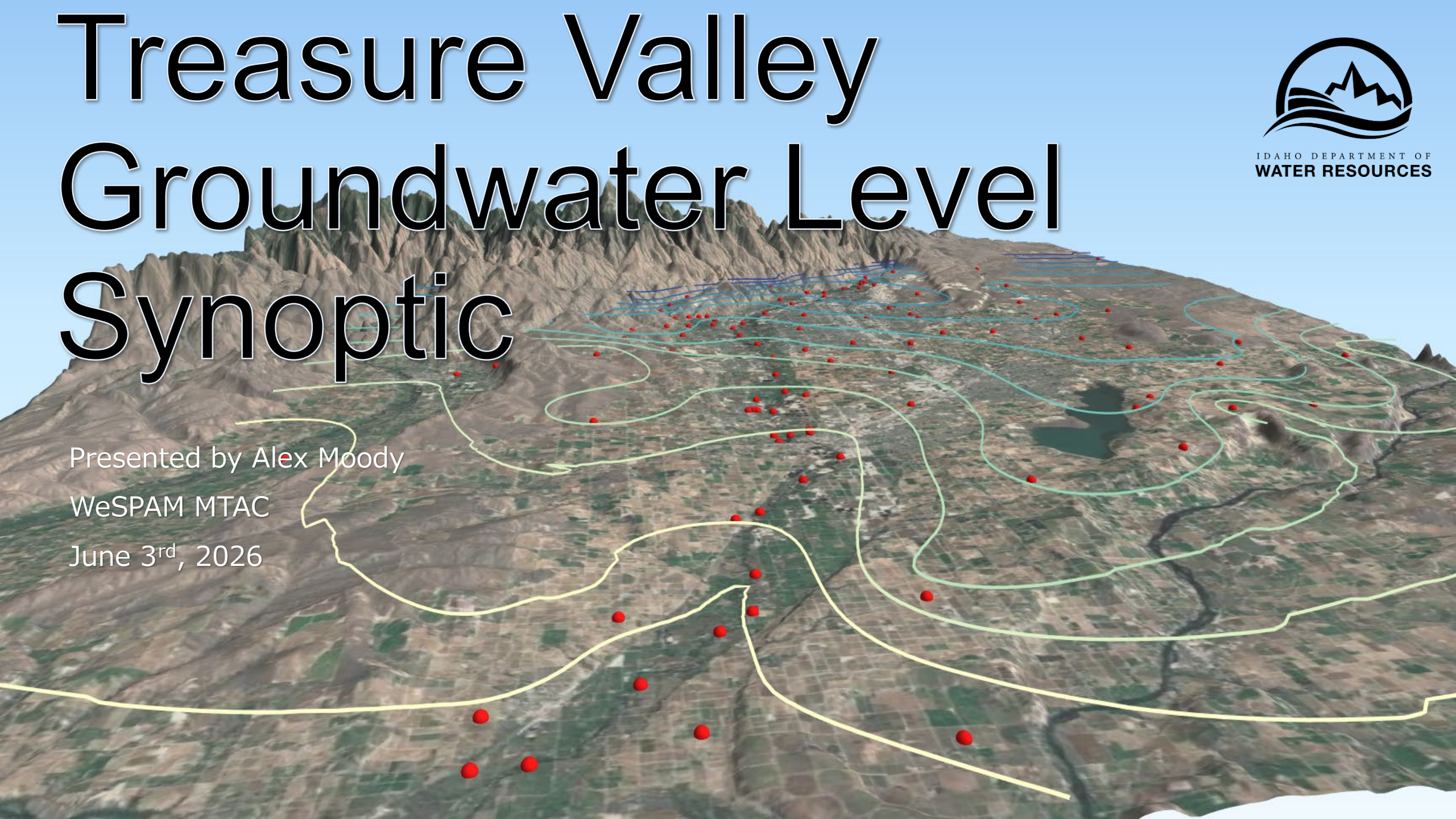
Treasure Valley Groundwater Level Synoptic



IDAHO DEPARTMENT OF WATER RESOURCES

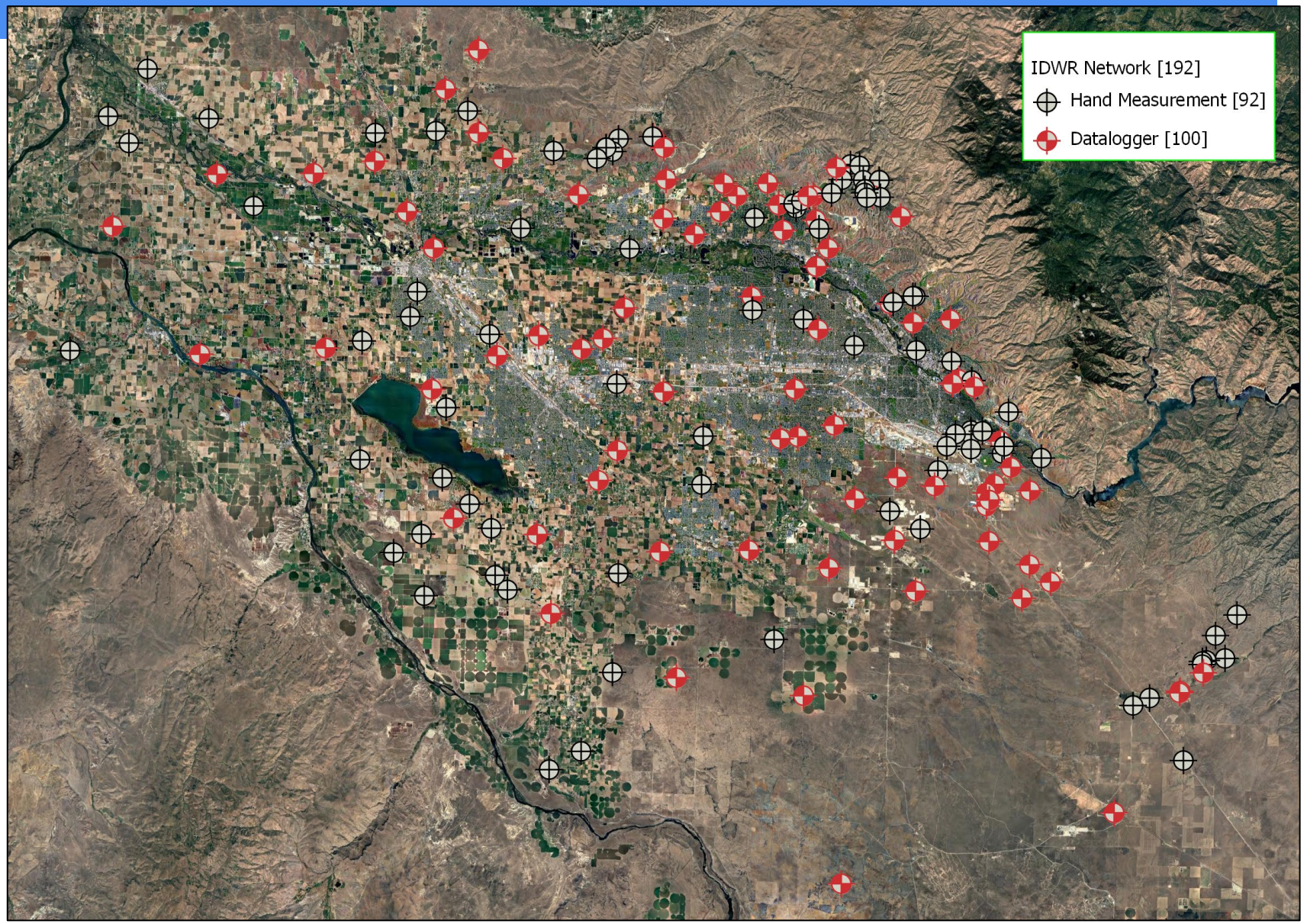
Presented by Alex Moody

WeSPAM MTAC

June 3rd, 2026

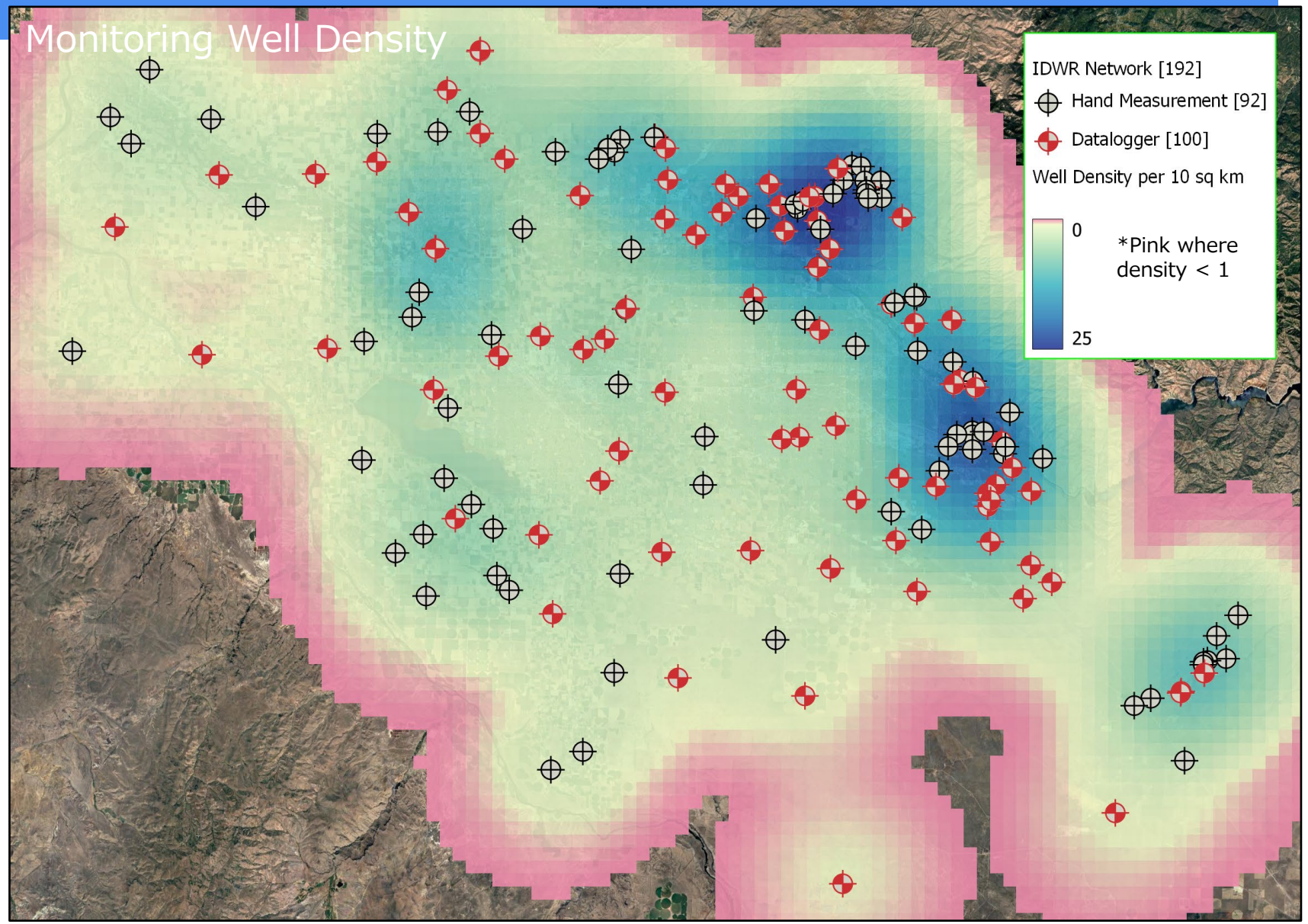
IDWR Groundwater Monitoring

- IDWR receives frequent for recent water level elevation contours and water level change maps
- IDWR monitoring occurs across the valley and tends to target specific areas of interest
  - SE Boise
  - North Ada (from M3 era)

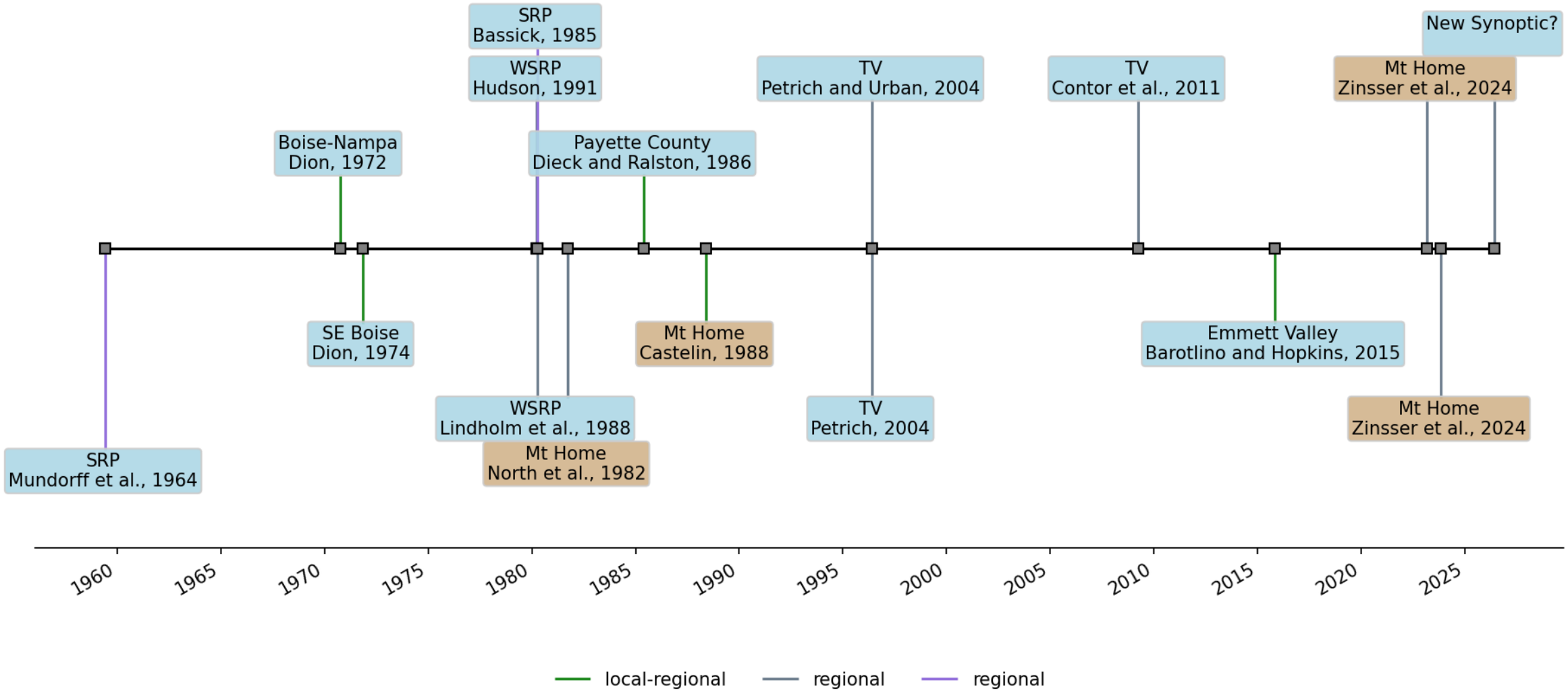


Network Coverage

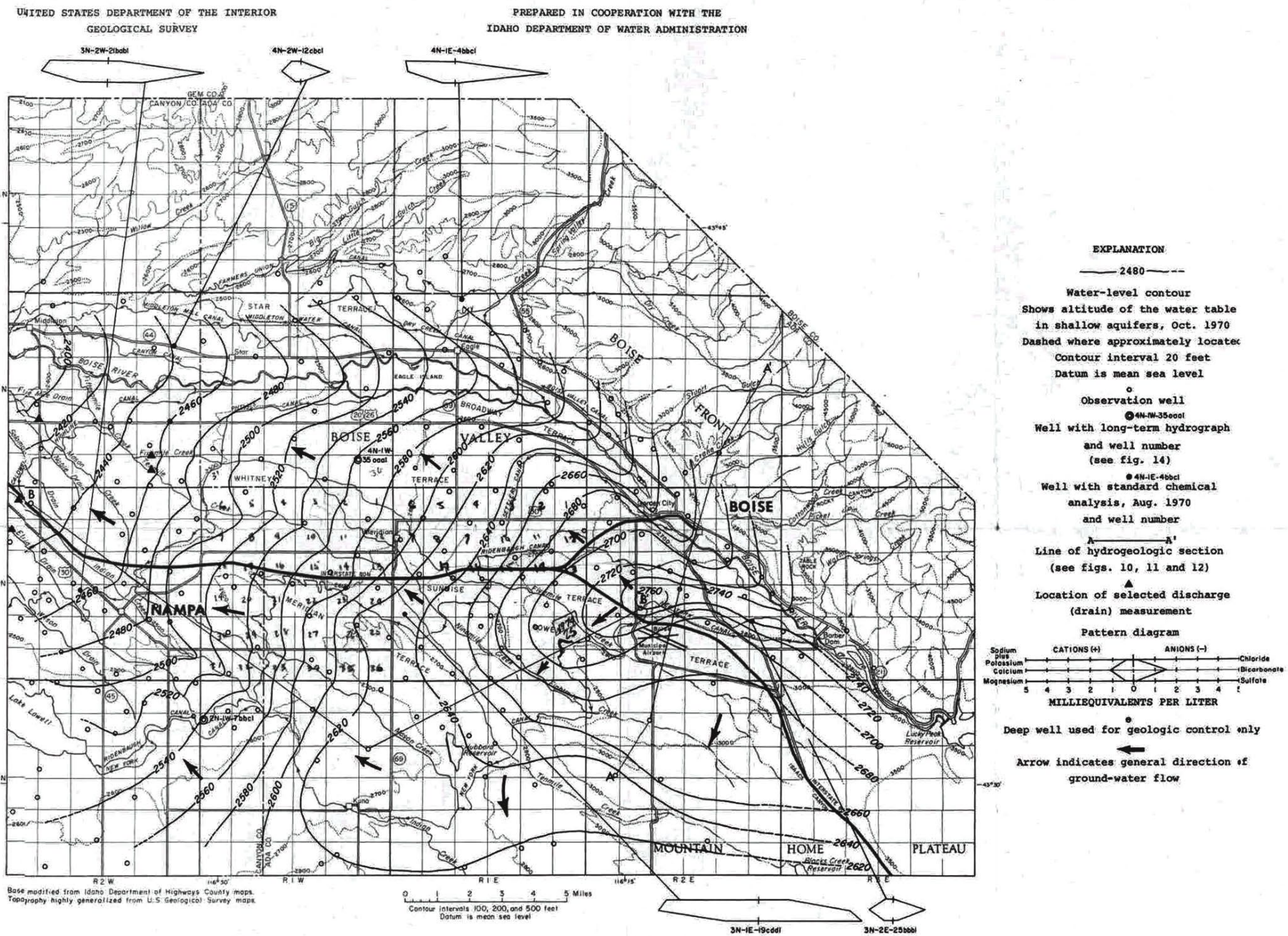
- The IDWR groundwater network is widespread but has identifiable spatial gaps laterally and vertically.
- Current network may not fully capture subregional scales in all areas of the valley

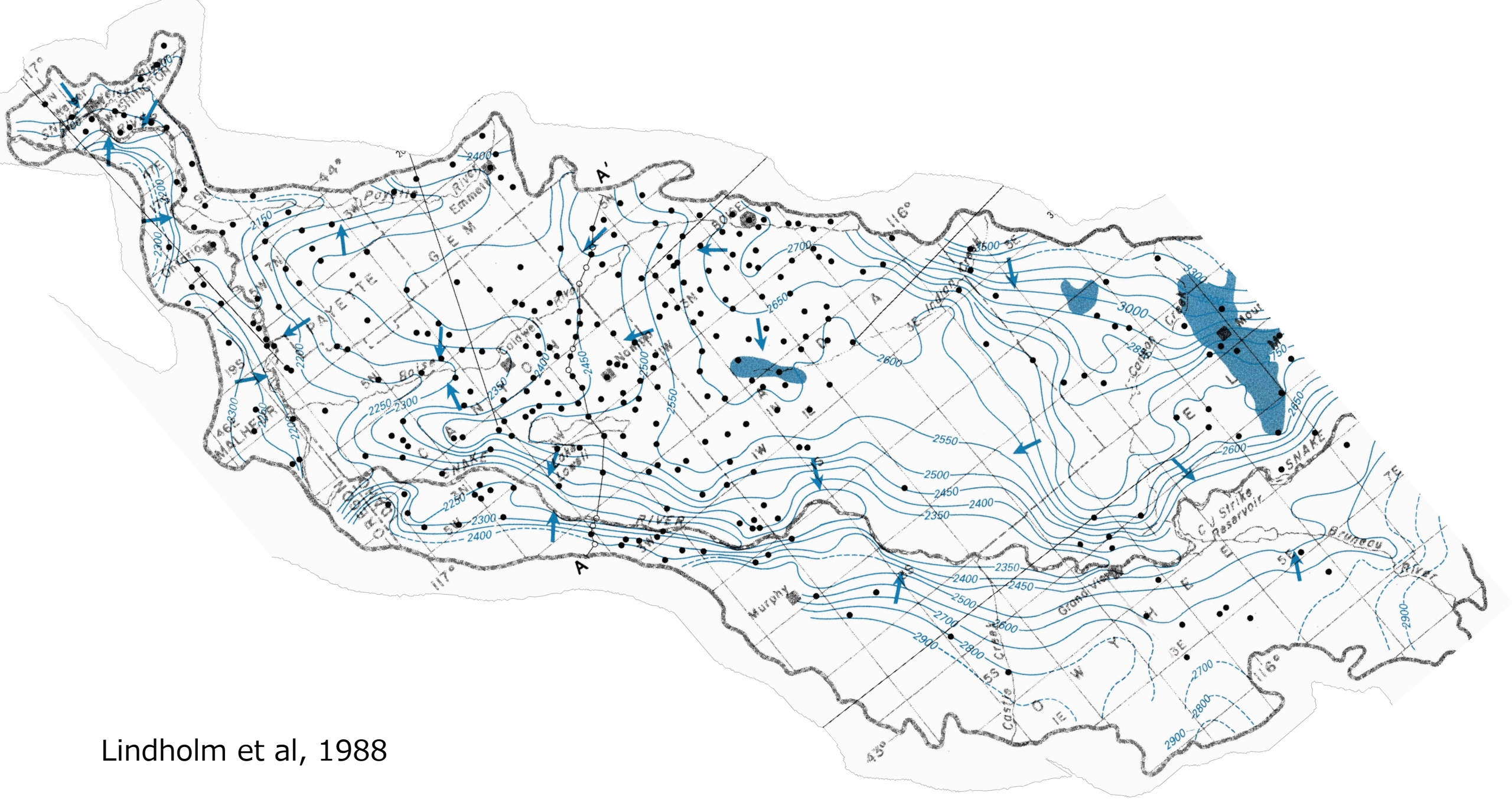


Previous water level contouring



Dion, 1972


UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
PREPARED IN COOPERATION WITH THE
IDAHO DEPARTMENT OF WATER ADMINISTRATION
3N-2W-21babl
4N-2W-12cbcl
4N-1E-4bbcl
BOISE VALLEY
BOISE FRONT
BOISE
NAMPA
MOUNTAIN HOME PLATEAU
EXPLANATION
2480
Water-level contour
Shows altitude of the water table in shallow aquifers, Oct. 1970
Dashed where approximately located
Contour interval 20 feet
Datum is mean sea level
Observation well
4N-1W-35aaal
Well with long-term hydrograph and well number (see fig. 14)
4N-1E-4bbcl
Well with standard chemical analysis, Aug. 1970 and well number
A A'
Line of hydrogeologic section (see figs. 10, 11 and 12)
Location of selected discharge (drain) measurement
Pattern diagram
CATIONS (+)
ANIONS (−)
Sodium plus Potassium
Calcium
Magnesium
Chloride
Bicarbonate
Sulfate
MILLIEQUIVALENTS PER LITER
Deep well used for geologic control only
Arrow indicates general direction of ground-water flow
Base modified from Idaho Department of Highways County maps.
Topography highly generalized from U.S. Geological Survey maps.
5 Miles
Contour intervals 100, 200, and 500 feet
Datum is mean sea level
3N-1E-19cddl
3N-2E-25bbbl



Lindholm et al, 1988

TVHP

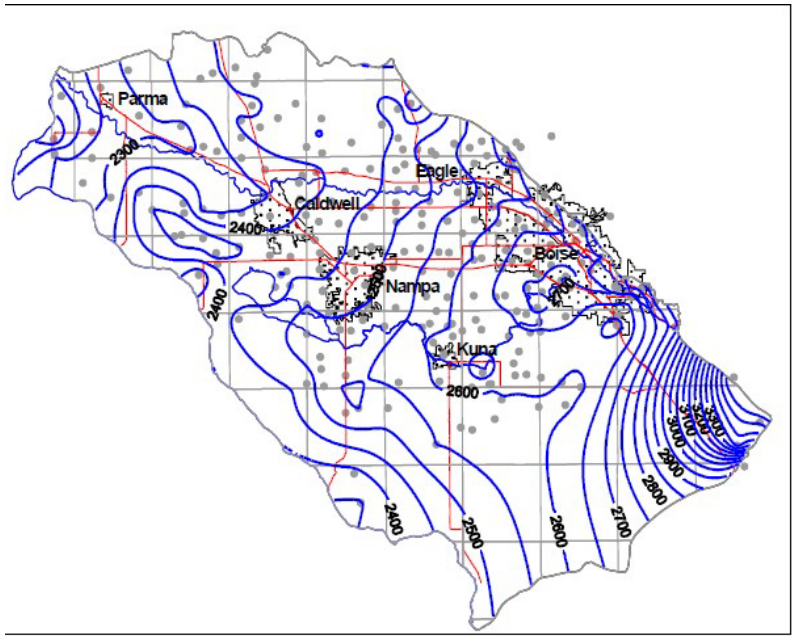


Figure 5-1: Potentiometric surface, spring 1996, shallow zone (240 wells).

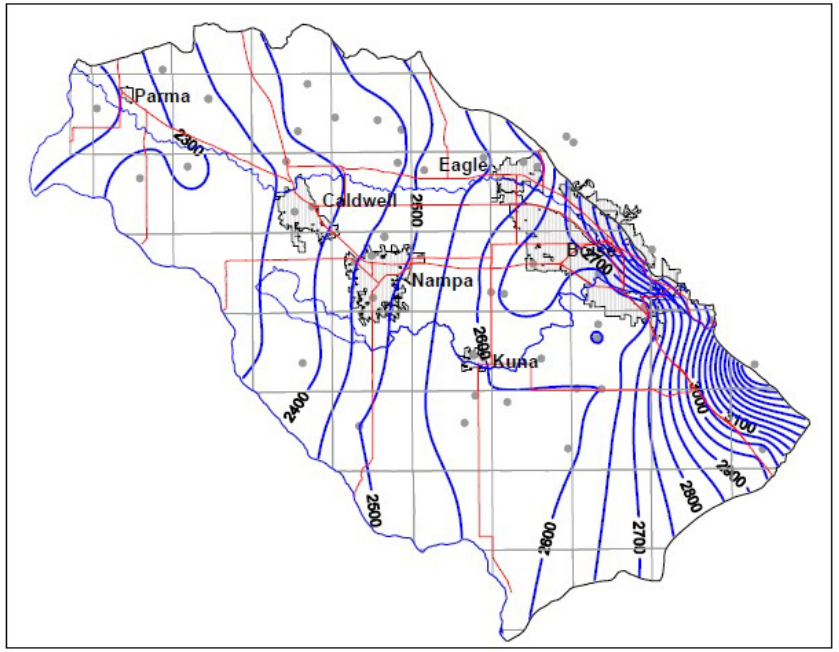


Figure 5-2: Potentiometric surface, spring 1996, intermediate zone (49 wells)

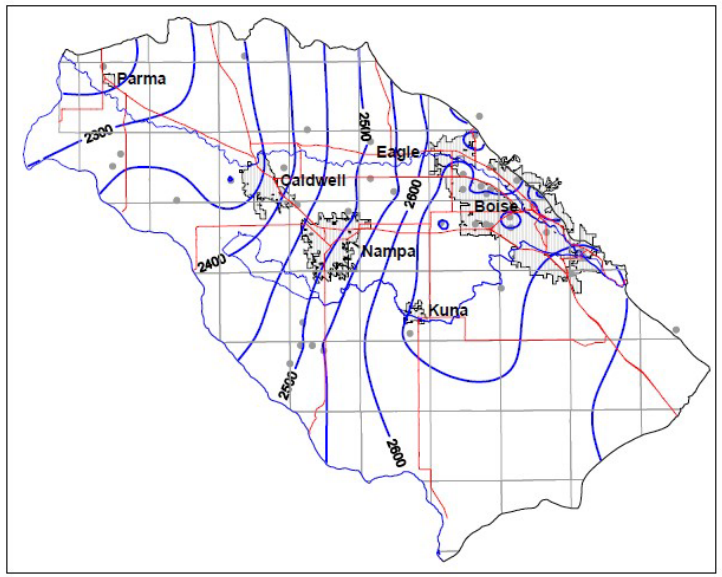


Figure 5-3: Potentiometric surface, spring 1996, deep zone (45 wells).

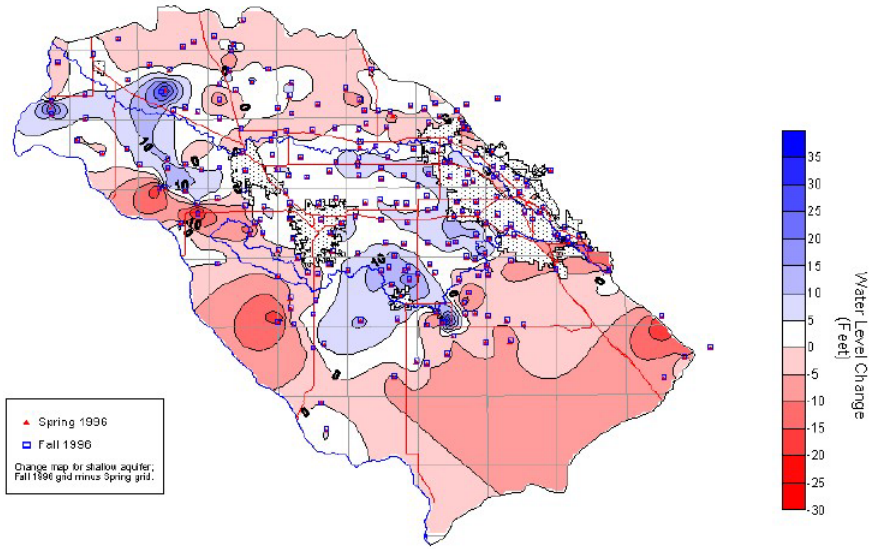


Figure 5-4: Spring and fall 1996 change map.

Petrich, 2004

TVHP Synoptics

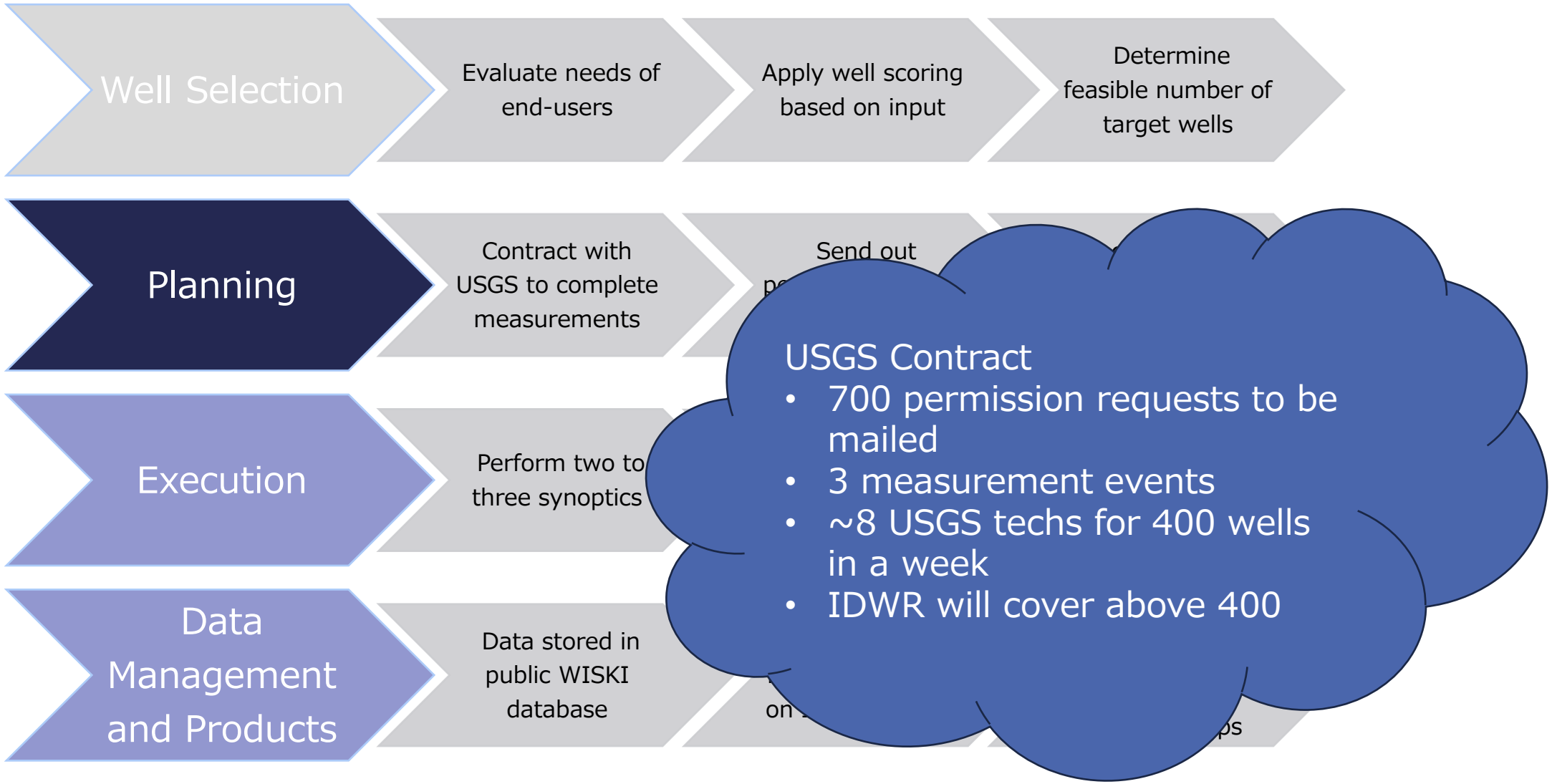
- Seven synoptic surveys completed between 1996 and 2001 by the USGS and Kleinfelder Inc
- Contoured three aquifer levels
  - Shallow, coarse-grained Snake River seds = 0 - 200 ft
  - Intermediate, Lake and pro-delta with Chalk Hills unconformity at base = 200 – 400 ft
  - Deep, Idaho group seds = 400+ (Up to 1,200 in TVHP)

Year	Spring Well Count	Fall Well Count
1996	343	342
1998	383	372
2000	392	390
2001	-	341

Purpose

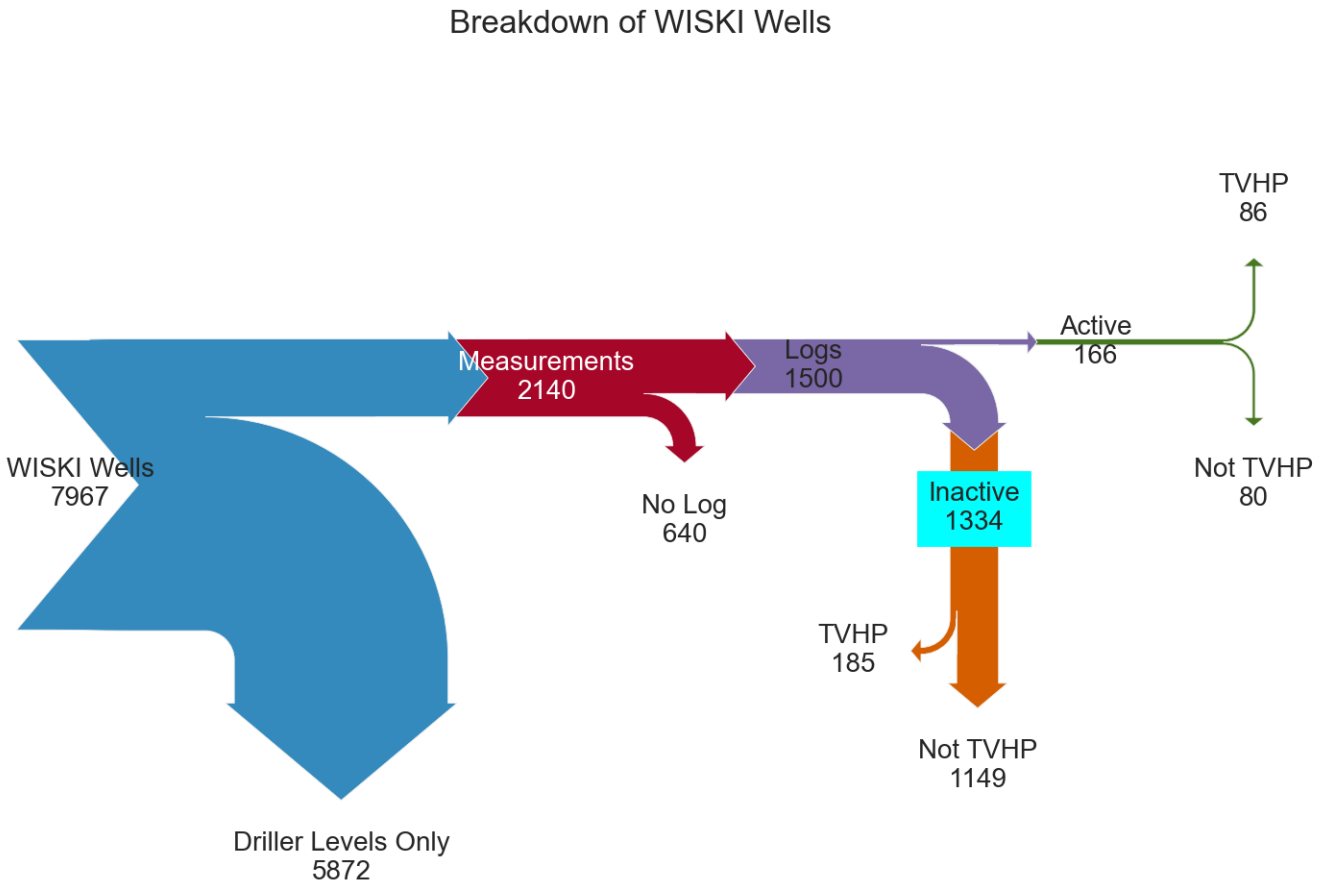
- A comprehensive valley-wide synoptic has not occurred since the Treasure Valley Hydrologic Project (TVHP; Petrich et al) in 2001
- IDWR has identified water level data gaps south of Lake Lowell.
  - TVGWFM (Hundt, 2023) showed high uncertainty in this area due to lack of calibration data and difficulty estimating seepage from Lake Lowell
- Provide more spatially robust dataset for public use in 1st order approximations of flow paths, gradients, depth-to-water, and change maps
- Provide data for the western Snake River Plain Aquifer Model
- Provide current unconfined water level maps that better represent general subregional water table conditions across the Treasure Valley

Scope

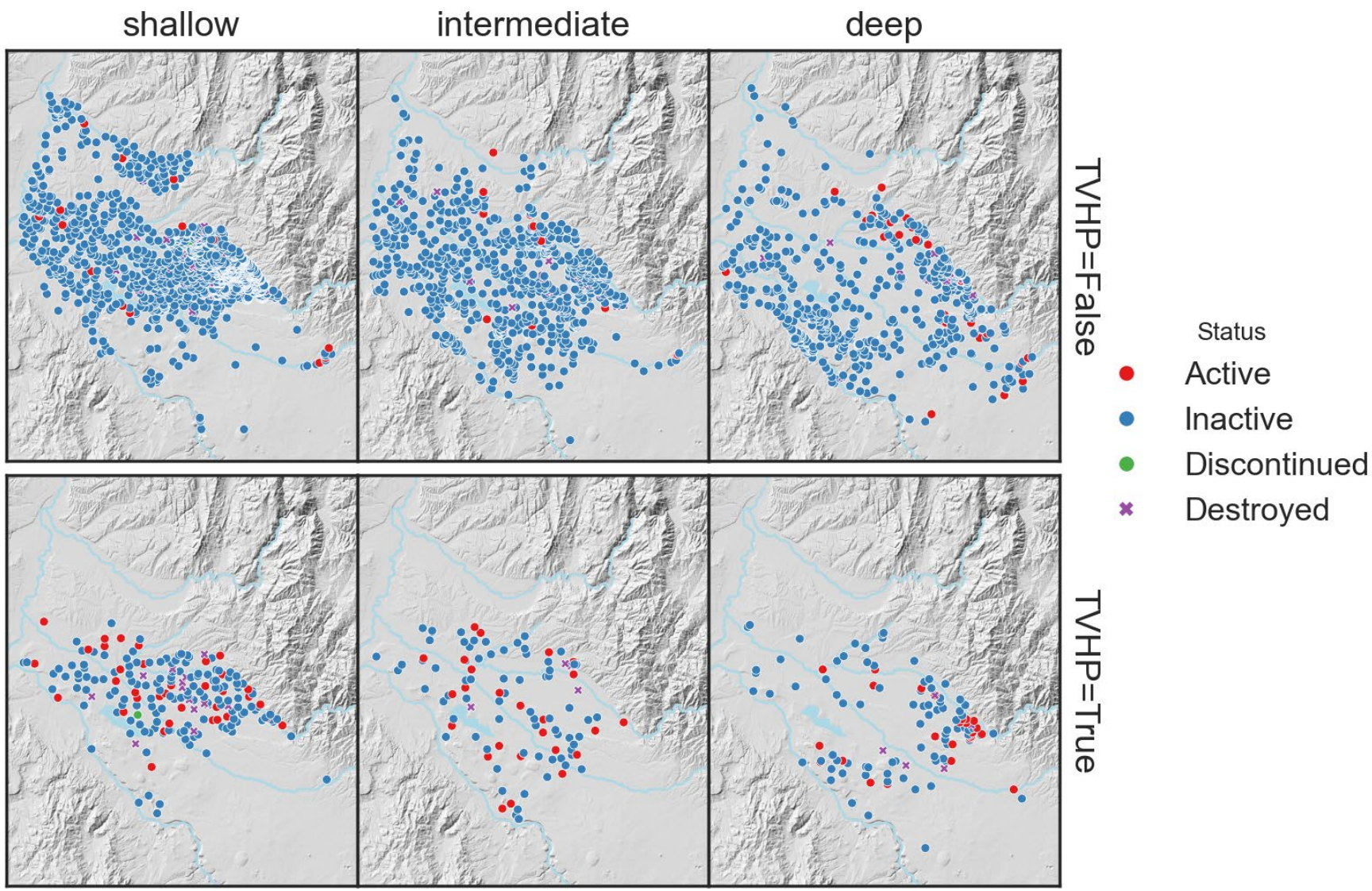

Well Selection
Evaluate needs of end-users
Apply well scoring based on input
Determine feasible number of target wells
Planning
Contract with USGS to complete measurements
Send out
Execution
Perform two to three synoptics
Data Management and Products
Data stored in public WISKI database
USGS Contract
• 700 permission requests to be mailed
• 3 measurement events
• ~8 USGS techs for 400 wells in a week
• IDWR will cover above 400

WISKI Groundwater Level Database

- Selected wells in Ada, Canyon, Owyhee, Payette, and Elmore roughly in the Boise and Payette Valleys
- 1,334 wells with logs, measurements, that aren't currently monitored
- May still include wells without logs

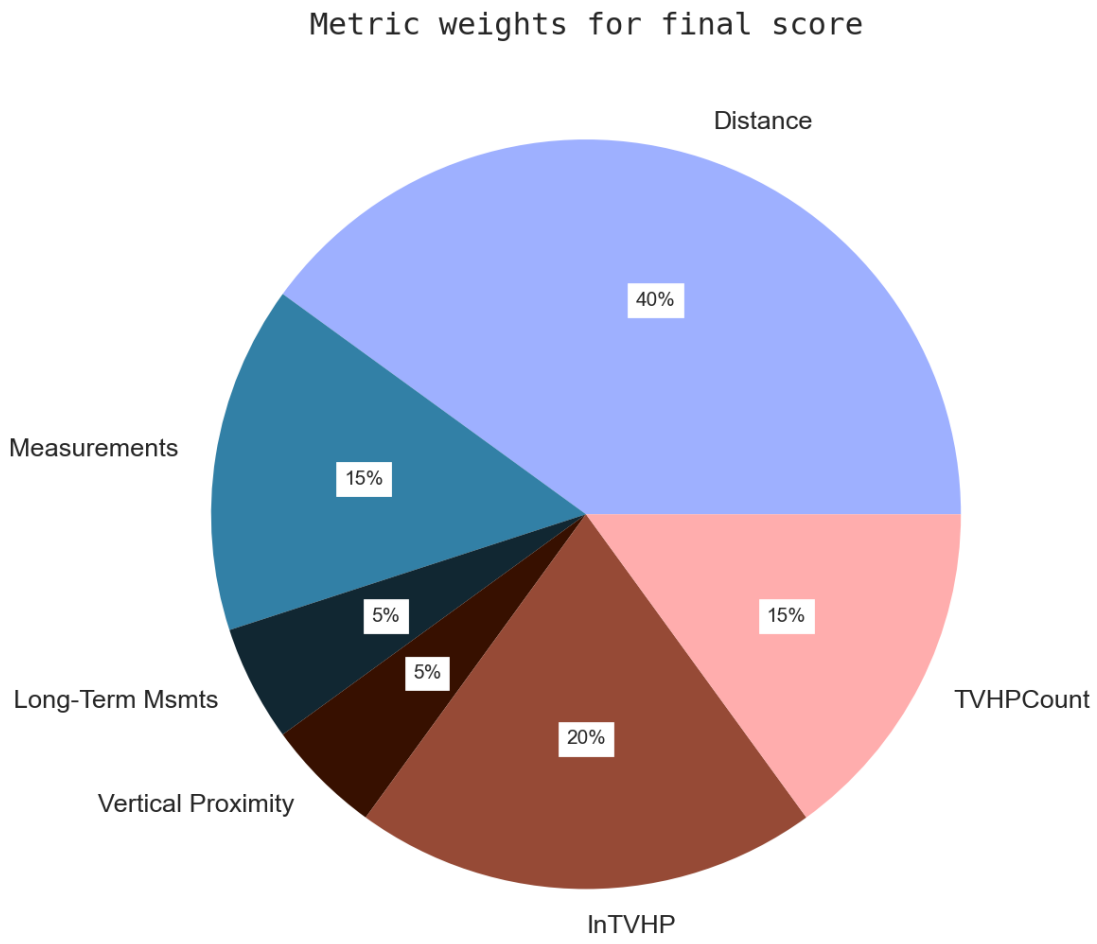


WISKI Database and TVHP Wells



Scoring Metrics

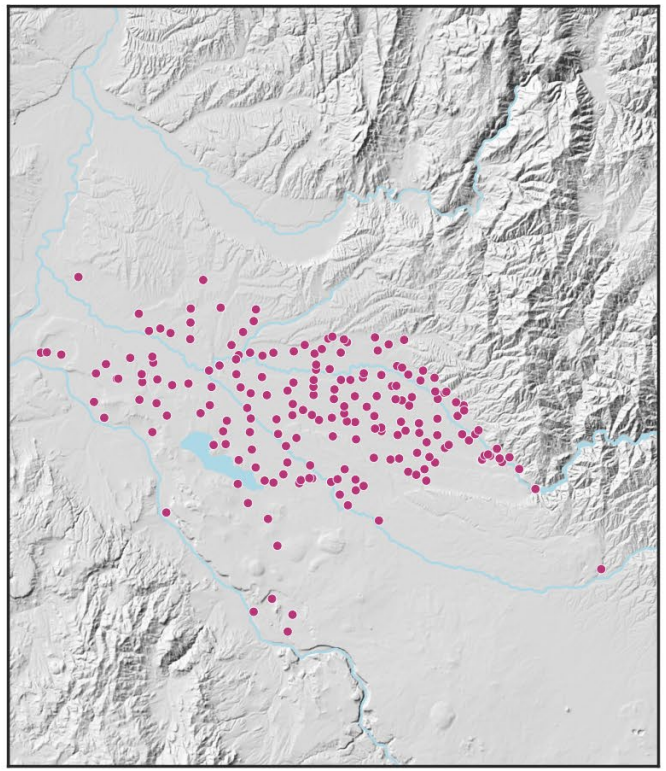
- Distance from TVHP or IDWR well by interval, (greater distances score higher)
- Months with measurements since 1970
- Long-term measurements
  - Weights wells with sparse measurements through time
- In TVHP and still exists
- Number of TVHP measurements
- Proximity to well in adjacent vertical layer



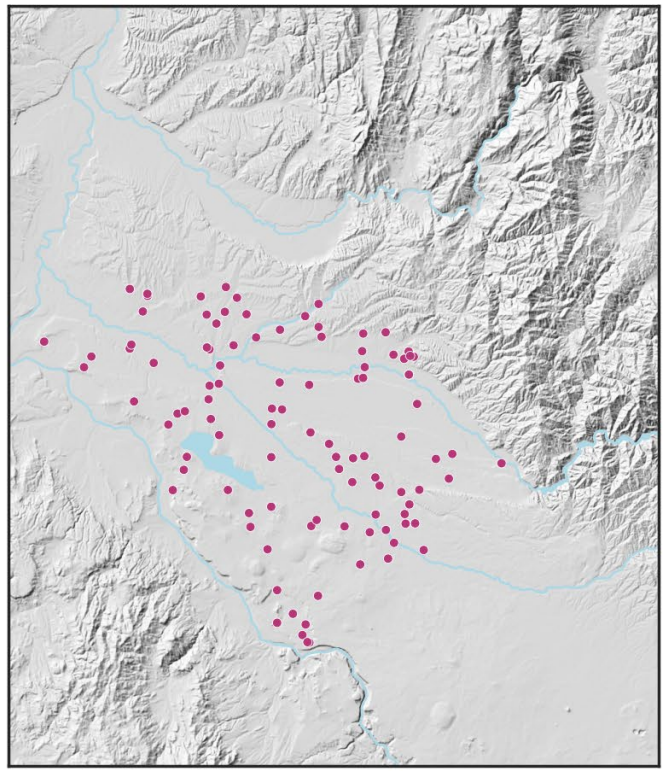
In TVHP

Top 100 InTVHP score

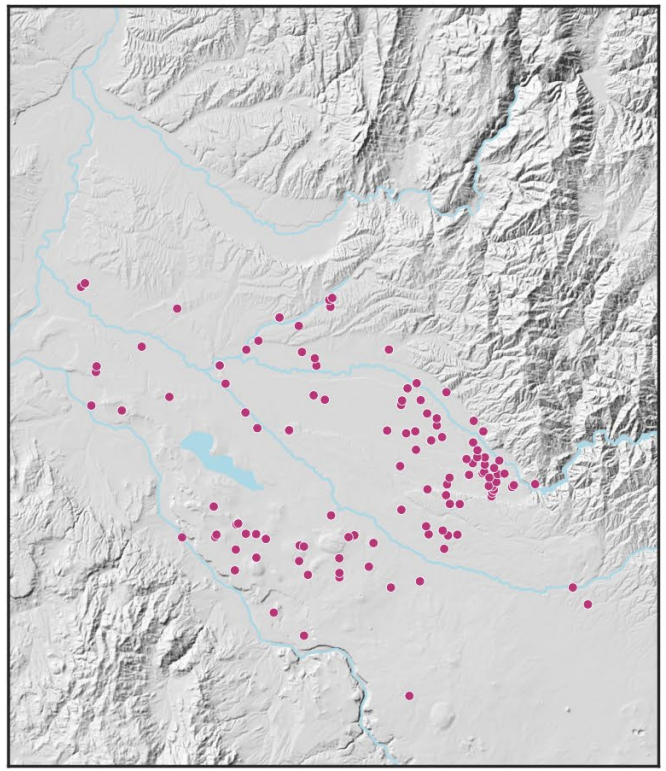
interval = shallow



interval = intermediate

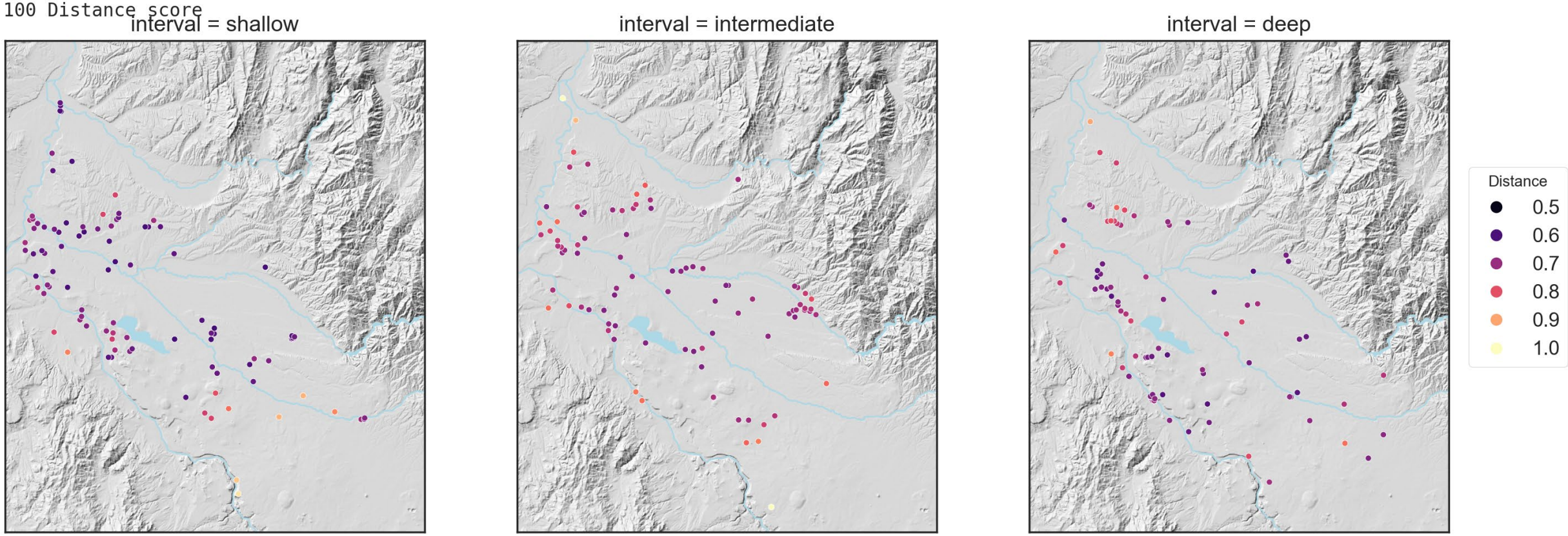


interval = deep



Distance from TVHP or IDWR well

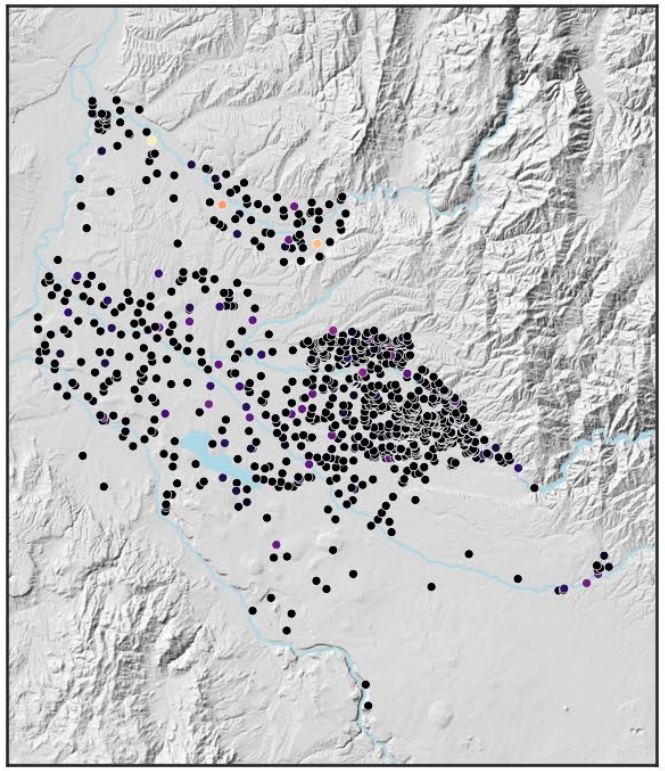
Top 100 Distance score



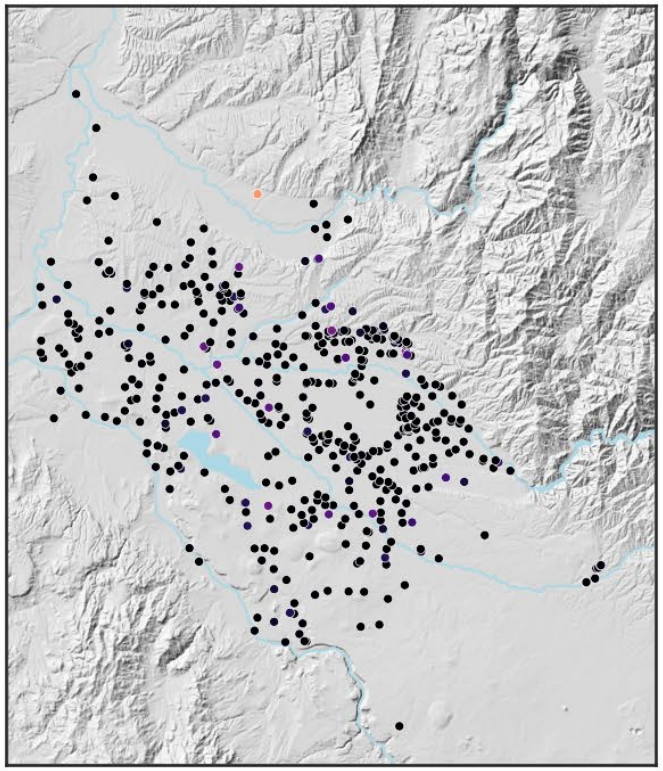
Number of Months with Measurements

Measurements score

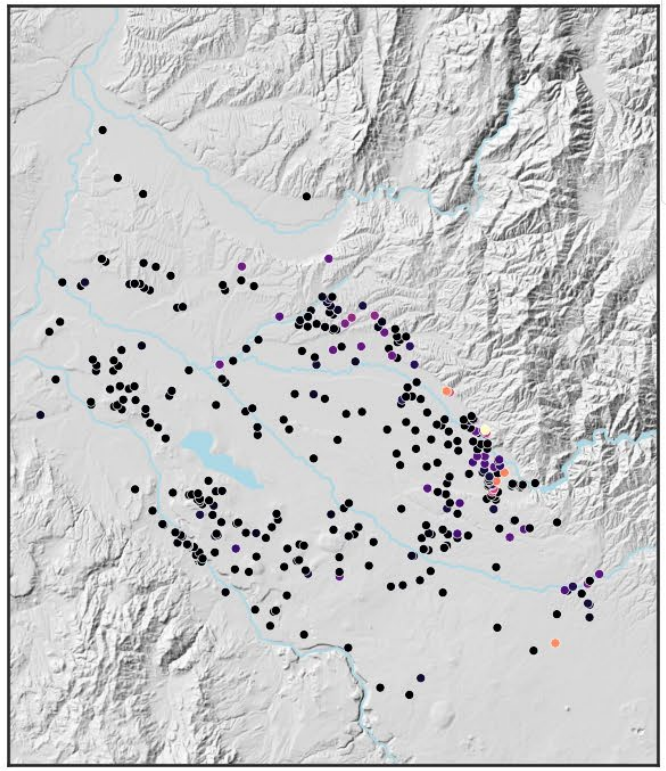
interval = shallow



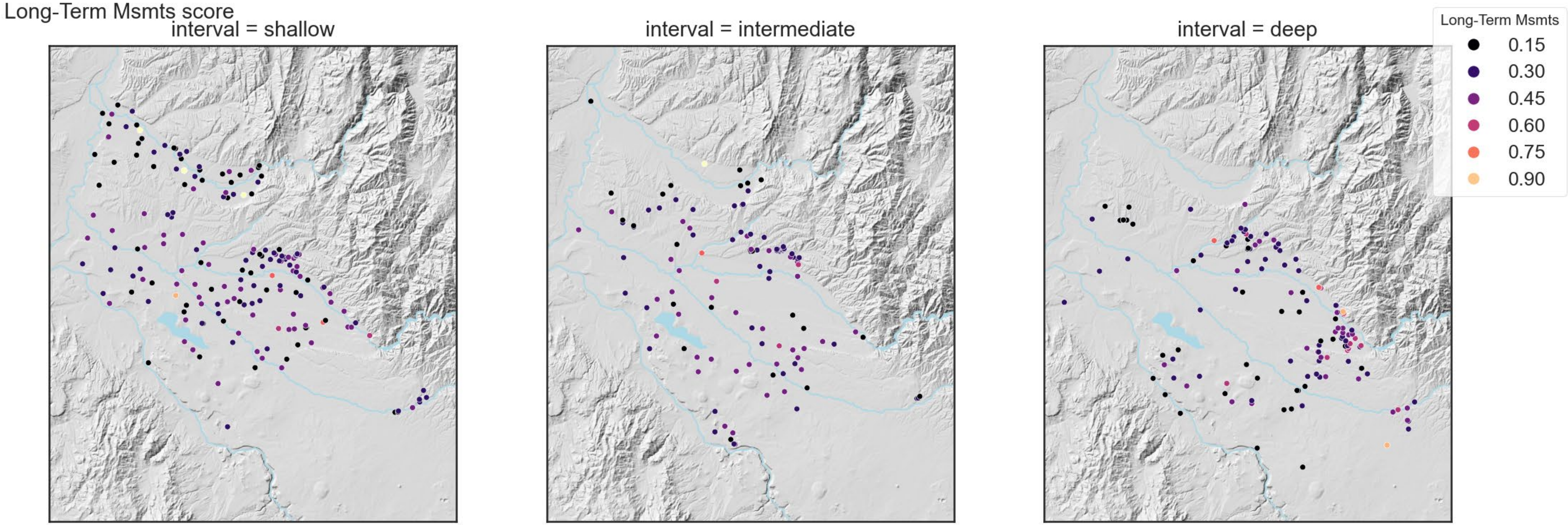
interval = intermediate



interval = deep

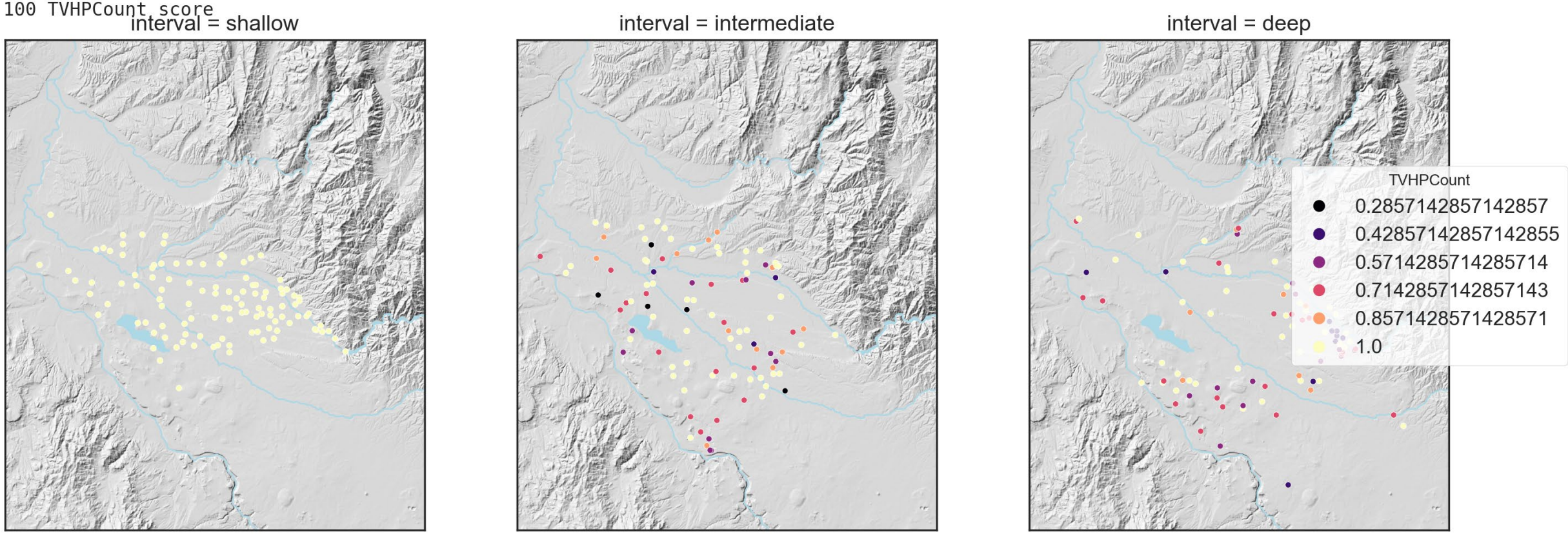


Long Term Measurements



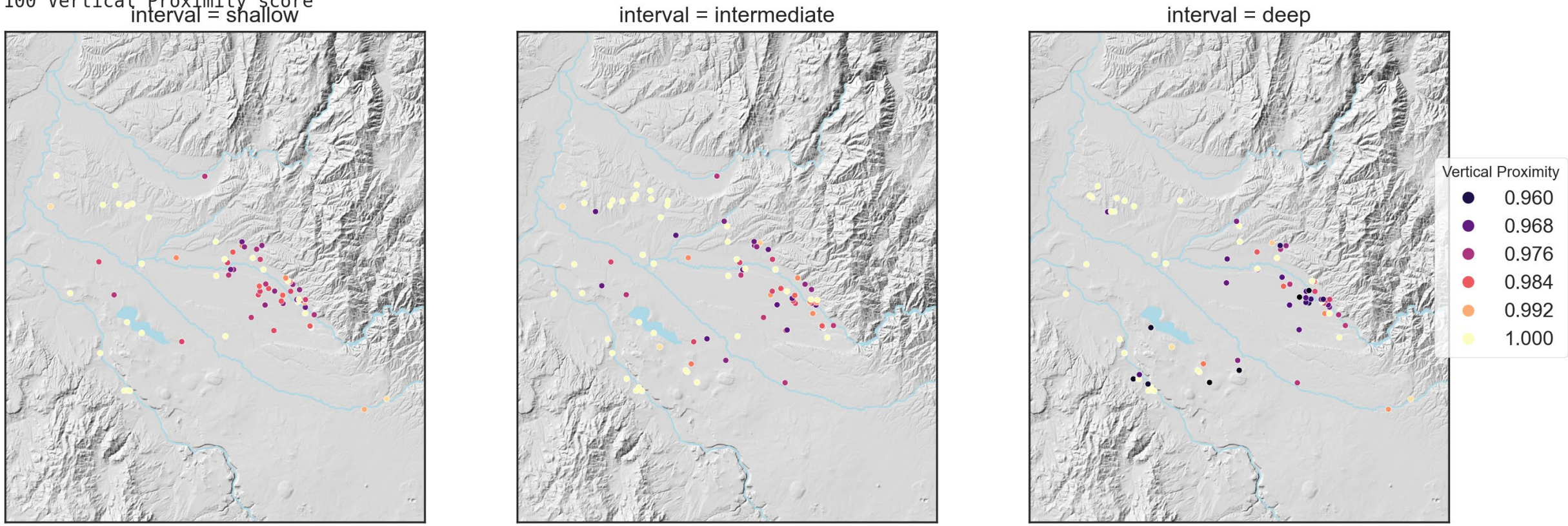
Number of TVHP measurements

Top 100 TVHPCount score

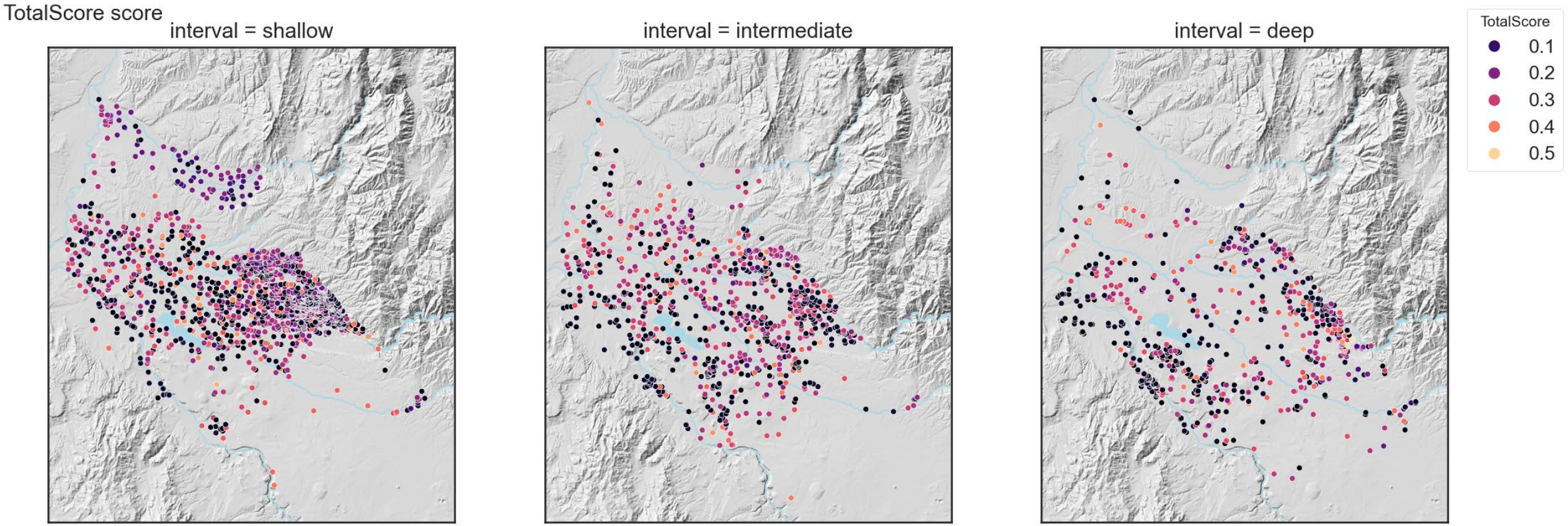


Vertical Proximity

Top 100 Vertical Proximity score

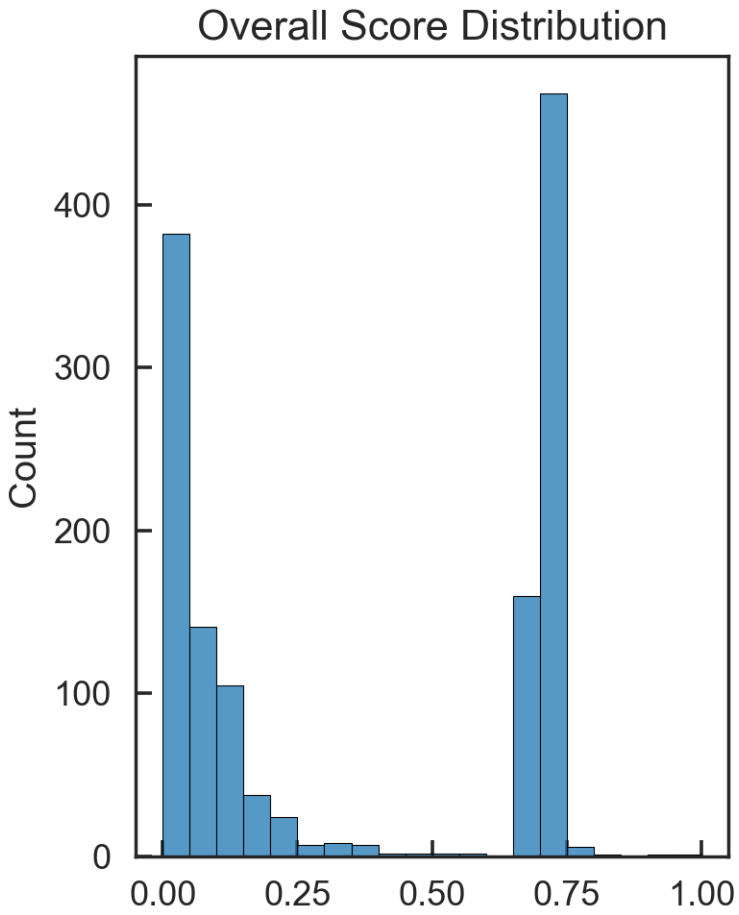


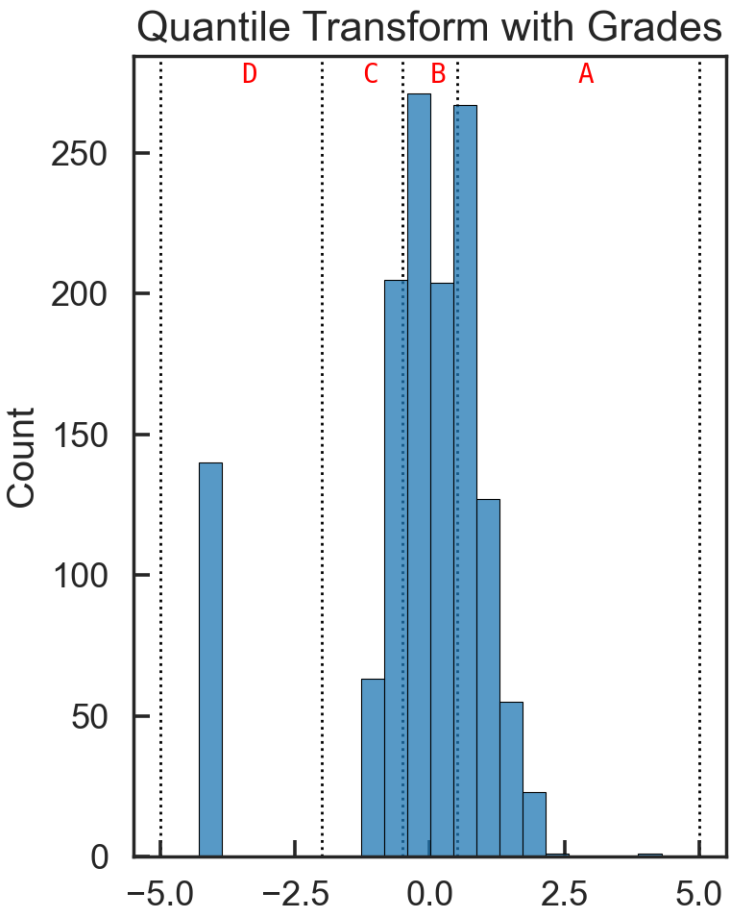
Total Score

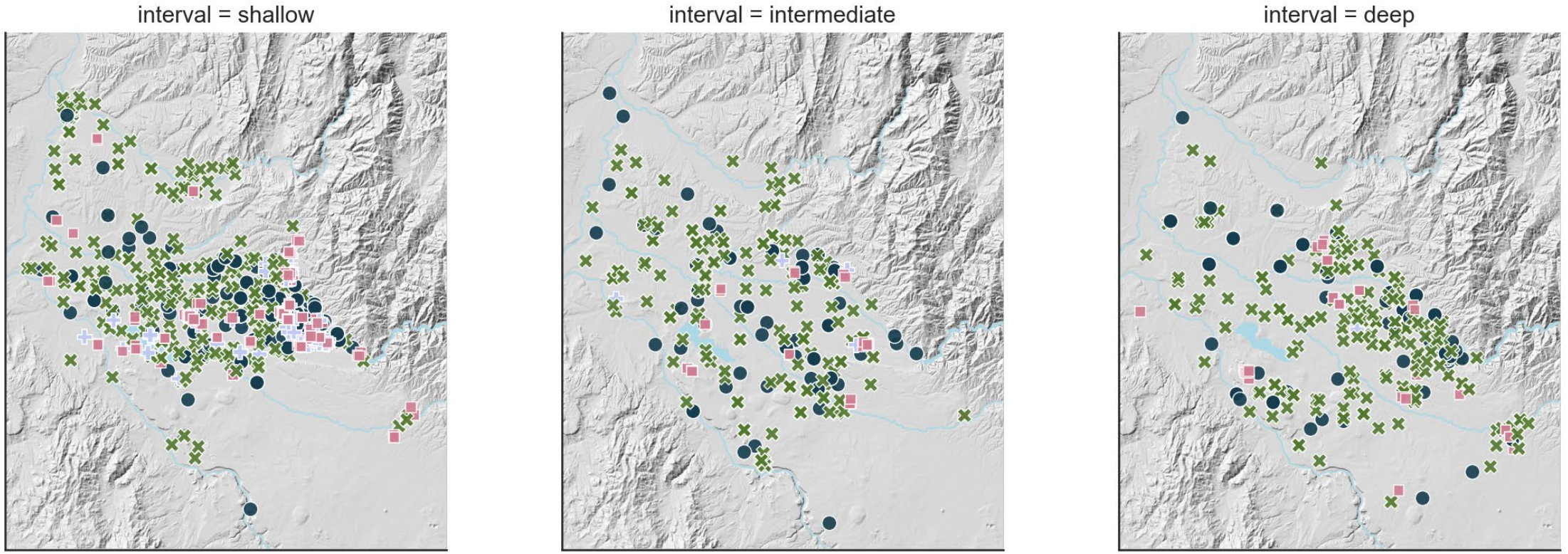

TotalScore score
interval = shallow
interval = intermediate
interval = deep
TotalScore
0.1
0.2
0.3
0.4
0.5

Grading Final Scores

- Grades assigned to final score
  - Quantile transform of bi-modal score distribution to allow for easier grading
  - Anything above the resulting average values = A
    - A: > 0.5
    - B: -0.5 to 0.5
    - C: -2.0 to -0.5
    - D: < -2.0
- Final graded dataset
  - size = 1,637 wells
  - Includes monitoring wells from well construction database







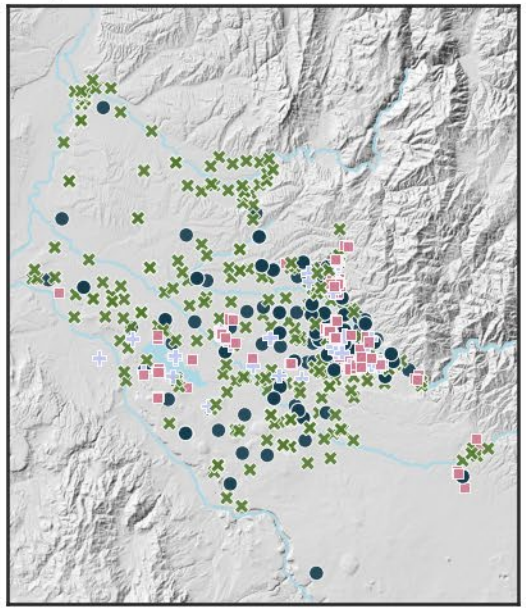
Grade by interval and Valley

Valley	interval	A	B	C	D
Boise	shallow	196	214	197	128
	intermediate	97	189	32	9
	deep	103	237	35	2
	unknown	6	86	1	0
Payette	shallow	2	56	4	0
	intermediate	3	16	0	0
	deep	1	3	0	0
	unknown	3	17	0	0

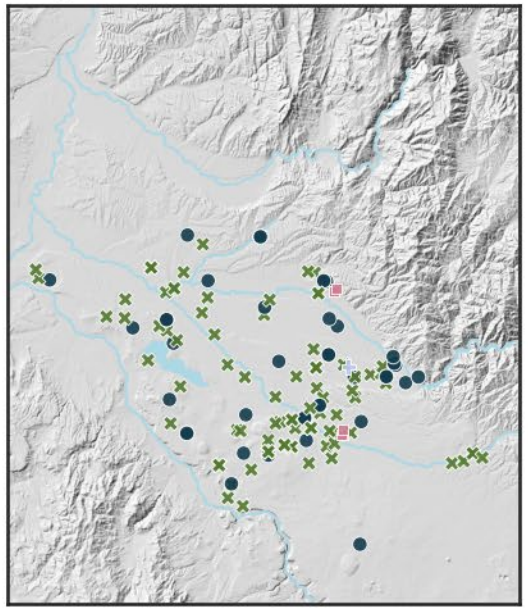
Grades by Treasure Valley Model Layer

Grade	A	B	C	D
Layer 1	209	281	196	117
Layer 2	59	98	6	1
Layer 3	83	169	17	9
Layer 4	112	267	17	1
Layer 5	45	124	13	1
Layer 6	31	95	17	5

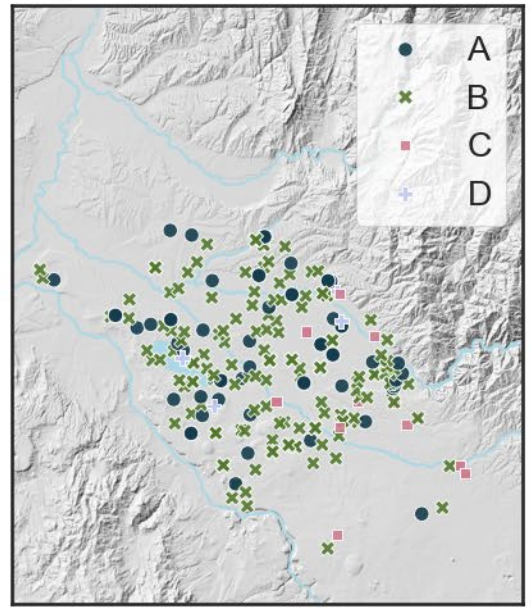
Layer 1: 803 wells



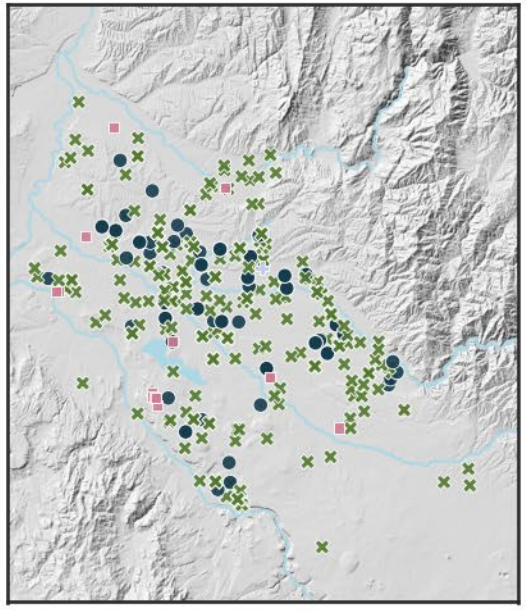
Layer 2: 164 wells



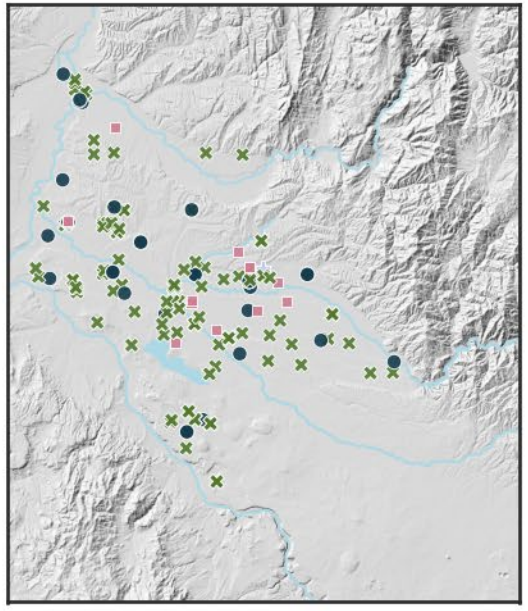
Layer 3: 278 wells



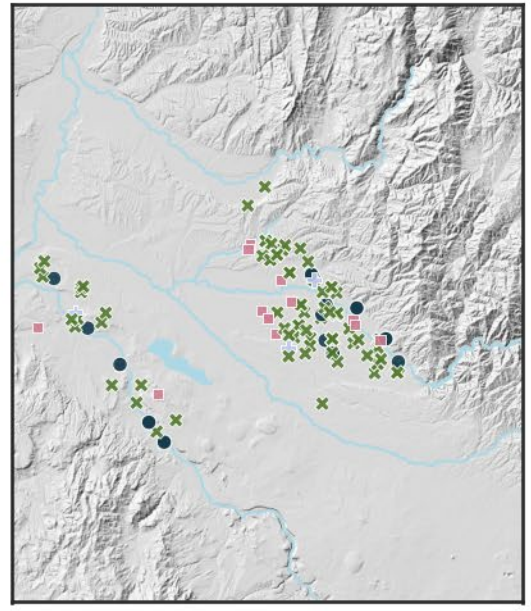
Layer 4: 397 wells



Layer 5: 183 wells



Layer 6: 148 wells



Wrap-up

- Grades A and B will be prioritized for sending permissions
- Aiming for at least 400 wells, with any overage to be measured by IDWR
- Scoring can be re-run after receiving permissions
- Fall 2026 will be the first measurement
- Alex.moody@idwr.Idaho.gov