4/1/2024

2024 Spring Ground Water Level Report

SOUTH PLATTE NATURAL RESOURCES DISTRICT

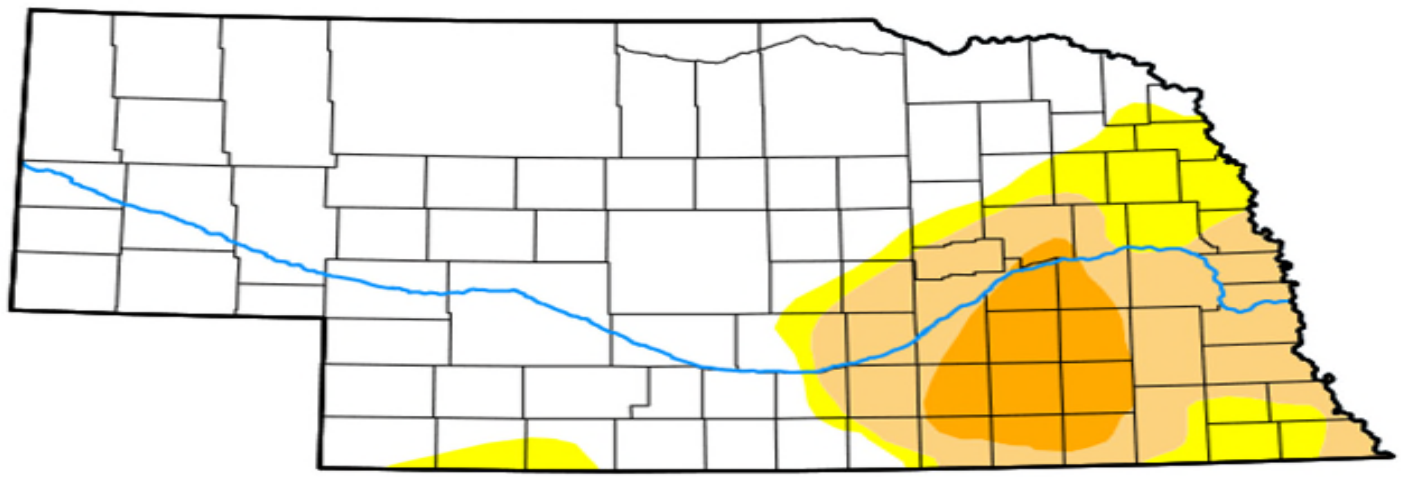
This report summarizes the results of the spring 2024 groundwater level measurement program. Ground water levels were collected by South Platte NRD staff Chris Kaiser and Tyler Sanders. We experienced a drought during 2020, 2021, and 2022. 2023 was a change of pace as we had a brutal winter followed by an extremely wet spring. Rainfall was 4.11" higher than average and we saw water levels rise districtwide in the spring of 2024 an average of 0.90 feet.

The Pine Bluff to Oliver Reservoir subarea, Buffalo Bend to Sidney, and the Sidney to Colorado subarea are comprised of the Brule formation. Because of the lack of porosity in the Brule formation (low storage capability), these areas are the quickest to show recharge after a wet year while they are also the quickest to show declines during a dry year. The Ogallala formation on the other hand, has a high degree of porosity (large storage capacity) and may not show any increases or decreases after a wet year. It also could take years before that water reaches the aquifer in the deeper portions. Districtwide, water levels increased 0.90 feet on average based on 196 well measurements.

Attached in this report are data correlating precipitation changes from normal amounts compared to the average decline/incline in ground water levels. A map indicating allocation subareas and a map indicating how we correlate water level changes within geological boundaries. Included are one, seven, fifteen, twenty-five and forty year water level difference maps. Allocations took effect in 2009 and the fifteen-year map shows comparisons of where water levels have changed since the District was under a full allocation. Landowners who have NRD observation wells installed on their property, as well as landowners from whom we take irrigation well measurements are sent hydrographs of their current water level each spring. The saturated thickness map included in this report has been updated with new information that was obtained from over 700 oil and gas well logs as well as CSD test hole and NRD monitoring well data.

*Any inquiries regarding other information that is not included in this report (geology, well construction, hydrographs) can be obtained at the SPNRD office.

U.S. Drought Monitor
Nebraska



March 26, 2024
(Released Thursday, Mar. 28, 2024)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	71.49	28.51	19.96	6.14	0.00	0.00
Last Week *03-19-2024*	61.30	38.70	24.53	12.08	0.00	0.00
3 Months Ago *12-26-2023*	60.04	39.96	26.38	19.56	9.66	2.08
Start of Calendar Year *01-02-2024*	60.04	39.96	26.38	18.81	7.18	0.17
Start of Water Year *09-26-2023*	35.05	64.95	44.76	27.38	14.02	4.65
One Year Ago *03-28-2023*	0.37	99.63	98.59	79.36	32.56	5.09

Intensity:

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

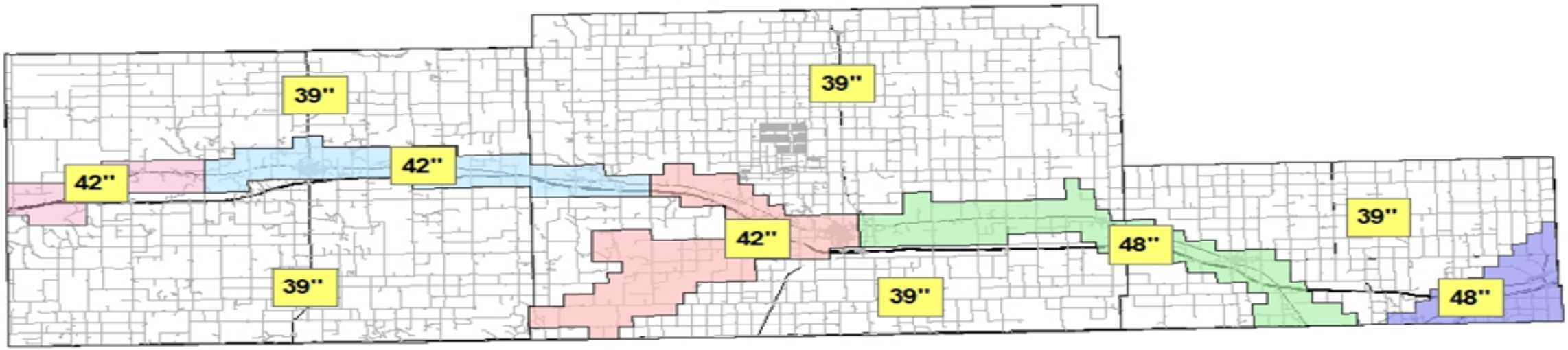
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Brad Rippey
U.S. Department of Agriculture

droughtmonitor.unl.edu

South Platte Natural Resources District

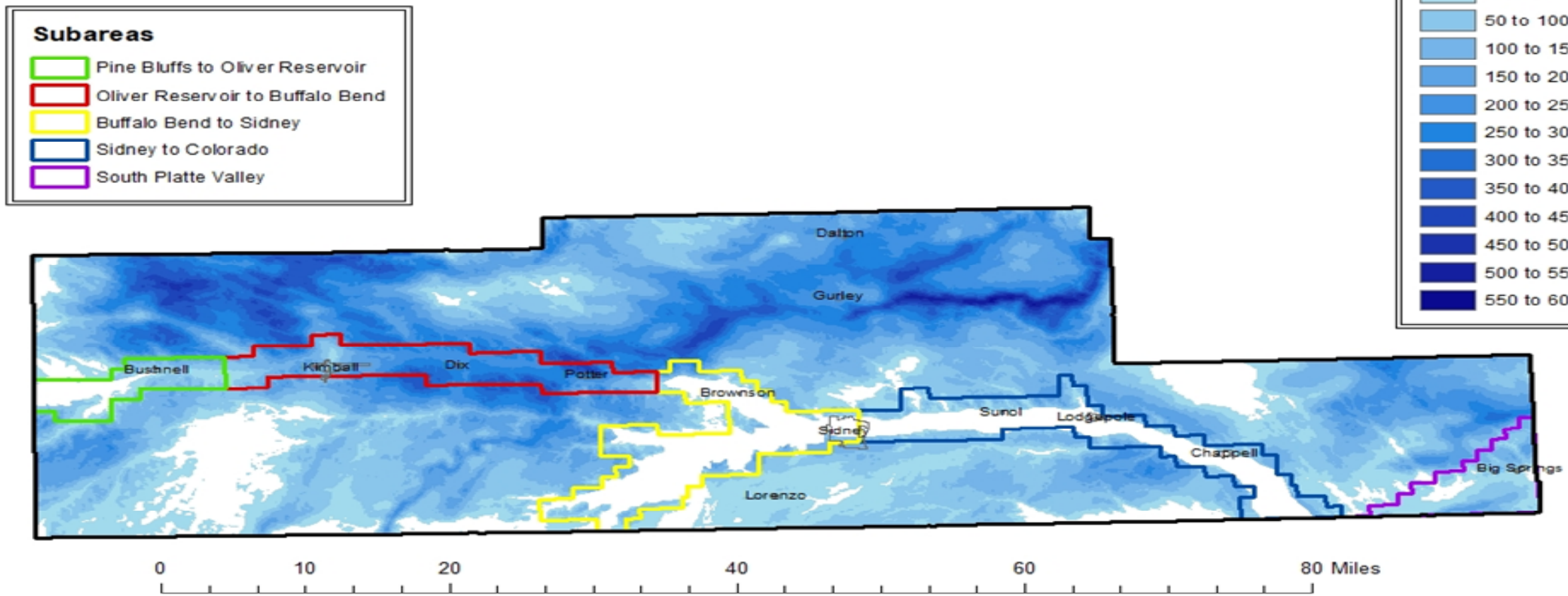
Allocation Subareas & Allocations (Acre-inches) for the 2022 through 2024 Allocation Period



Legend

- A - Wyoming State Line to Oliver Reservoir (RD 27)
- B - Oliver Reservoir to Buffalo Bend (RD 87)
- C - Buffalo Bend to Sidney (RD 115)
- D - Sidney to Colorado State Line
- E - South Platte Valley
- F - Tablelands

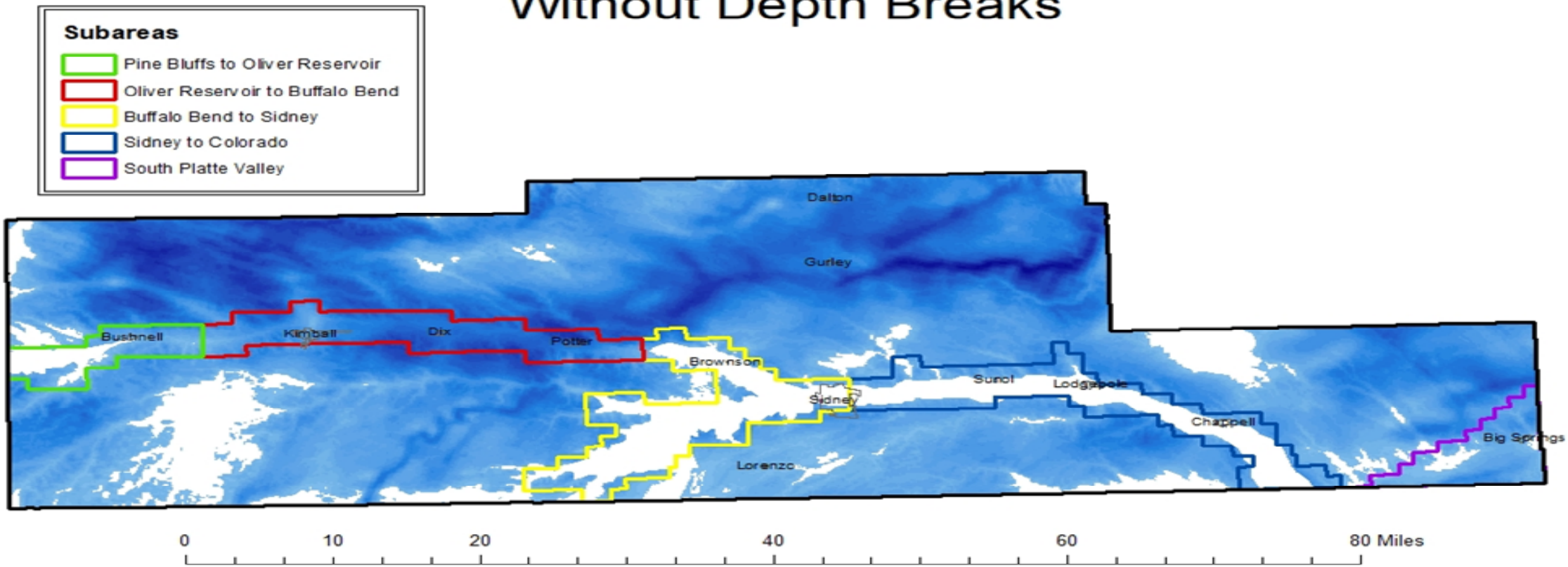
Saturated Thickness Ogallala Aquifer



SOUTH PLATTE
NATURAL RESOURCES DISTRICT

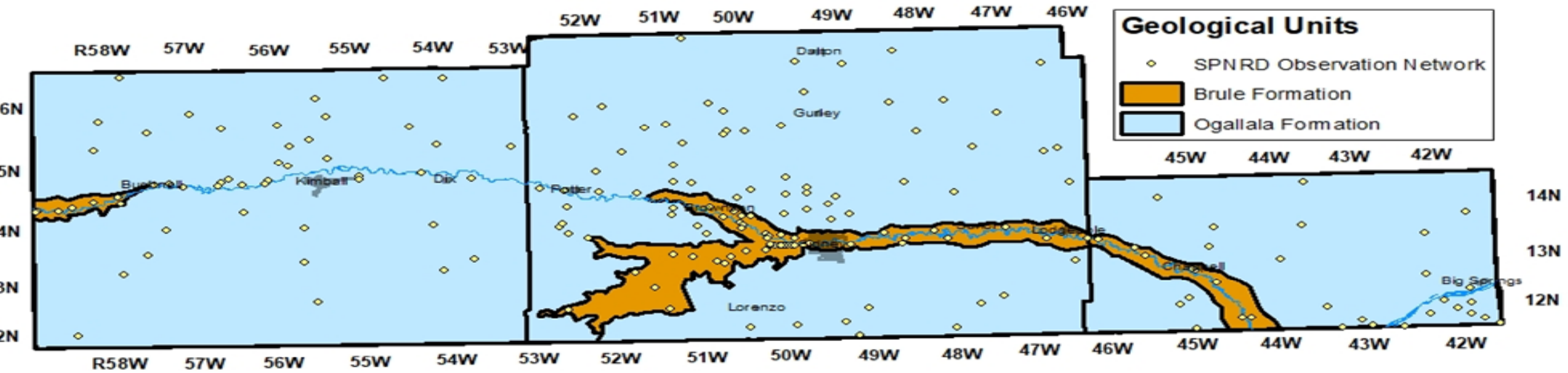
Saturated Thickness Ogallala Aquifer

Without Depth Breaks



South Platte
Natural Resources District

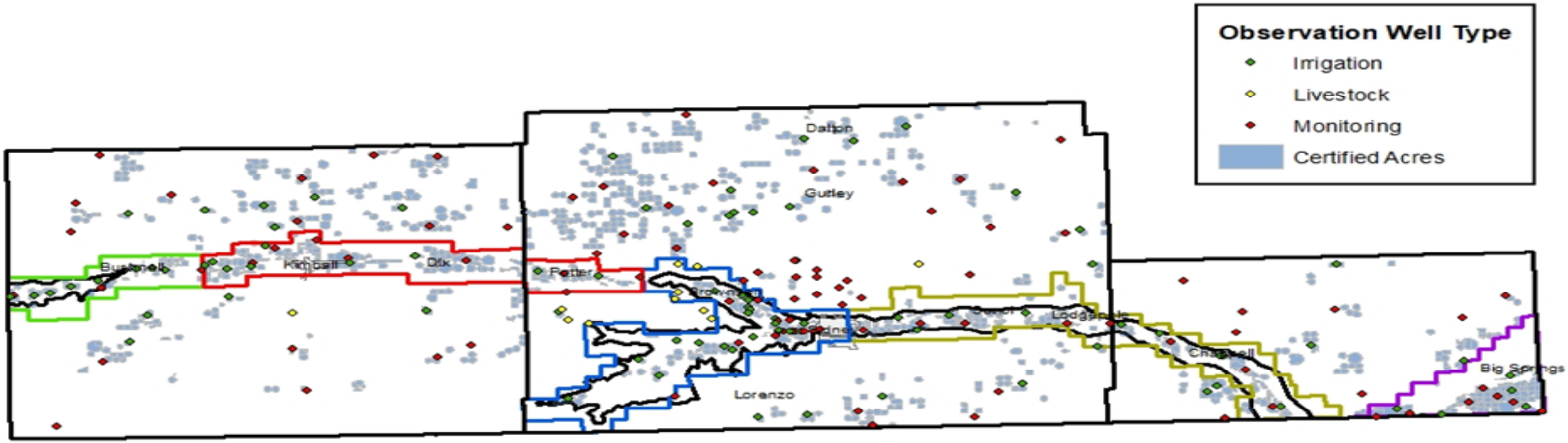
SPNRD Geological Breakdowns



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).

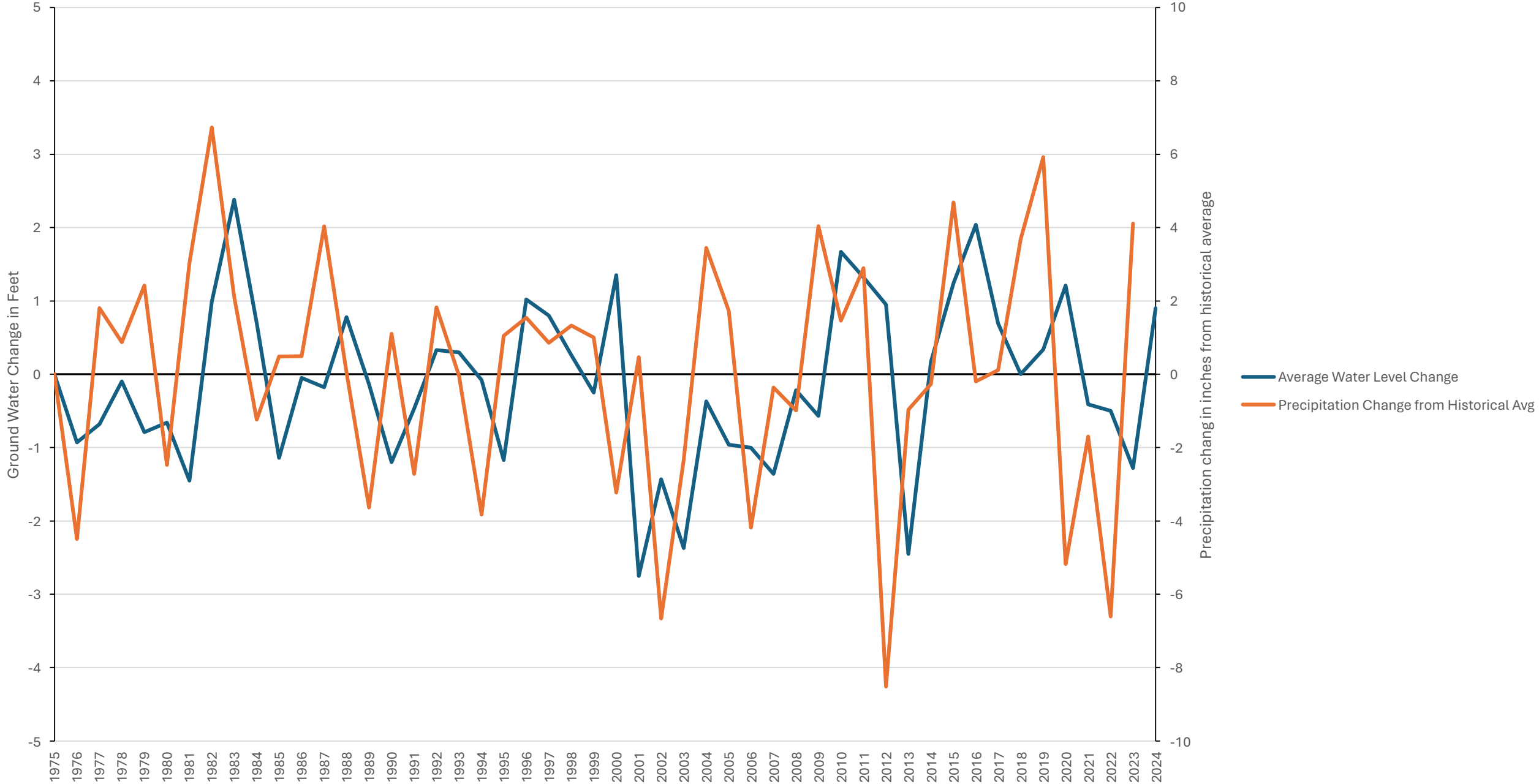
SOUTH PLATTE
NATURAL RESOURCES DISTRICT

SPNRD Observation Well Network

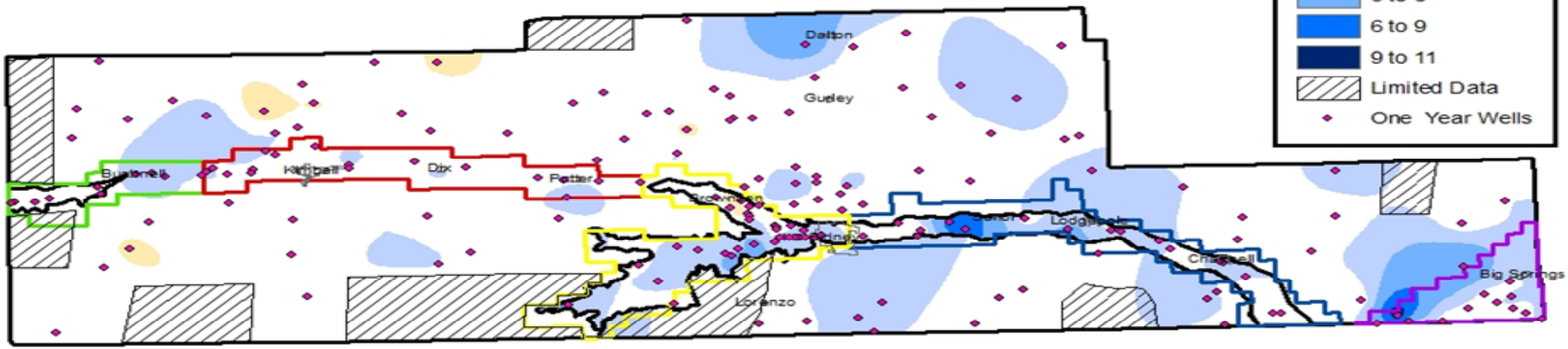


SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Groundwater and Precipitation Accumulation Changes 1975-2023



SPNRD 1 Year Water Level Differences



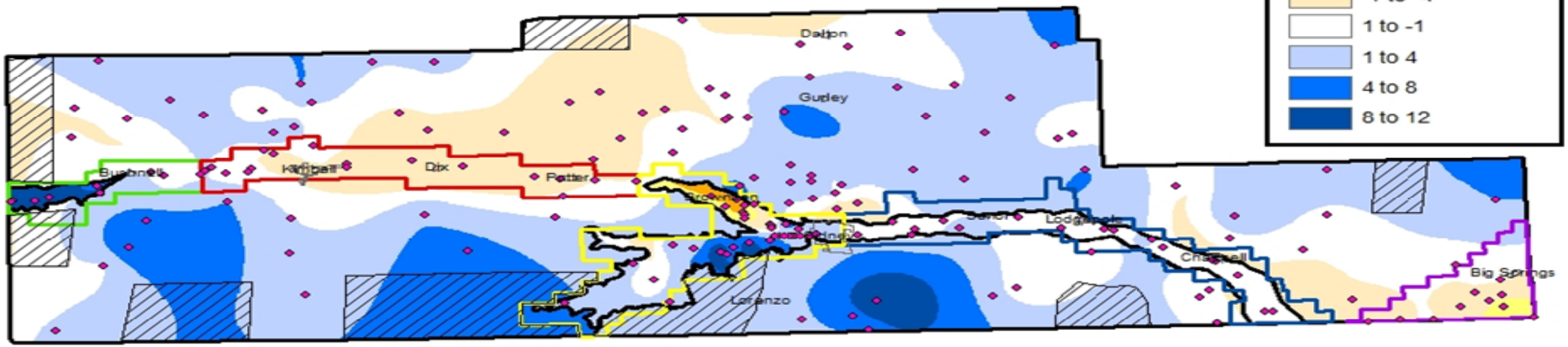
South Platte NRD 1 Year Stats by Subarea				
Subarea	**Ave.**	**Max**	**Min**	**# of Wells**
Pine Bluffs to Oliver	0.52	1.84	-0.42	11
Oliver to Buffalo Bend	0.71	2.65	-1.05	19
Buffalo Bend to Sidney	1.19	4.03	-3.43	37
Sidney to Colorado	1.88	7.6	-0.62	17
South Platte Valley	2.16	10.36	0.22	13
Fully Appropriated	0.53	4.83	-2.4	99
Districtwide	**0.90**	**10.36**	**-3.43**	**196**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2023 - Spring 2024

SPNRD 7 Year Water Level Differences

*Allocations Have Remained the Same in all Subareas Since 2016



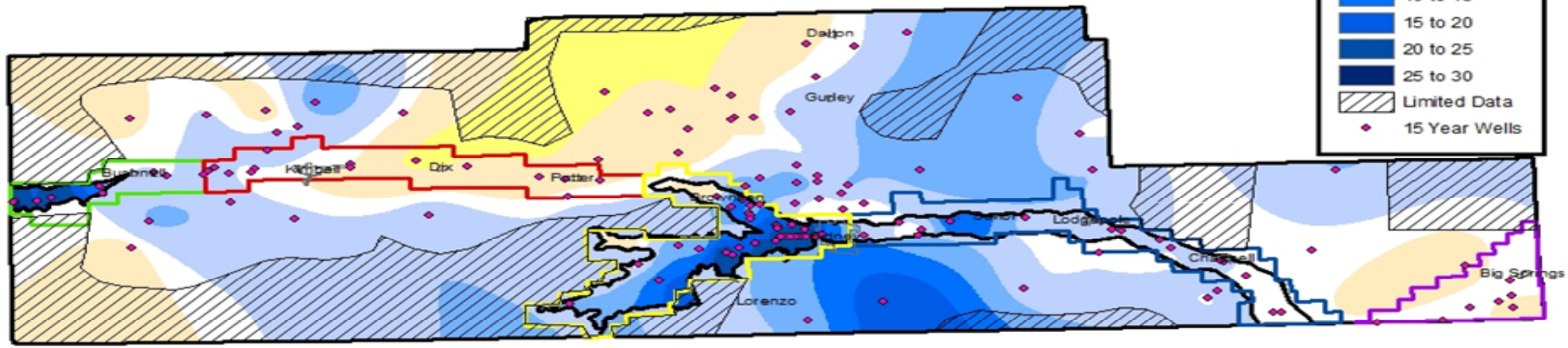
South Platte NRD 7 Year Stats by Subarea				
Subarea	**Ave.**	**Max**	**Min**	**# of Wells**
Pine Bluffs to Oliver	6.83	11.77	-0.5	10
Oliver to Buffalo Bend	-1.05	1.35	3.96	19
Buffalo Bend to Sidney	0.4	10.76	-11.14	37
Sidney to Colorado	0.18	1.65	-0.8	17
South Platte Valley	-2.45	-0.45	-5.4	11
Fully Appropriated	1.43	11.51	-3.17	95
Districtwide	**0.92**	**11.77**	**-11.14**	**189**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2016 - Spring 2024

SPNRD 15 Year Water Level Differences

*2009 Was the First Year All Subareas Were Under Allocation



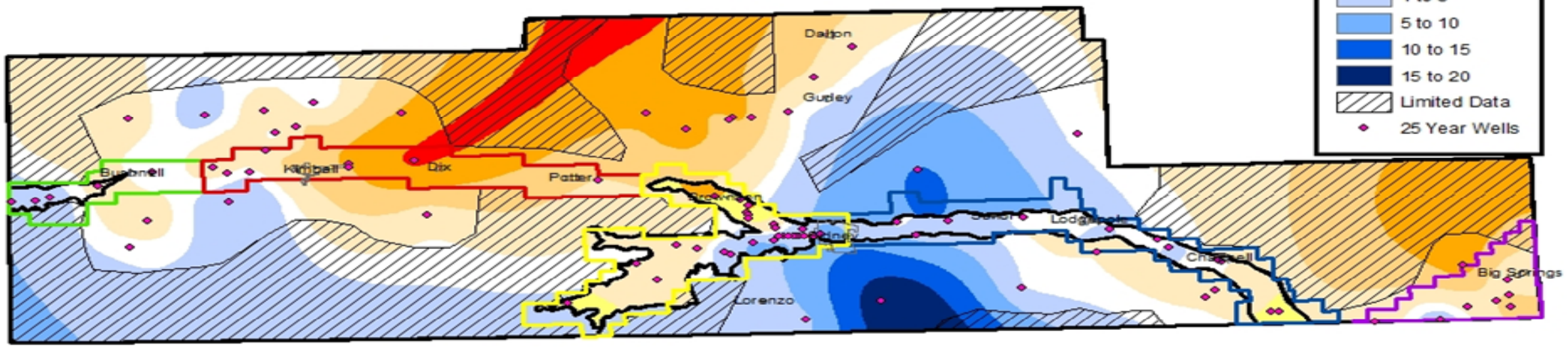
South Platte NRD 15 Year Stats by Subarea				
Subarea	**Ave.**	**Max**	**Min**	**# of Wells**
Pine Bluffs to Oliver	14.66	28.13	0.98	10
Oliver to Buffalo Bend	-0.6	3.82	-5.59	14
Buffalo Bend to Sidney	16.44	25.82	-0.62	36
Sidney to Colorado	2.55	14.38	-0.41	15
South Platte Valley	-0.91	0.26	-2.37	8
Fully Appropriated	1.89	18.69	-6.02	59
Districtwide	**6.15**	**28.13**	**-6.02**	**142**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2009 - Spring 2024

SPNRD 25 Year Water Level Differences

*25 Years is a Short Term Climate Cycle NeDNR Likes to Use for Modeling Purposes

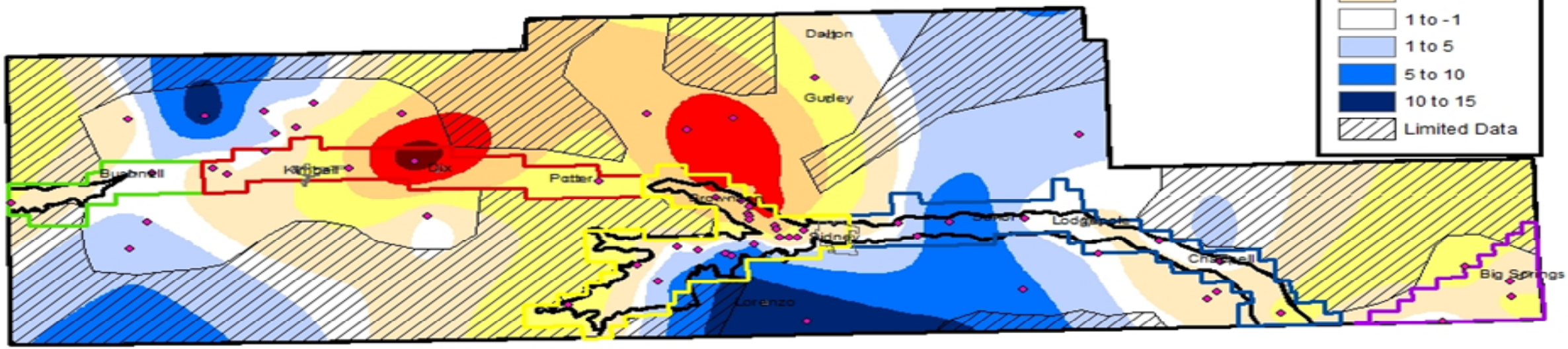


South Platte NRD 25 Year Stats by Subarea				
Subarea	**Ave.**	**Max**	**Min**	**# of Wells**
Pine Bluffs to Oliver	1.15	3.82	-2.28	5
Oliver to Buffalo Bend	-5.9	0.1	-15.49	8
Buffalo Bend to Sidney	-0.54	6.12	-10.44	29
Sidney to Colorado	-0.29	3.47	-6.47	11
South Platte Valley	-4.15	2.99	-12.42	8
Fully Appropriated	-1.91	18.35	-12.29	27
Districtwide	**-1.65**	**18.35**	**-15.49**	**88**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 1999 - Spring 2024

SPNRD 40 Year Water Level Differences



South Platte NRD 40 Year Stats by Subarea				
Subarea	**Ave.**	**Max**	**Min**	**# of Wells**
Pine Bluffs to Oliver	-2.18	0.77	-5.13	2
Oliver to Buffalo Bend	-7.29	0.44	-22.27	6
Buffalo Bend to Sidney	-6.11	6.42	-16.33	20
Sidney to Colorado	1.2	9.45	-5.21	7
South Platte Valley	-3.61	0.56	-6.9	4
Fully Appropriated	-1.78	13.99	-17.58	20
Districtwide	**-3.59**	**13.99**	**-22.27**	**59**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 1984 - Spring 2024