4/4/2019

2019 Spring Ground Water Level Report

Chris Kaiser
SOUTH PLATTE NATRUAL RESOURCES DISTRICT

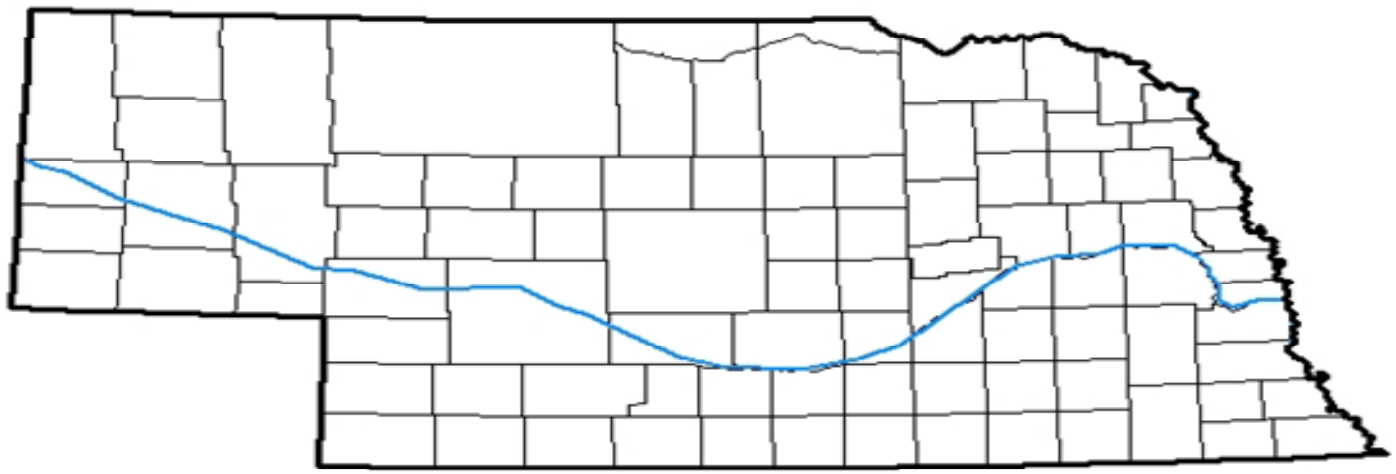
This report summarizes the results of the spring 2019 groundwater level measurement program. Groundwater levels were collected by South Platte NRD staff Chris Kaiser, Tyler Sanders, and Galen Wittrock. During 2018, rainfall events were much higher on average for precipitation amounts in Kimball, Cheyenne, and Deuel Counties averaging 3.69" above historical averages. There were water level increases observed in the southern table of Cheyenne County and in the Pine Bluffs to Oliver Reservoir (PBOR) subarea where water levels increased the highest. It should be noted that those increases only occurred in the Brule formation portion of the PBOR subarea. There was only one well that showed a major decrease compared to last year. That well is 5 miles North and 2.5 miles west of Kimball. Districtwide, water levels increased 0.34 feet on average based on 203 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 are also attached. Included are one, five, ten, twenty, and thirty-year water level difference maps. Allocations took effect in 2009 and the ten-year map show comparisons of where water levels have changed since the District was under a full allocation. Random selections of wells are graphed showing long term data trends. Landowners who have NRD observation wells installed on their property, as well as landowners from whom we take irrigation measurements are sent hydrographs of their current water level each spring.

The SPNRD added one new monitoring well in the fully appropriated subarea in northern Deuel County in 2018. We budget for one monitoring well a year. The main criteria we look for in placing new monitoring wells are locations where we don't have any hydrogeological data. We are always looking for willing landowners who would allow us to take well measurements to use in this report or to install monitoring wells on their property. If you're interested in allowing the NRD to use your irrigation or livestock well for monitoring water levels, please let us know. This year, we will be drilling a monitoring well south of Sunol near the Colorado state line.

*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, 2019
(Released Thursday, Mar. 28, 2019)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	100.00	0.00	0.00	0.00	0.00	0.00
Last Week *03-19-2019*	98.46	1.54	0.00	0.00	0.00	0.00
3 Months Ago *12-25-2018*	100.00	0.00	0.00	0.00	0.00	0.00
Start of Calendar Year *01-01-2019*	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year *09-25-2018*	99.83	0.17	0.00	0.00	0.00	0.00
One Year Ago *03-27-2018*	81.17	18.83	1.00	0.00	0.00	0.00

Intensity:

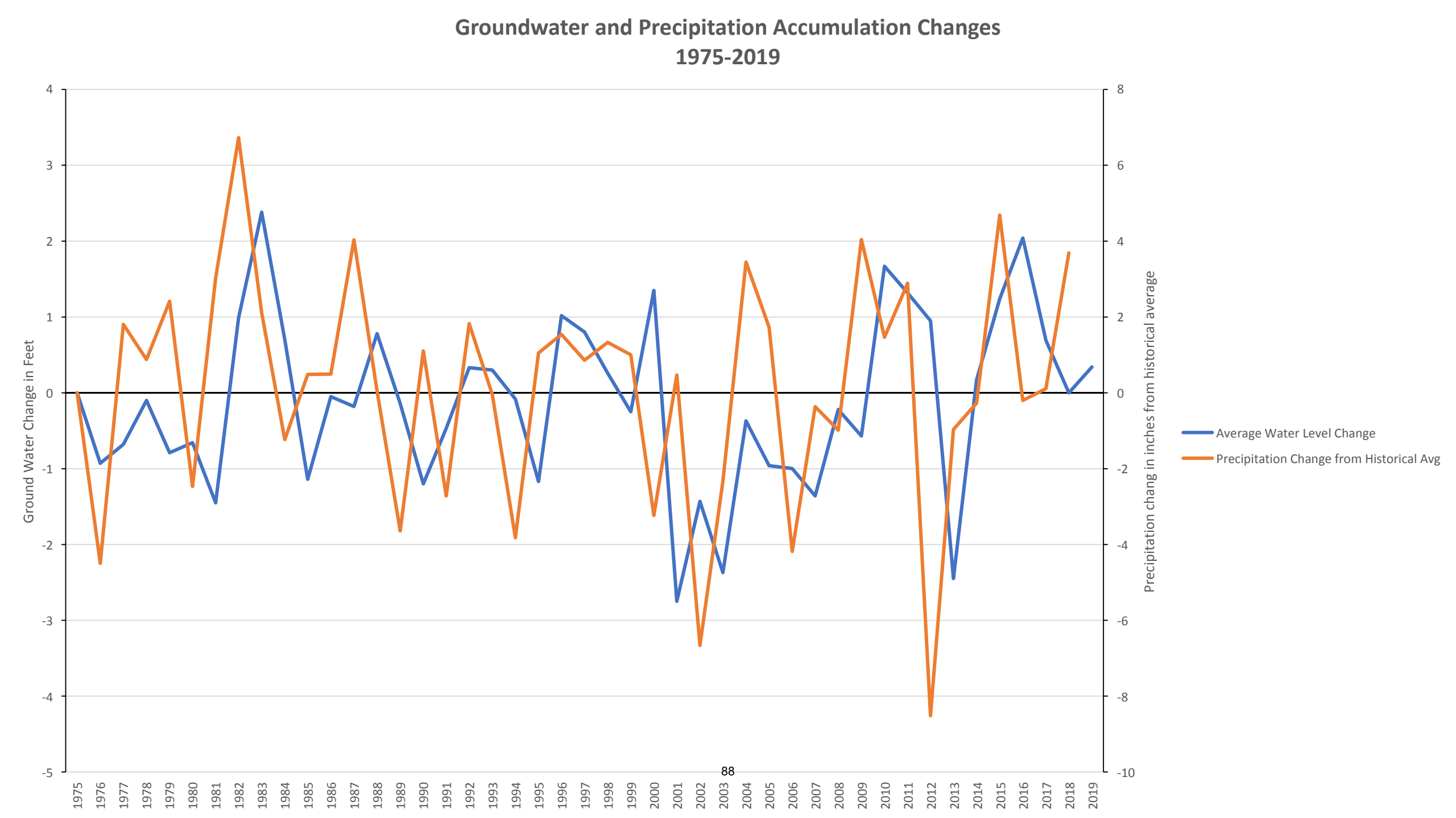
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

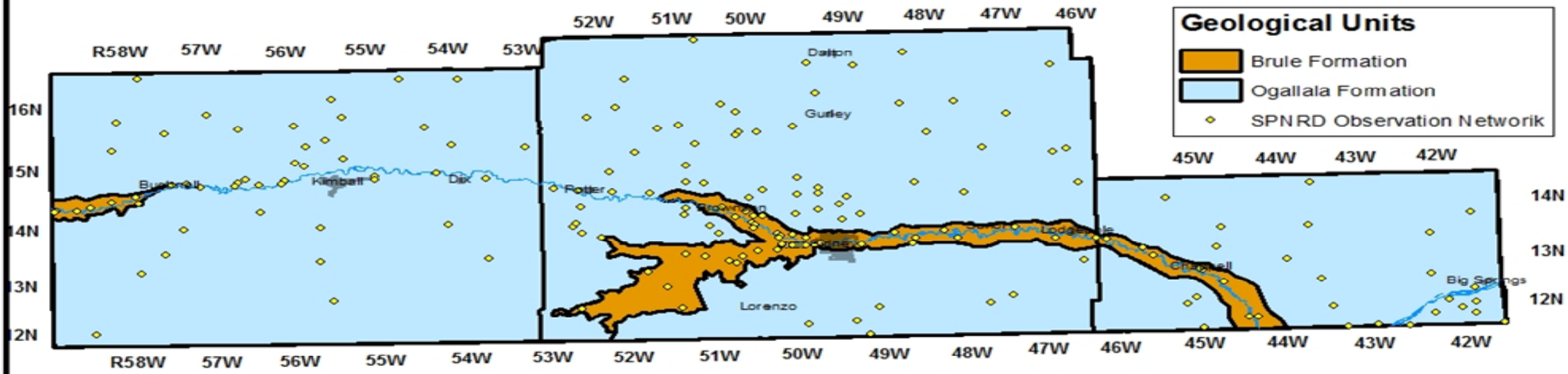
Author:
Eric Luebehusen
U.S. Department of Agriculture

USDA NDMC NOAA

http://droughtmonitor.unl.edu/


Groundwater and Precipitation Accumulation Changes
1975-2019
Ground Water Change in Feet
Precipitation chang in inches from historical average
Average Water Level Change
Precipitation Change from Historical Avg
4
3
2
1
0
-1
-2
-3
-4
-5
8
6
4
2
0
-2
-4
-6
-8
-10
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019

SPNRD Geological Breakdowns

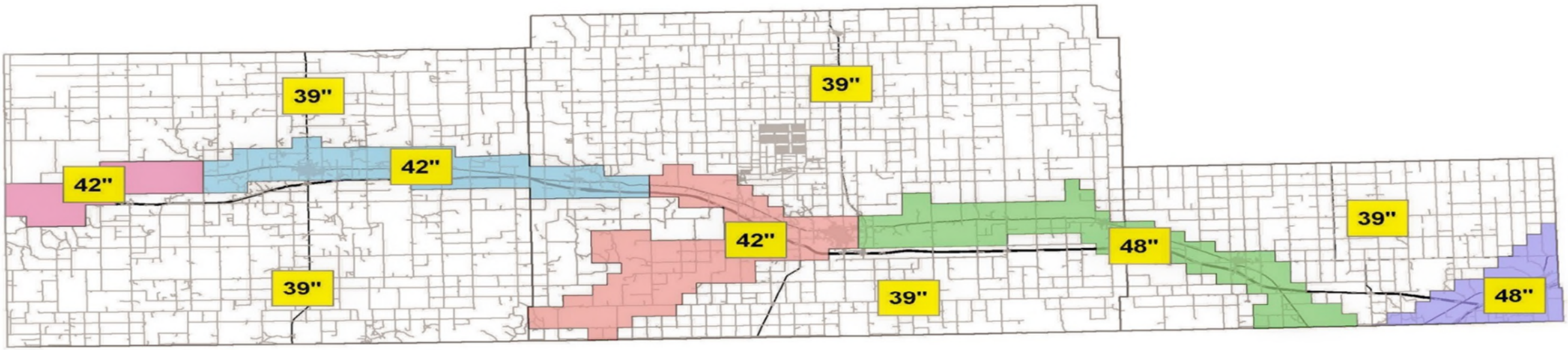


All wells located within each geological unit are only influenced by wells within each sole unit. That is, wells located in the southern ogallala unit are only influenced by the wells located there. It does not "share" water, nor is it influenced with wells in the Brule Formation. As of this time, the 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

South Platte Natural Resources District

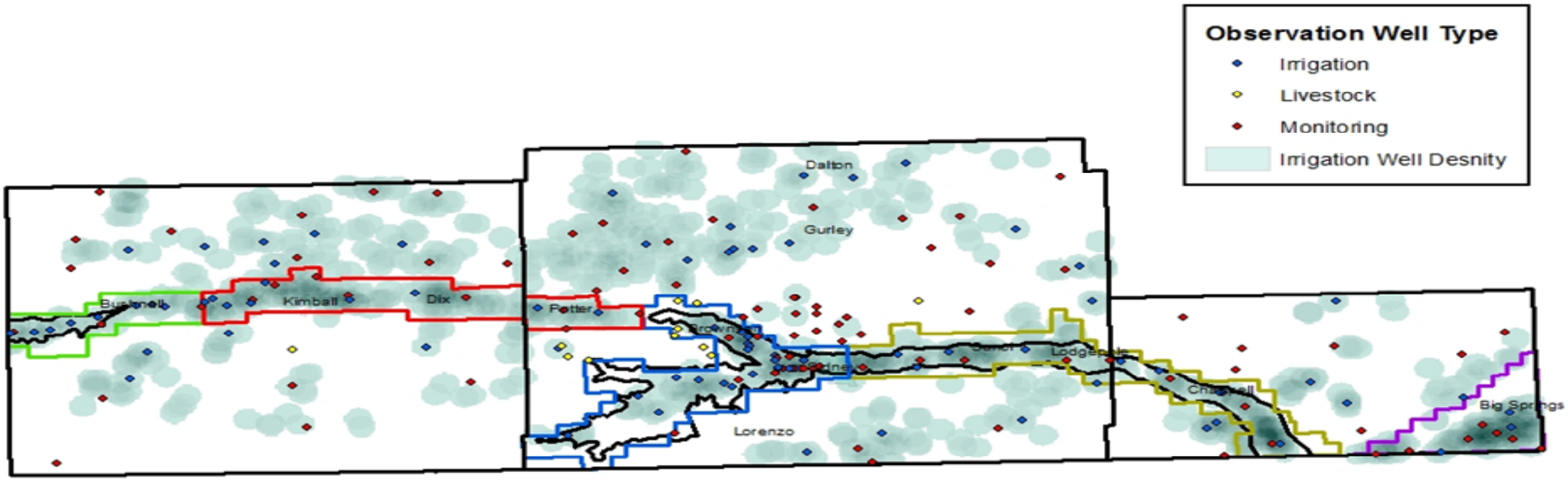
Allocation Subareas & Allocation (Acre-inches) for the 2019 through 2021 Allocation Period



Legend

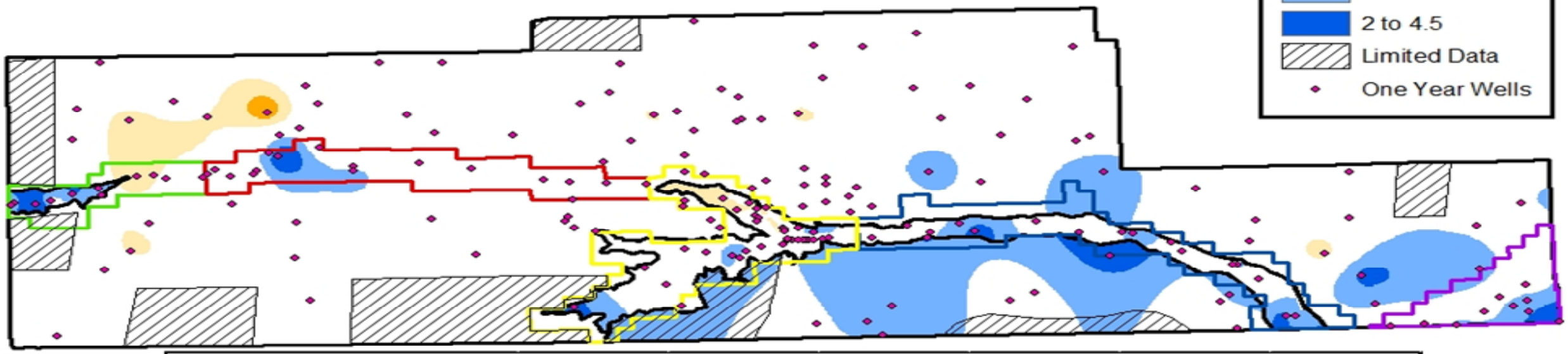
- A - Wyoming State Line to Oliver Reservoir (RD 27)
- B - Oliver Reservoir to Buffalo Bend (RD 87)
- C - Buffalo Bend to Sidney (RD 115)
- D - Sidney to Colorado State Line
- E - South Platte Valley
- F - Tablelands
- Start 2019

SPNRD Observation Well Network



SOUTH PLATTE
NATURAL RESOURCES DISTRICT

SPNRD 1 Year Water Level Differences

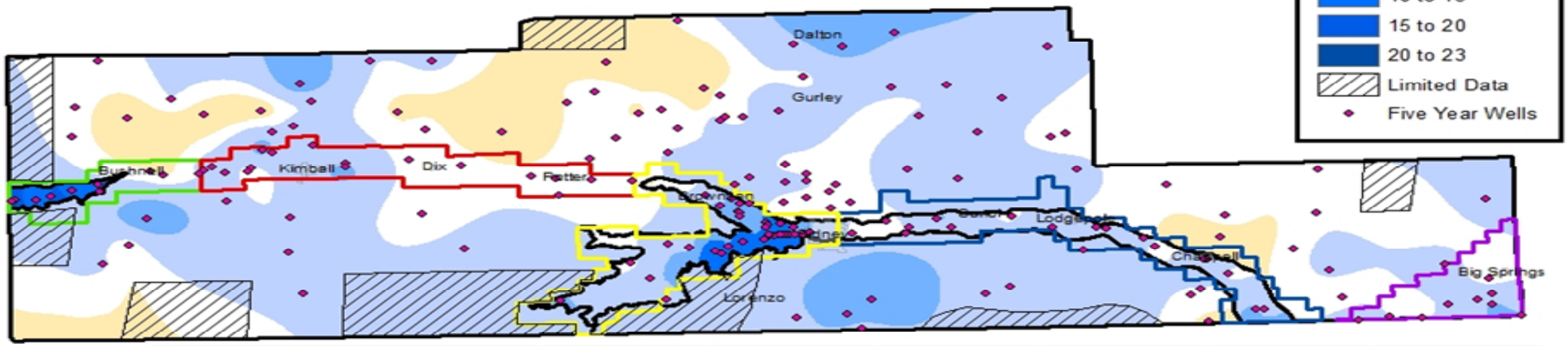


South Platte NRD 1 Year Stats by Subarea						
Subarea	**Ave.**	**Max**	**Min**	**Count**	**Decline**	**%Decline**
Pine Bluffs to Oliver	1.21	4.05	-1.35	12	2	17%
Oliver to Buffalo Bend	0.6	4.15	-0.6	19	5	26%
Buffalo Bend to Sidney	-0.11	2.39	-1.22	40	32	80%
Sidney to Colorado	0.94	2.32	0.11	17	0	0%
South Platte Valley	0.06	2.97	1.14	11	0	0%
Fully Appropriated	0.2	2.49	-2.59	104	28	27%
Districtwide	**0.34**	**4.15**	**-2.59**	**203**	**67**	**33%**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2018 - Spring 2019

SPNRD 5 Year Water Level Differences



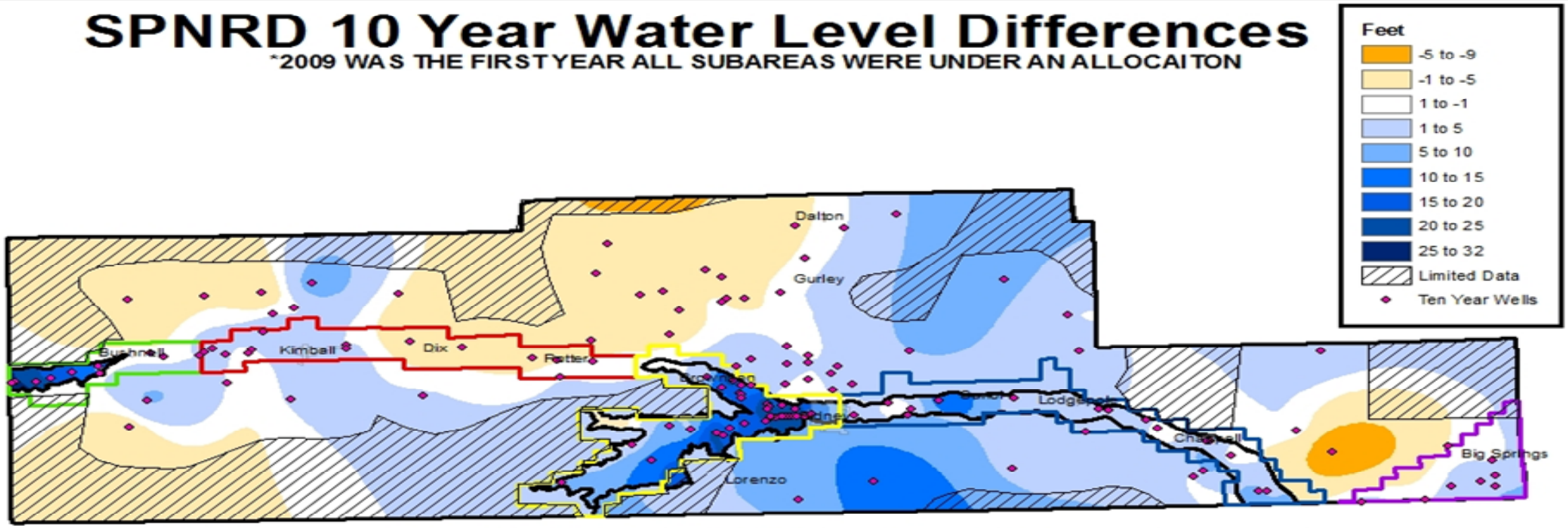
South Platte NRD 5 Year Stats by Subarea						
Subarea	**Ave.**	**Max**	**Min**	**Count**	**Decline**	**%Decline**
Pine Bluffs to Oliver	11.44	22.86	-1.22	11	1	9%
Oliver to Buffalo Bend	1.81	6.52	-0.28	19	4	21%
Buffalo Bend to Sidney	8.85	14.96	-0.21	37	1	3%
Sidney to Colorado	2.57	5.43	0.42	17	0	0%
South Platte Valley	2.6	5.02	-0.5	10	1	10%
Fully Appropriated	1.1	8.73	-4.74	95	27	28%
Districtwide	**3.5**	**22.86**	**-4.74**	**189**	**34**	**18%**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2014 - Spring 2019

SPNRD 10 Year Water Level Differences

*2009 WAS THE FIRST YEAR ALL SUBAREAS WERE UNDER AN ALLOCAITON

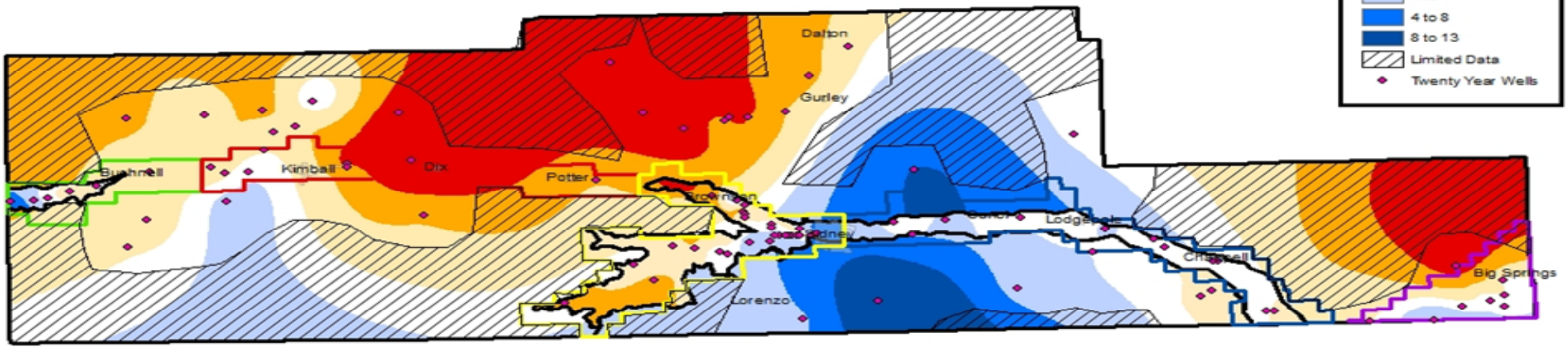


South Platte NRD 10 Year Stats by Subarea						
Subarea	**Ave.**	**Max**	**Min**	**Count**	**Decline**	**%Decline**
Pine Bluffs to Oliver	14.67	31.1	-0.52	11	2	18%
Oliver to Buffalo Bend	0.43	3.45	-2.89	14	5	36%
Buffalo Bend to Sidney	17.33	24.7	0.17	36	0	0%
Sidney to Colorado	3.17	12.12	0.33	15	0	0%
South Platte Valley	2.1	4.39	-1	8	1	13%
Fully Appropriated	0.93	12.74	-8.61	61	21	34%
Districtwide	**6.29**	**31.1**	**-8.61**	**145**	**29**	**20%**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 2009 - Spring 2019

SPNRD 20 Year Water Level Differences

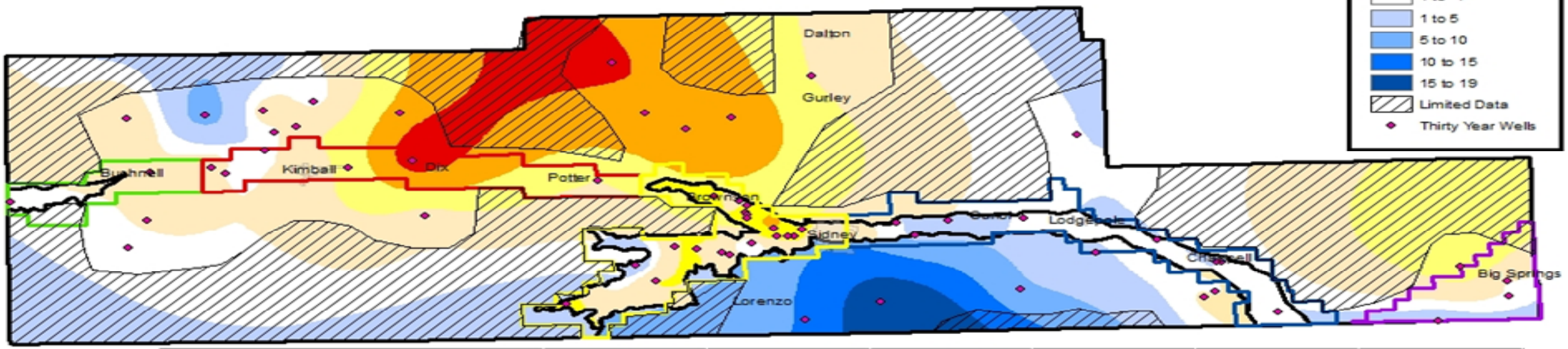


South Platte NRD 20 Year Stats by Subarea						
Subarea	**Ave.**	**Max**	**Min**	**Count**	**Decline**	**%Decline**
Pine Bluffs to Oliver	0.76	6.79	-2.11	6	4	67%
Oliver to Buffalo Bend	-4.6	0.32	-12.79	8	7	88%
Buffalo Bend to Sidney	0.08	5.02	-6.48	29	13	45%
Sidney to Colorado	0.52	3.59	-1.98	11	3	27%
South Platte Valley	-1.14	4.08	-11.05	8	4	50%
Fully Appropriated	-2.8	12.4	-11.08	28	20	71%
Districtwide	**-1.24**	**12.4**	**-12.79**	**90**	**51**	**57%**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

Spring 1999 - Spring 2019

SPNRD 30 Year Water Level Differences

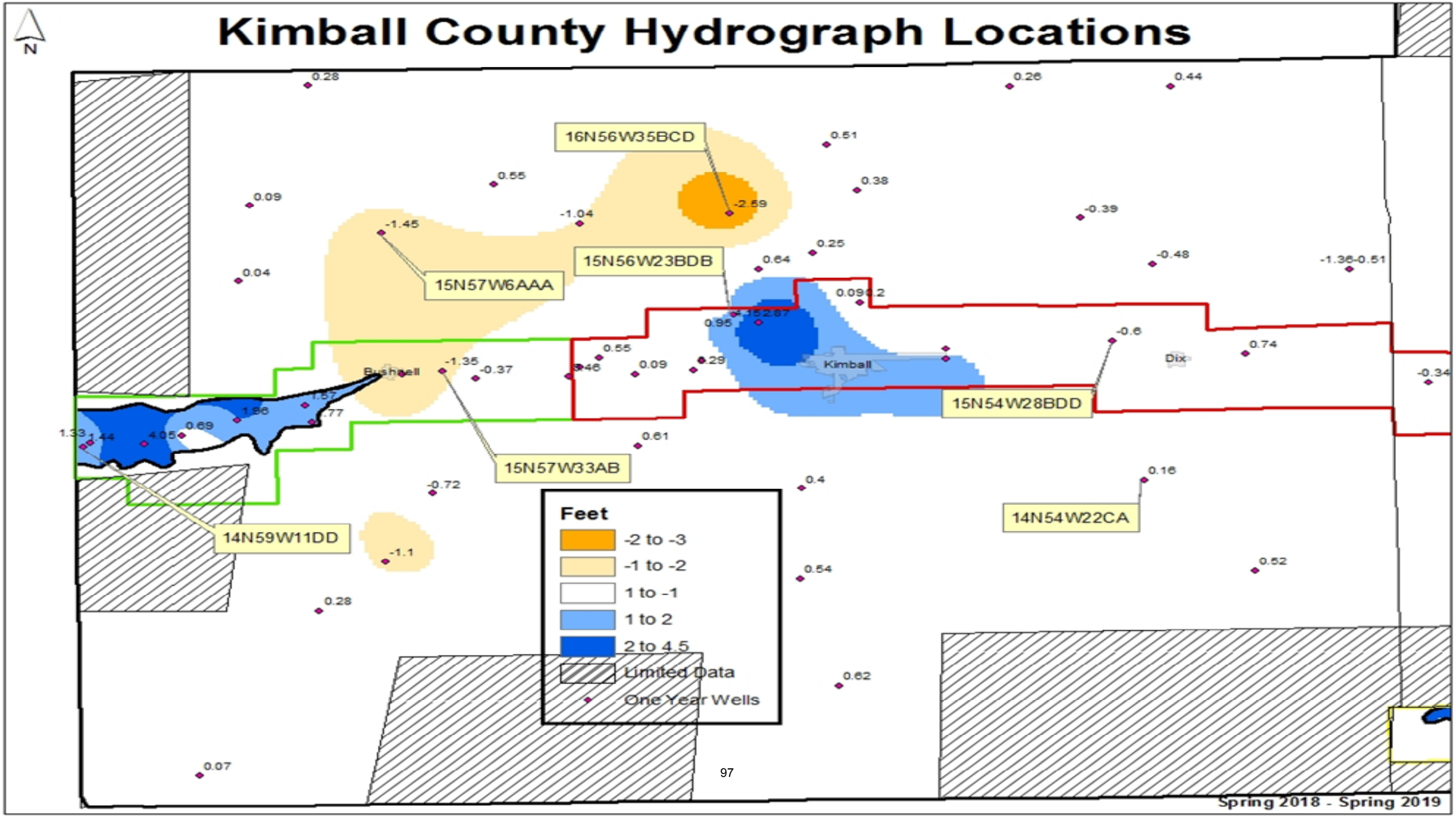


South Platte NRD 30 Year Stats by Subarea						
Subarea	**Ave.**	**Max**	**Min**	**Count**	**Decline**	**%Decline**
Pine Bluffs to Oliver	-0.56	-0.1	-1.02	2	2	100%
Oliver to Buffalo Bend	-5.39	-0.04	-17.3	6	6	100%
Buffalo Bend to Sidney	-4.76	4.63	-9.94	19	16	84%
Sidney to Colorado	1.33	4.74	-0.25	8	1	13%
South Platte Valley	-1.7	2.95	-1.7	4	3	75%
Fully Appropriated	-2.2	18.28	-15.28	22	16	73%
Districtwide	**-2.76**	**18.28**	**-17.3**	**61**	**44**	**72%**

SOUTH PLATTE
NATURAL RESOURCES DISTRICT

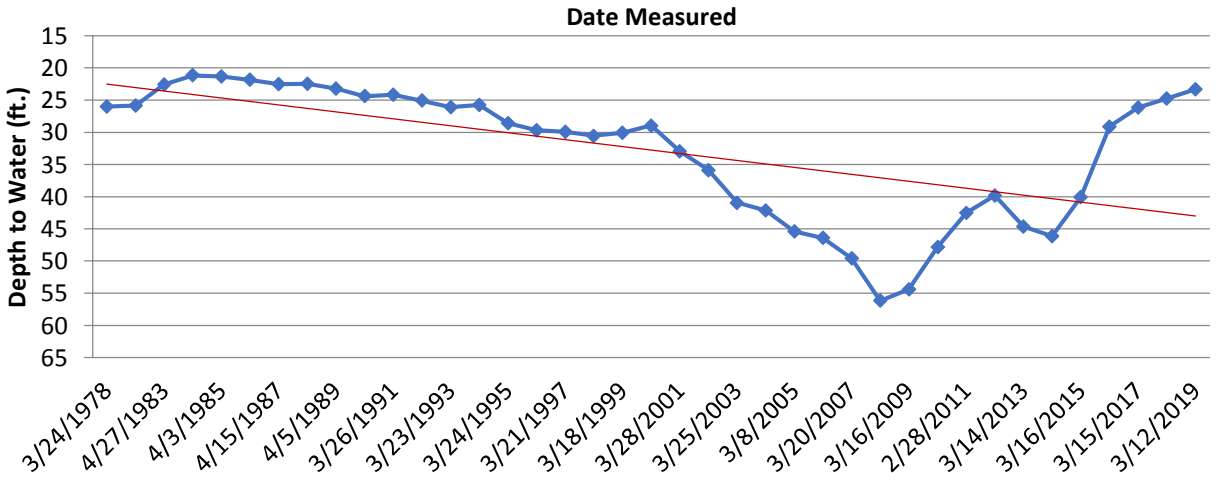
Spring 1989 - Spring 2019

Kimball County Hydrograph Locations



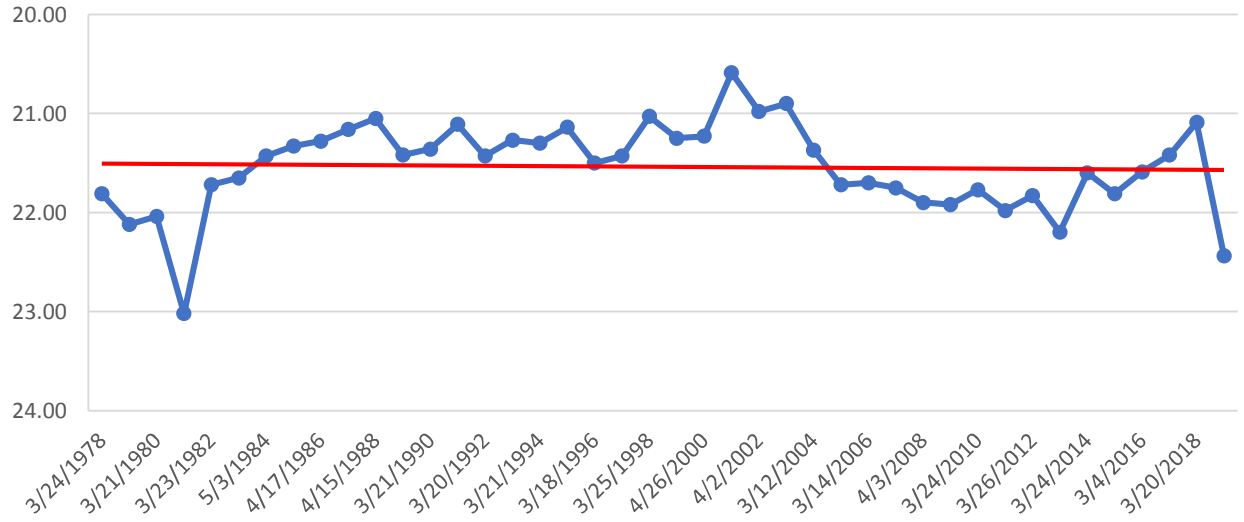
14N 59W 11DD

NE/WY Stateline 1 East of Pine Bluffs
Brule Formation
Pine Bluffs to Oliver Reservoir Subarea



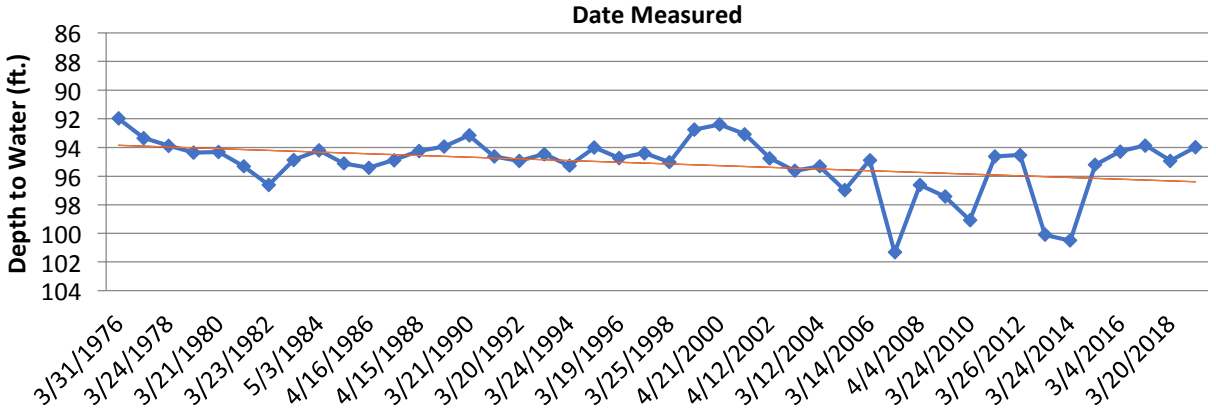
15N 57W 33AB

1 East of Bushnell
Ogallala Formation
Pine Bluffs to Oliver Reservoir Subarea



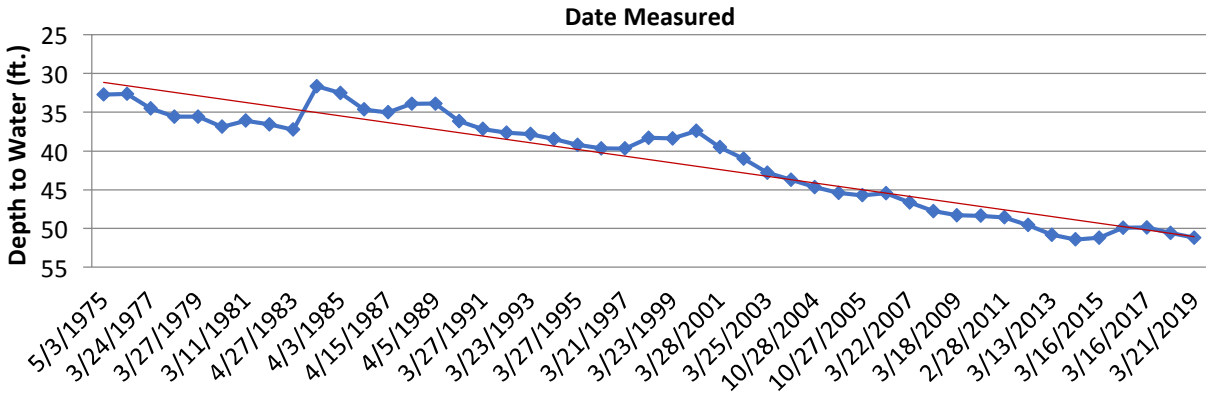
15N 56W 23BDB

3 West 2 North of Kimball
Ogallala Formation
Oliver Reservoir to Buffalo Bend Subarea



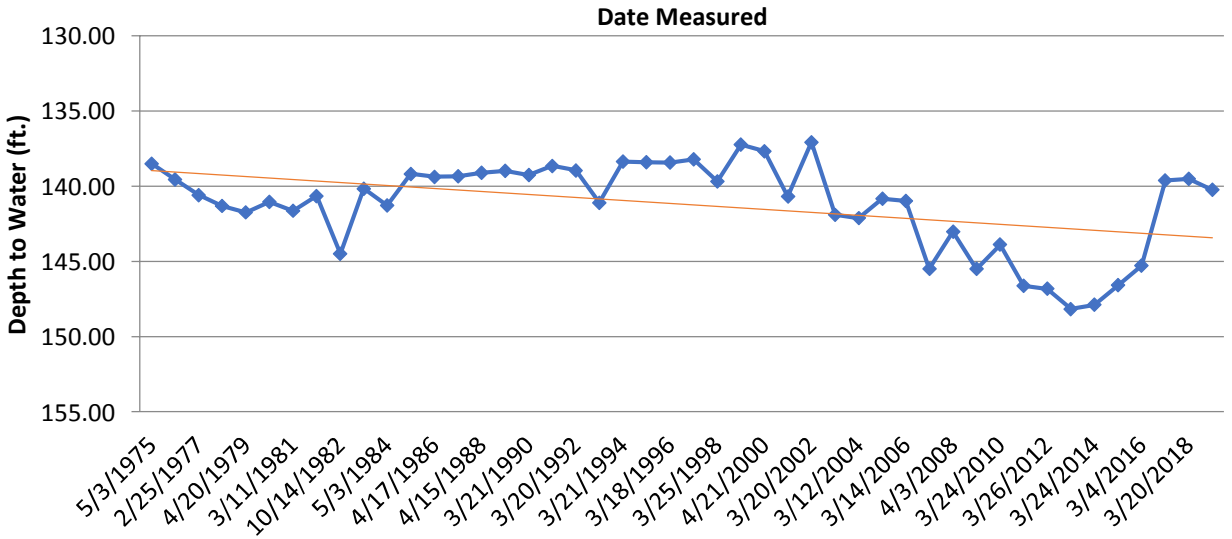
15N 54W 28BDD

1.5 West of Dix
Ogallala Formation
Oliver Reservoir to Buffalo Bend Subarea



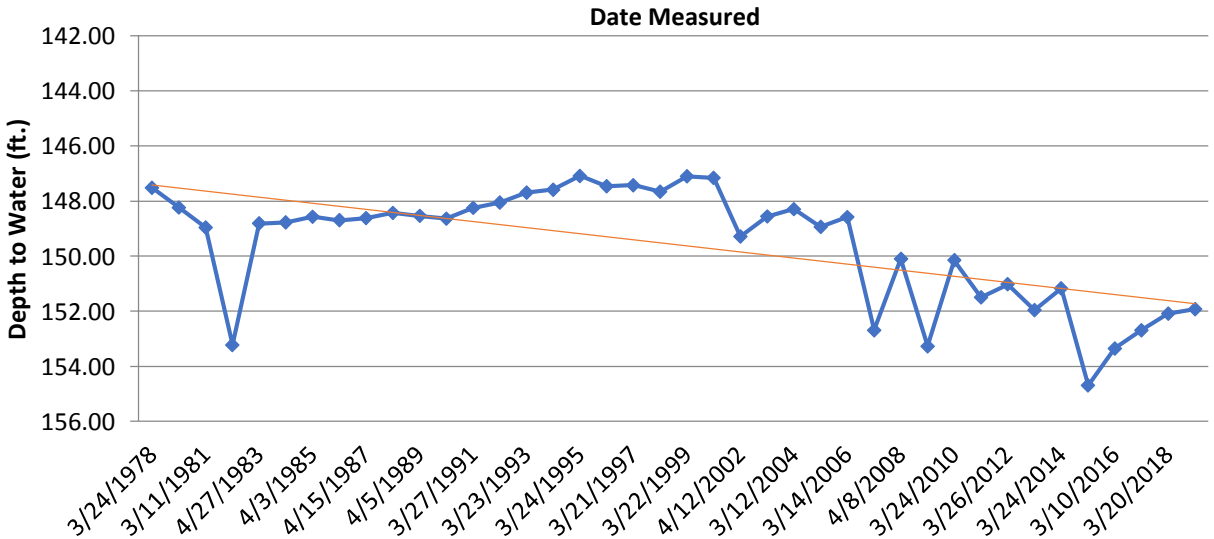
14N 57W 21CCA

5 South 1 East of Bushnell
Ogallala Formation
Fully Appropriated Subarea



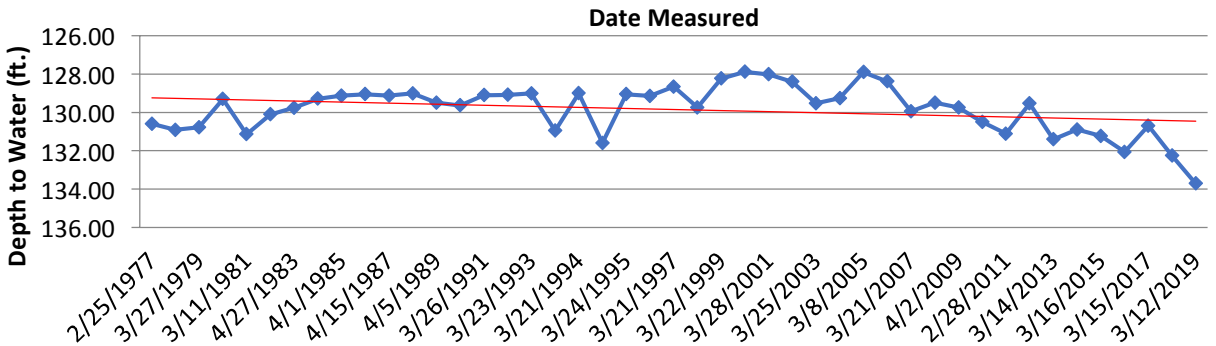
14N 54W 22CA

4 South 1 West of Dix
Ogallala Formation
Fully Appropriated Subarea



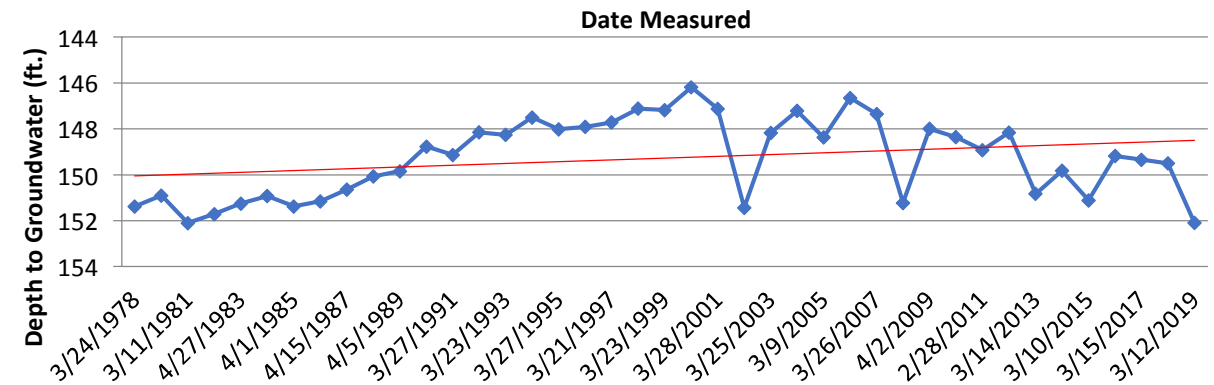
15N 57W 6AAA

5 North of Bushnell
Ogallala Formation (North Table)
Fully Approprated Subarea

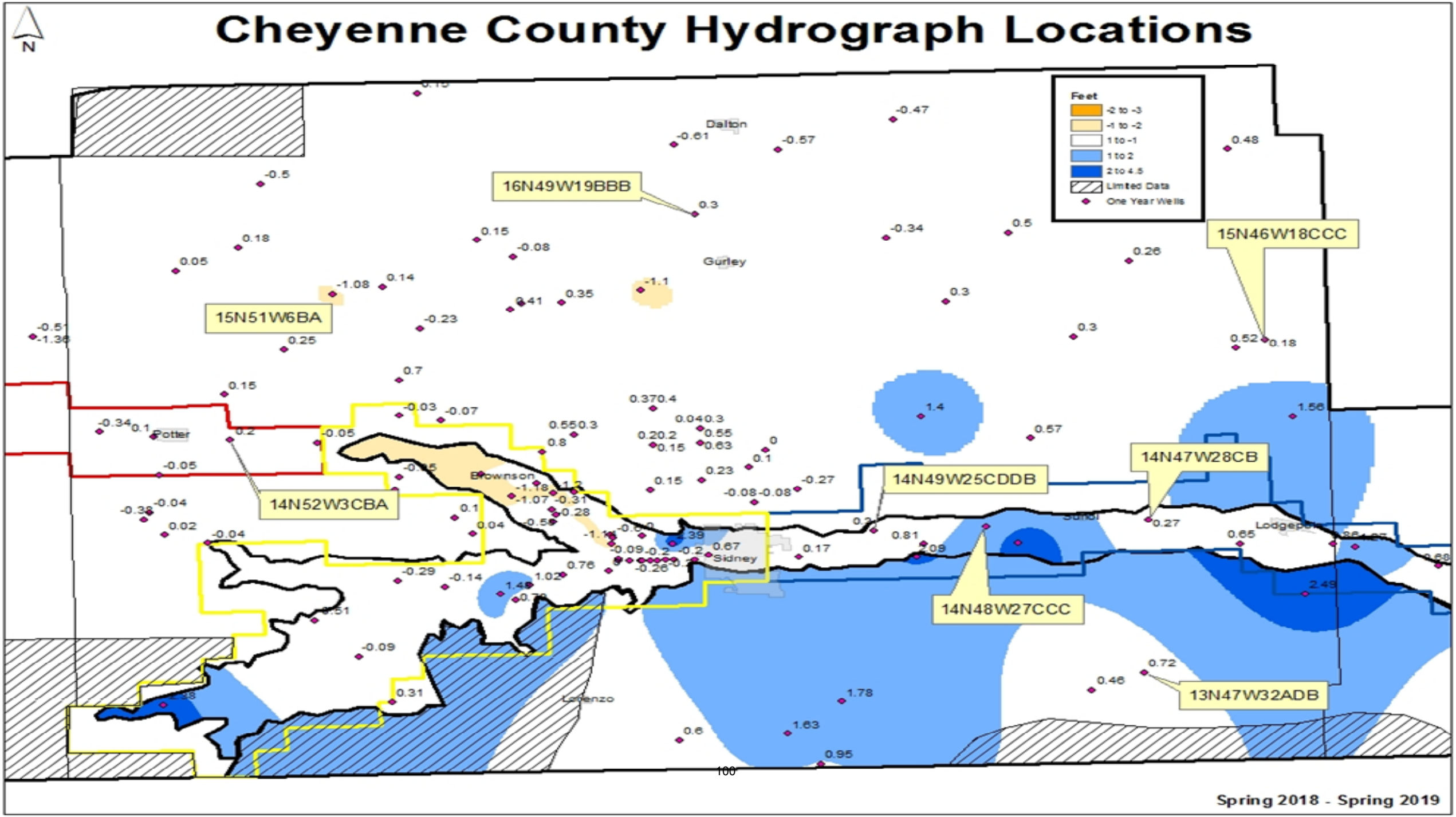


16N 56W35BCD

6 North 3 West of Kimball
Ogallala Formation
Fully Appropriated Subarea (North Table)

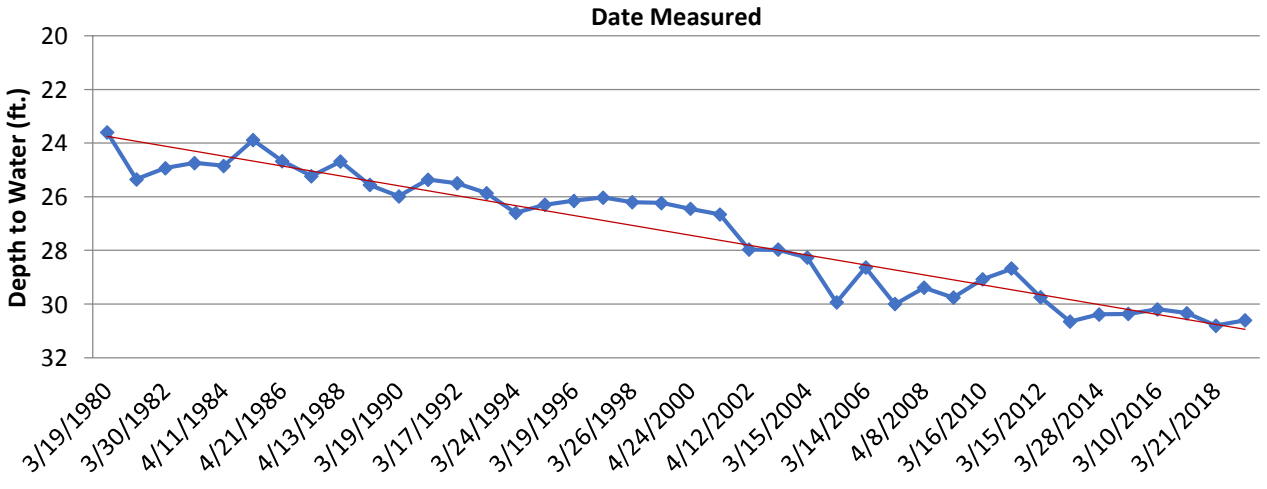


Cheyenne County Hydrograph Locations



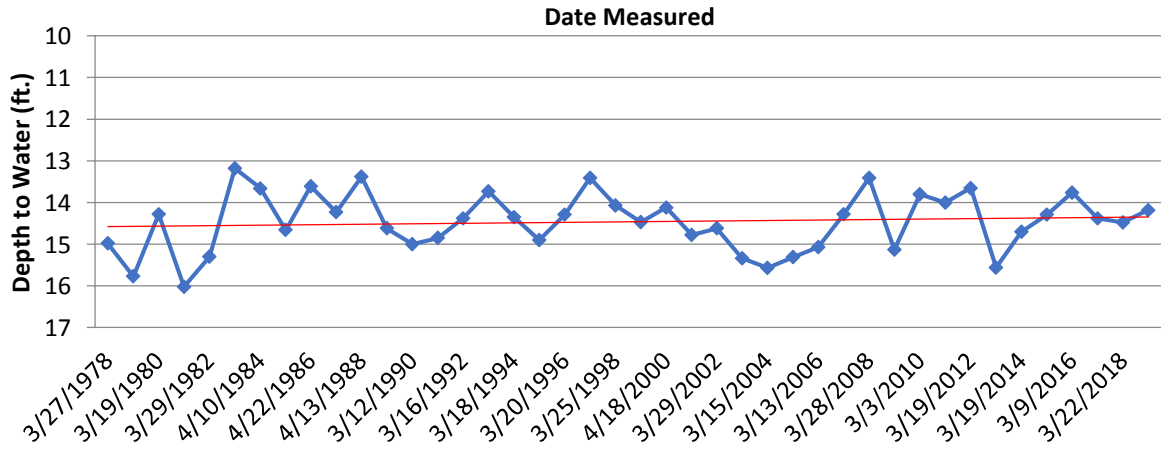
14N 52W 3CBA

2 East of Potter
Ogallala Formation
Oliver Reservoir to Buffalo Bend subarea



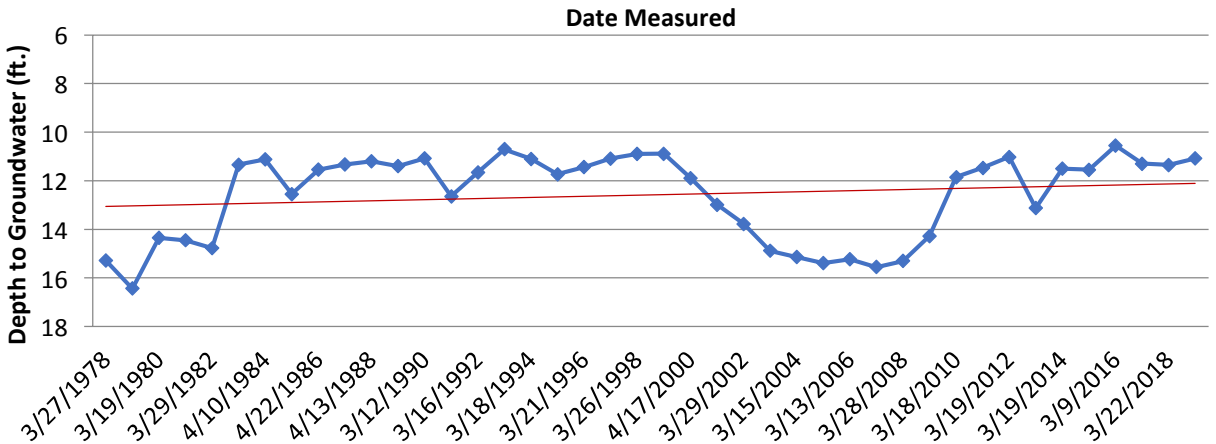
14N 49W 25CDDB

7 East 1 North of Sidney
Brule Formation
Sidney to Colorado Subarea



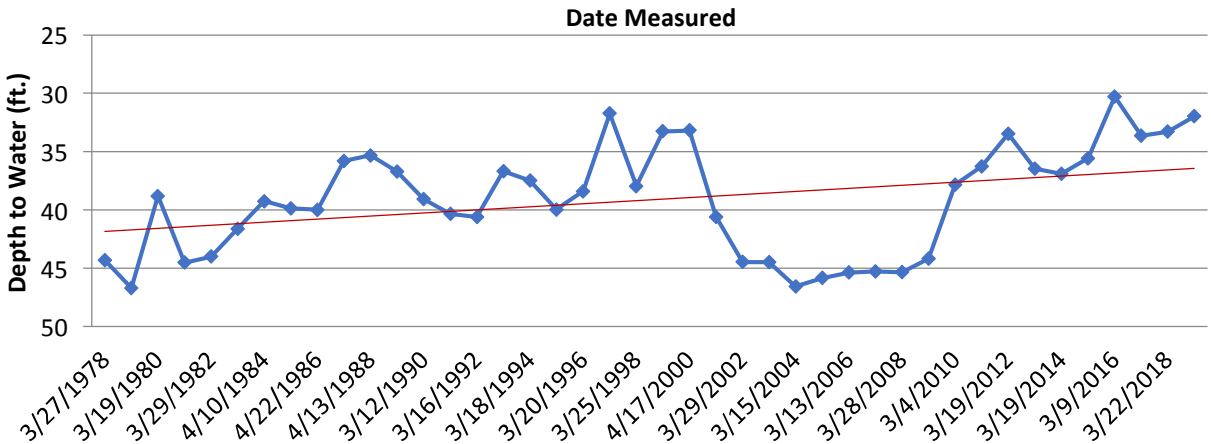
14N 47W 28CB

2 East of Sunol
Brule Formation
Sidney to Colorado Subarea



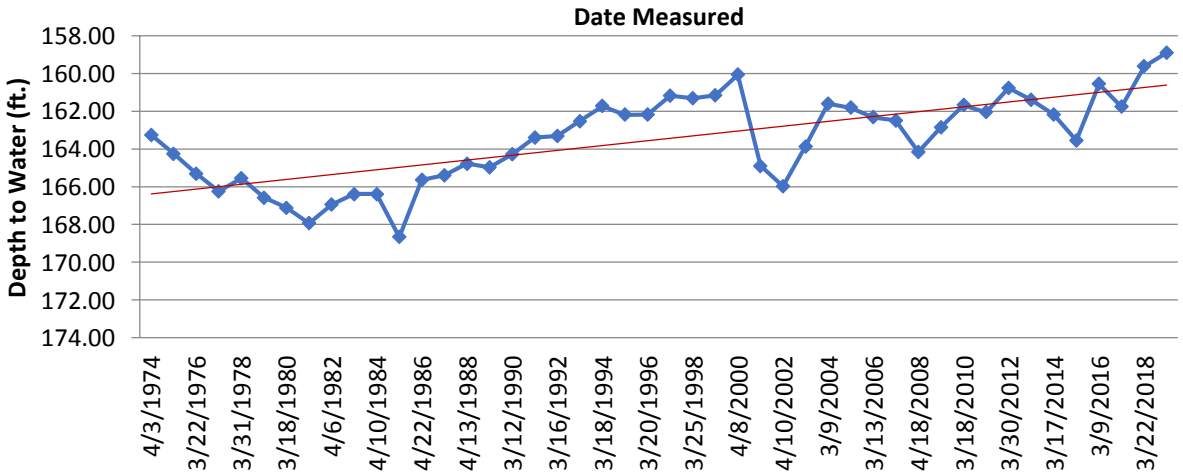
14N 48W 27CCC

2 West of Sunol
Brule Formation
Sidney to Colorado Subarea



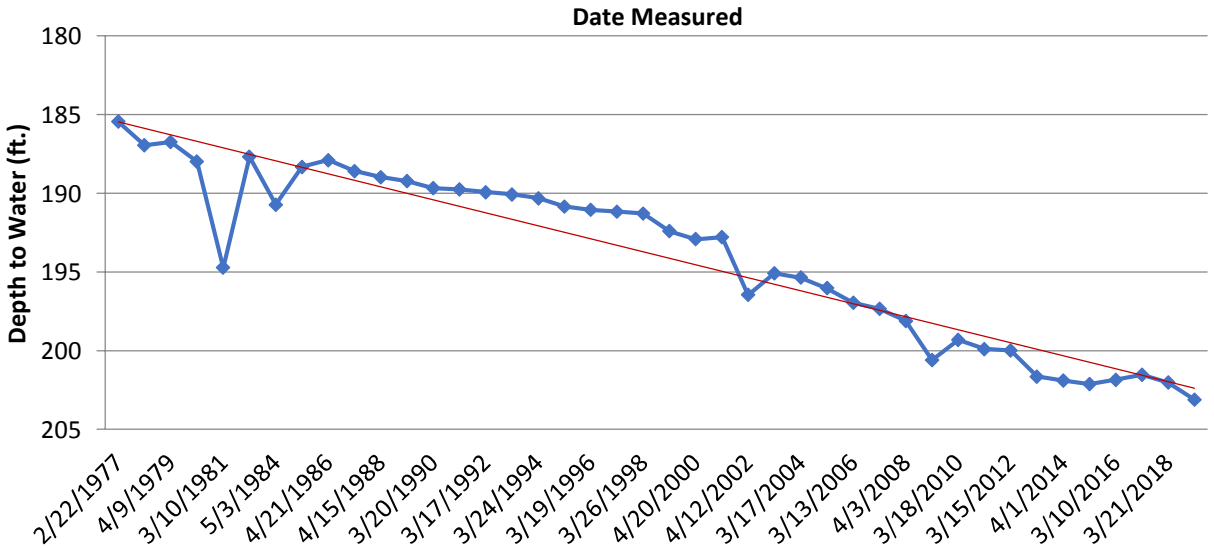
13N 47W 32ADB

6 South 4 West of Lodgepole
Ogallala Formation
Fully Appropriated Subarea (South Table)



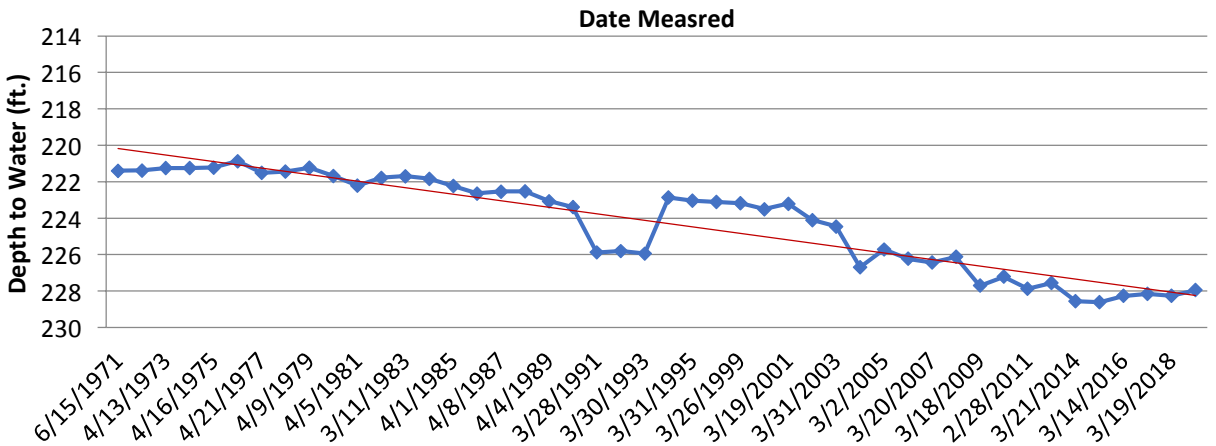
15N 51W 6BA

6 North 5 East of Potter
Ogallala Formation
Fully Appropriated Subarea (North Table)



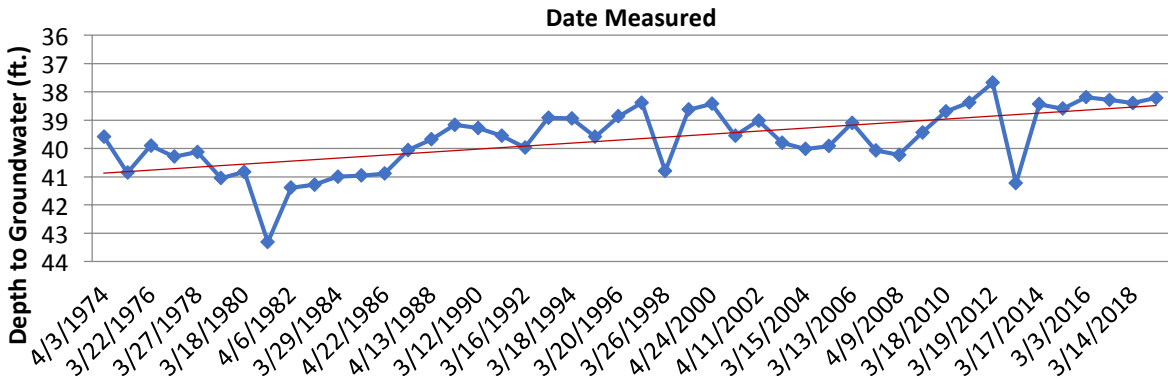
16N 49W 19BBB

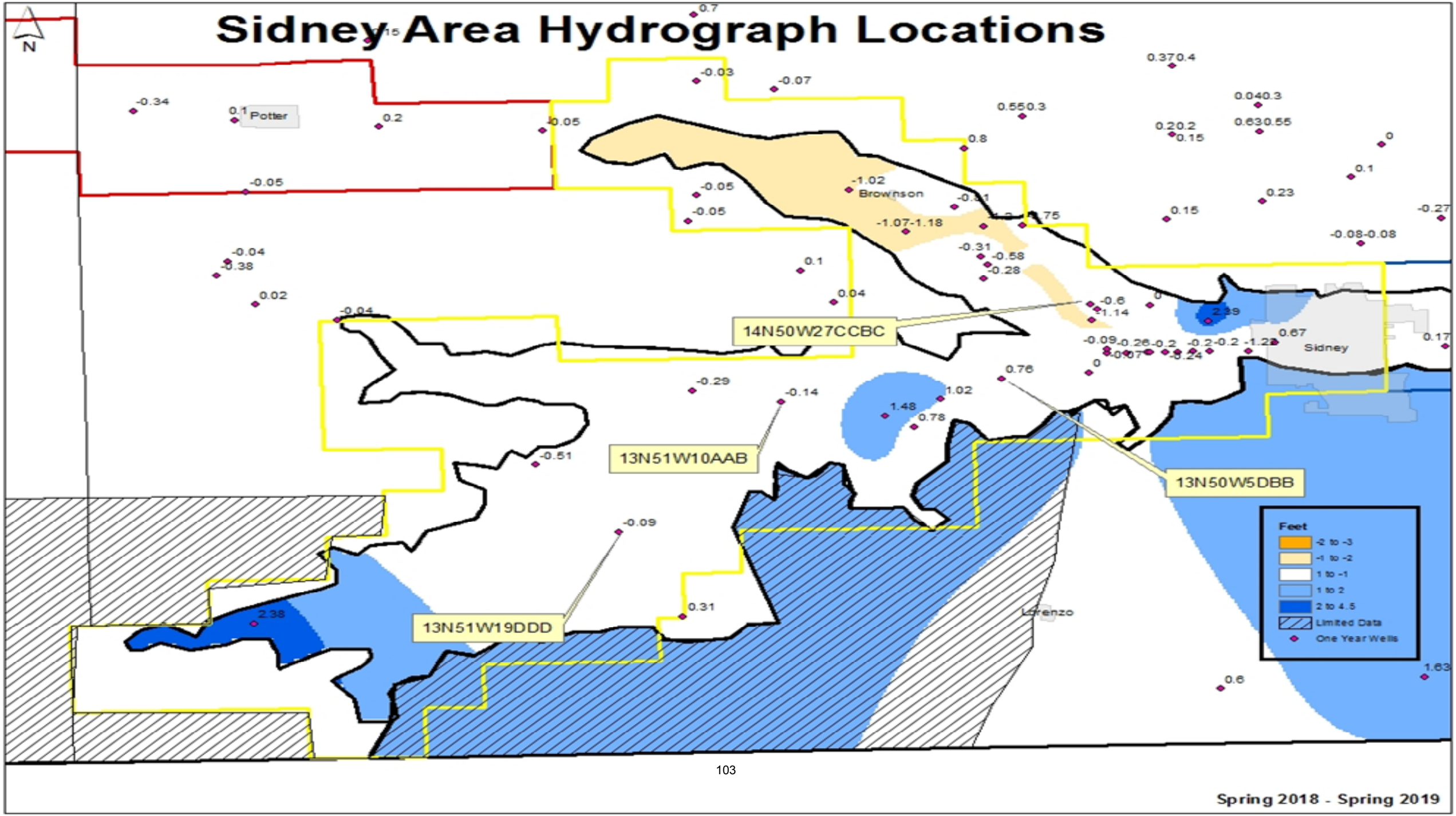
2 North 1 West of Gurley
Ogallala Formation
Fully Appropriated Subarea (North Table)



15N 46W 18CCC

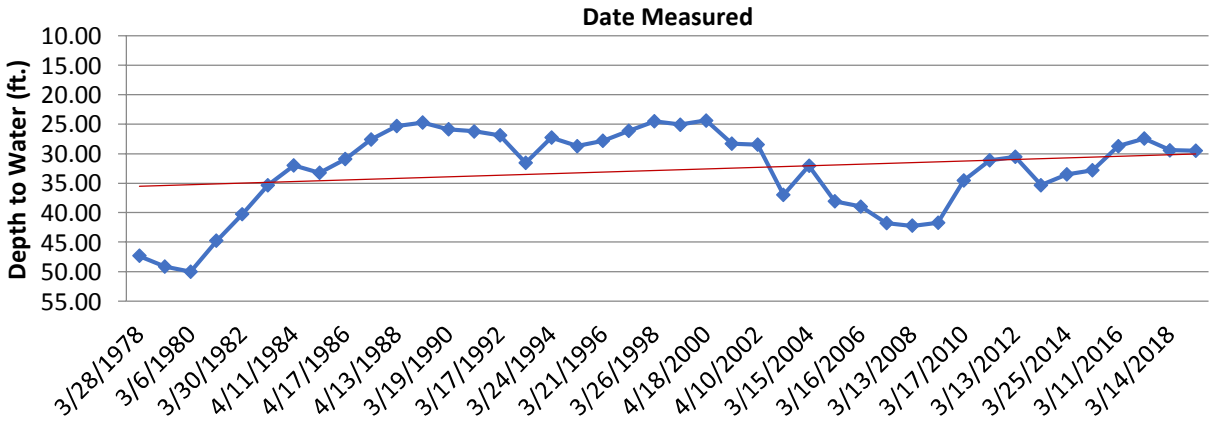
8 North 1 West of Lodgepole
Ogallala Formation
Fully Appropriated (North Table)




Sidney Area Hydrograph Locations
N
Potter
Brownson
Sidney
Lorenzo
14N50W27CCBC
13N51W10AAB
13N50W5DBB
13N51W19DDD
Feet
-2 to -3
-1 to -2
1 to -1
1 to 2
2 to 4.5
Limited Data
One Year Wells
Spring 2018 - Spring 2019

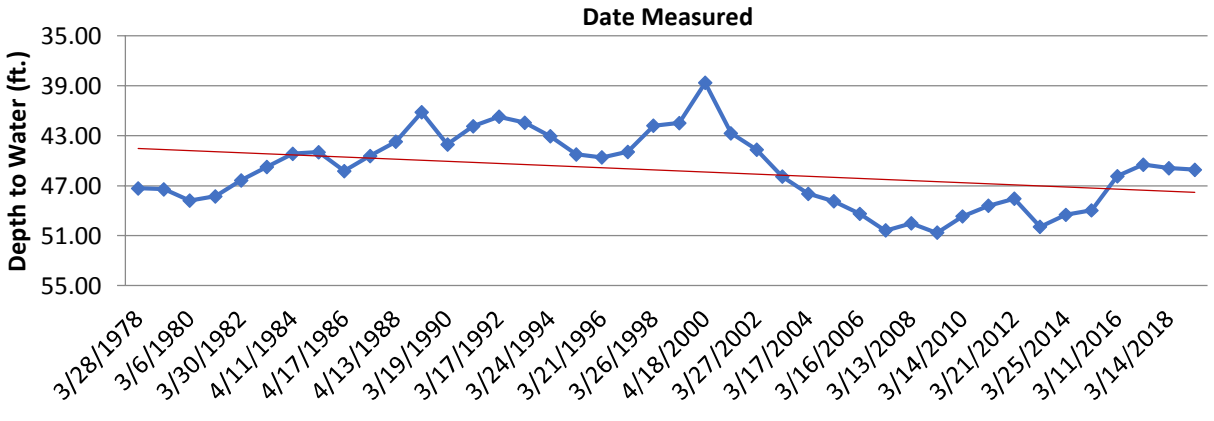
13N 51W 19DDD

4 South 11West of Sidney
Brule Formation
Buffal Bend to Sidney Subarea



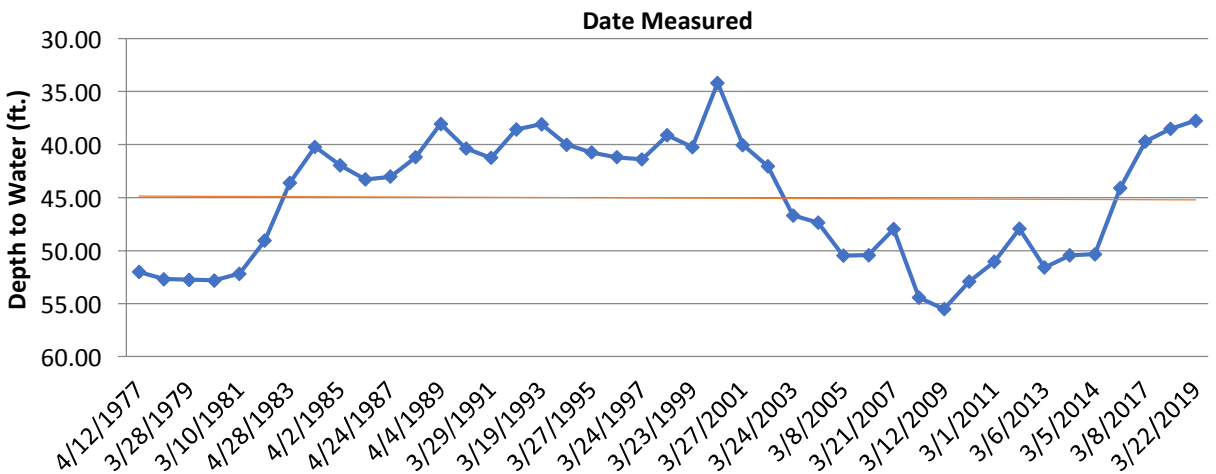
13N 51W 10AAB

1 South 8 West of Sidney
Brule Formation
Buffalo Bend to Sidney Subarea



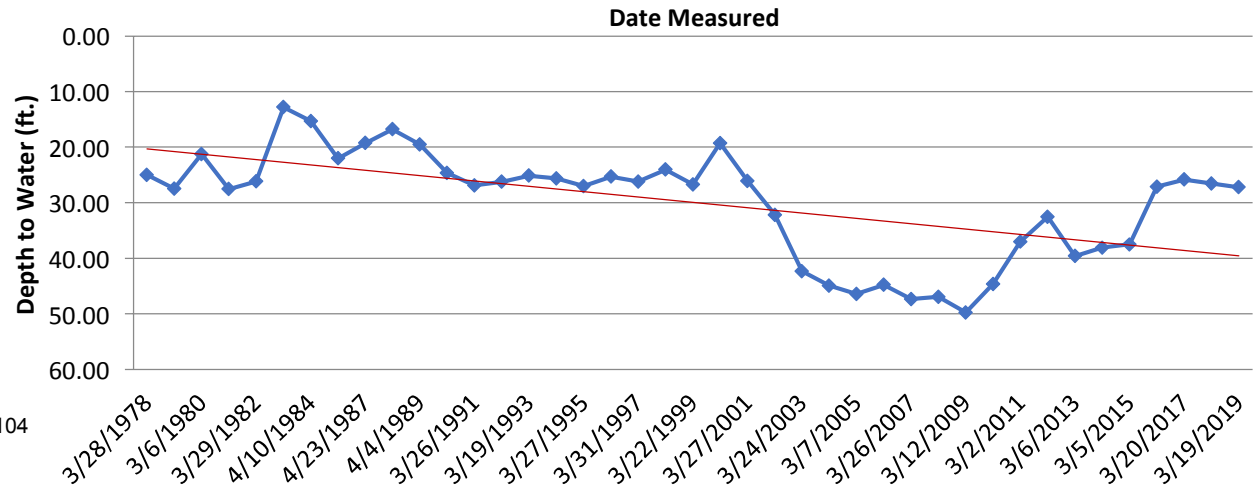
13N 50W 5DBB

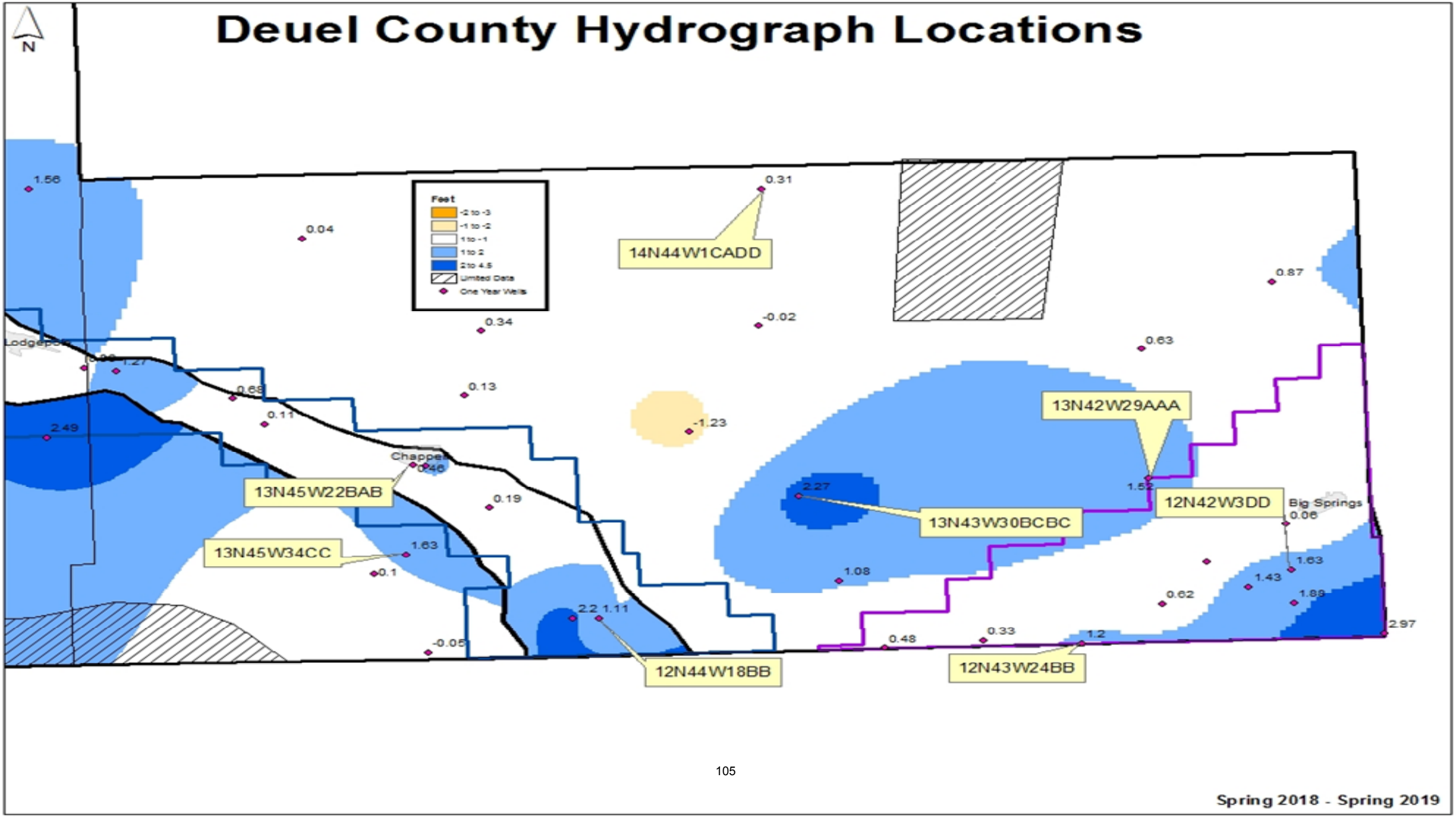
4.5 West of Sidney
Brule Formation
Buffalo Bend to Sidney Subarea



14N 50W 27CCBC

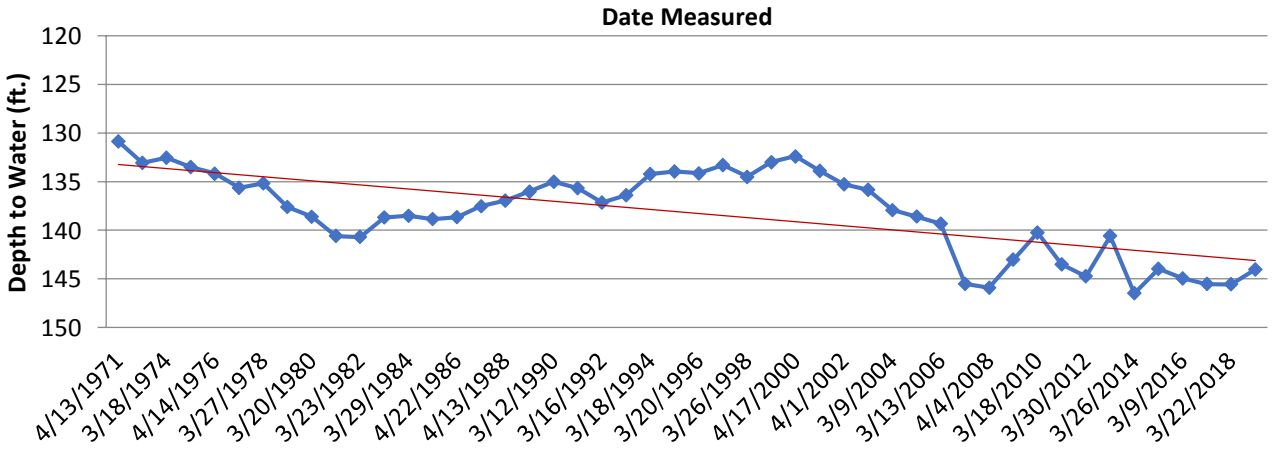
3 West of Sidney
Brule Formation
Buffalo Bend to Sidney Subarea




Deuel County Hydrograph Locations
N
Feet
-2 to -3
-1 to -2
1 to -1
1 to 2
2 to 4.5
Limited Data
One Year Wells
14N44W1CADD
13N45W22BAB
13N45W34CC
13N42W29AAA
13N43W30BCBC
12N42W3DD
12N44W18BB
12N43W24BB
Big Springs
Chappell
Spring 2018 - Spring 2019

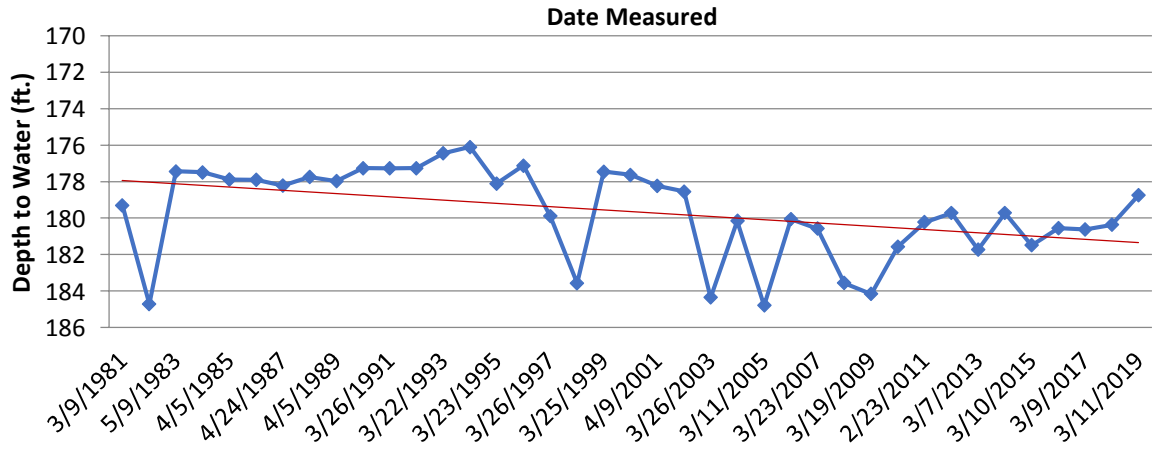
13N 42W 29AAA

4 West 1 North of Big Springs
Ogallala Formation
South Platte Valley Subarea



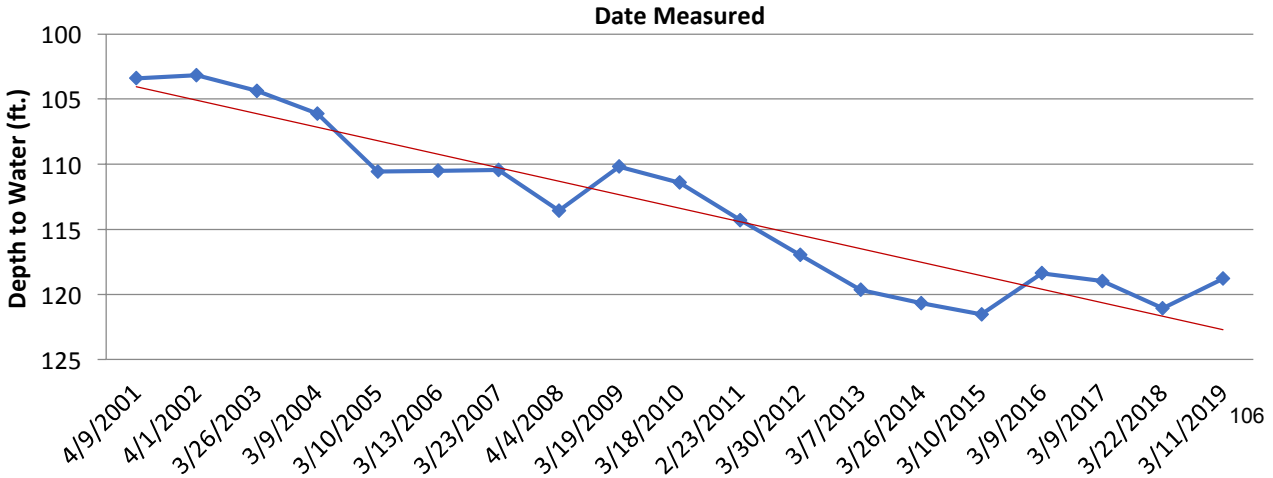
13N 45W 34CC

3 South of Chappell
Ogallala Formation
Full Appropiated Subarea (South Table)



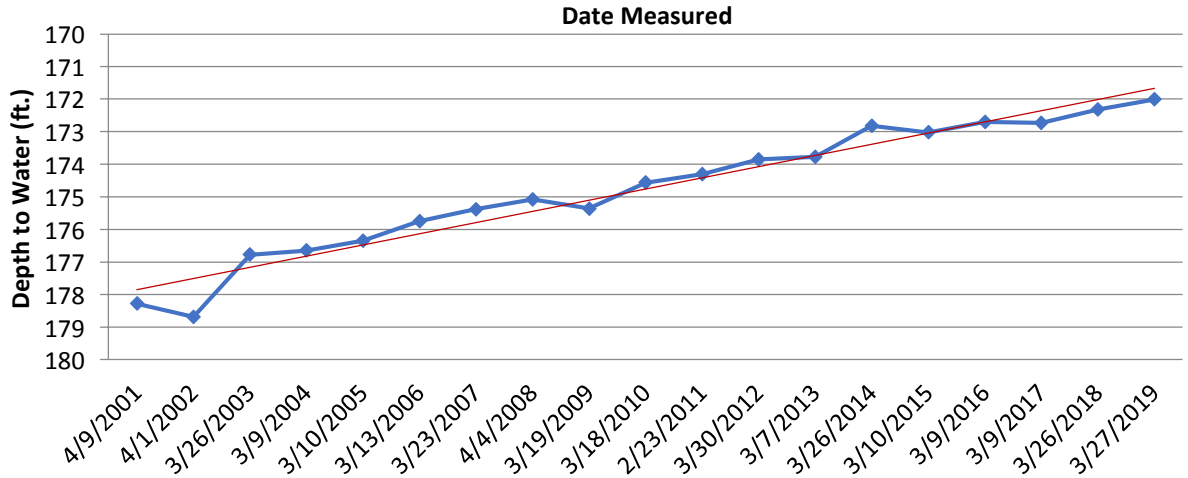
13N43W30BCBC

8 East 1 South of Chappell
Ogallala Formation
Fully Appropriated Subarea (North Table)



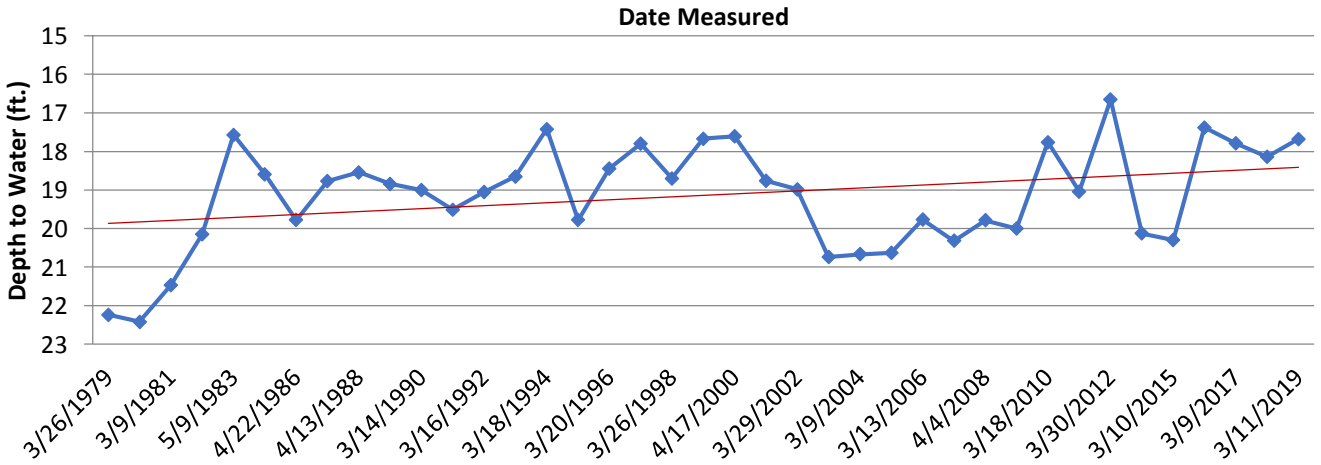
14N44W1CADD

9 North 7 East from Chappell
Ogallala Formation
Fully Appropriated Subarea (North Table)



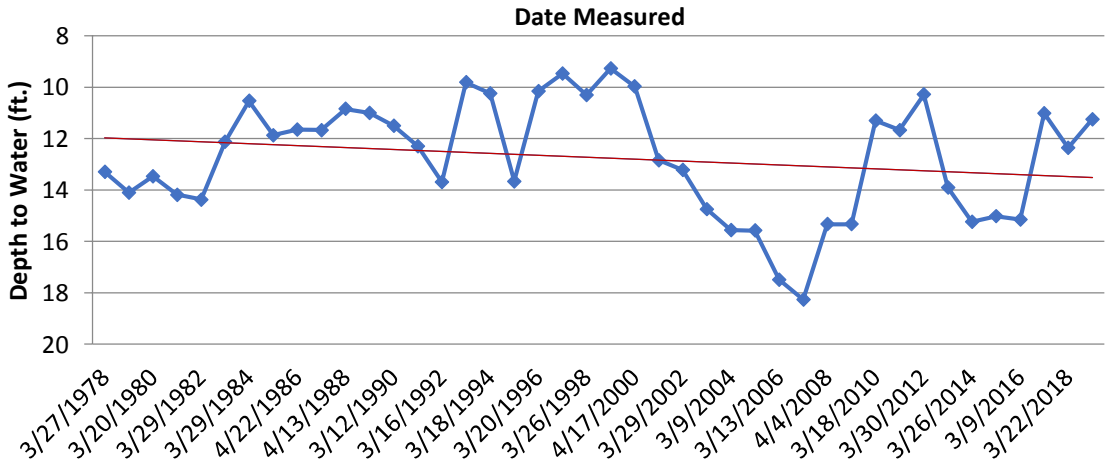
13N 45W 22BAB

in Chappell by viaduct
Brule Formation
Sidney to Colorado Subarea



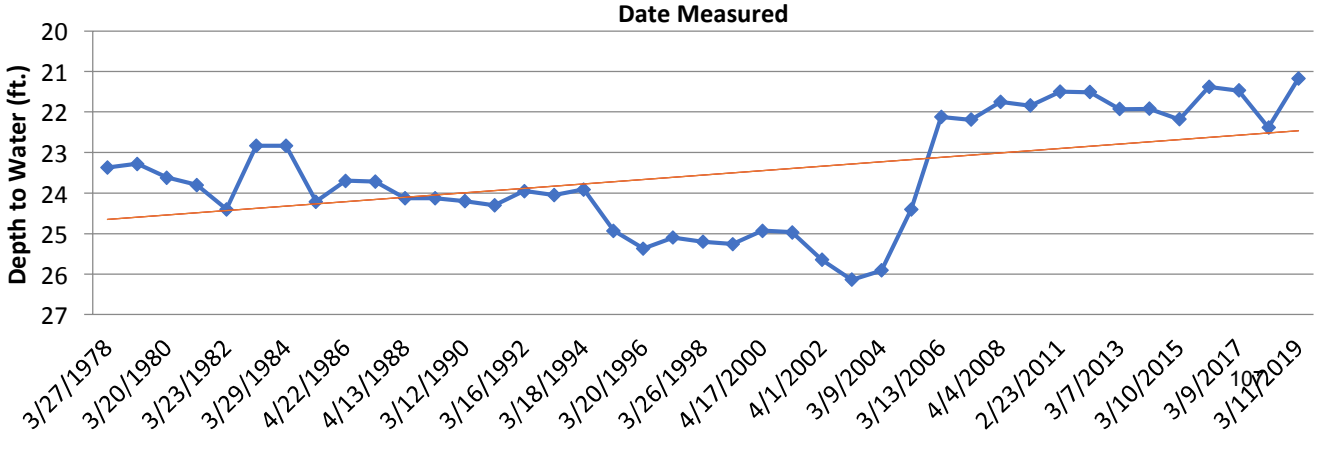
12N 44W 18BB

1 North of CO/NE State Line
Brule Formation
Sidney to Colorado Subarea



12N 43W 24BB

4 South 6 West of Big Springs
Alluvium/Ogallala Formations
South Platte Valley Subarea



12N 42W 3DDD

2 South 1 West of Big Springs
Alluviam/Ogallala Formations
South Platte Valley Subarea