



11/5/2020

2020 Fall Ground Water Level Report



Chris Kaiser
SOUTH PLATTE NATRUAL RESOURCES DISTRICT

This report summarizes the results of the fall 2020 ground water level measurement program. Water levels were taken by NRD staff Chris Kaiser and Galen Wittrock. Ground water level data are collected twice a year, during the spring and fall. This report is not as detailed as our spring report. The fall report only shows the major areas of aquifer stress/drawdown during the irrigation season (typically from April – October). During the time frame when fall measurements are taken, the aquifer is still fluctuating from “pumping pressure” during the irrigation season. Because of this fluctuation, the fall measurements and the year to year differences between those measurements will vary due to the amount of water pumped during the growing season. An example would be a pivot planted to corn during the 2019 growing season. In 2020, the producer may plant a lower water use crop and thus the pumping pressure will be considerably less during 2020. Hence, we are measuring a high pumping well in 2019 (great cone of depression) and comparing that to a low pumping well (low cone of depression) the following year and as to be expected, the water level will typically be higher than the previous year’s measurement. The opposite would be expected if the well was used very little during 2019 and had a high water use in 2020. This is just one example. Many different scenarios and biases play into interpreting fall levels. During the drought of 2012 and 2020, we saw almost all wells decline in the fall regardless of crop type planted. Due to these reasons, fall levels are not a good interpretation of aquifer level decreases/increases.

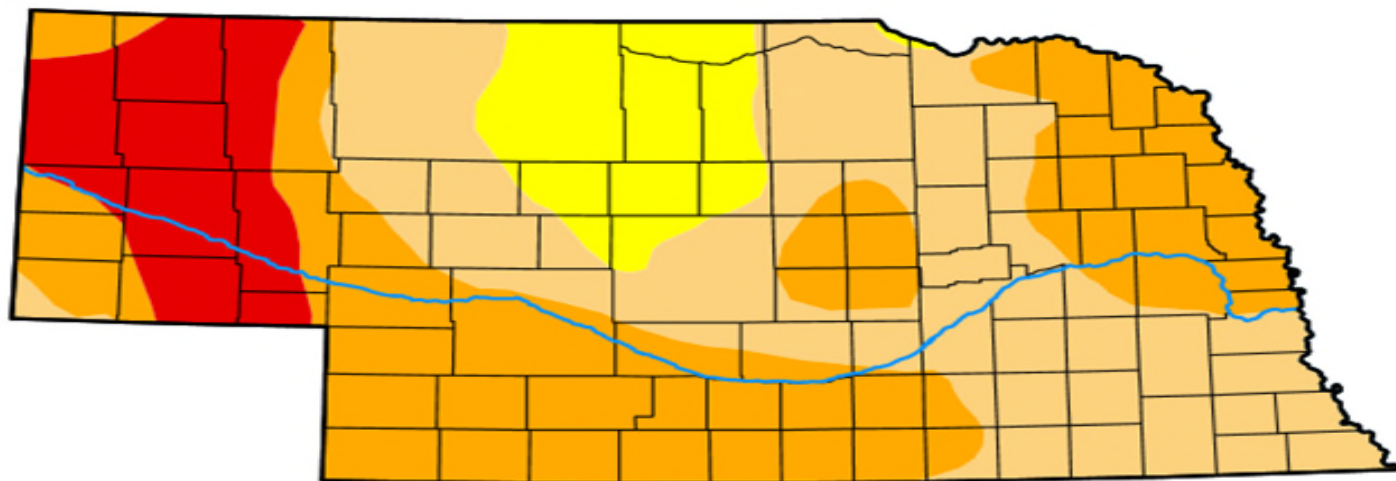
Attached in this report are maps depicting how water levels are mapped across the district and locations where our observation wells are located. Also attached in this report are fall-fall water level correlations going back one, five, ten, twenty, and thirty years.

As of this report, the SPNRD is currently observing 85 irrigation wells, 11 livestock wells, and 109 dedicated SPNRD owned monitoring wells. The SPNRD will be adding an additional monitoring well during 2021.

**Please note all water management decisions are based off of the spring ground water management report, amongst other projects and studies. This report is for informational purposes only.*

U.S. Drought Monitor Nebraska

November 3, 2020
(Released Thursday, Nov. 5, 2020)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	89.44	51.35	11.96	0.00
Last Week <i>10-27-2020</i>	0.00	100.00	85.77	49.61	11.96	0.00
3 Months Ago <i>08-04-2020</i>	44.11	55.89	33.56	6.82	0.00	0.00
Start of Calendar Year <i>12-31-2019</i>	97.47	2.53	0.00	0.00	0.00	0.00
Start of Water Year <i>09-29-2020</i>	1.64	98.36	77.26	32.68	7.56	0.00
One Year Ago <i>11-05-2019</i>	98.43	1.57	0.00	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

David Miskus
NOAA/NWS/NCEP/CPC



U.S. Drought Monitor

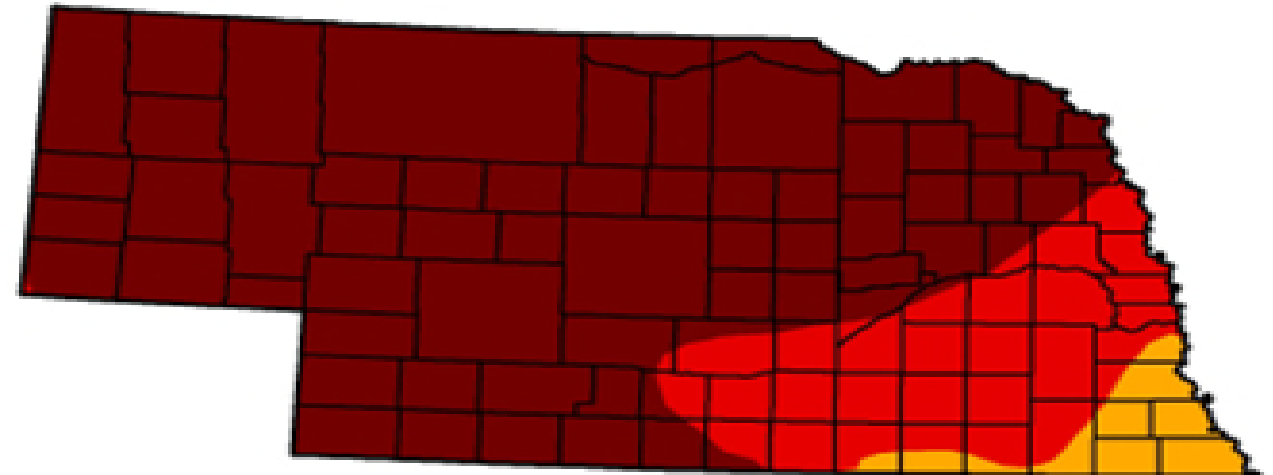
November 6, 2012

Valid 7 a.m. EST

Nebraska

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	100.00	95.74	77.58
Last Week (10/30/2012 map)	0.00	100.00	100.00	100.00	95.31	77.58
3 Months Ago (08/07/2012 map)	0.00	100.00	100.00	100.00	91.17	3.46
Start of Calendar Year (12/27/2011 map)	71.68	28.32	13.81	0.65	0.00	0.00
Start of Water Year (09/25/2012 map)	0.00	100.00	100.00	100.00	97.94	73.25
One Year Ago (11/01/2011 map)	70.44	29.56	20.42	0.00	0.00	0.00



Intensity:



The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

<http://droughtmonitor.unl.edu>

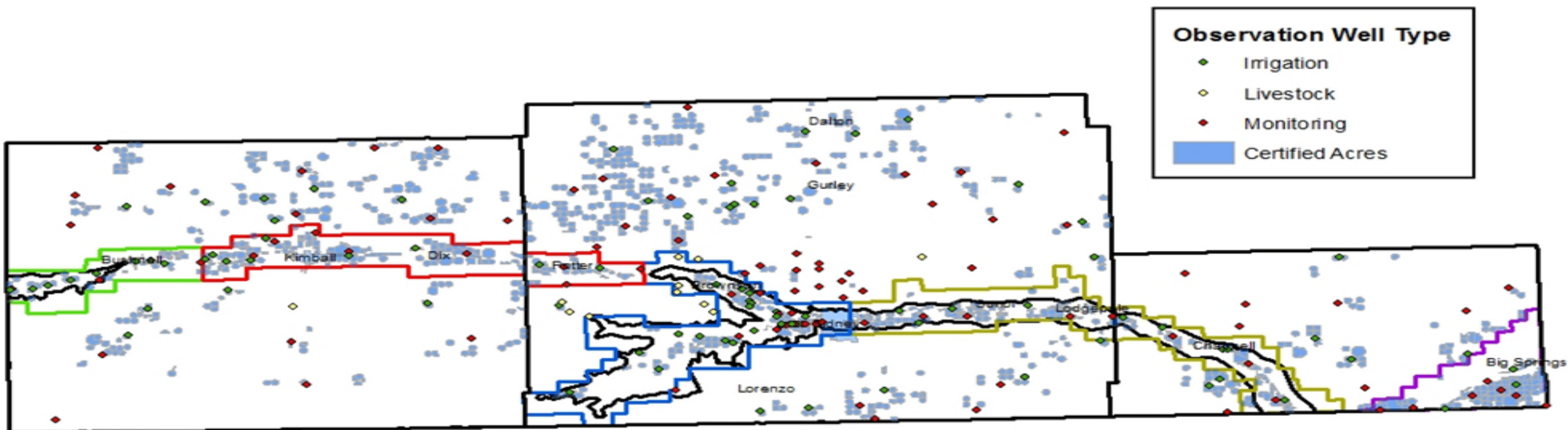


Released Thursday, November 8, 2012

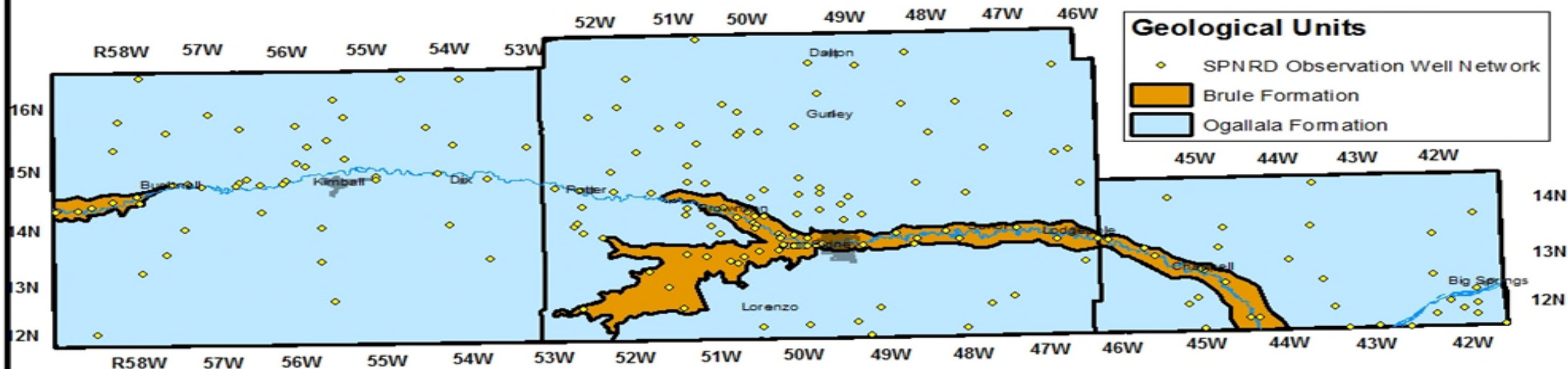
David Miskus, Climate Prediction Center/NCEP/NWS/NOAA



SPNRD Observation Well Network



SPNRD Geological Breakdowns



All wells located within each geological unit are only influenced by wells within each sole unit. That is, wells located in the southern ogallala unit are only influenced by the wells located there. It does not "share" water, nor is it influenced with wells in the Brule Formation. As of this time, the SPNRD has determined there is no hydrologic connectivity between the brule and ogallala formations, respectively. All maps have been created in this manner. The geological units described above are derived from the Platte River Cooperative Hydrology Study (COHYST).

Cone of Depression

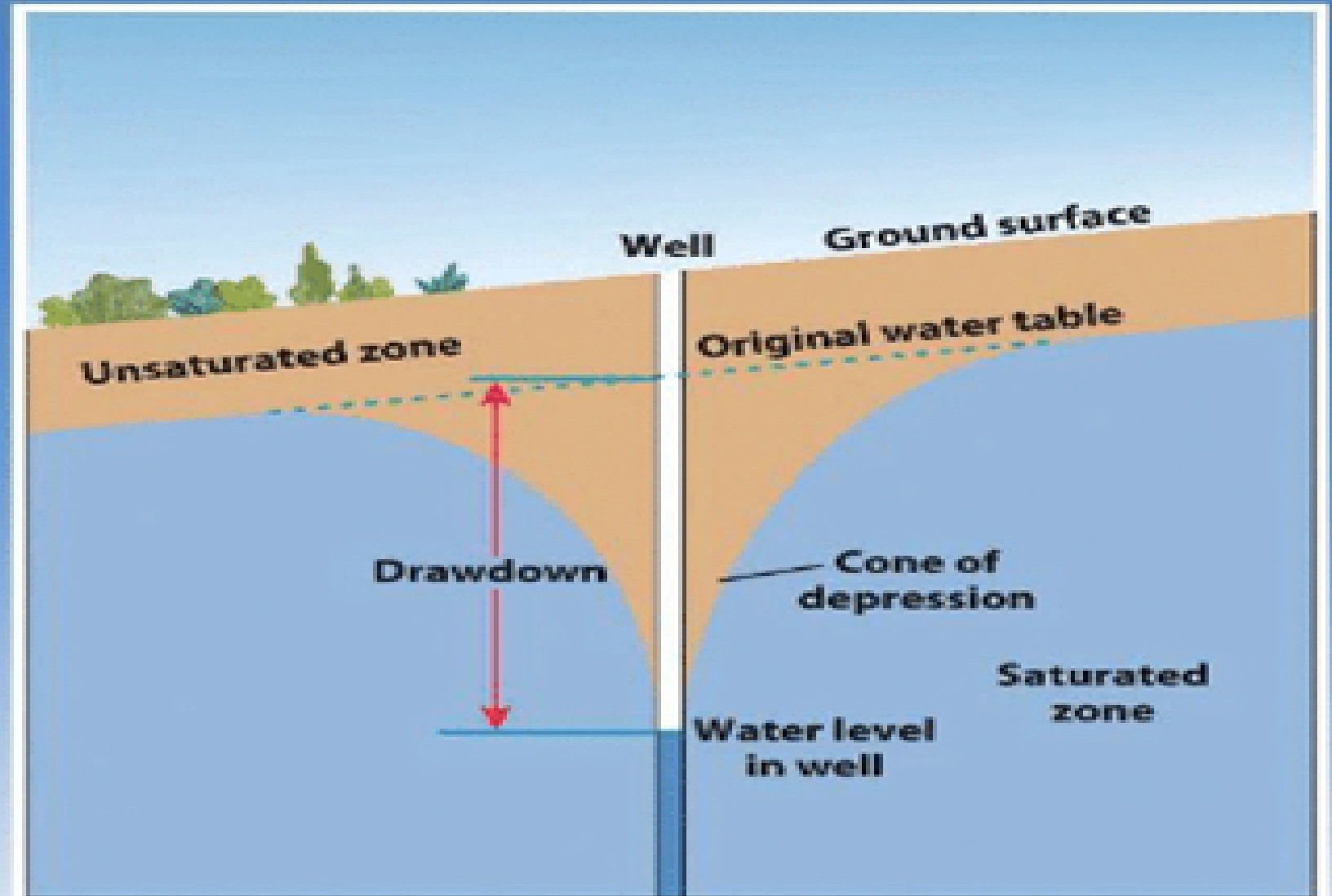


Figure 11.10
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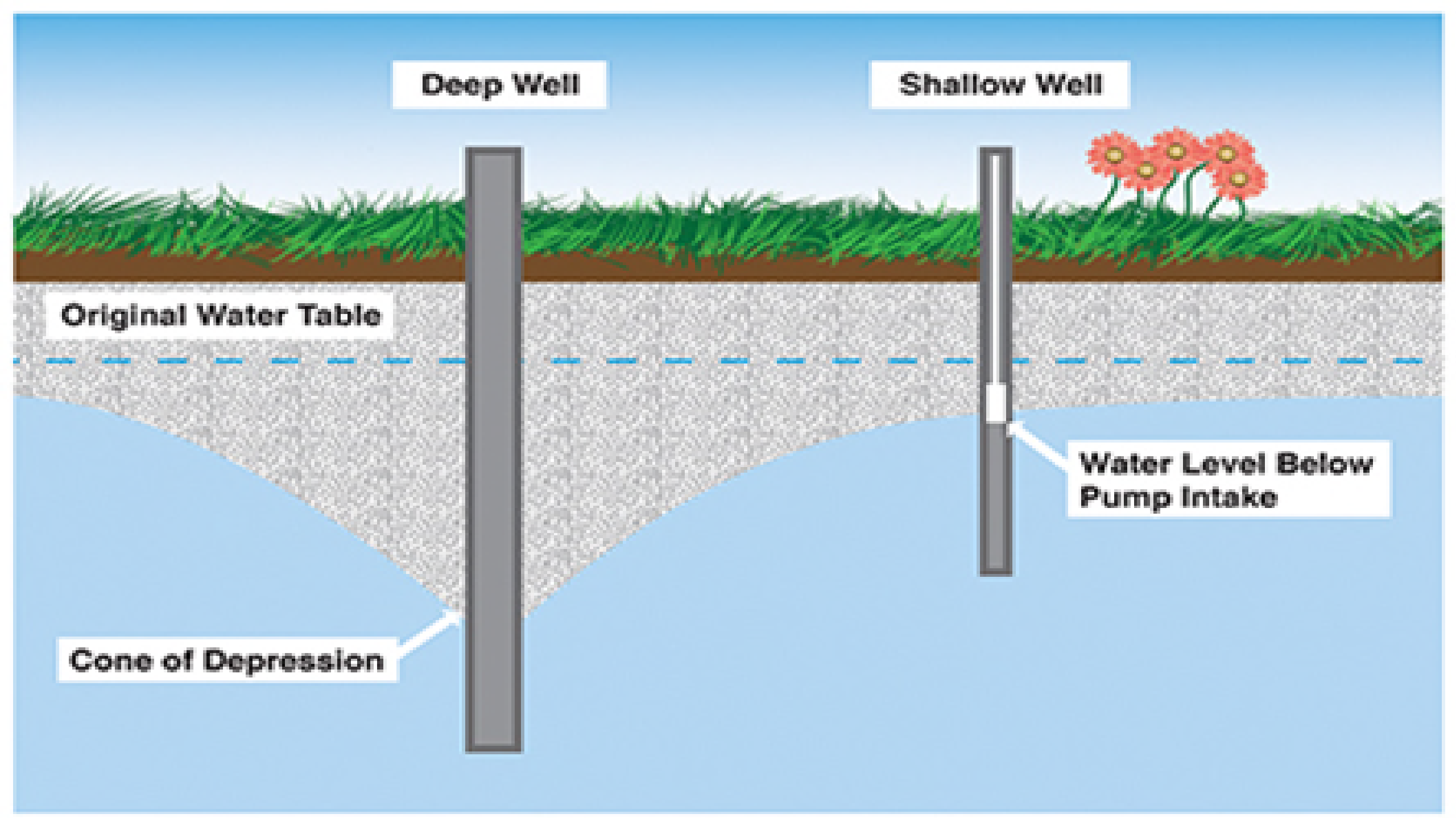
Deep Well

Shallow Well

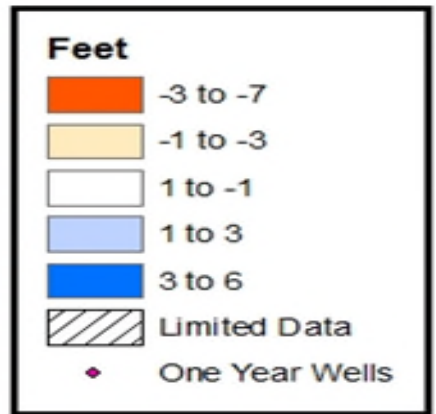
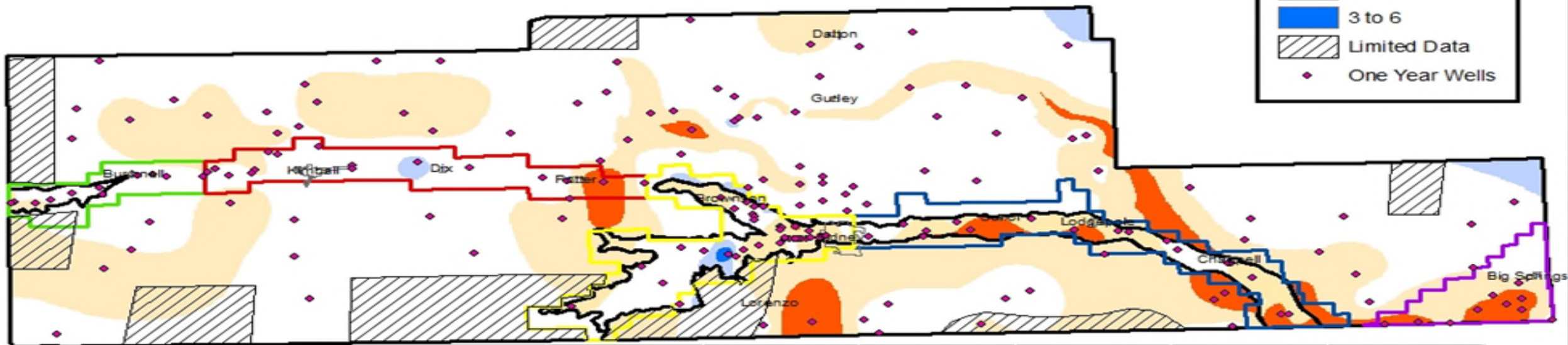
Original Water Table

Cone of Depression

Water Level Below Pump Intake



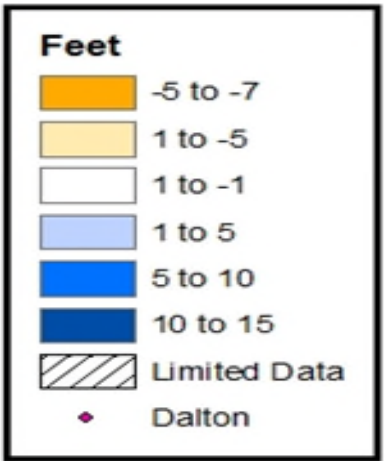
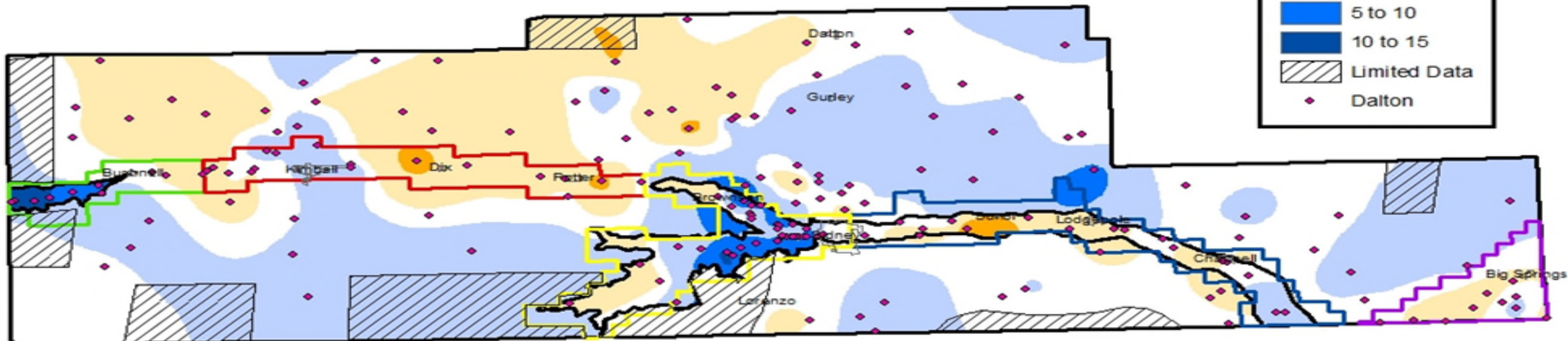
SPNRD 1 Year Water Level Differences



South Platte NRD 1 Year Stats by Subarea

Subarea	Ave.	Max	Min	Count	Decline	%Decline
Pine Bluffs to Oliver	-0.84	0.83	-2.49	12	11	92%
Oliver to Buffalo Bend	-0.8	1.3	-5.89	19	17	89%
Buffalo Bend to Sidney	-0.97	5.2	-3.88	37	31	84%
Sidney to Colorado	-2.08	-0.09	-6.01	17	17	100%
South Platte Valley	-3.1	-0.33	-5.88	11	11	100%
Fully Appropriated	-0.68	2.33	-6.08	99	72	73%
Districtwide	-1.02	5.2	-6.08	195	159	82%

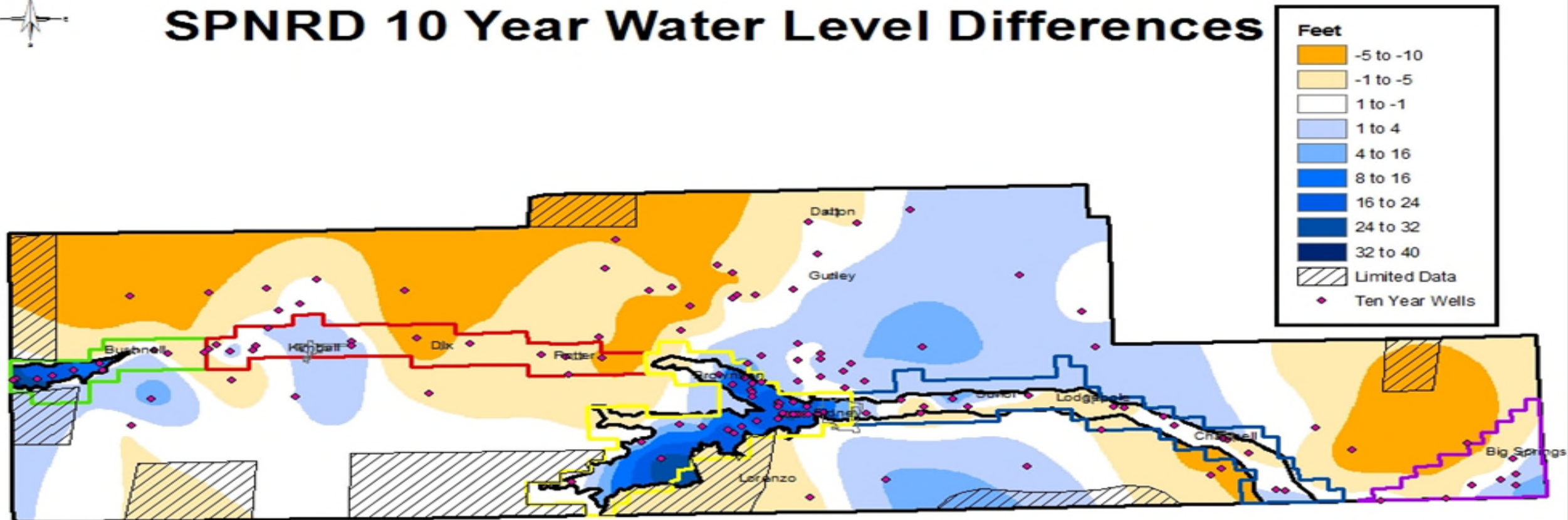
SPNRD 5 Year Water Level Differences



South Platte NRD 5 Year Stats by Subarea

Subarea	Ave.	Max	Min	Count	Decline	%Decline
Pine Bluffs to Oliver	7.62	14.97	-1.59	11	2	18%
Oliver to Buffalo Bend	-0.66	4	-6.17	19	11	58%
Buffalo Bend to Sidney	4.65	10.76	-3.01	37	4	11%
Sidney to Colorado	-0.88	3.1	-7.24	17	11	65%
South Platte Valley	-0.7	1.93	-2.63	11	7	64%
Fully Appropriated	0.13	7.3	-5.73	94	42	45%
Districtwide	1.23	14.97	-7.24	189	77	41%

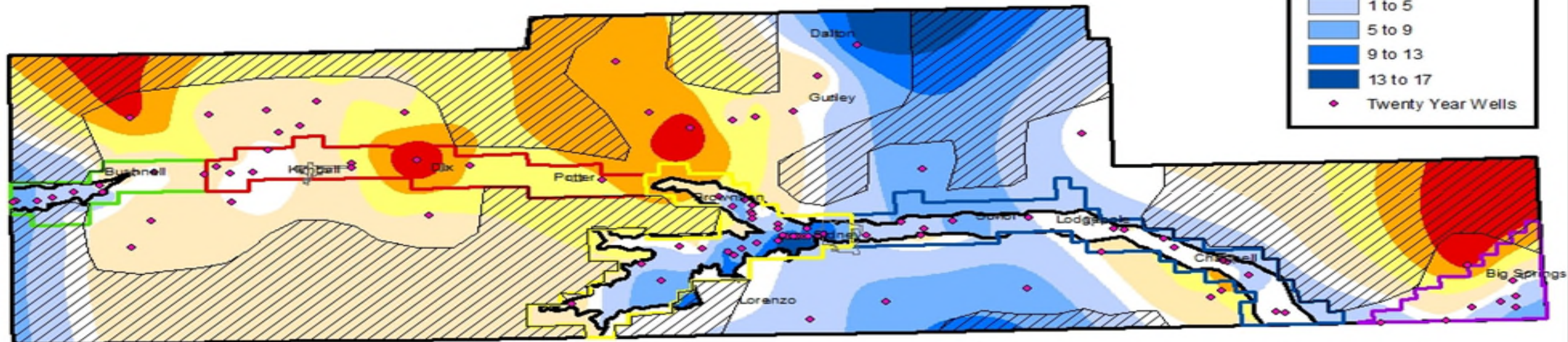
SPNRD 10 Year Water Level Differences



South Platte NRD 10 Year Stats by Subarea

Subarea	Ave.	Max	Min	Count	Decline	%Decline
Pine Bluffs to Oliver	16.25	37.63	-2.02	11	2	18%
Oliver to Buffalo Bend	-1.46	3	-7.64	14	9	64%
Buffalo Bend to Sidney	17.74	26.17	-1.99	36	1	3%
Sidney to Colorado	-0.25	7.29	-3.76	16	10	63%
South Platte Valley	-0.39	3.84	-7.3	8	3	38%
Fully Appropriated	-0.76	6.05	-9.57	60	31	52%
Districtwide	5.13	37.63	-9.57	145	56	39%

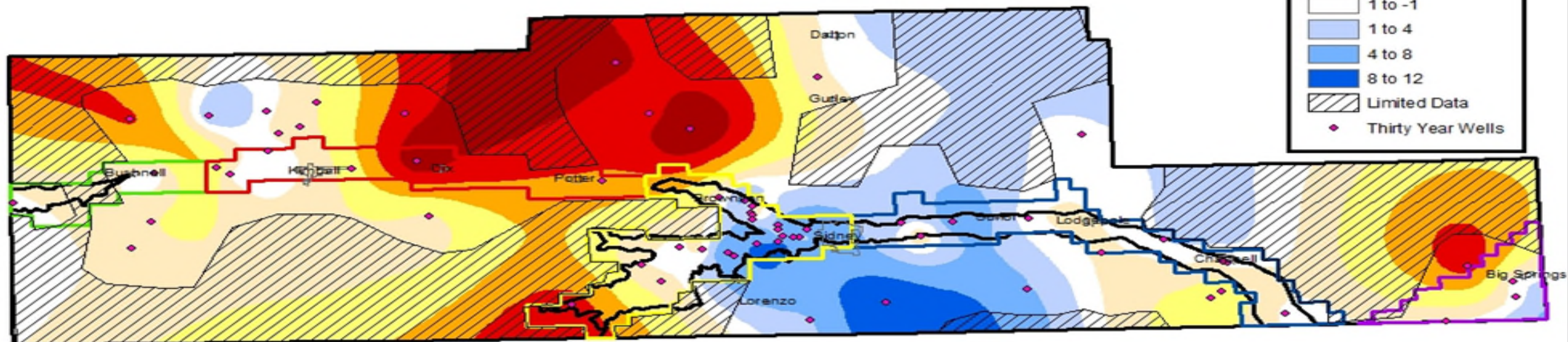
SPNRD 20 Year Water Level Differences



South Platte NRD 20 Year Stats by Subarea

Subarea	Ave.	Max	Min	Count	Decline	%Decline
Pine Bluffs to Oliver	3.61	9.01	-3.26	10	2	20%
Oliver to Buffalo Bend	-5.55	0.13	-16.53	9	8	89%
Buffalo Bend to Sidney	7.59	16.19	-3.36	31	5	16%
Sidney to Colorado	0.99	6.45	-2.36	15	4	27%
South Platte Valley	-0.15	4.72	-13.84	8	2	25%
Fully Appropriated	-2.86	12.55	-15.71	27	23	85%
Districtwide	1.58	16.19	-16.53	100	44	44%

SPNRD 30 Year Water Level Differences



South Platte NRD 30 Year Stats by Subarea

Subarea	Ave.	Max	Min	Count	Decline	%Decline
Pine Bluffs to Oliver	-0.25	-0.22	-0.28	2	2	100%
Oliver to Buffalo Bend	-7.2	0.46	-18.46	6	5	83%
Buffalo Bend to Sidney	2.24	8.03	-13.54	21	8	38%
Sidney to Colorado	0.61	6.48	-2.31	8	5	63%
South Platte Valley	-3.82	-0.1	-13.31	4	4	100%
Fully Appropriated	-4.14	11.58	-20.24	21	16	76%
Districtwide	-1.52	11.58	-20.24	62	40	65%