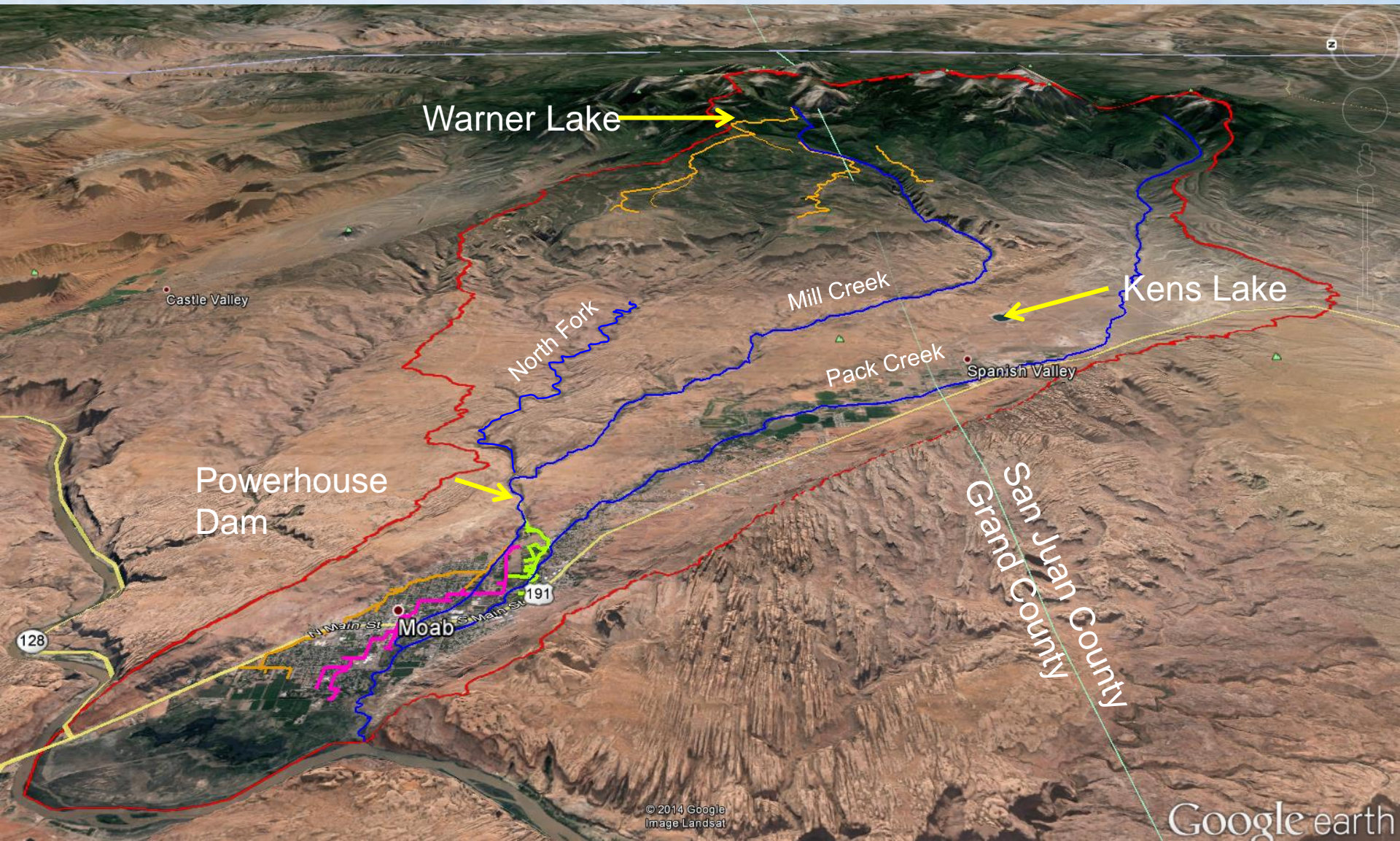


Utah Division of Water Rights



REVIEW OF GROUNDWATER MONITORING MOAB / SPANISH VALLEY - SOUTH

Moab / Spanish Valley Watershed



Warner Lake



Castle Valley

Mill Creek

Kens Lake

North Fork

Pack Creek

Spanish Valley

Powerhouse Dam

San Juan County
Grand County

Moab

191

128



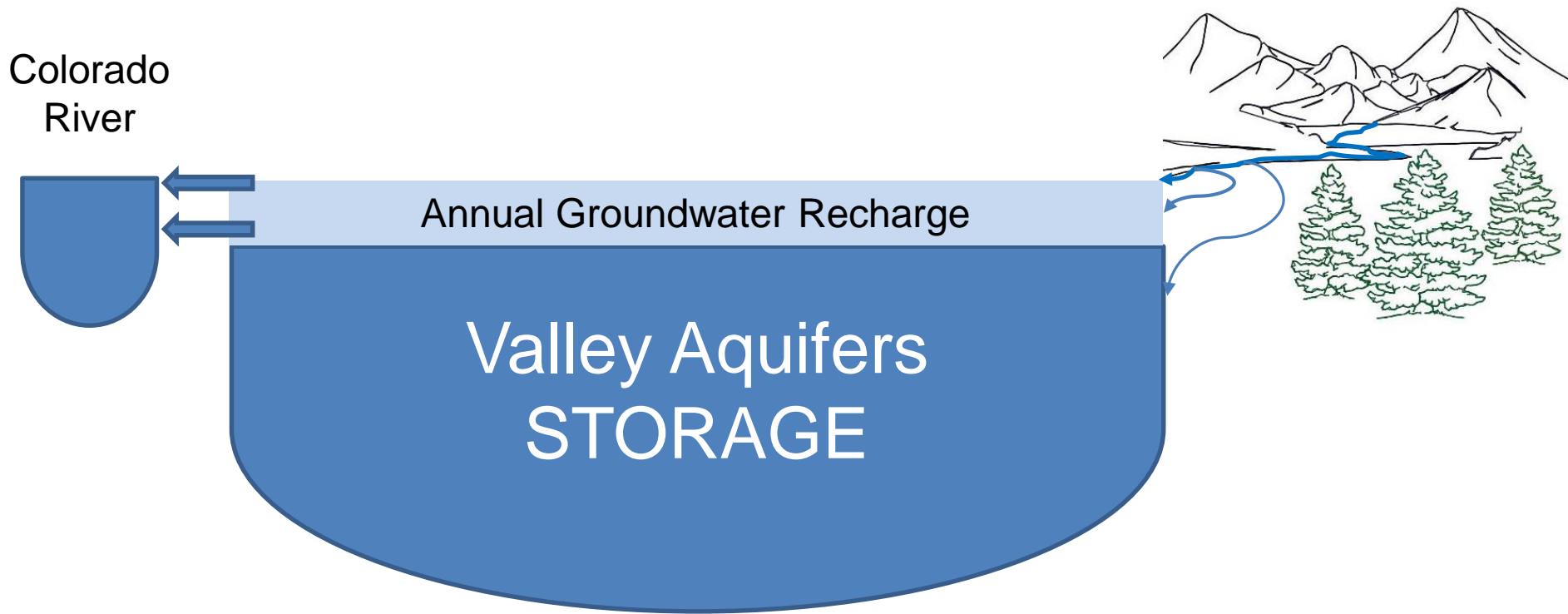
Groundwater Management Plans

- Est. in Section 73-5-15 Utah Code

Objectives:

- Limit groundwater withdrawals to safe yield.
- Protect physical integrity of the aquifer.
- Protect water quality.

“Safe Yield” means the amount of groundwater that can be withdrawn from a groundwater basin over a period of time without exceeding the long-term recharge of the basin or unreasonably affecting the basin’s physical and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.



**USGS “Evaluation of Groundwater Resources in the Spanish Valley Watershed, Grand and San Juan Counties, Utah”
Scientific Investigations Report 2019-5062, pg. 55**

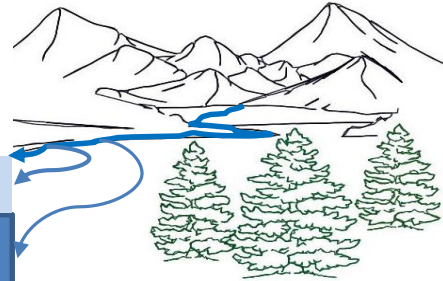
- Recharge: 9,550 – 30,000 acre-feet
- Discharge: 14,000 – 16,000 acre-feet

Colorado River

Well & Spring Development

Annual Groundwater Recharge

Valley Aquifers STORAGE



Ground Surface

▼ Water Table Elevation

● Zero Development

Annual Recharge

▼ Water Table Elevation

● Maximum Development Allowed Under Utah Law

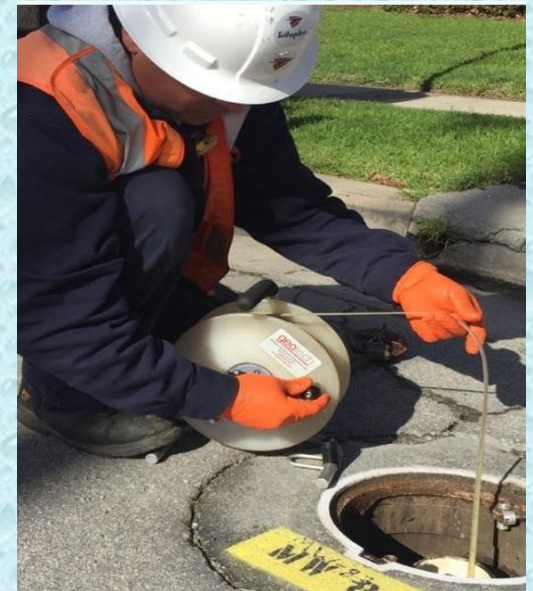
Valley Aquifers STORAGE

▼ Groundwater Mining / Overdraft



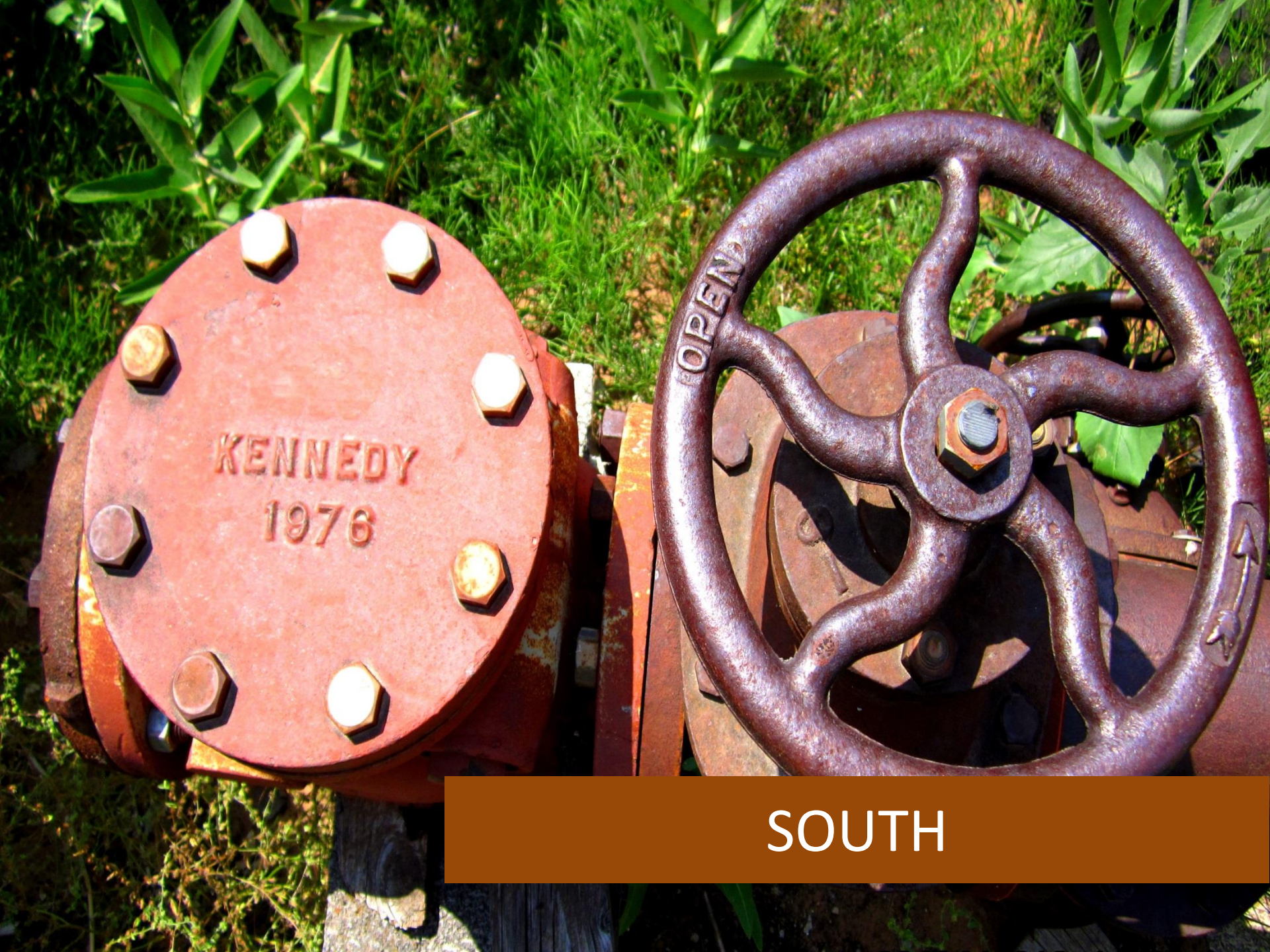
What Should Be Measured?

- Spring Flows
- Stream Flows
- Water Quality
- Water Table Elevations



Who's collecting the Data?

- USGS
- Moab City
- Moab Irrigation Company
- Grand Water & Sewer SA
- San Juan Spanish Valley SSD
- Division of Water Quality
- Division of Water Rights

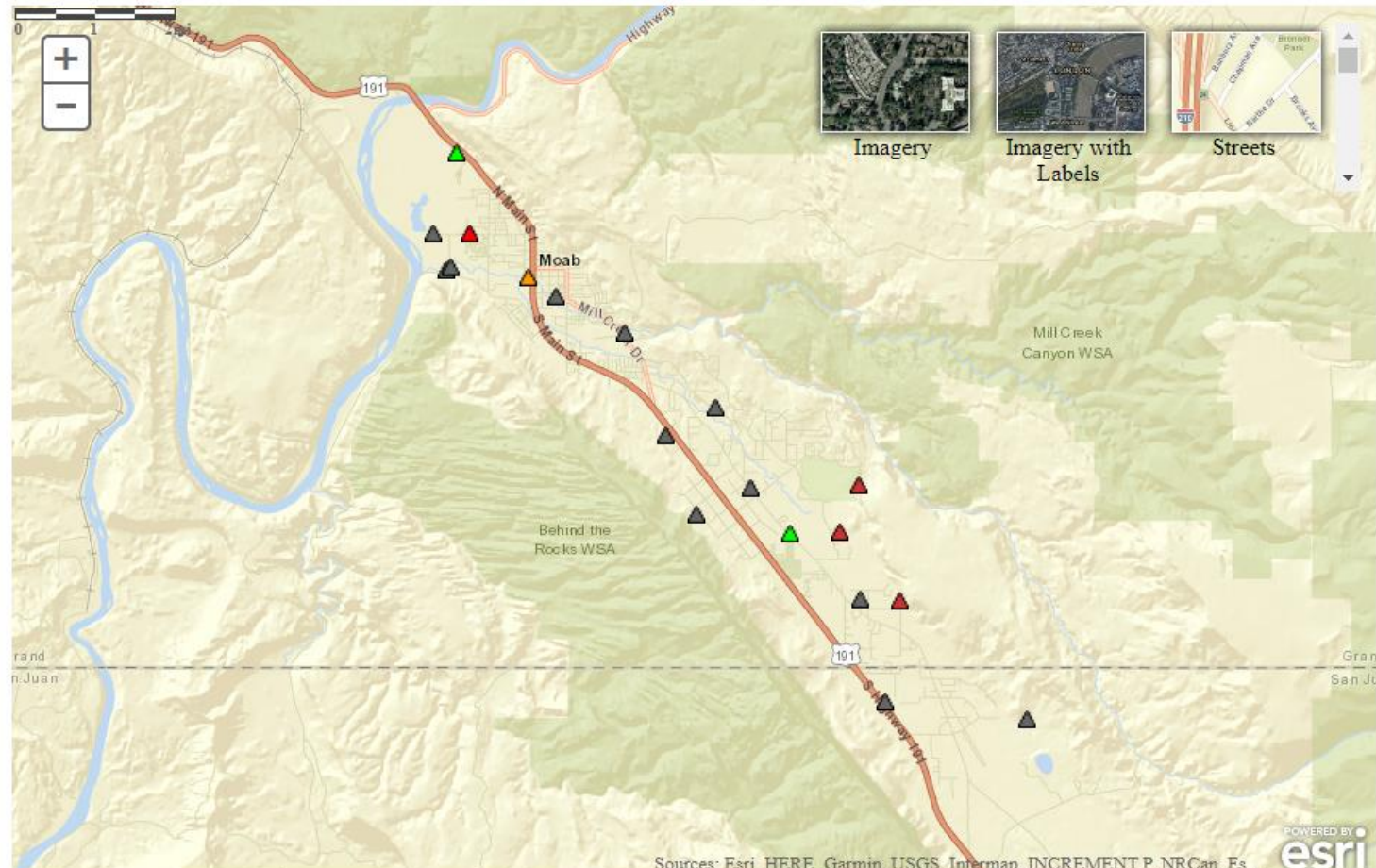


SOUTH



Utah Active Water Level Network

Click site symbol to open information pop-up. Click Station ID in pop-up for county information and site selection.
 Map loading slowly? Try a different browser. Web browser performance varies significantly.



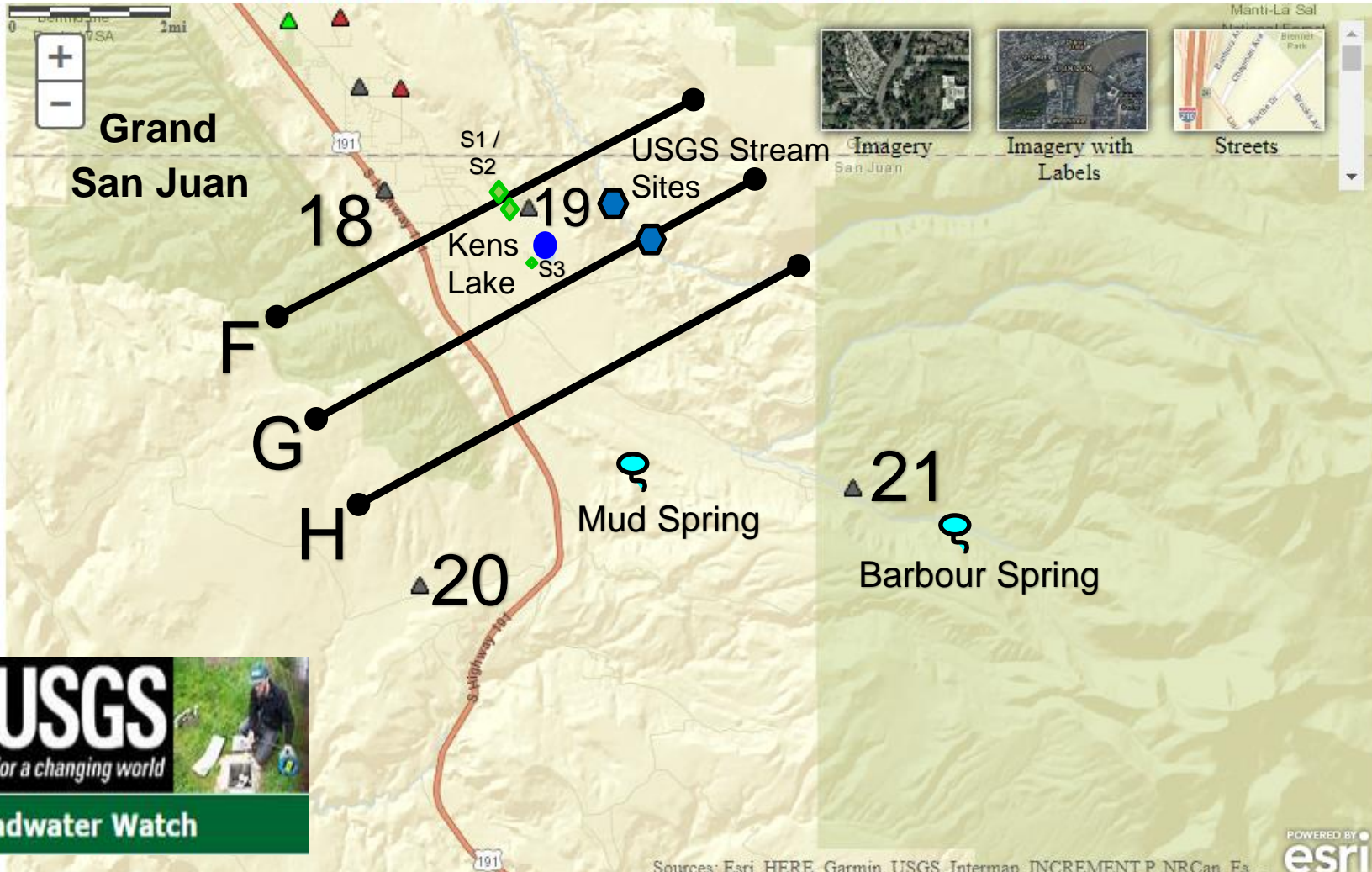
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Es...

Explanation - Percentile classes (symbol color based on most recent measurement)							Wells		Springs	
●	●	●	●	●	●	●	○	□	□	□
Low	<10	10-24	25-75	76-90	>90	High	Real-Time	Continuous	Periodic Measurements	Not Ranked
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal					

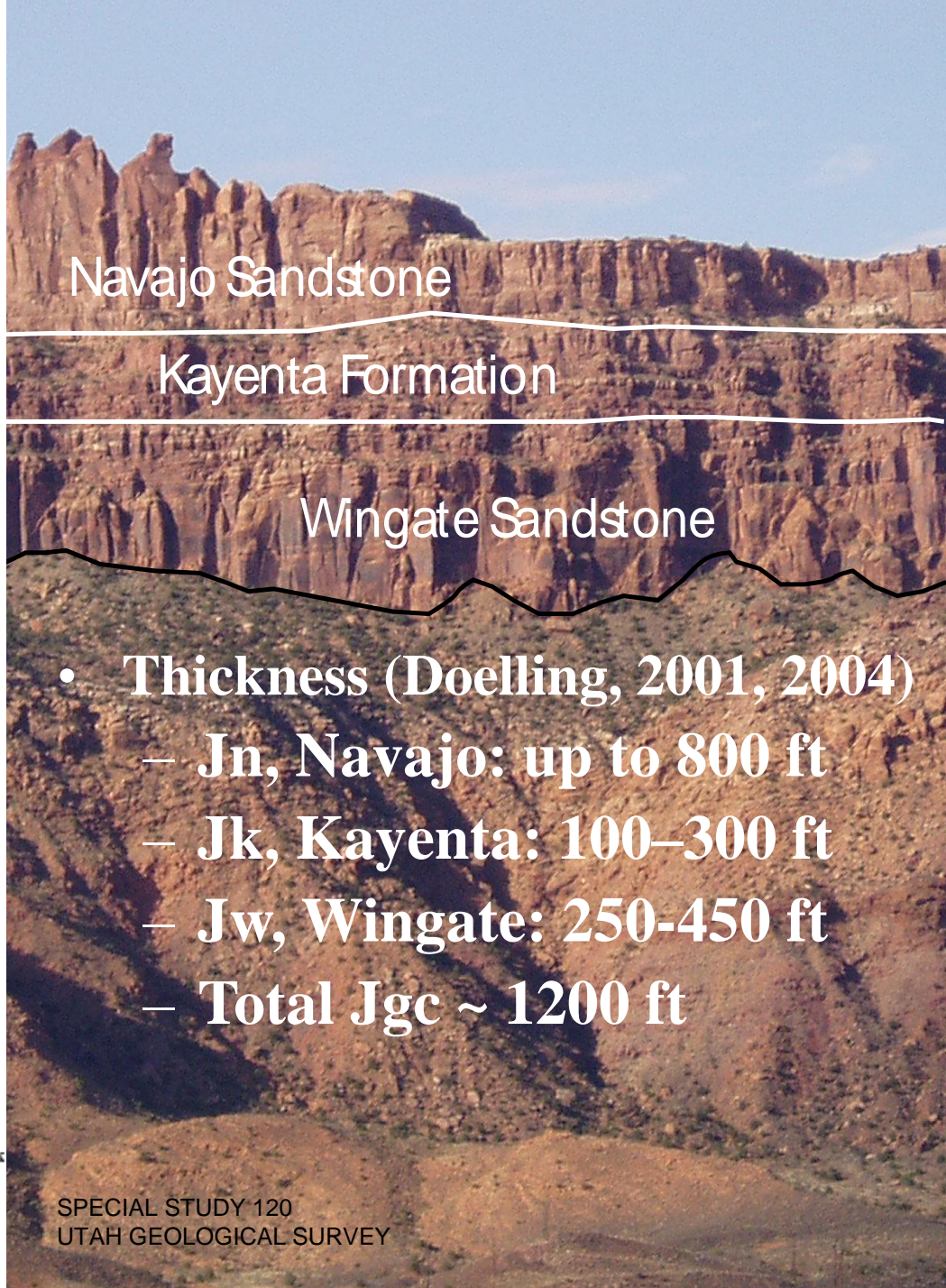
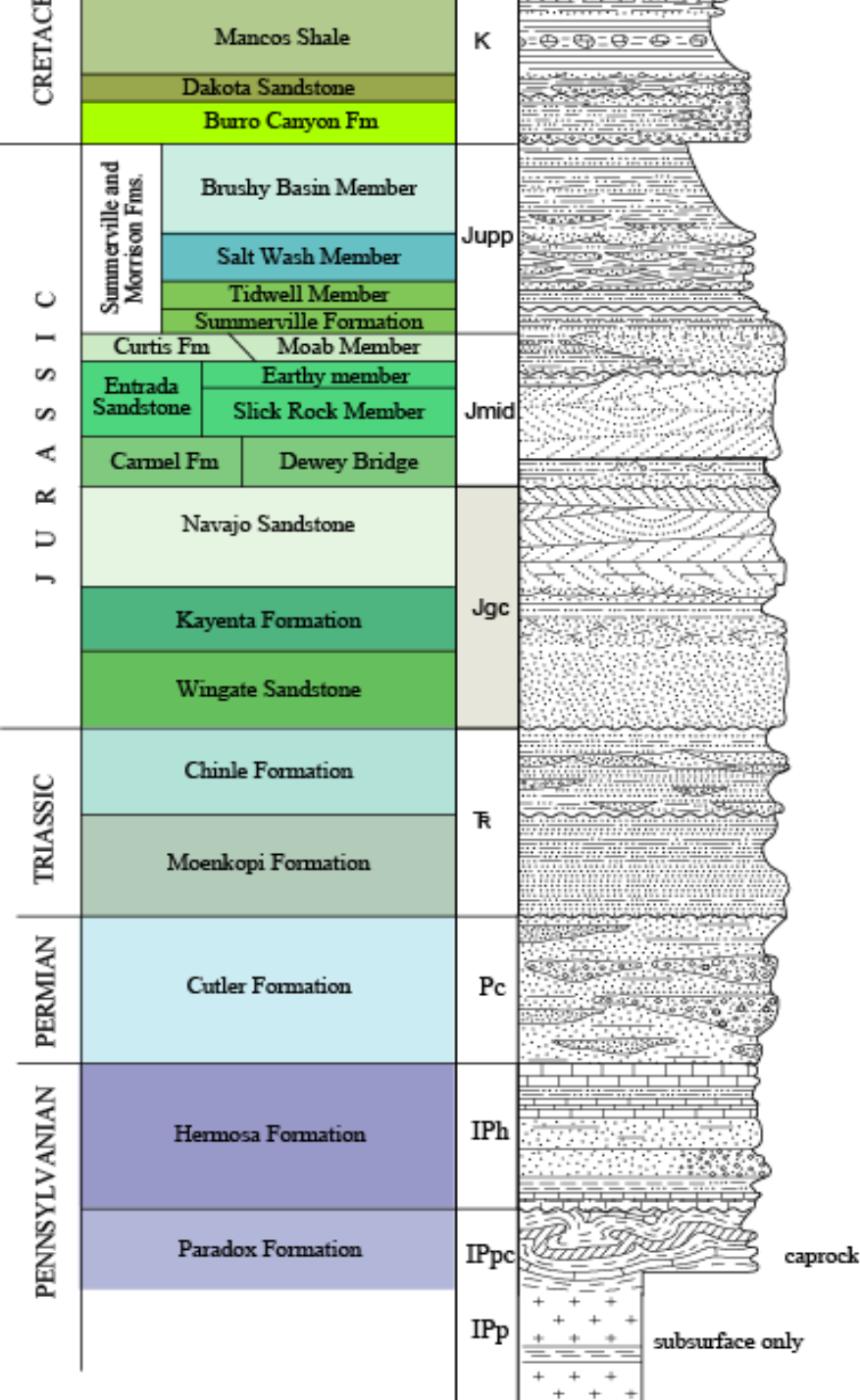


Utah Active Water Level Network

Click site symbol to open information pop-up. Click Station ID in pop-up for county information and site selection.
 Map loading slowly? Try a different browser. Web browser performance varies significantly.

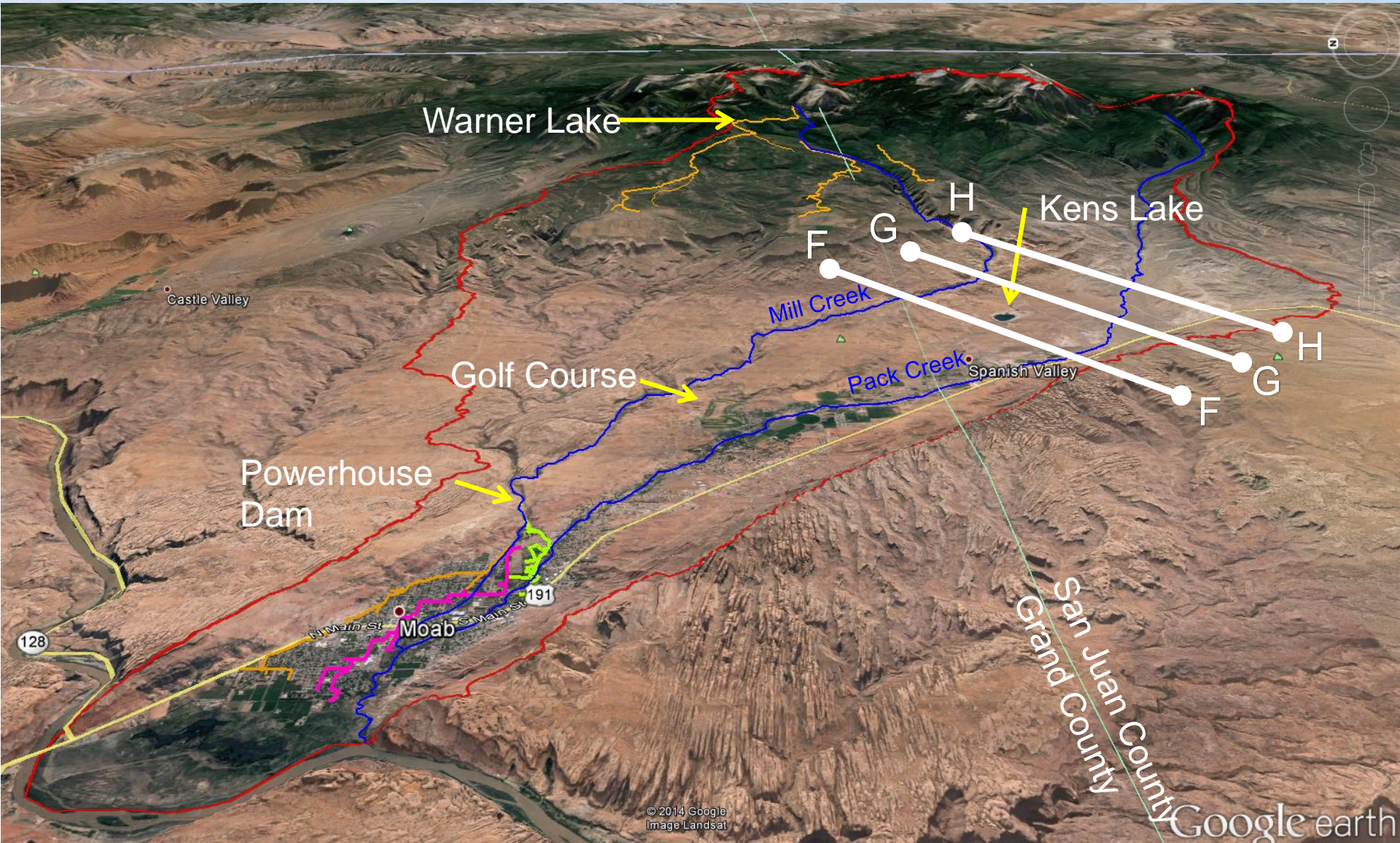


Explanation - Percentile classes (symbol color based on most recent measurement)							Wells		Springs	
Low	●	●	●	●	●	●	●	●	○ Real-Time	■
		<10 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	High	Not Ranked	□ Continuous	■
									△ Periodic Measurements	■



- Thickness (Doelling, 2001, 2004)
 - Jn, Navajo: up to 800 ft
 - Jk, Kayenta: 100–300 ft
 - Jw, Wingate: 250-450 ft
 - Total Jgc ~ 1200 ft

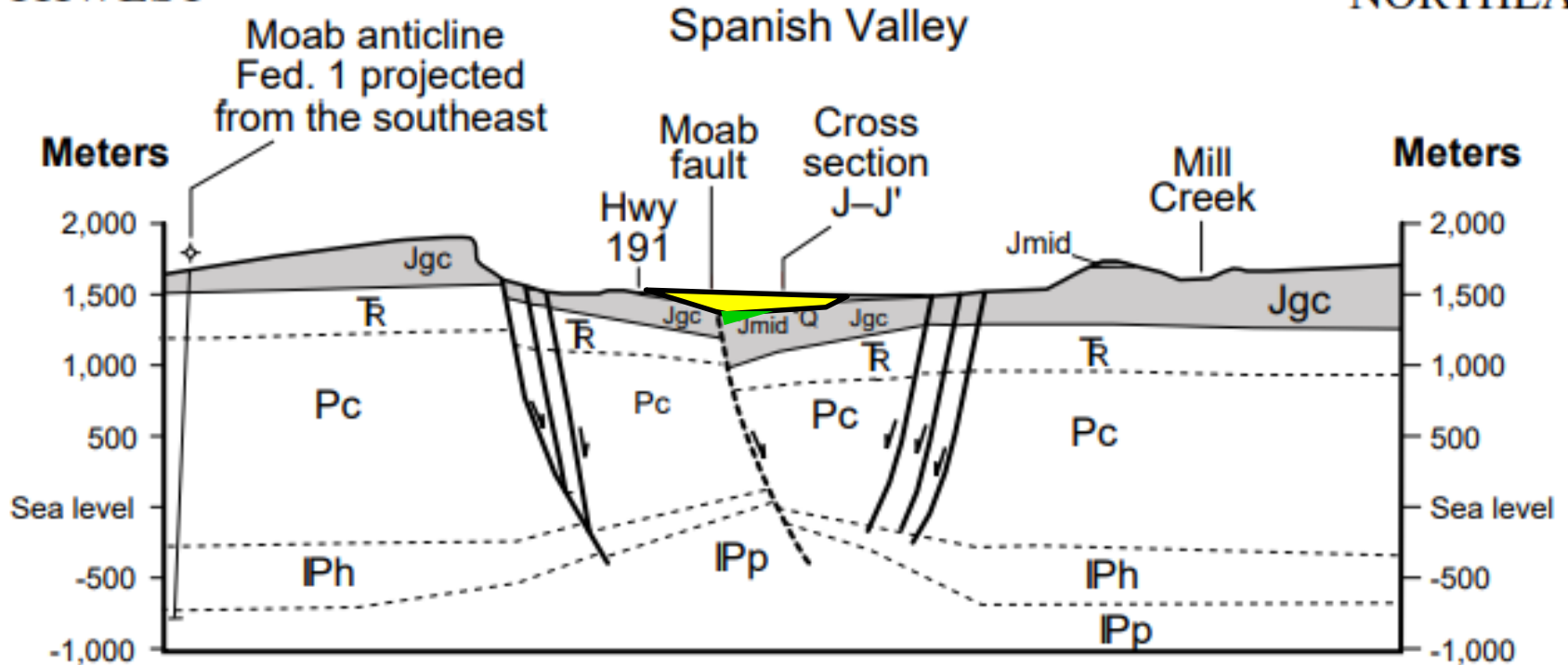
Moab / Spanish Valley Watershed



F**F'**

SOUTHWEST

NORTHEAST

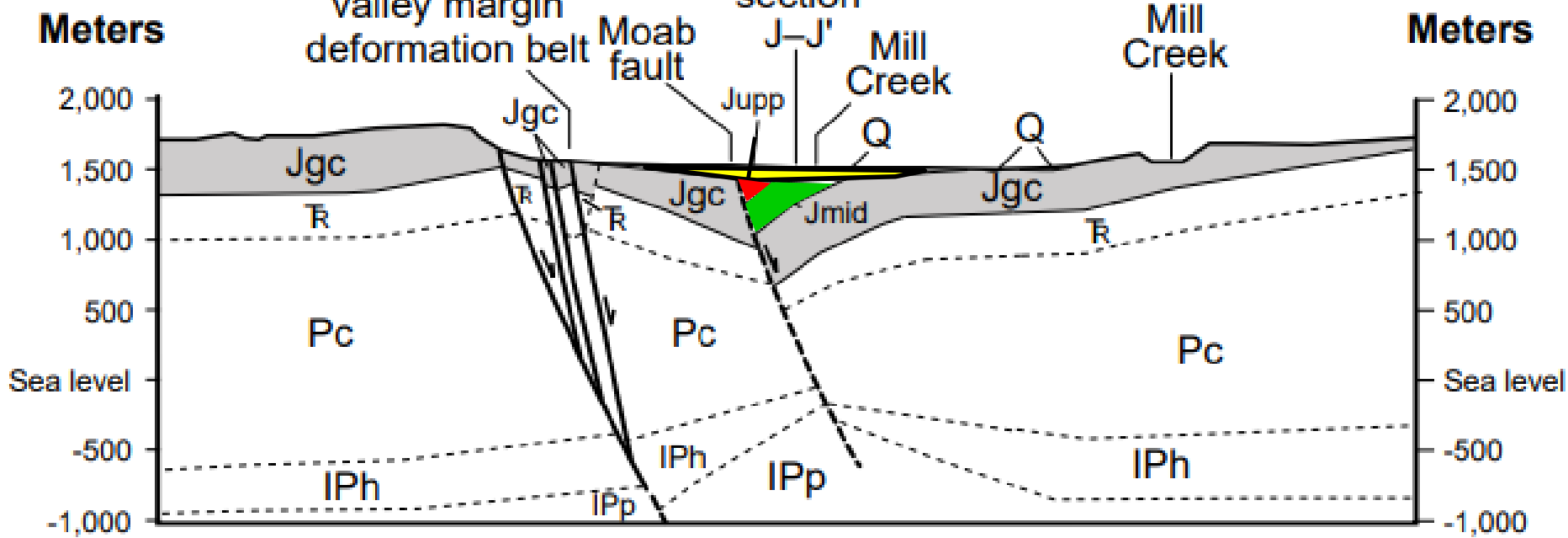


Valley Fill – Sand / Gravel



Carmel / Dewey Bridge Formation

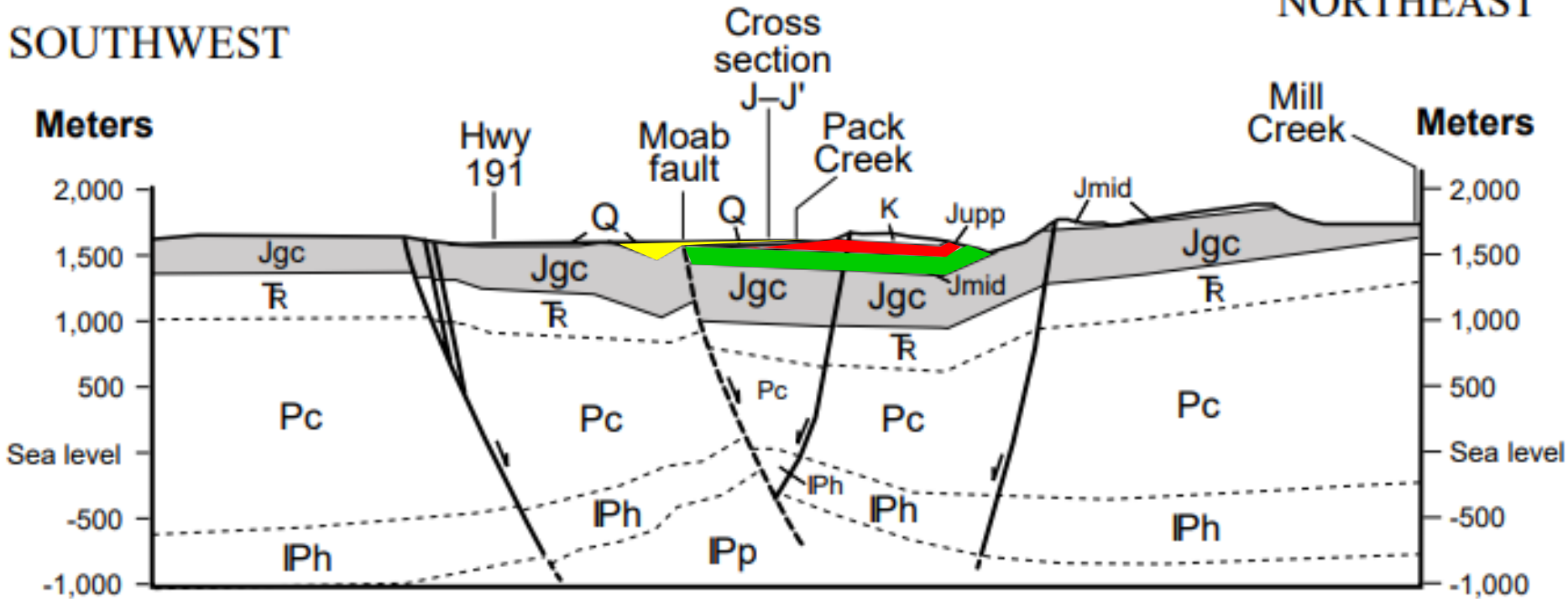
G **G'**
SOUTHWEST **NORTHEAST**






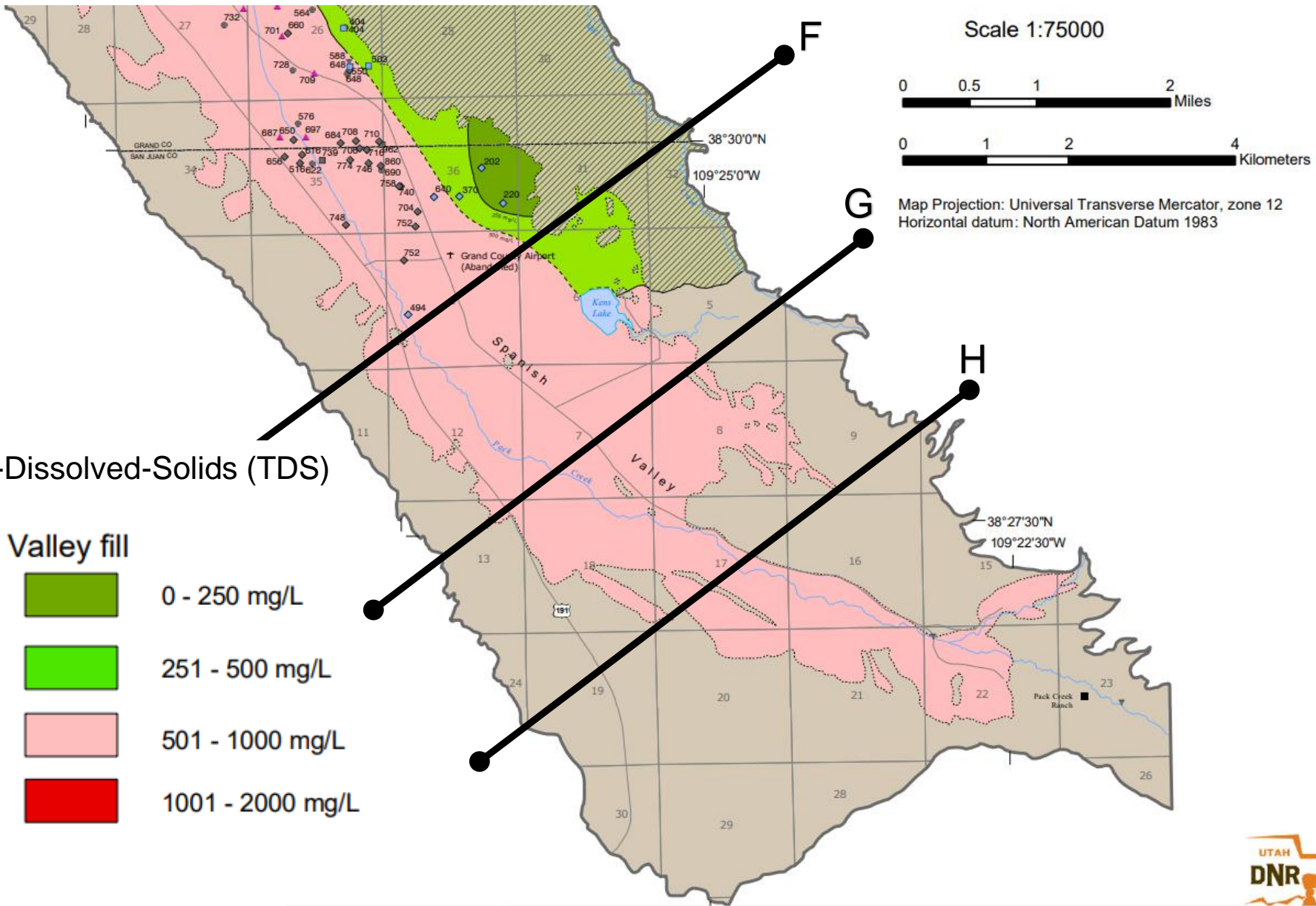
- Valley Fill – Sand / Gravel
- Morrison Formation
- Carmel / Dewey Bridge Formation

H
SOUTHWEST

H'
NORTHEAST



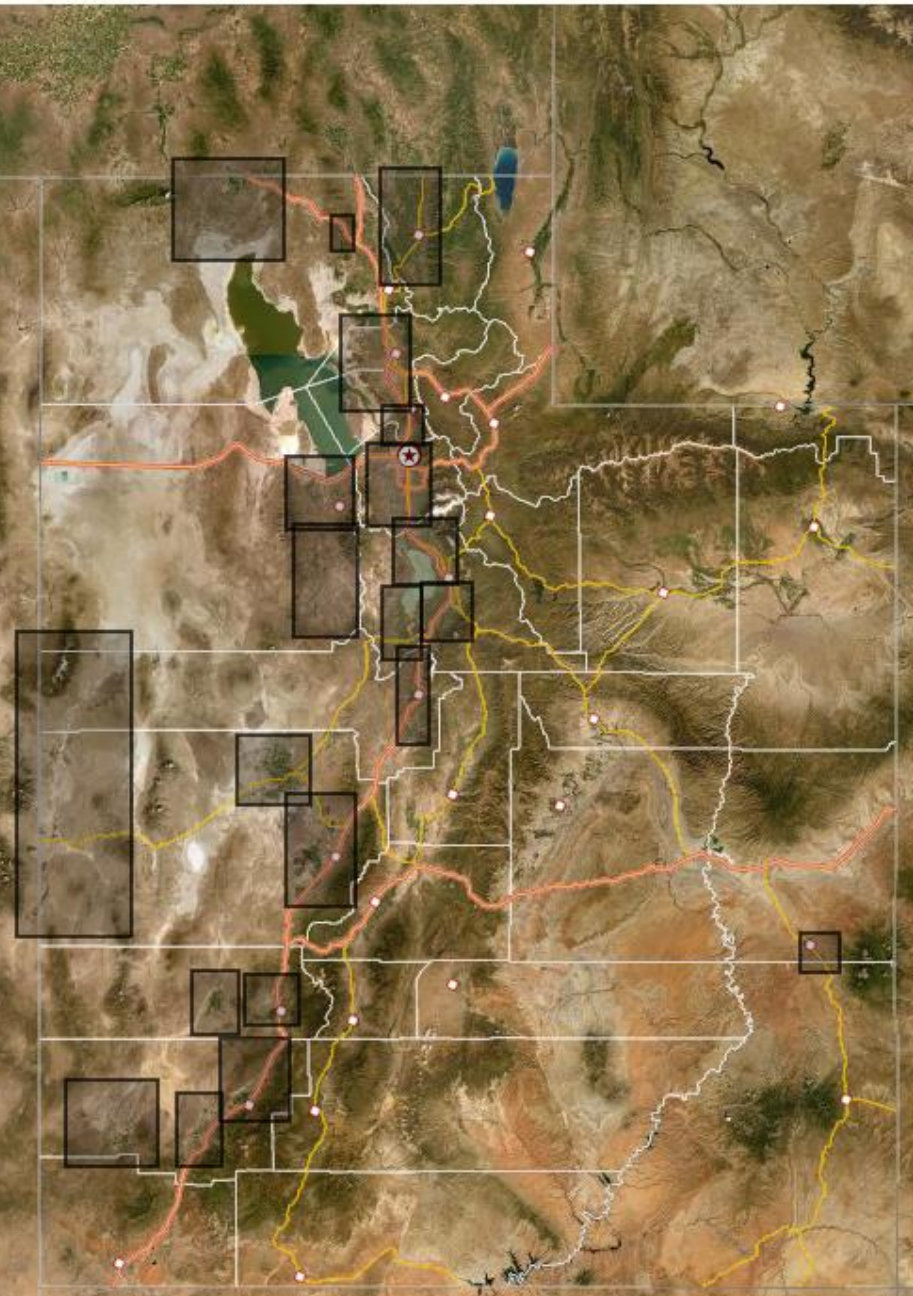
-  Valley Fill – Sand / Gravel
-  Morrison Formation
-  Carmel / Dewey Bridge

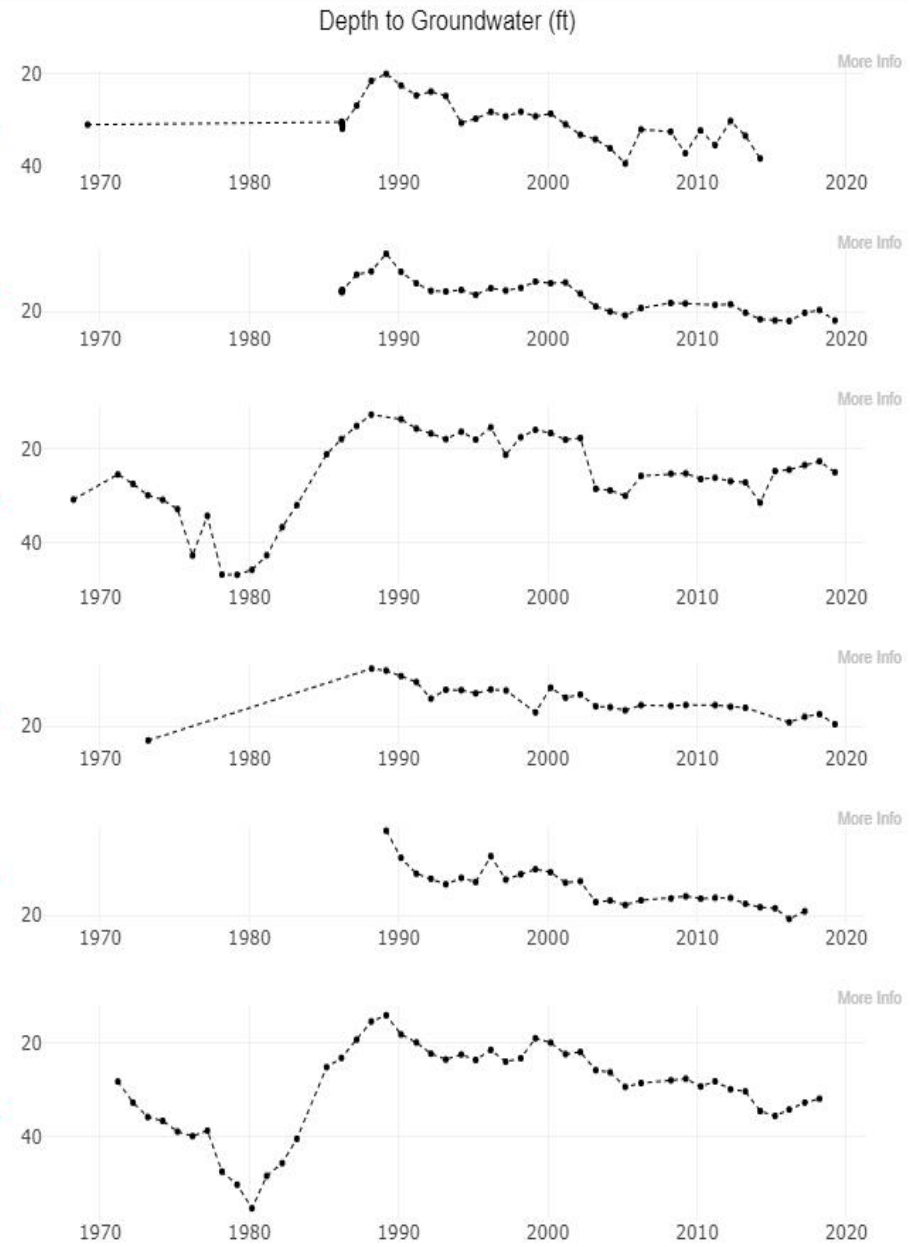


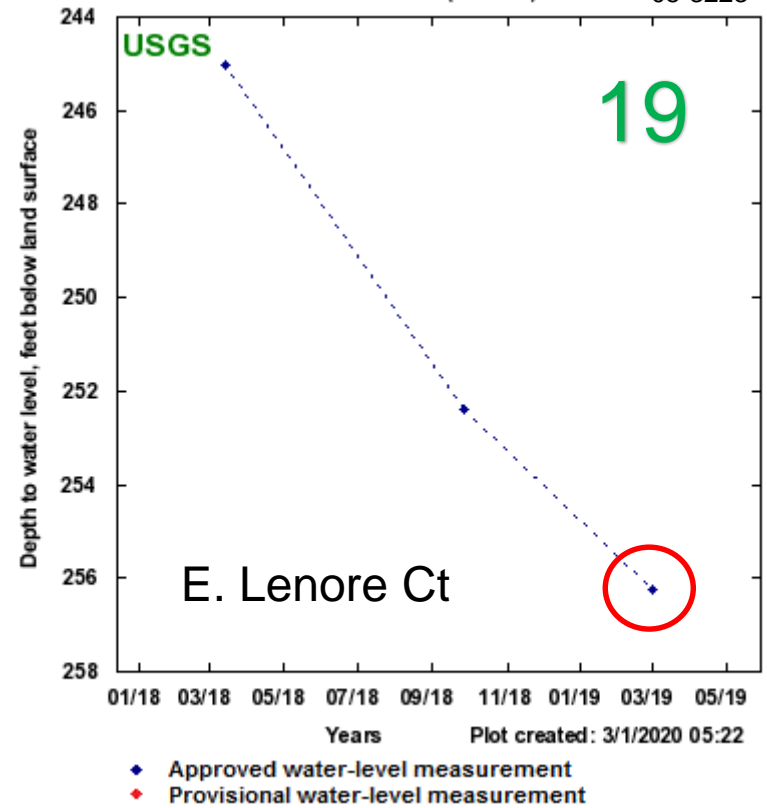
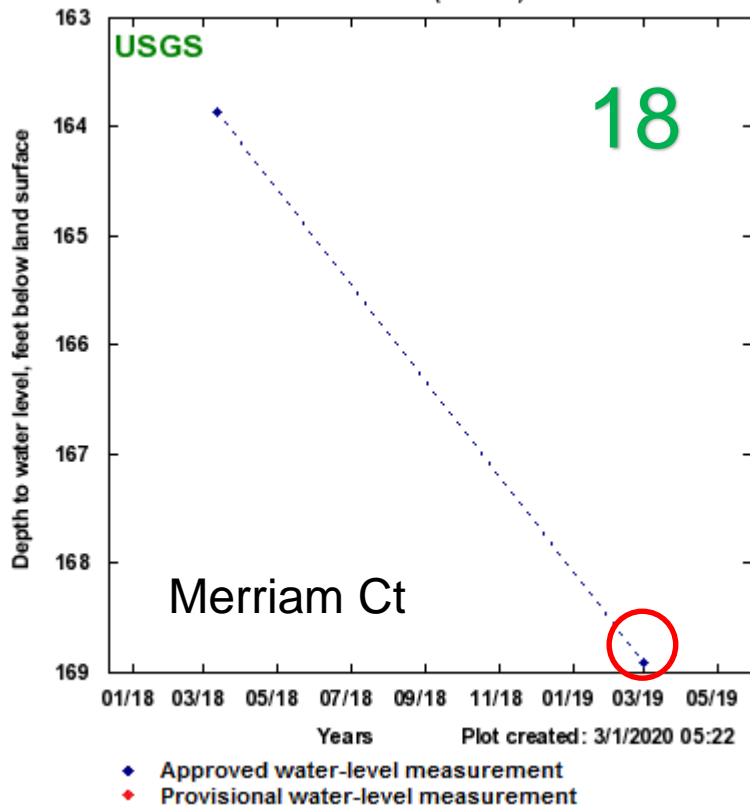


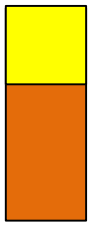
Areas in Utah


- [Beaver Valley](#)
- [Beryl-Enterprise](#)
- [Bothwell Area](#)
- [Cedar City Valley](#)
- [Curlew Valley](#)
- [Cache Valley](#)
- [Delta Area](#)
- [East Shore \(Bountiful\)](#)
- [East Shore \(Weber-Delta\)](#)
- [Goshen Valley](#)
- [Juab Valley](#)
- [Milford Valley](#)
- [Moab Area](#)
- [Pahvant Valley](#)
- [Parowan Valley](#)
- [Rush Valley](#)
- [Salt Lake Valley](#)
- [Snake Valley](#)
- [Tooele Valley](#)
- [Utah Valley \(Southern\)](#)
- [Utah Valley \(Northern\)](#)



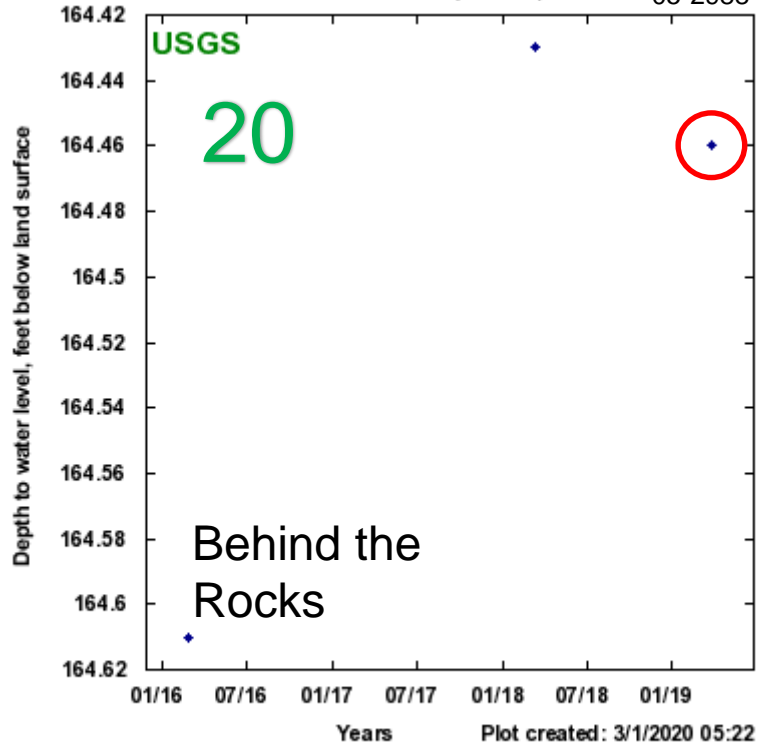





 Valley Fill
 0 - 110' Sand & Gravel
 Glen Canyon Group
 110' - 320' Sandstone


 Slope Overburden
 0 - 35' Sand / Gravel
 Glen Canyon Group
 35' - 320' Sandstone

382517109273601 - (D-27-22)26dda-1 05-2988

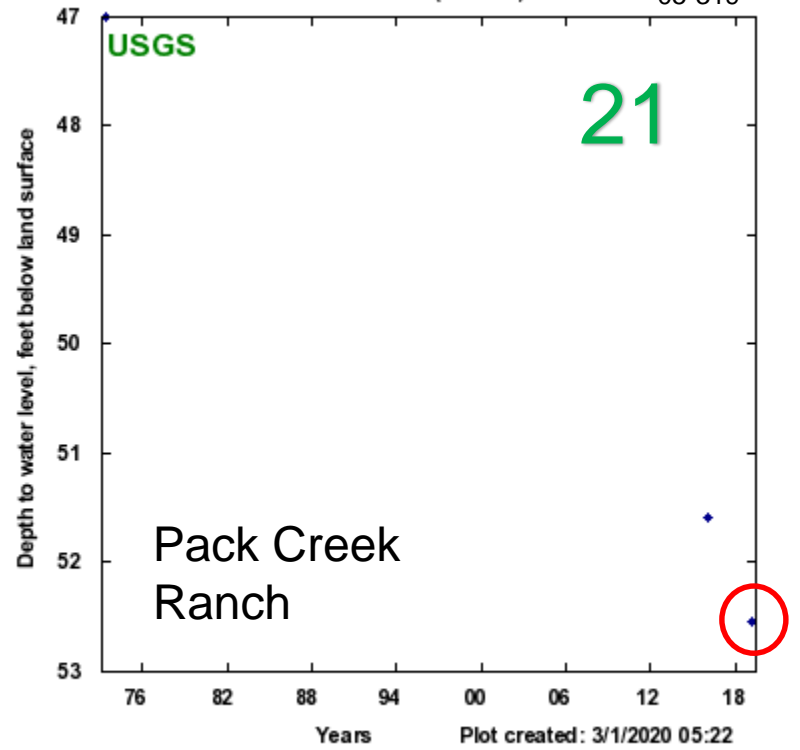


- ◆ Approved water-level measurement
- ◆ Provisional water-level measurement

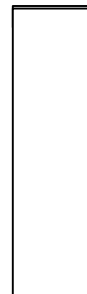


No Well Log

382618109213201 - (D-27-23)23caa-1 05-319



- ◆ Approved water-level measurement
- ◆ Provisional water-level measurement

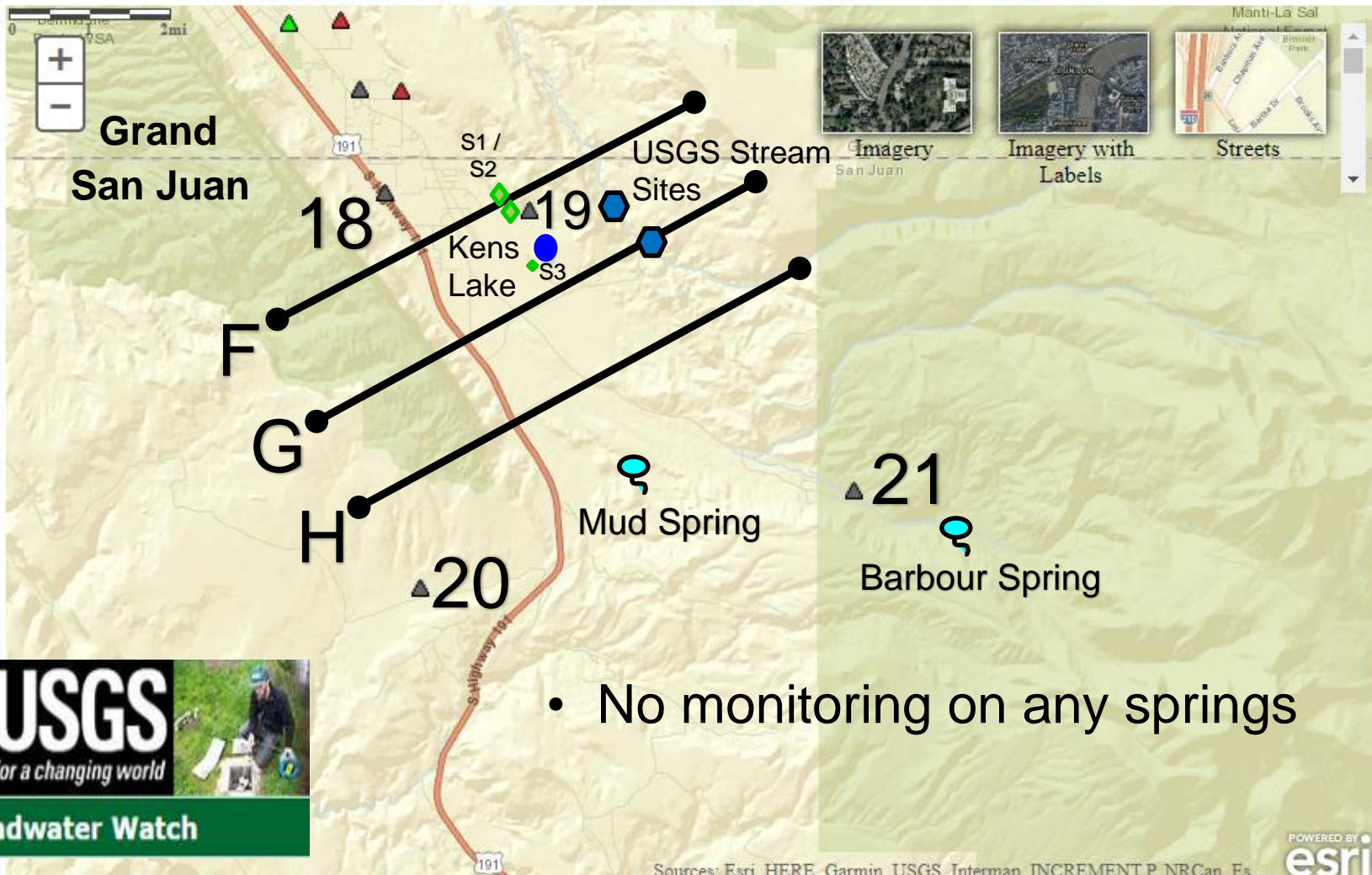


No Well Log



Utah Active Water Level Network

Click site symbol to open information pop-up. Click Station ID in pop-up for county information and site selection.
 Map loading slowly? Try a different browser. Web browser performance varies significantly.



- No monitoring on any springs

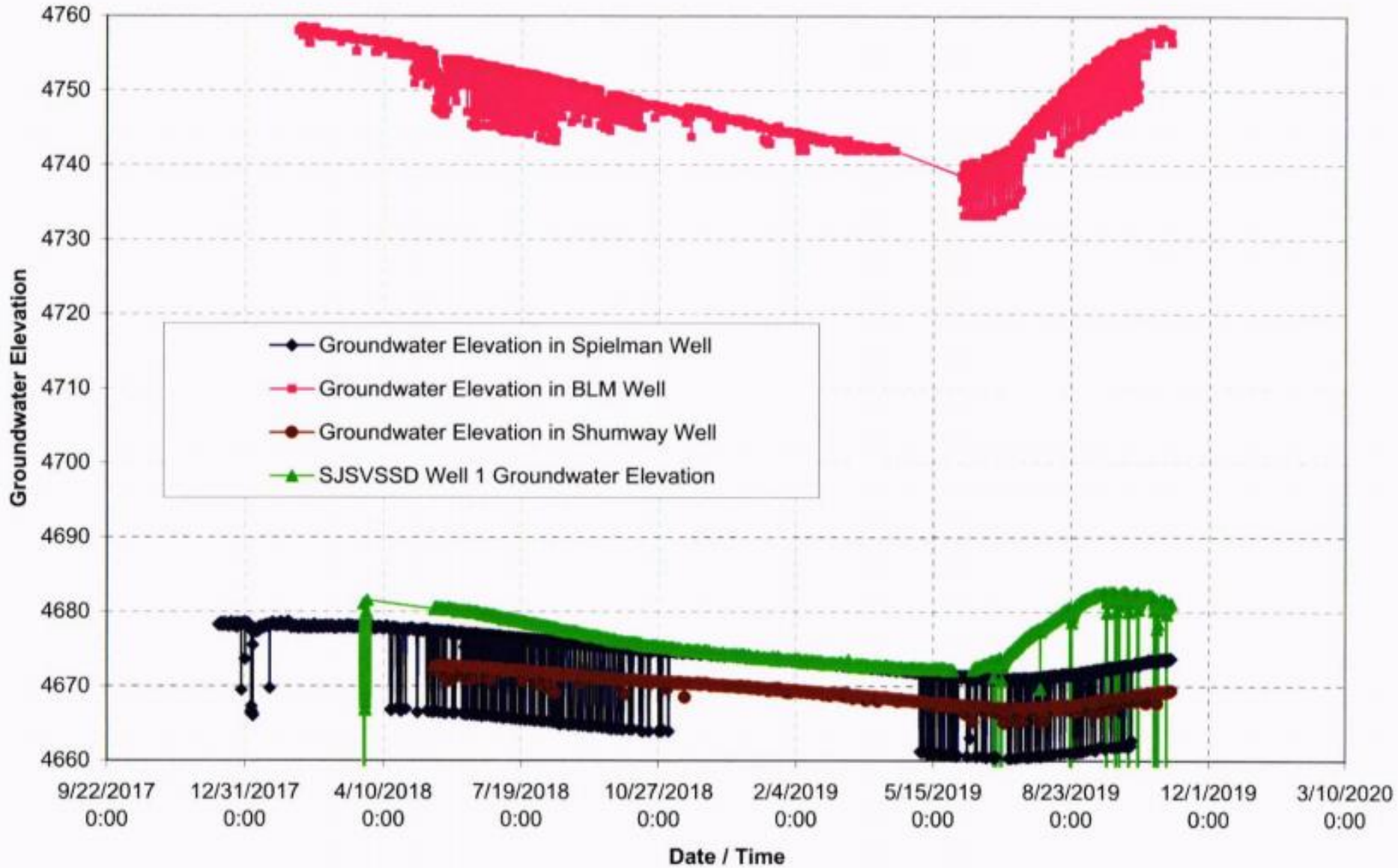
Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri

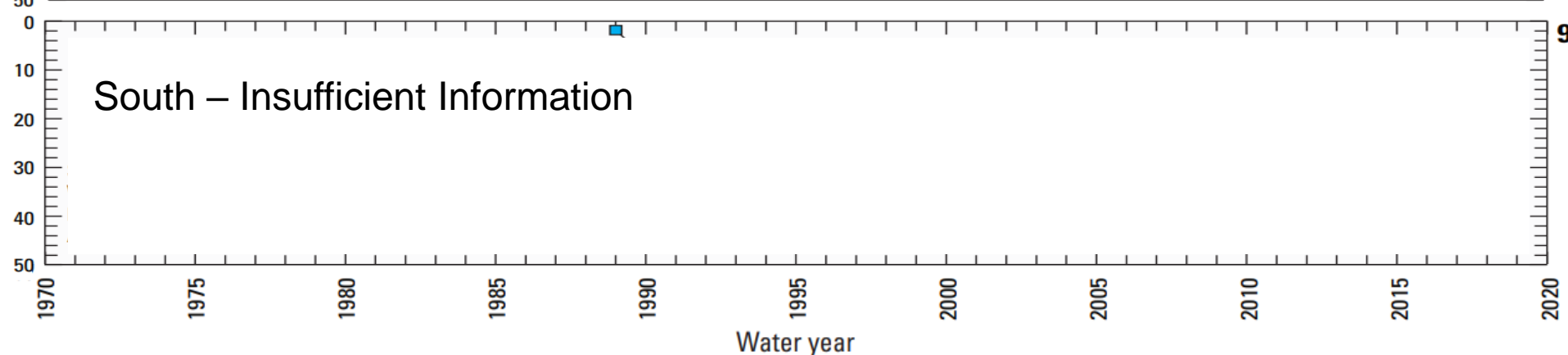
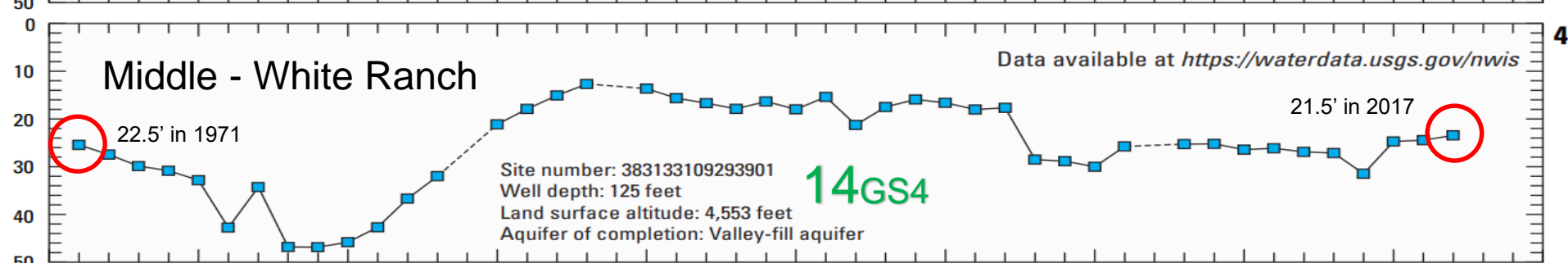
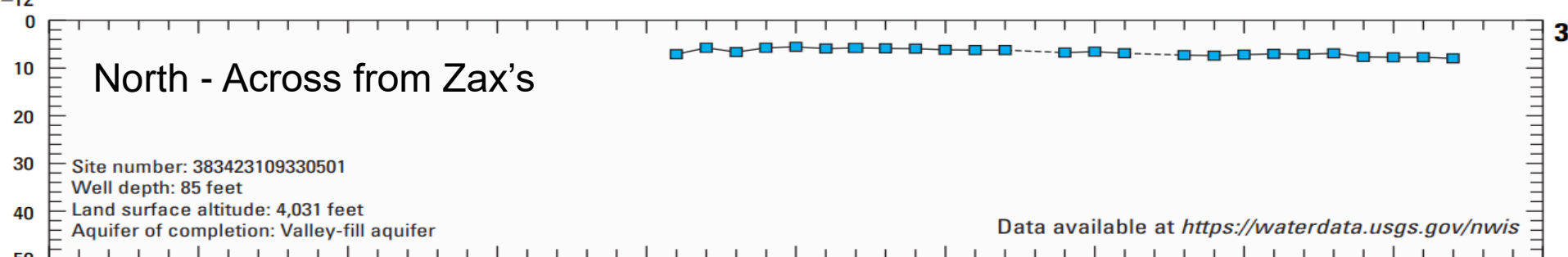
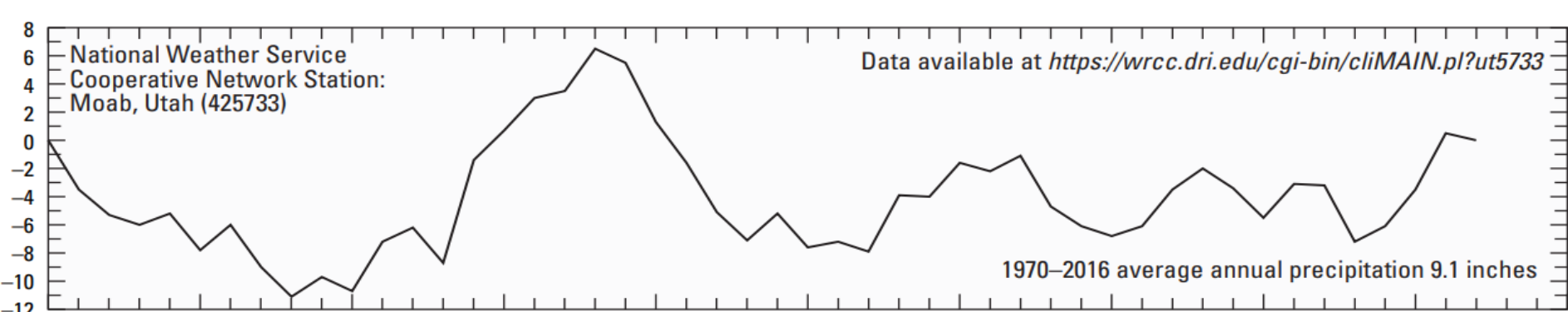
Explanation - Percentile classes (symbol color based on most recent measurement)							Wells		Springs	
●	●	●	●	●	●	●	○	○	■	■
Low	<10	10-24	25-75	76-90	>90	High	□	□	■	■
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal	Not Ranked	△	△	■	■
								Periodic Measurements		



S1, S2 & S3

Groundwater Elevation in SJSVSSD Well 1 & Area Wells

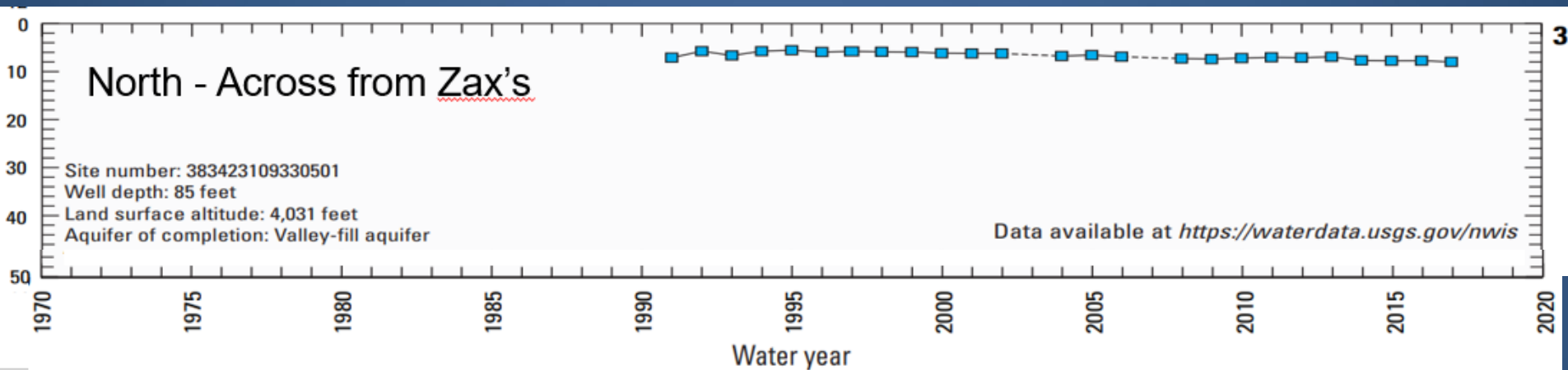




Overall Summary

Northern

- **Small Decline in Water Table Elevation**



- Insufficient information / analysis on Spring Flows to determine trend.
- Insufficient information on outflow to Colorado River & interaction between Brine & Freshwater Layers



Imagery



Imagery with Labels



Streets



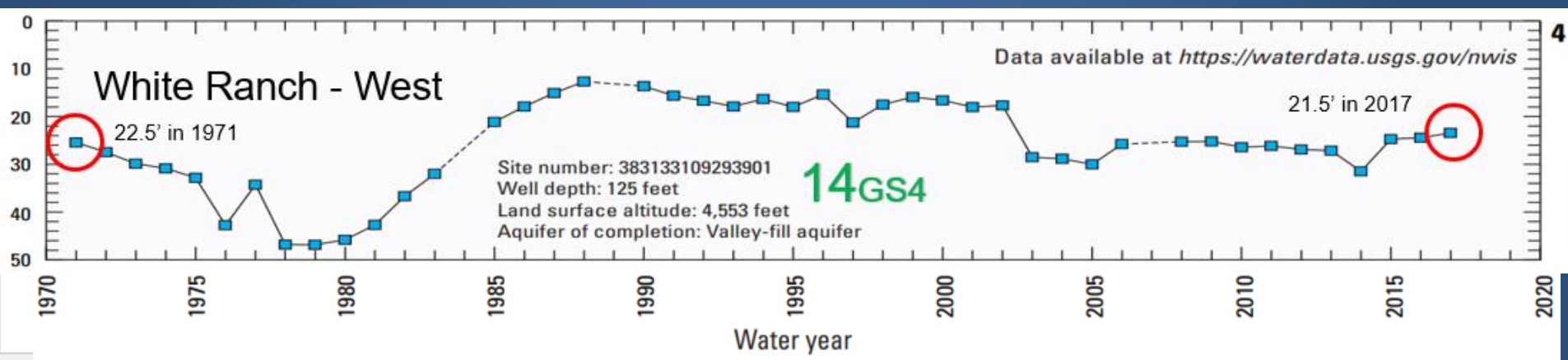
14^{GS4}

15^{GS8}

Overall Summary

Central

- Large Decline in 1970's followed by even Larger Recharge in the 1980's
- Moderate Decline since 1990
- Water Table Elevations at about same level as 1970



- Insufficient information / analysis on Spring Flows to determine trend.

Overall Summary

Southern

- **Insufficient Information to determine trends in groundwater table and spring flows**

Recommendations

USGS 2017

- Install Lower Mill Creek Gage – **COMPLETED** (measure discharge)
- Install Upper Pack Creek Gage (better quantify recharge)
- Monitor Spring Flows – (seasonal v. long term changes)
- Continuous or Quarterly Water Level Monitoring (see SJSVSSD)
- Numerical Model (test conceptual model)

Division of Water Quality (Hultquist)

- 3 Dedicated Monitoring Wells w/ continuous monitoring
- Monitor Spring Flows
- Dedicated Monitoring Well in Glen Canyon Group aquifer
- Dedicated Monitoring Well in Valley Fill aquifer
- Additional Stream Gages on Mill (North Fork) and Pack Creek
- Dedicated Monitoring Well above Kens Lake

Recommendations

Division of Water Rights

- **Ditto USGS & DWQ Recommendations**
- **Commission a Study of Existing Groundwater Monitoring Program**
 - **Determine Quality of Current Monitoring Wells (condition of wells, which aquifer is being monitored, reliability of data, interference issues, water quality issues)**
 - **Determine if there are Gaps in the Current System (i.e. brine layer)**
 - **Identify Critical Flow Pathways – Spring Flows (faults / joints)**
 - **Determine Best Placement of Resources and Monitoring Equipment**

Recommendations

Division of Water Rights

- **More Detailed Hydrologic Study of Three Key Areas:**
 - **Matheson Wetlands Area – outflow to Colorado River / interaction between brine and freshwater layers / movement of brine layer**
 - **Central Valley – interaction between the GCG & Valley Fill aquifers, interaction between Mill Creek & GCG/VF aquifers**
 - **Upper Valley – interaction between Kens Lake & GCG/VF aquifers / interaction between Pack Creek and VF aquifer**
- **Development of a Web Based Interface that provides Greater Transparency and Access for the public to the Data across all levels of Government reporting**

Thank You... Any Questions?



Utah Division of Water Rights