Raimee Seal

Assessing the Impacts of Hydrometeorological Extremes on the Water Quality in Nebraska

Supervised by Dr. Abadi and Dr. Bell

Introduction

Project & Implications

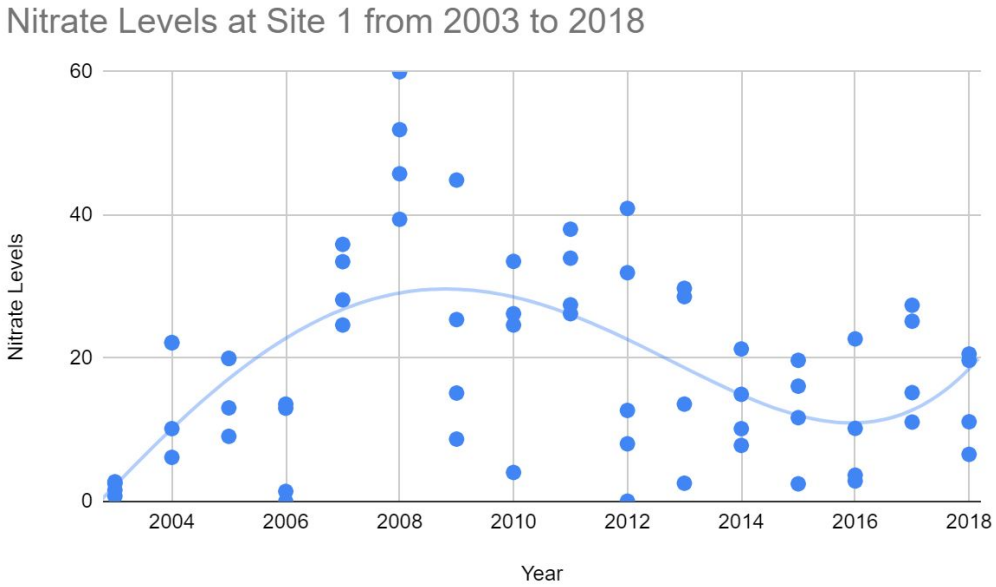
Research Question:

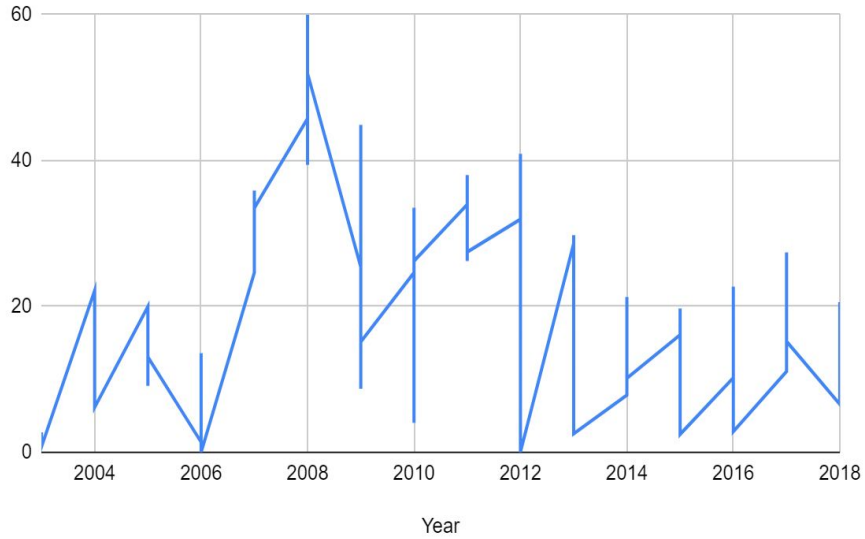
Is weather impacting water quality and the pollutants that contaminate water?

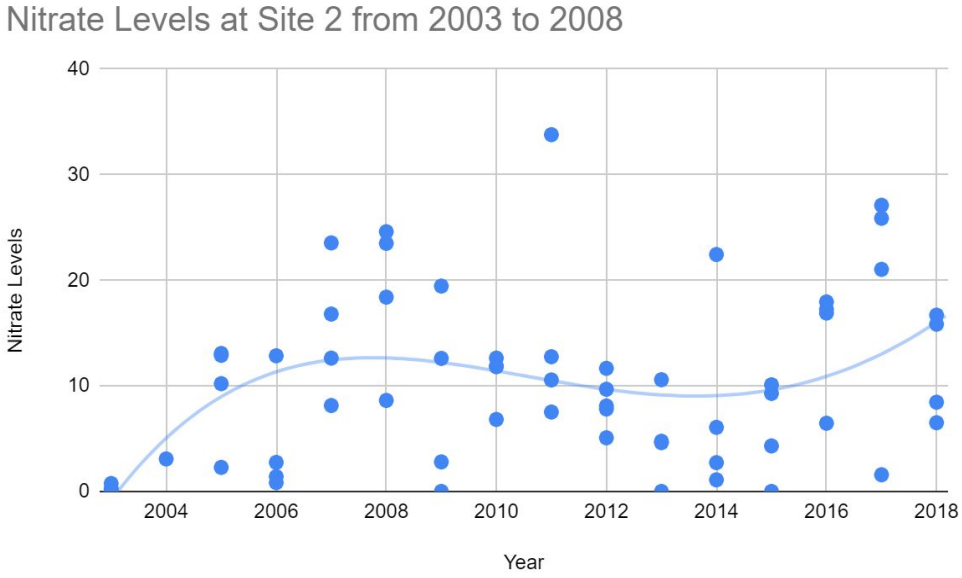
Shell Creek Watershed

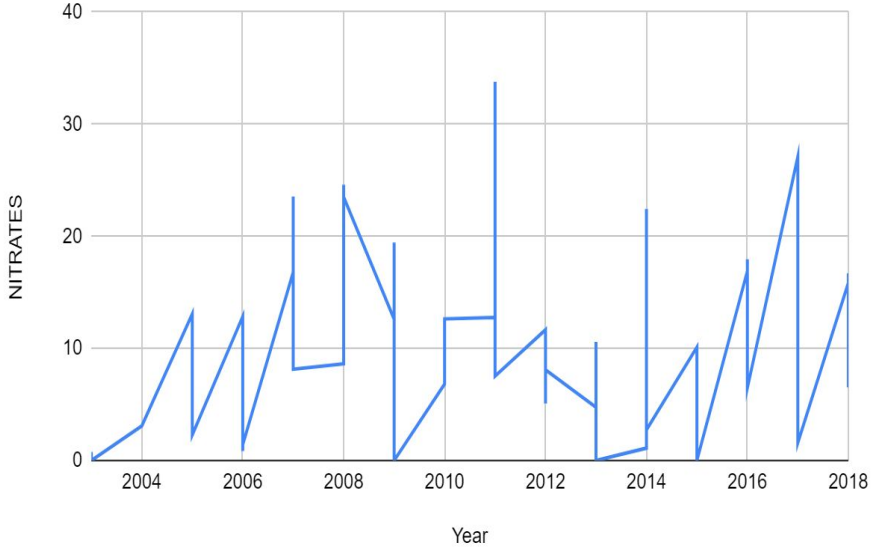
https://sites.google.com/ngpublicschools.com/shellcreek/gis-map-data?authuser=0

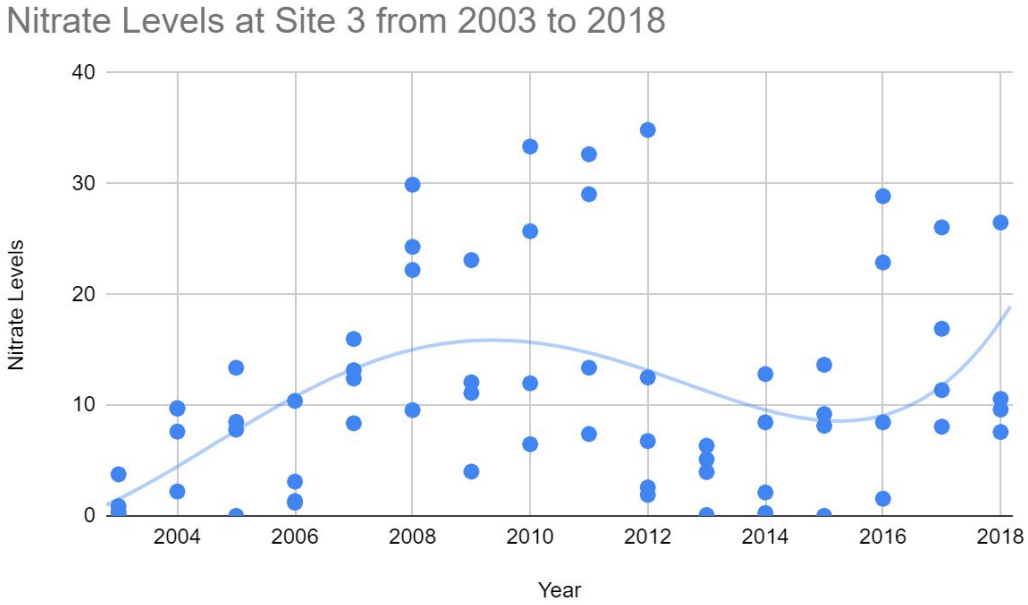
Shell Creek Watershed Charts for Each Site's Nitrate Concentrations

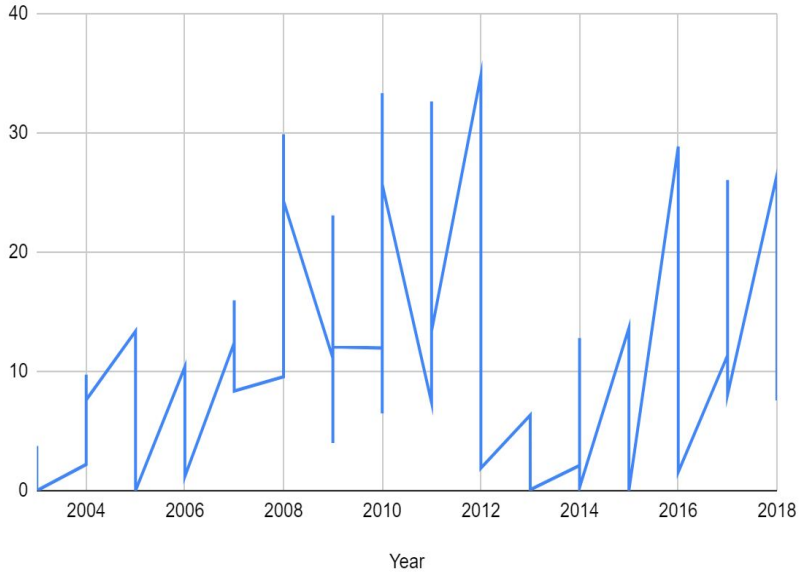

Nitrate Levels at Site 1 from 2003 to 2018
Nitrate Levels
60
40
20
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

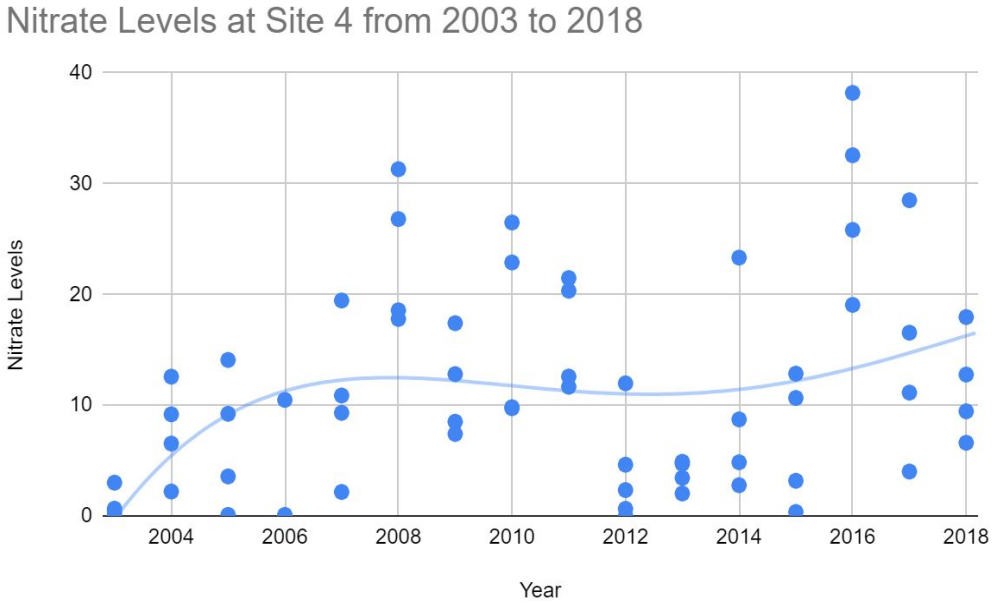

60
40
20
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

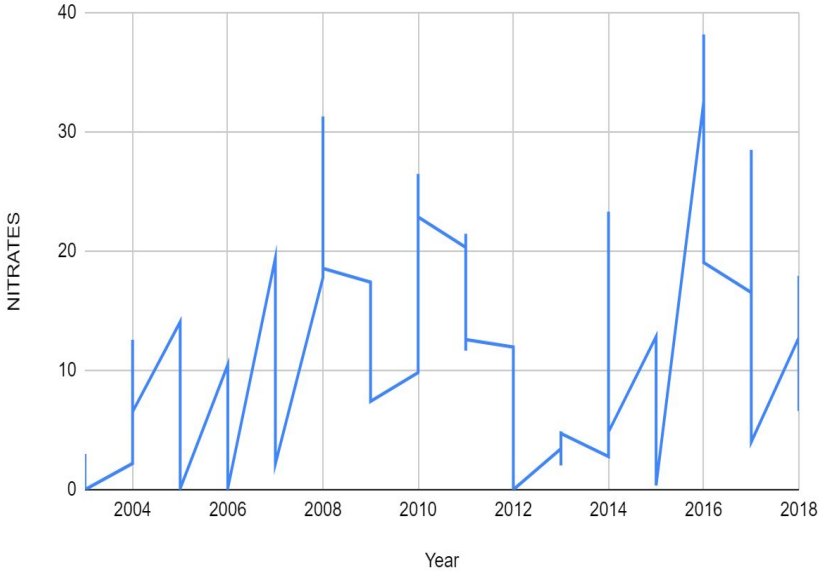

Nitrate Levels at Site 2 from 2003 to 2008
Nitrate Levels
40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year


NITRATES
40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

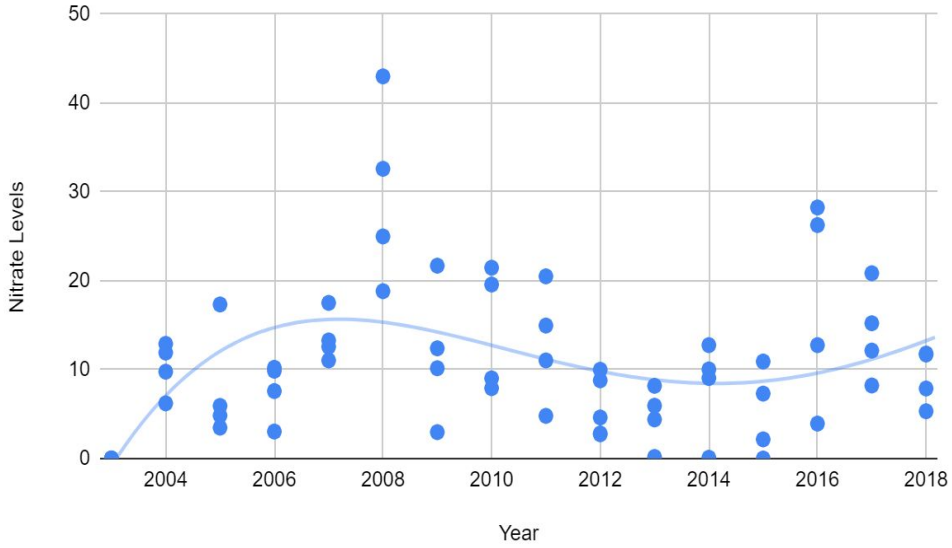

Nitrate Levels at Site 3 from 2003 to 2018
Nitrate Levels
40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

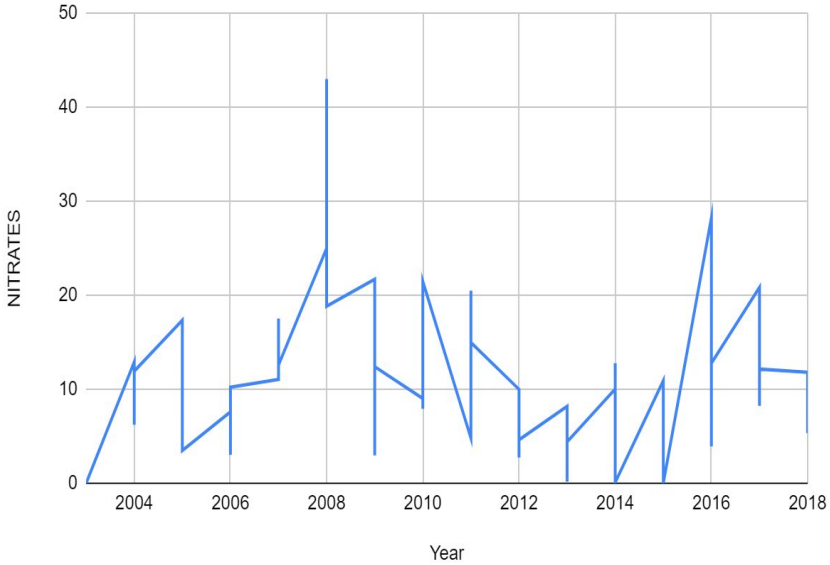

40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

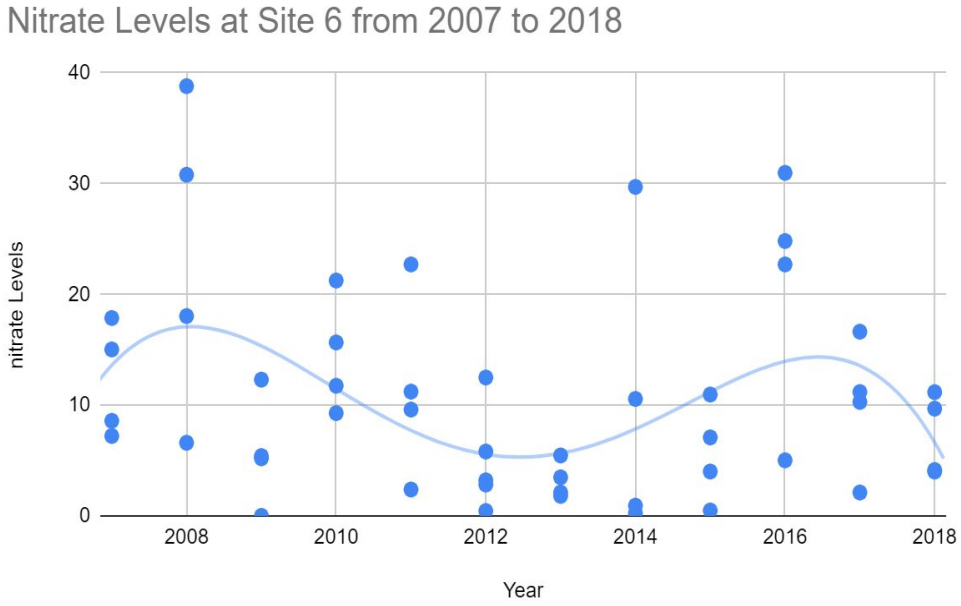

Nitrate Levels at Site 4 from 2003 to 2018
Nitrate Levels
40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

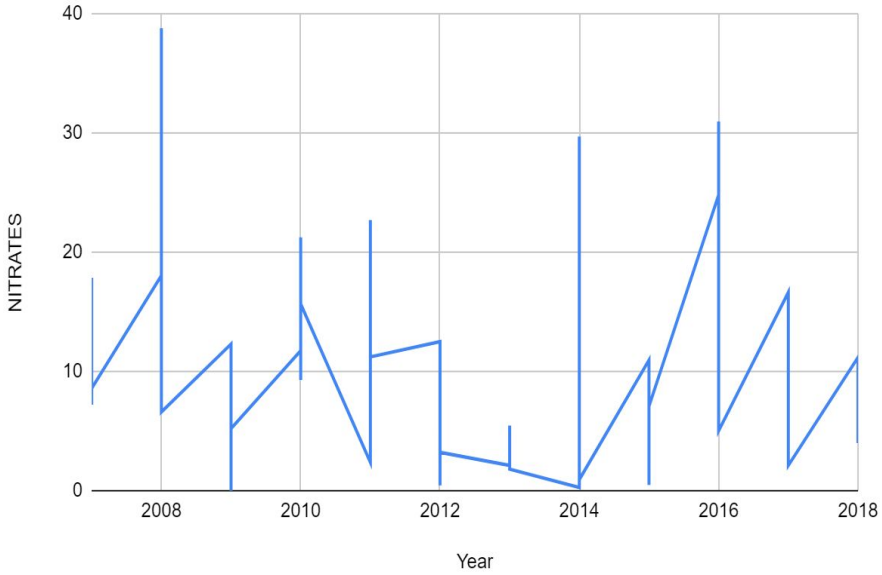

NITRATES
40
30
20
10
0
2004
2006
2008
2010
2012
2014
2016
2018
Year

Nitrate Levels at Site 5 from 2003 to 2018



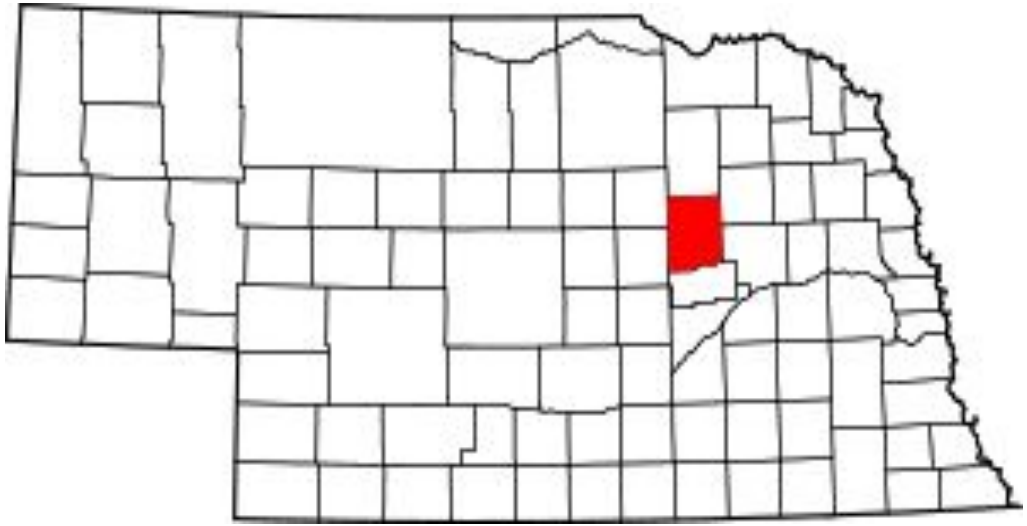


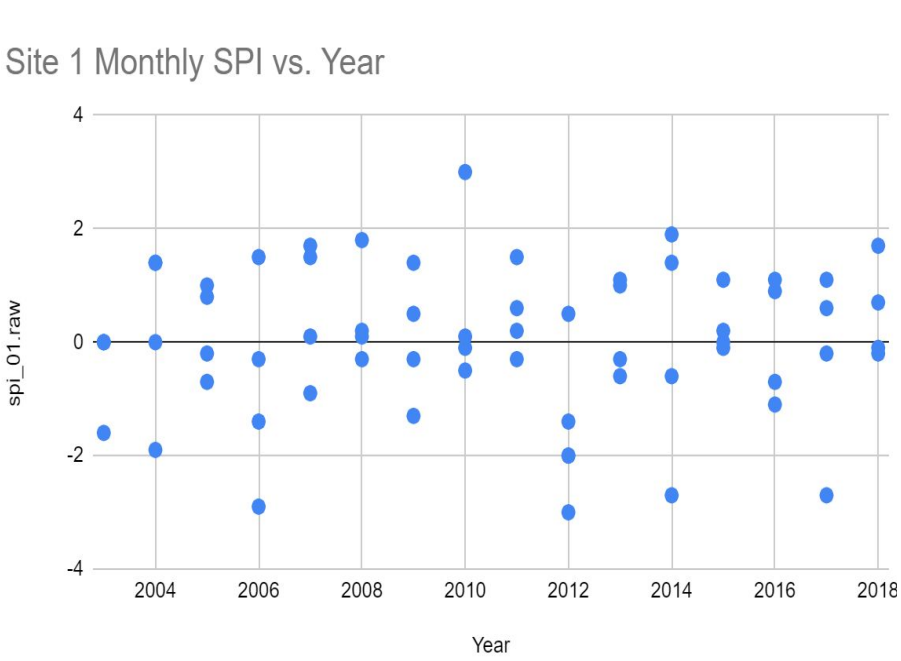

Nitrate Levels at Site 6 from 2007 to 2018
nitrate Levels
40
30
20
10
0
2008
2010
2012
2014
2016
2018
Year

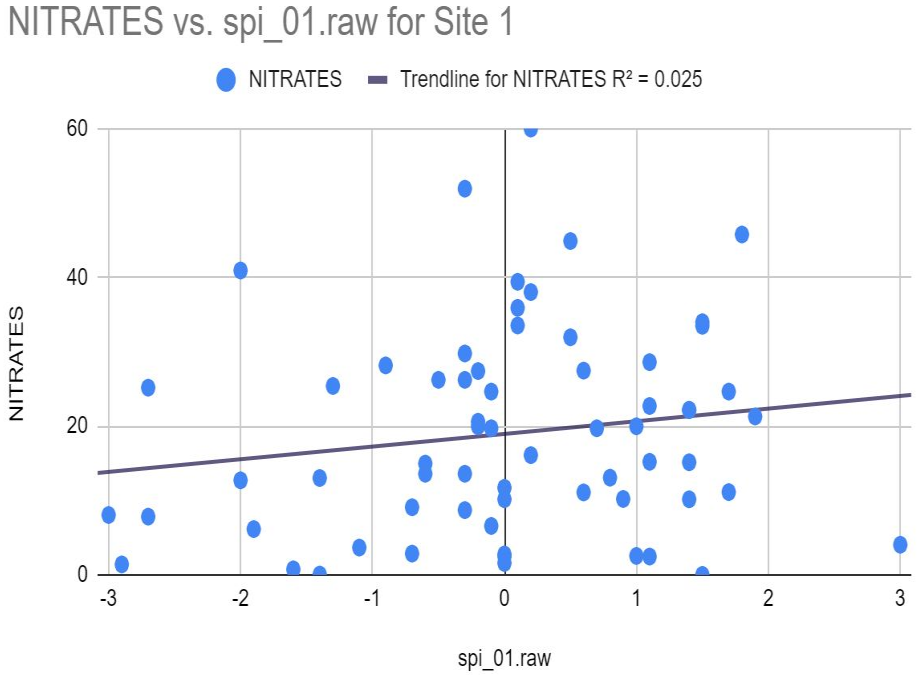

NITRATES
40
30
20
10
0
2008
2010
2012
2014
2016
2018
Year

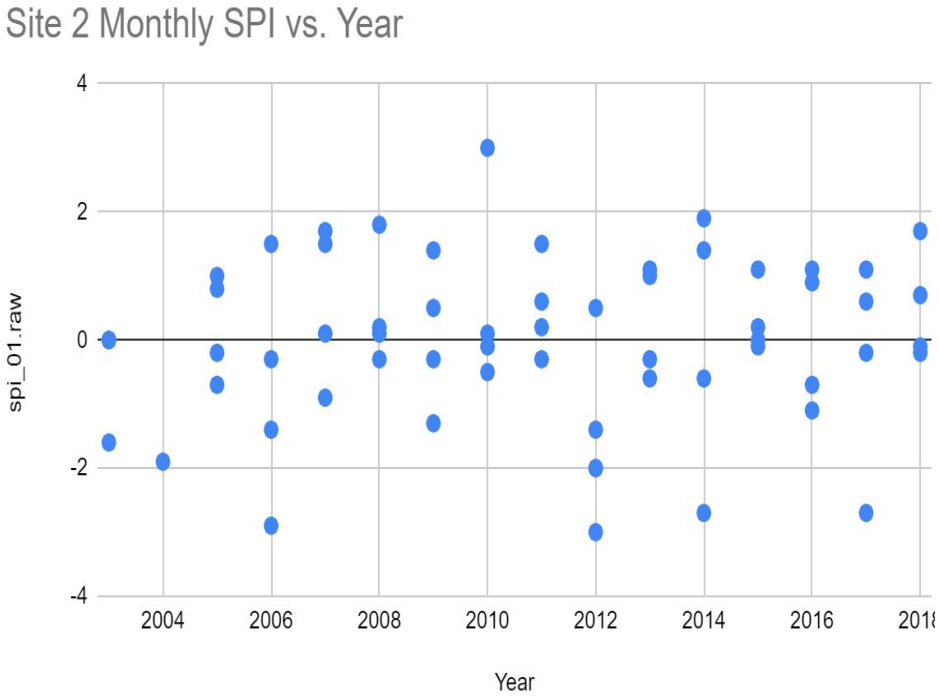
Conclusion for Shell Creek:
It seems for all of the sites, the years 2007-2008 presented the highest nitrate levels.

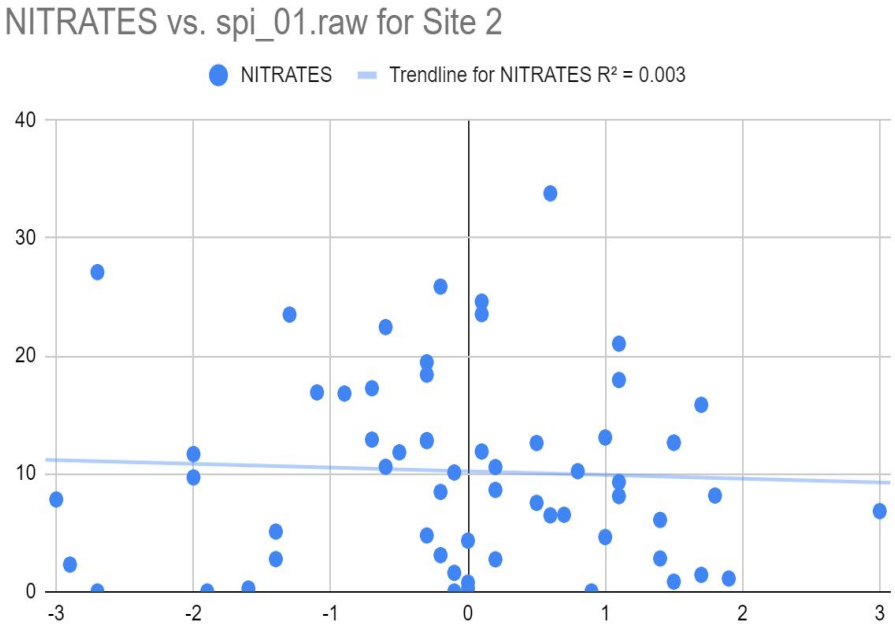
Boone County, Nebraska

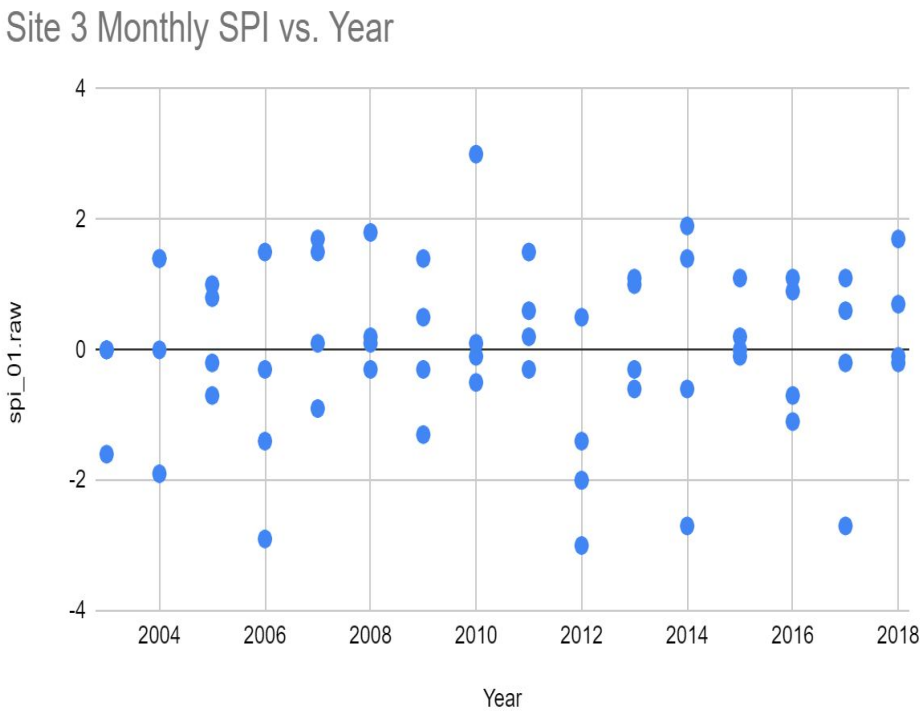


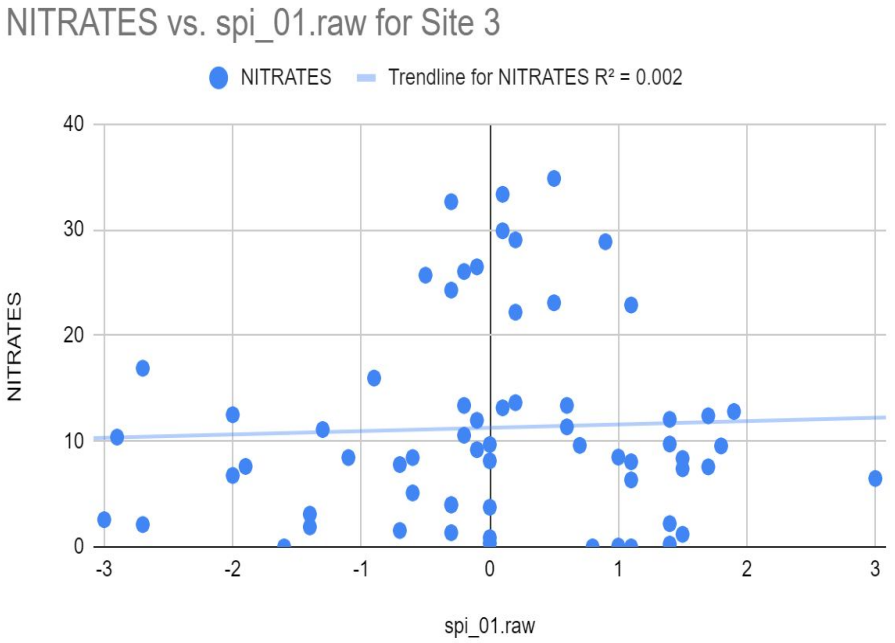

Site 1 Monthly SPI vs. Year
spi_01.raw
4
2
0
-2
-4
2004
2006
2008
2010
2012
2014
2016
2018
Year


NITRATES vs. spi_01.raw for Site 1
NITRATES
Trendline for NITRATES R² = 0.025
NITRATES
60
40
20
0
-3
-2
-1
0
1
2
3
spi_01.raw

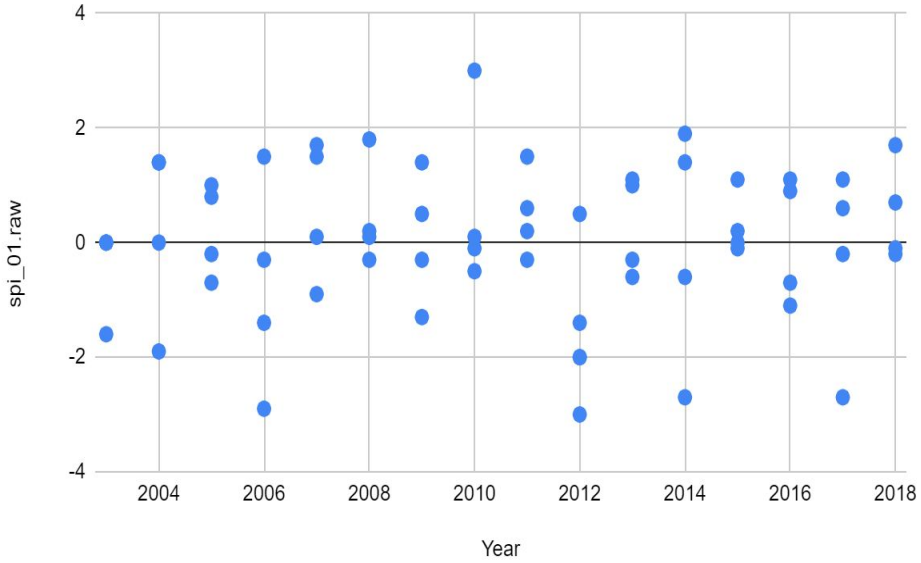

Site 2 Monthly SPI vs. Year
spi_01.raw
4
2
0
-2
-4
2004
2006
2008
2010
2012
2014
2016
Year


NITRATES vs. spi_01.raw for Site 2
NITRATES
Trendline for NITRATES R² = 0.003
40
30
20
10
0
-3
-2
-1
0
1
2
3

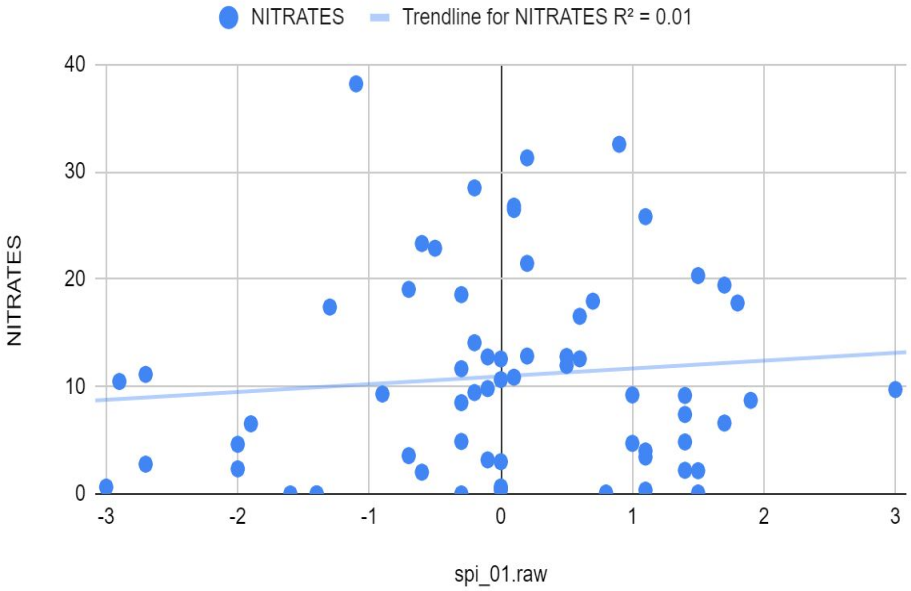

Site 3 Monthly SPI vs. Year
spi_01.raw
4
2
0
-2
-4
2004
2006
2008
2010
2012
2014
2016
2018
Year

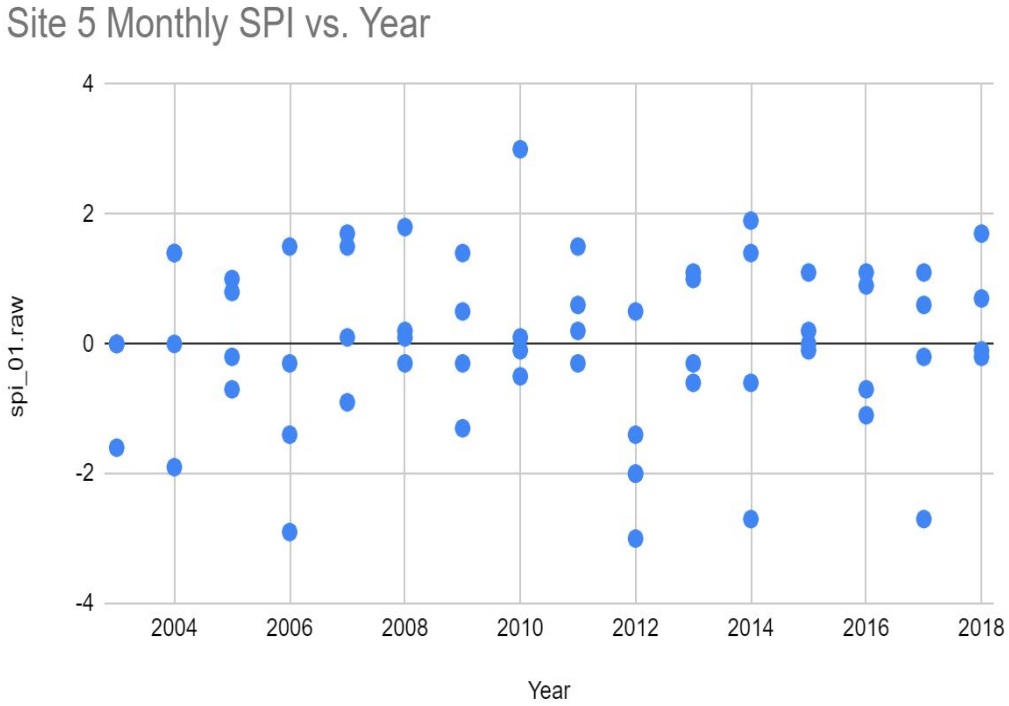

NITRATES vs. spi_01.raw for Site 3
NITRATES
Trendline for NITRATES R² = 0.002
NITRATES
40
30
20
10
0
-3
-2
-1
0
1
2
3
spi_01.raw

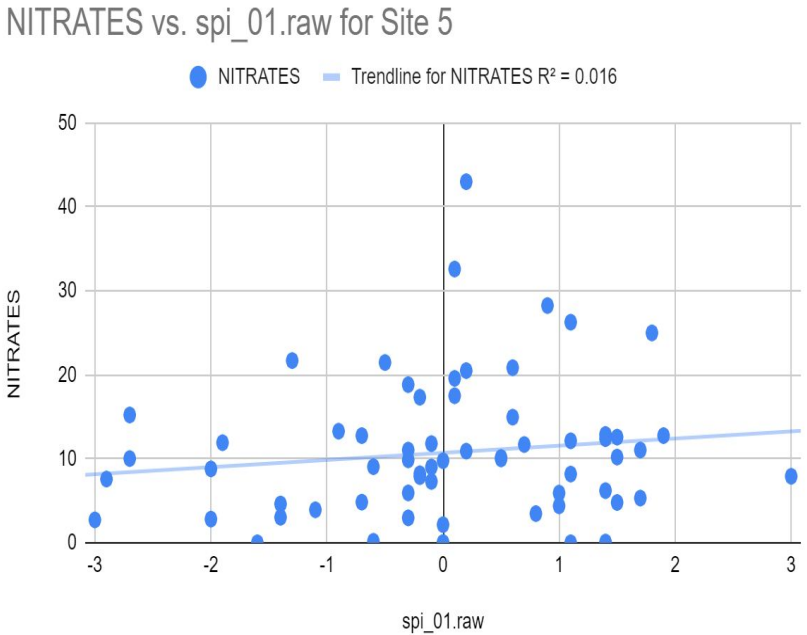
Site 4 Monthly SPI vs. Year



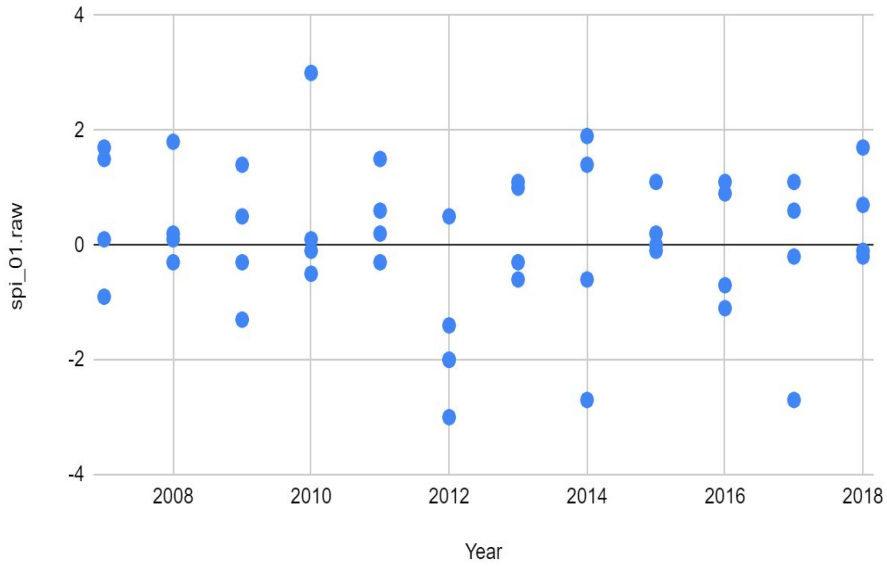
NITRATES vs. spi_01.raw for Site 4



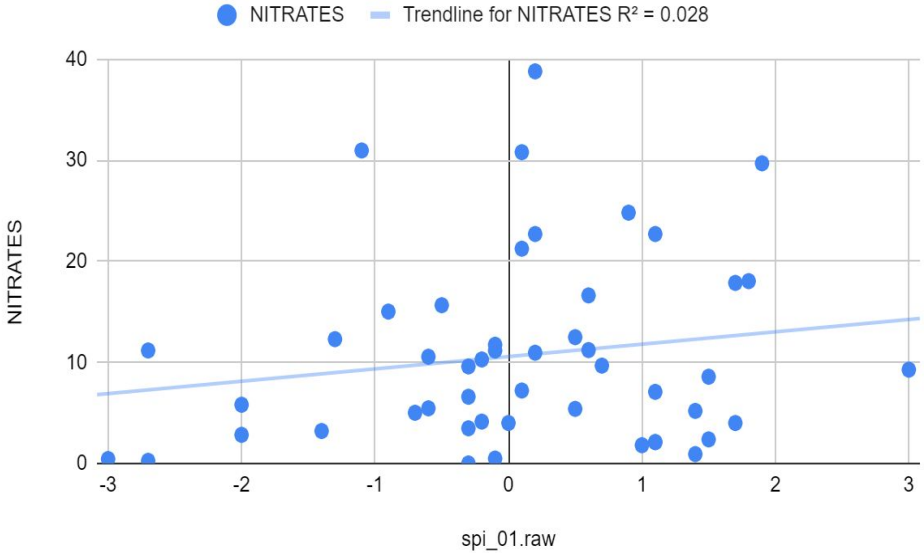

Site 5 Monthly SPI vs. Year
spi_01.raw
4
2
0
-2
-4
2004
2006
2008
2010
2012
2014
2016
2018
Year


NITRATES vs. spi_01.raw for Site 5
NITRATES
Trendline for NITRATES R² = 0.016
NITRATES
50
40
30
20
10
0
-3
-2
-1
0
1
2
3
spi_01.raw

Site 6 Monthly SPI vs. Year

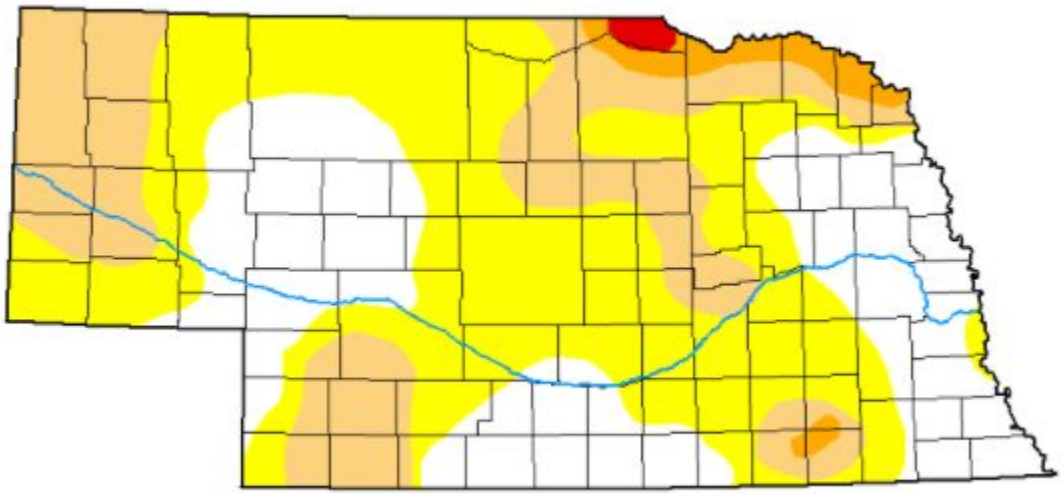


NITRATES vs. spi_01.raw for Site 6



Final Conclusion

Nebraska 2021



https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NE

Map released: Thurs. July 29, 2021

Data valid: July 27, 2021 at 8 a.m. EDT

Intensity

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

Works Cited:

https://journalstar.com/news/local/report-nebraskas-waterways-are-6th-worst-in-nation-for-pollution/article_b52146f6-a1e1-5c97-983c-93eadbf9e03d.html#:~:text=Nebraska%27s%20waterways%20are%20the%20sixth,to%20a%20report%20released%20Thursday

https://docs.google.com/document/d/1v1QcEi02jBEEMVVbaN7Hhj2rTZAIV0zX_4v3dCcE_Xc/edit

https://docs.google.com/document/d/1Mnie48NxGm7OlMv9rFsinyDzGOEMJxZN4RMYncwcz2Q/edit

https://docs.google.com/spreadsheets/d/1IwEsc--Og2rZ9tm8qCXoCWh_iMJdTuC-8EREbPcYrtY/edit#gid=0

Special thanks to Dr. Abadi and Dr. Bell for guiding me and giving me the opportunity to learn about these topics.