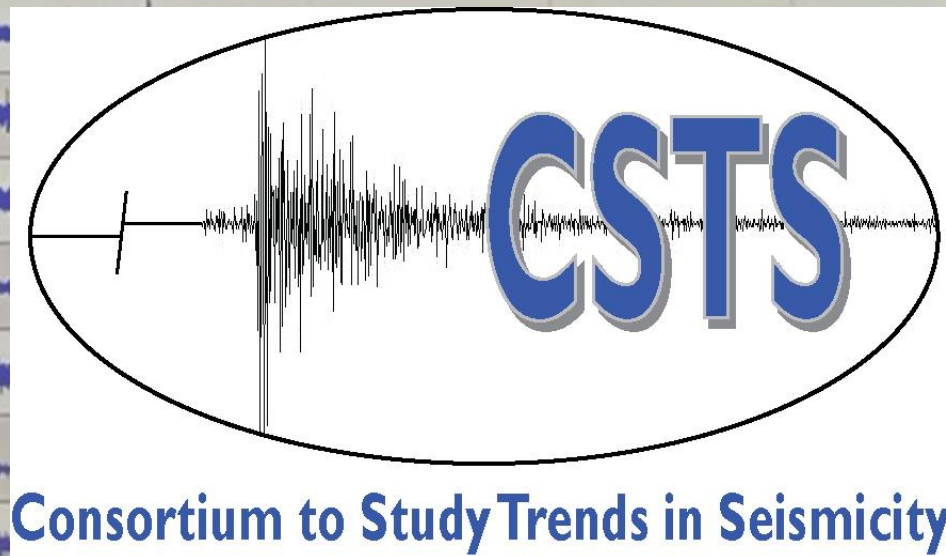
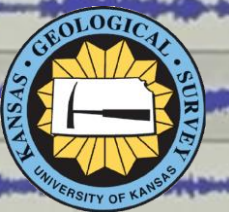


Studying Seismicity in Kansas Monitoring and Consortium Update

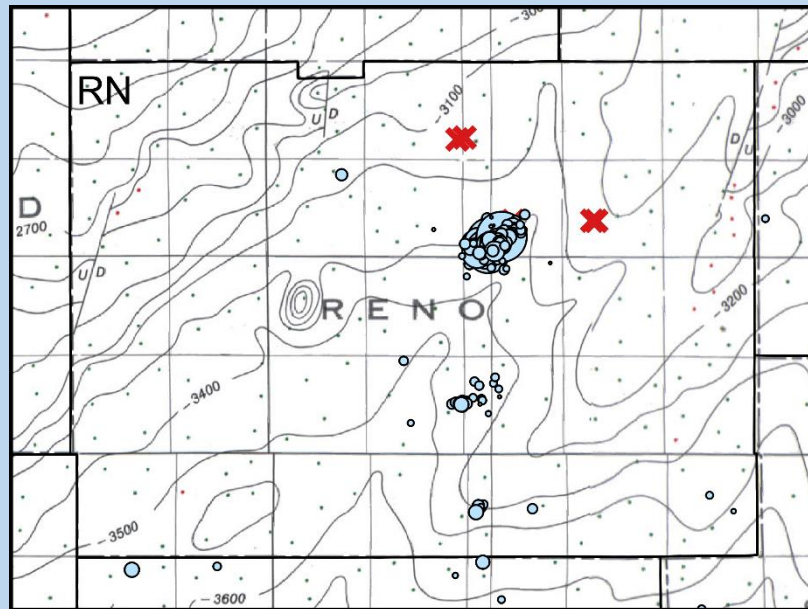


Seismicity across the State and impacts on
CSTS core mission



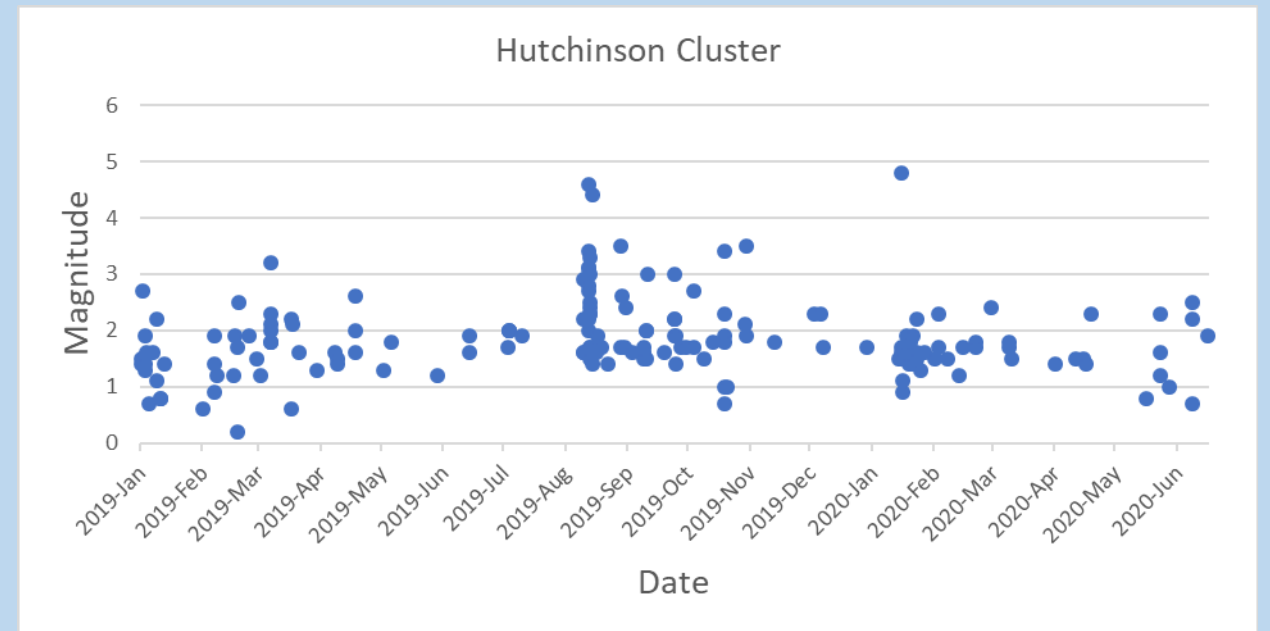
Hutchinson Earthquakes

last 18 months



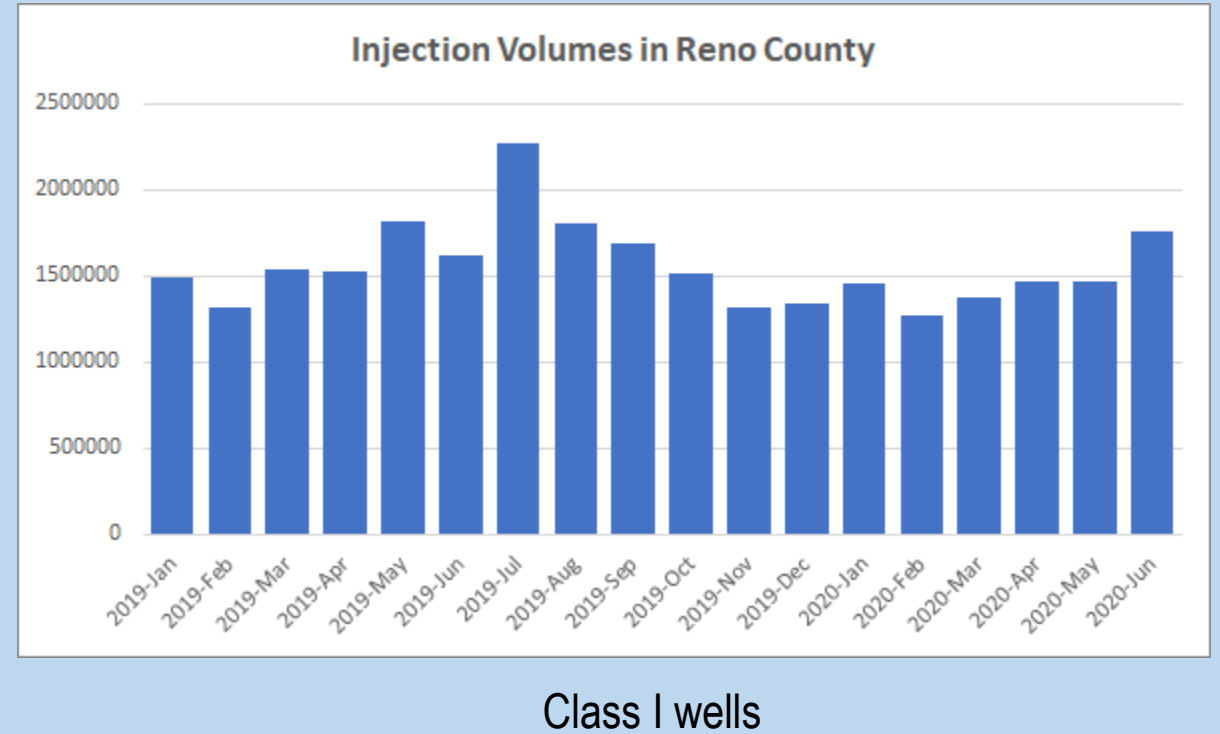
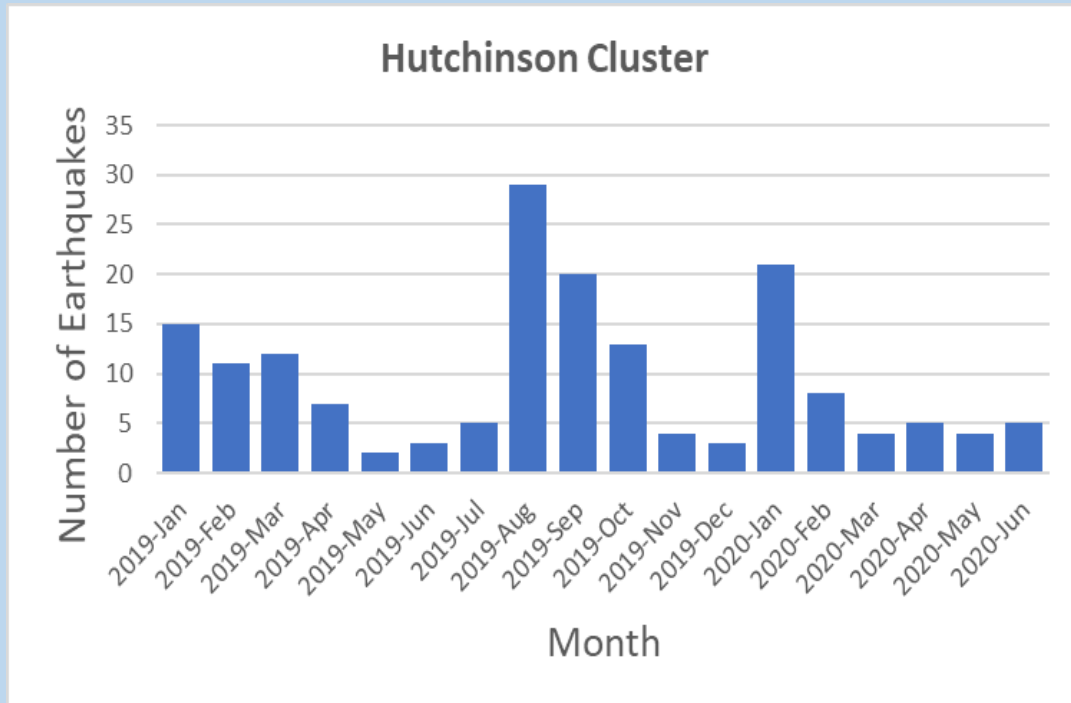
magnitude

1	2	3	4
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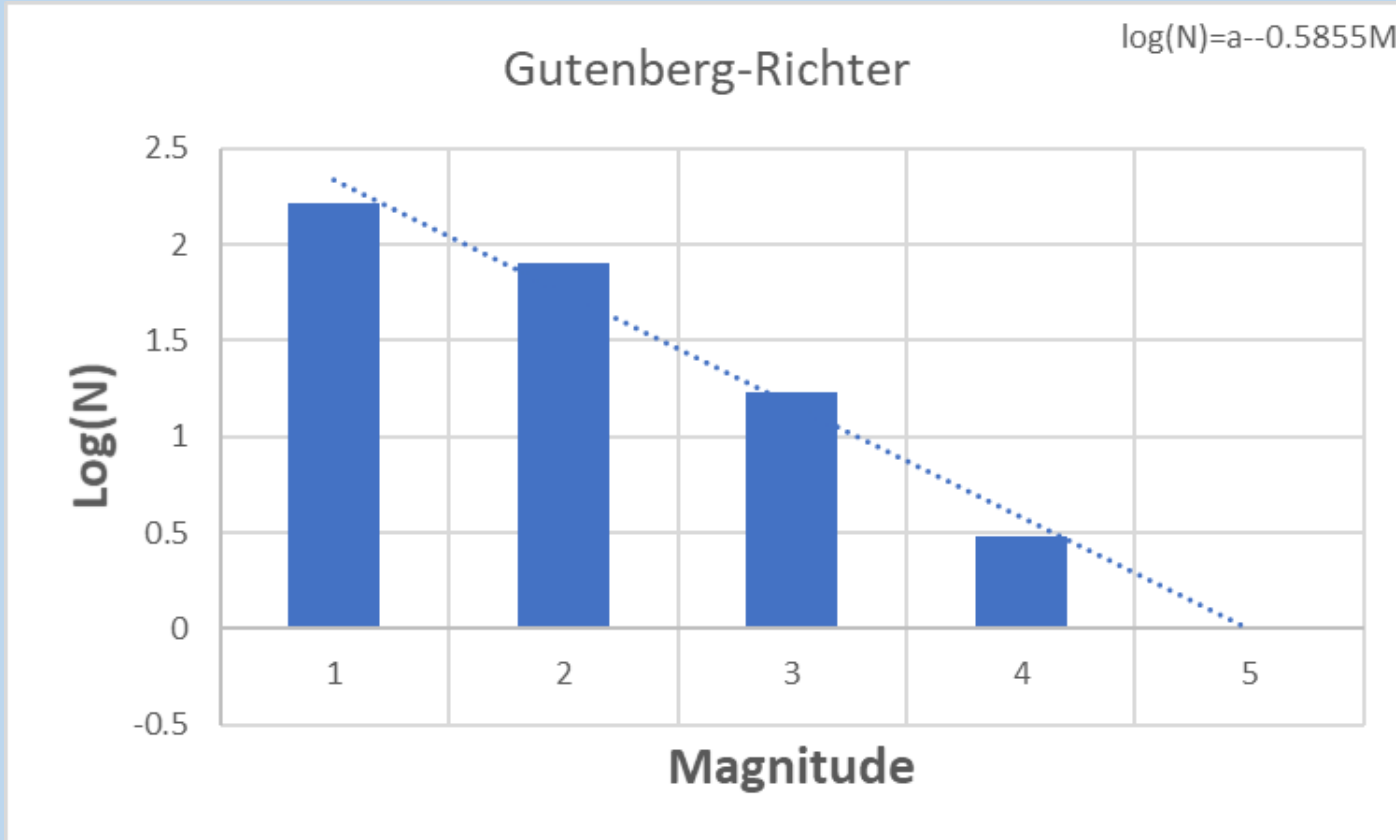


Hutchinson Earthquakes and Disposal

last 18 months



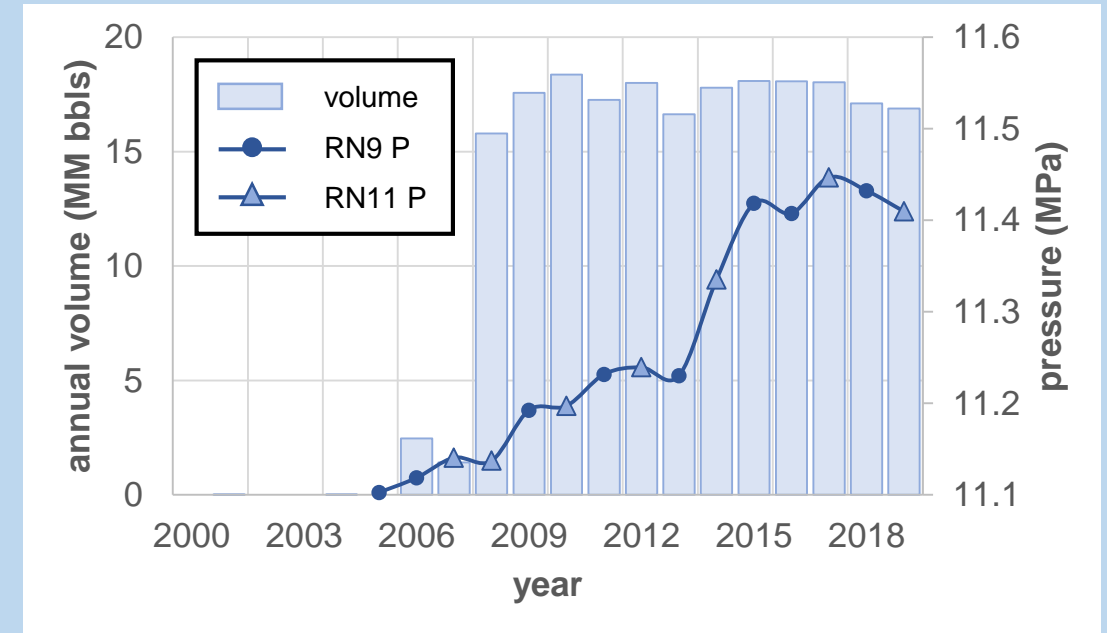
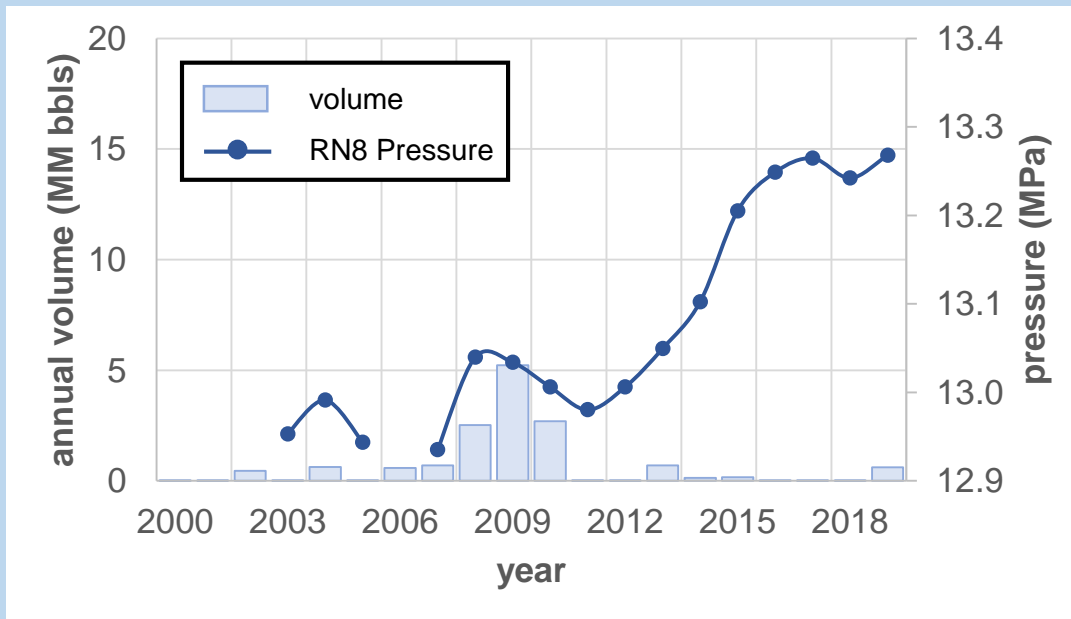
Hutchinson Earthquake Recursion



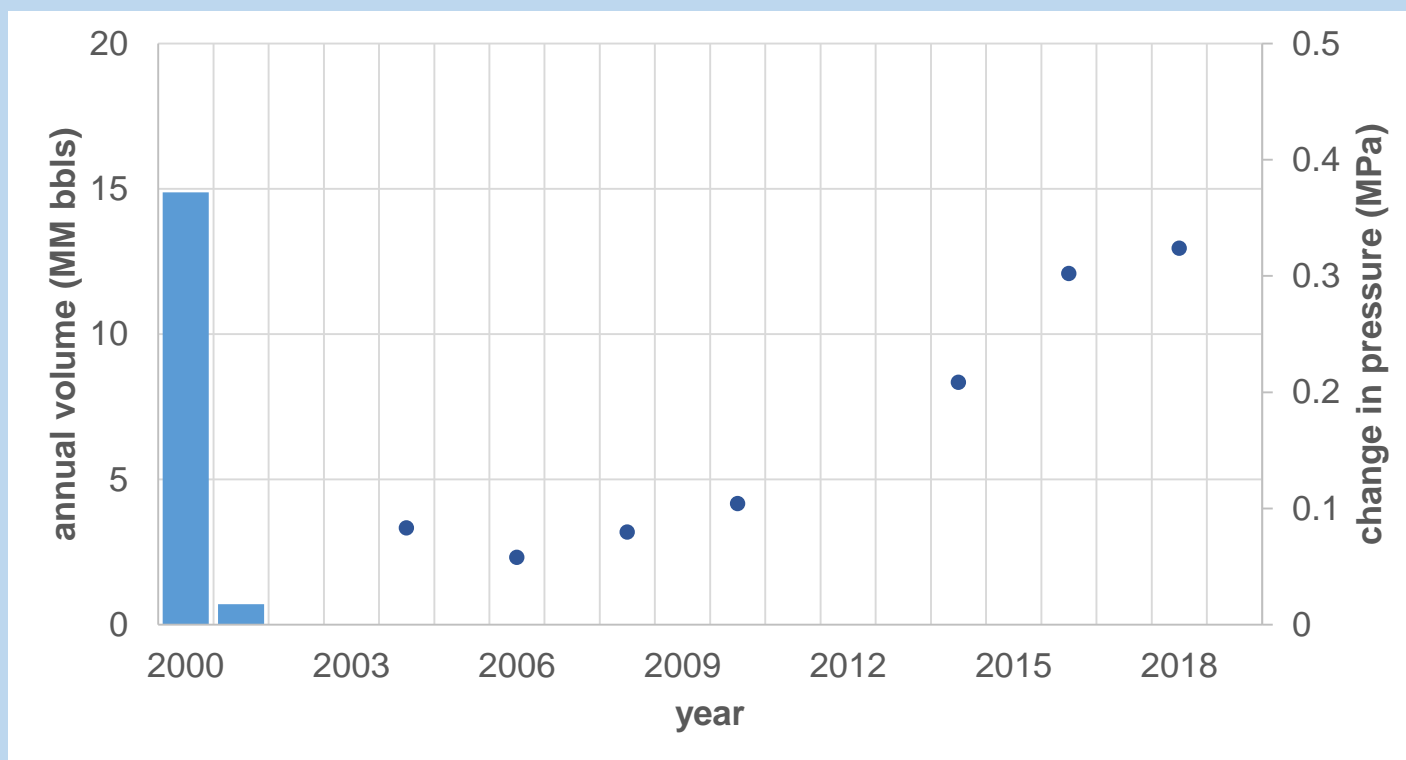
B-value = 0.5855

Greater proportion of
larger-magnitude events

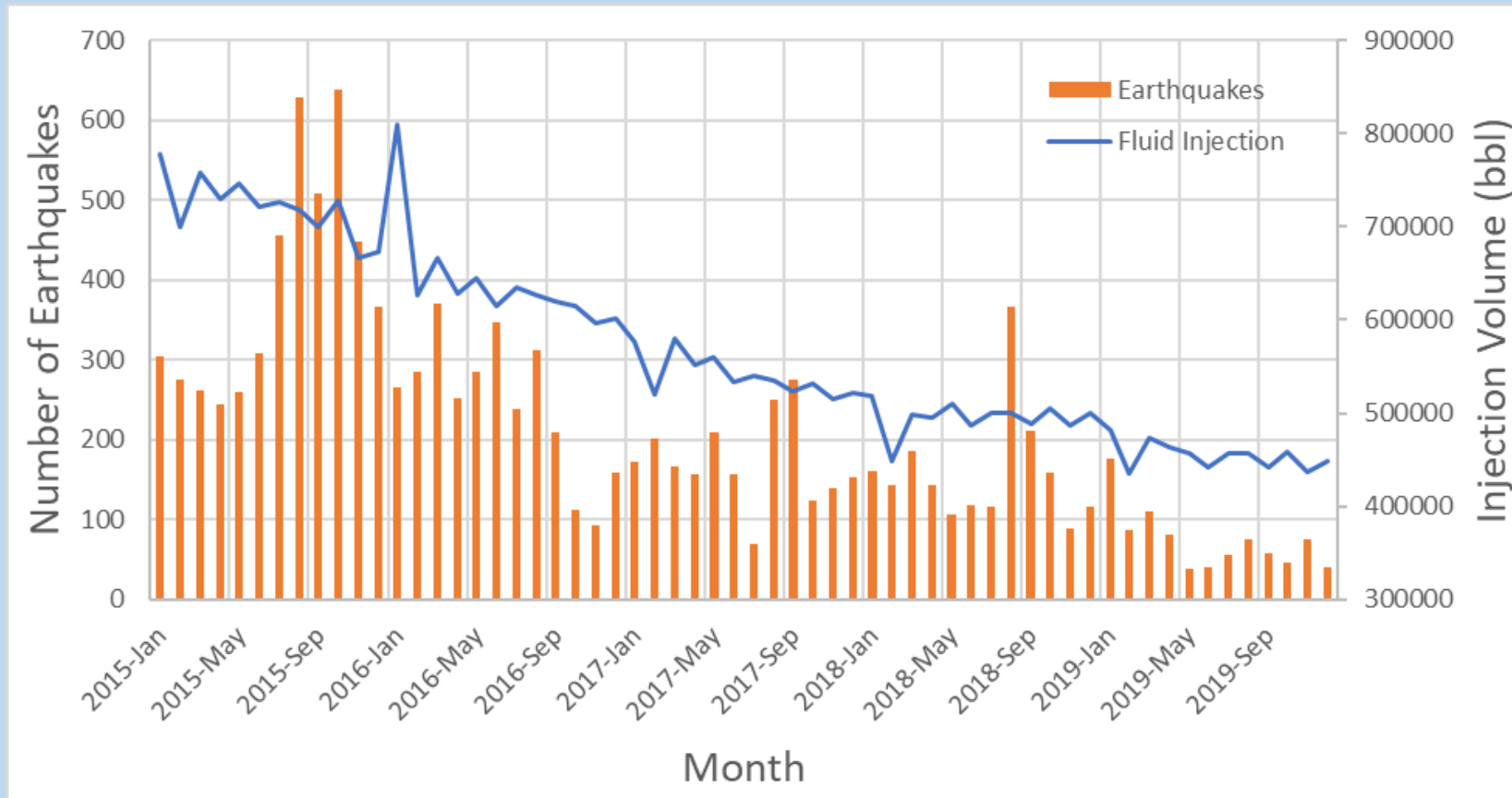
Pressure Curves: Low vs. High Rate Wells



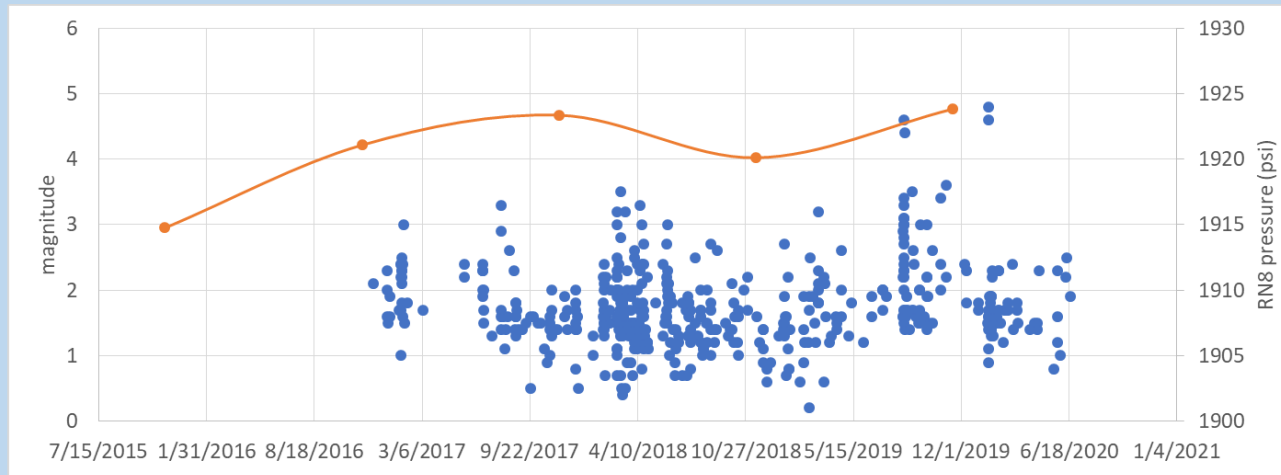
No injection: Yaggy #1



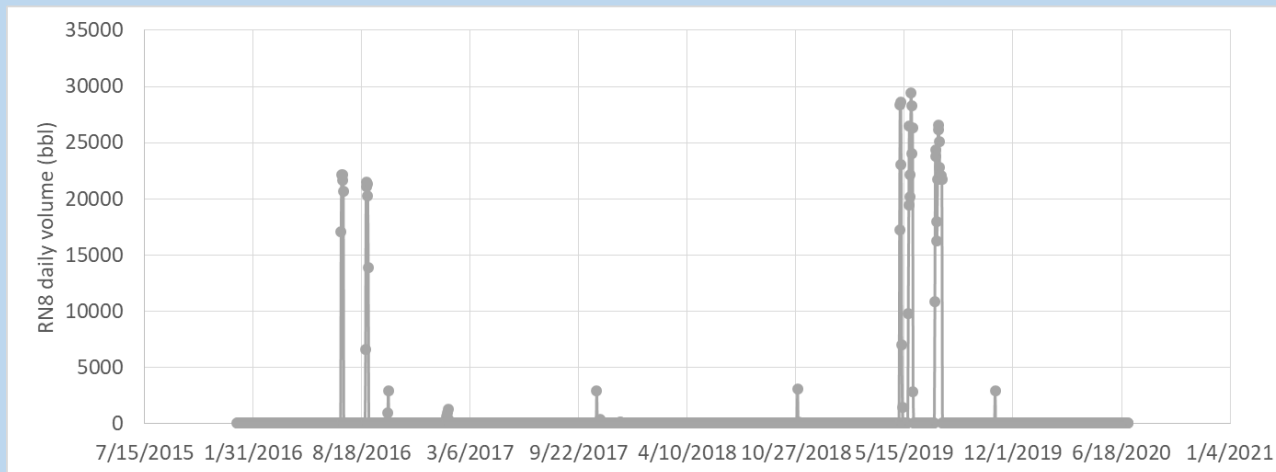
South-central Kansas



Hutchinson Earthquakes, Pressure, Volumes



Hutchinson earthquakes
and RN8 pressure

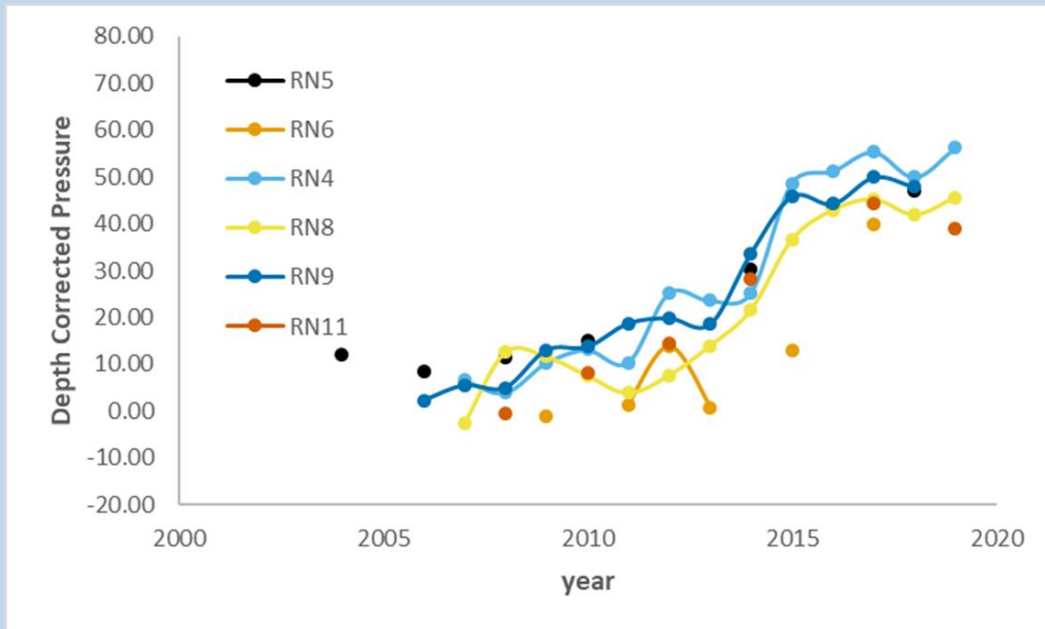


RN8 daily disposal

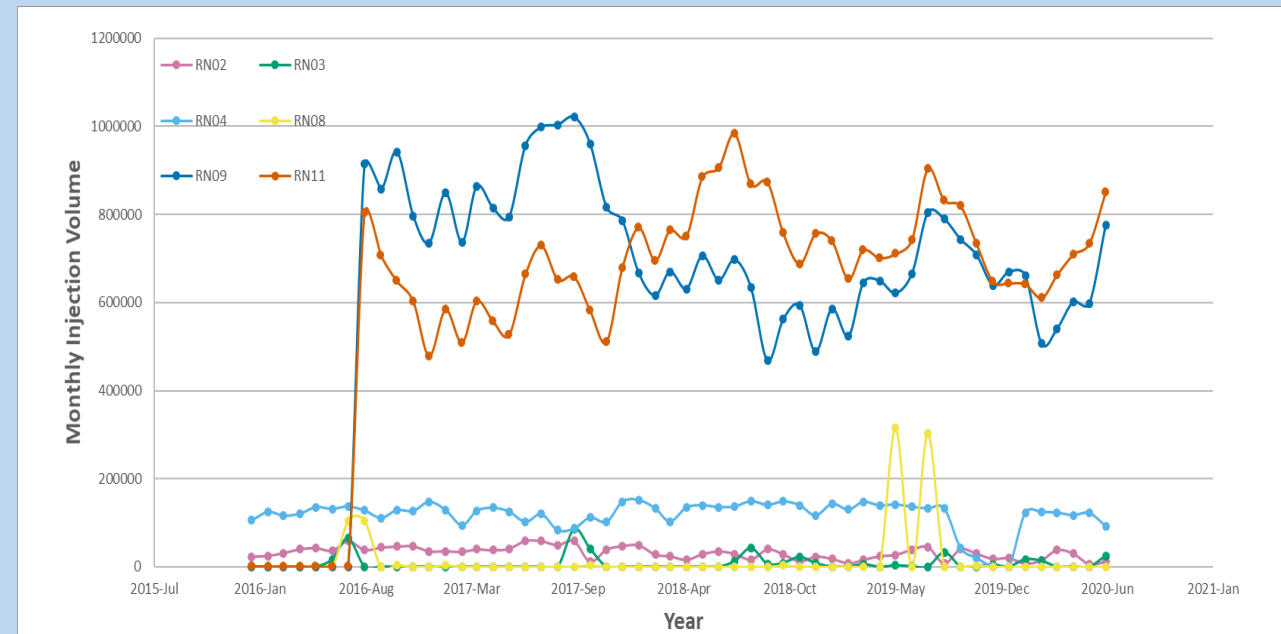
Stabilizing Pressure

pressure is stabilizing regardless of injection volume (or cumulative volume)

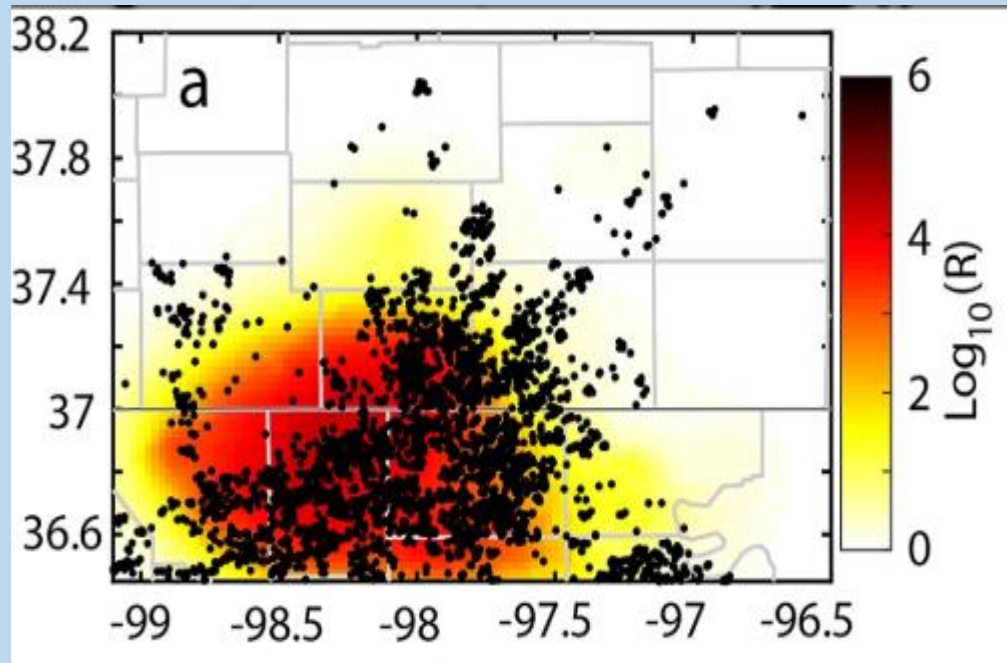
Hutchinson area Class I pressures



Hutchinson area Class I monthly volumes



Recent Publication on Oklahoma & Kansas



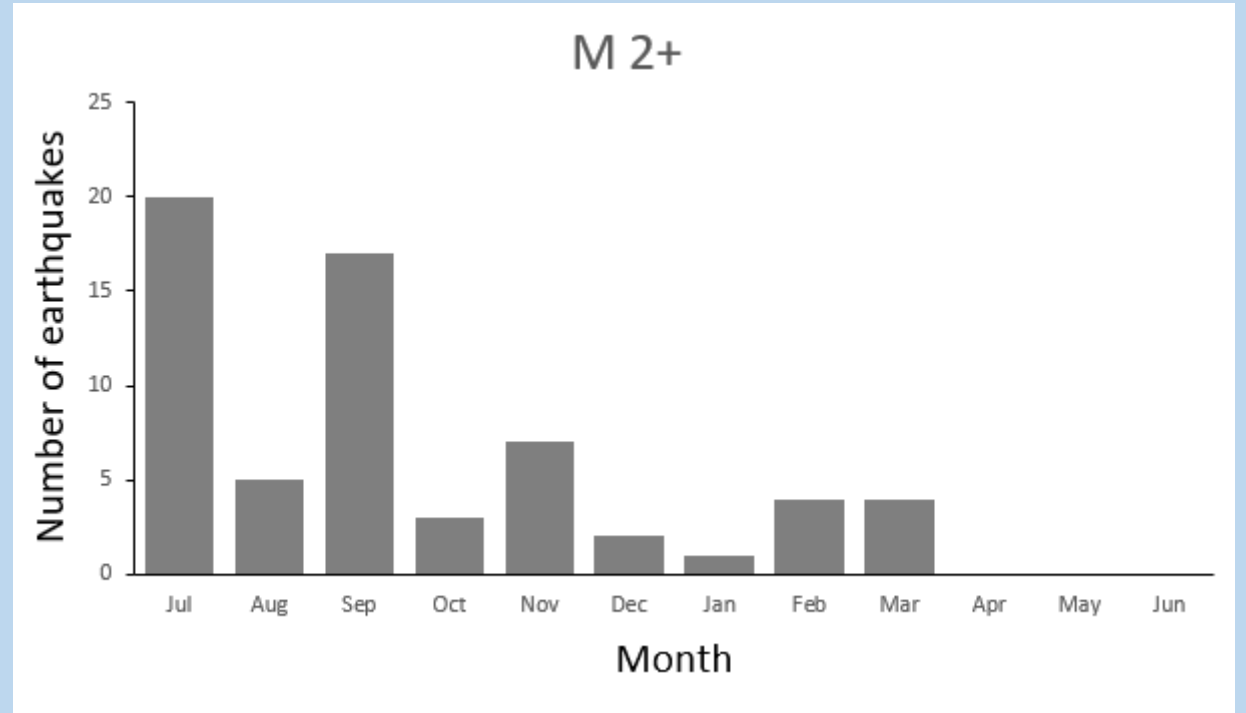
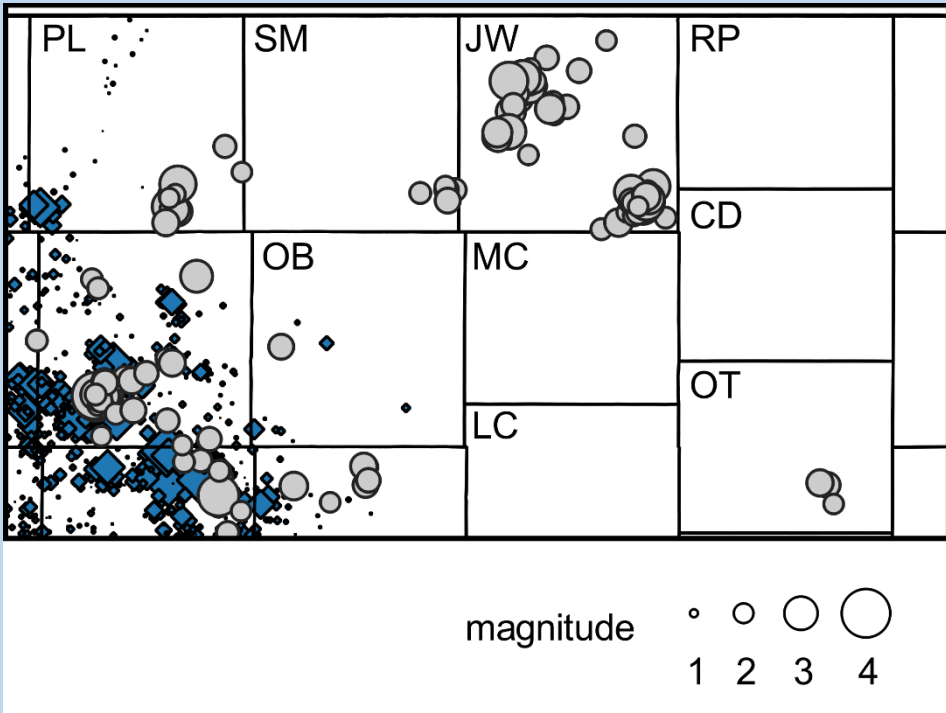
Zhai et. al (2020)

Conclusion: injection in Oklahoma caused 3x increase in Kansas seismicity

Confirms regional pressure influence

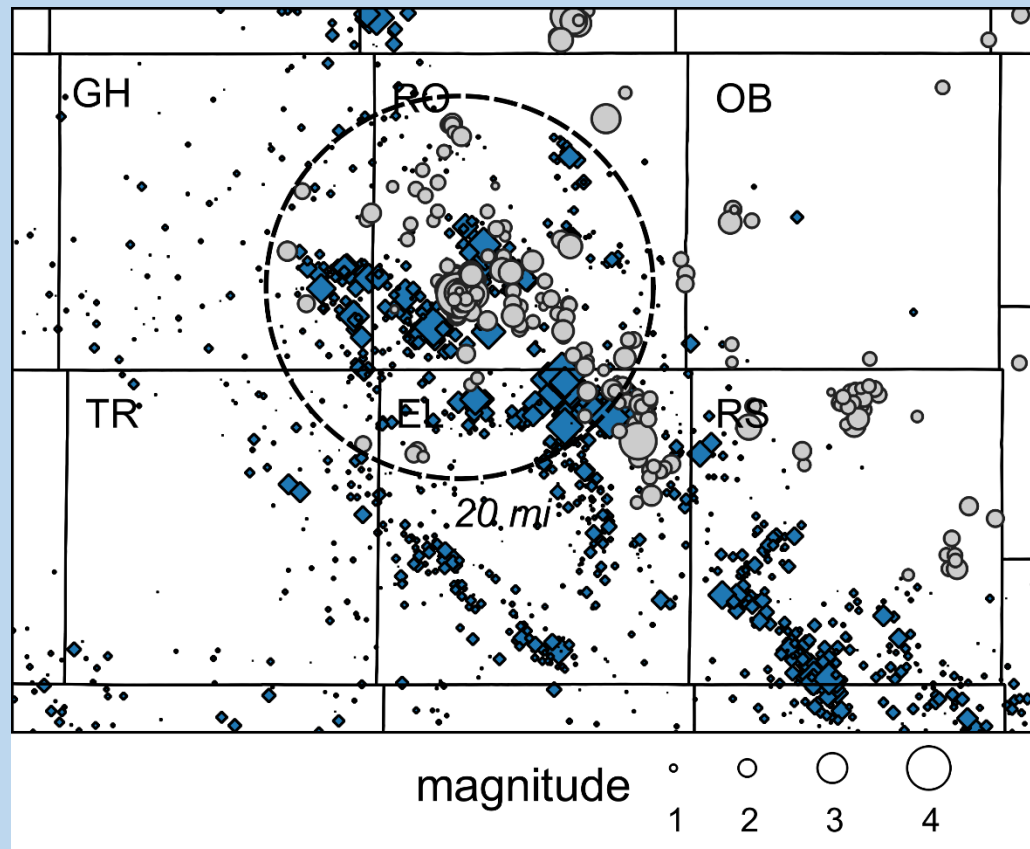
Significant distance from injection point

Jewell County Clusters

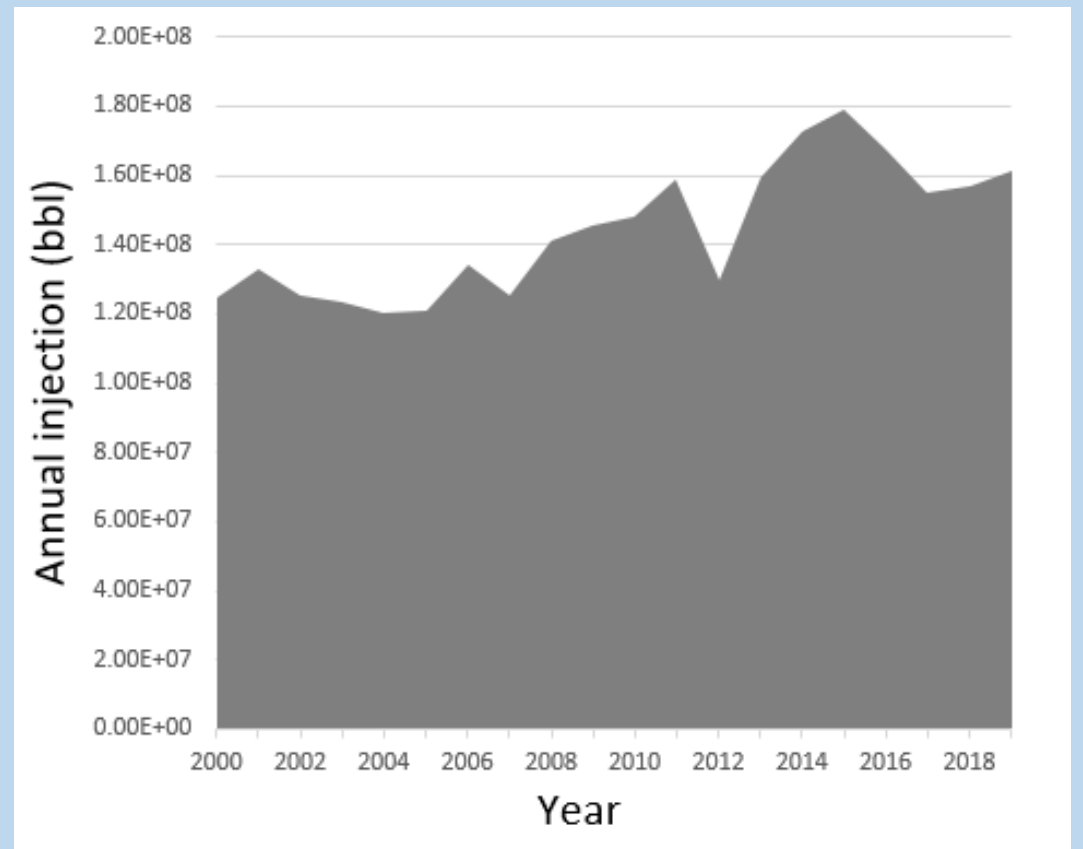


Rooks Area Disposal Wells

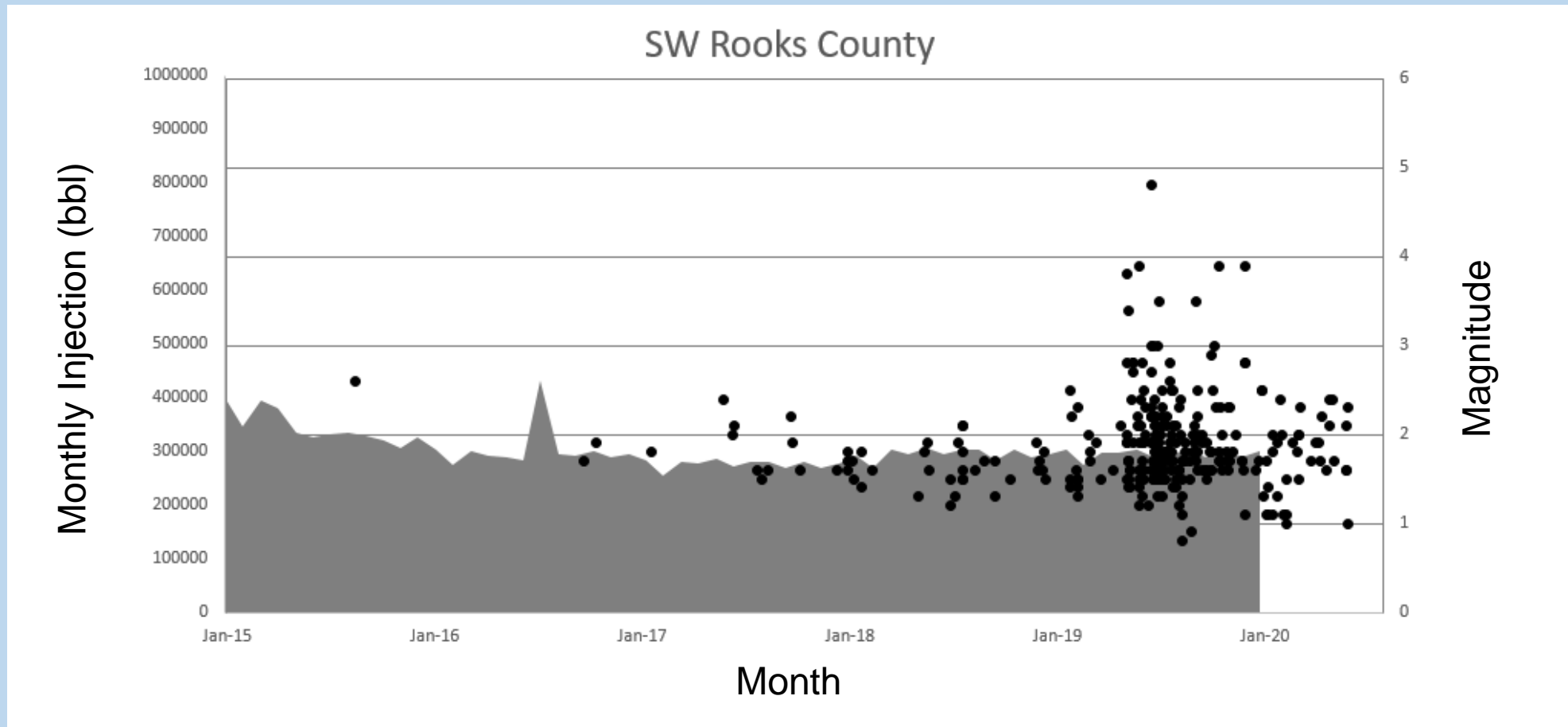
SWD wells



annual disposal volume w/in 20 mi

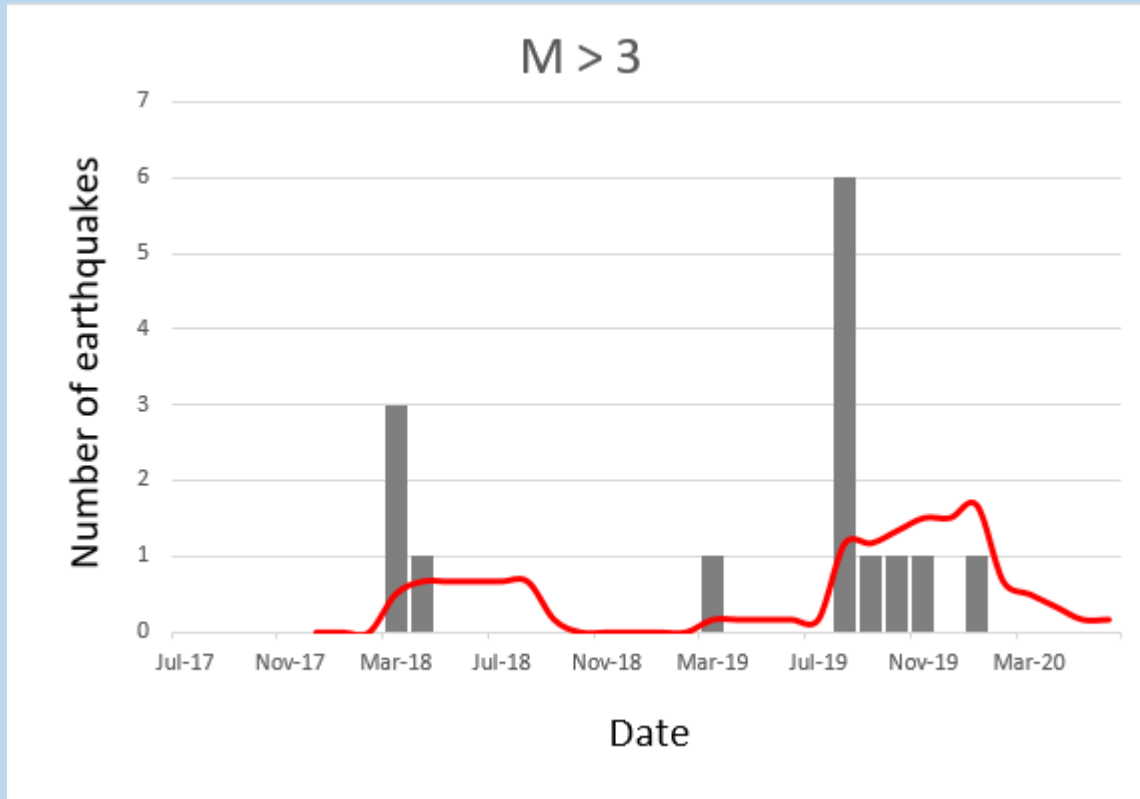


Monthly Volume w/in 20 mi



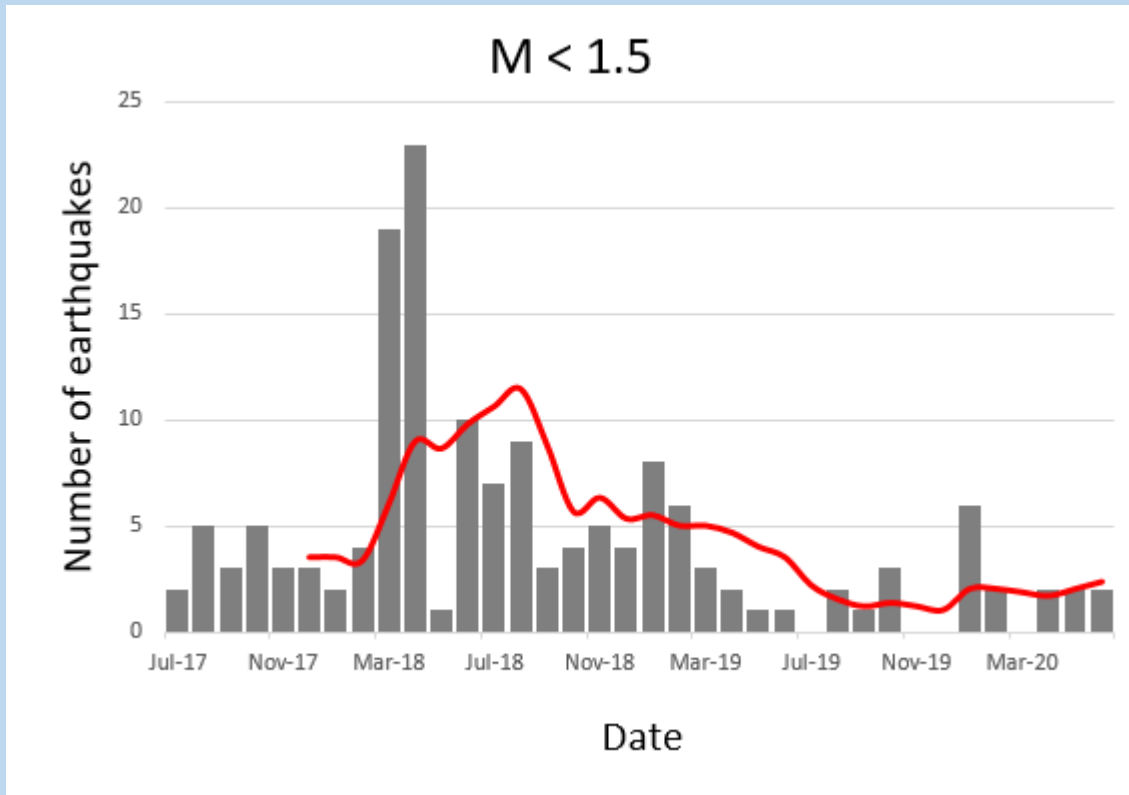
Hutchinson Cluster $M > 3$

6mo running average in red

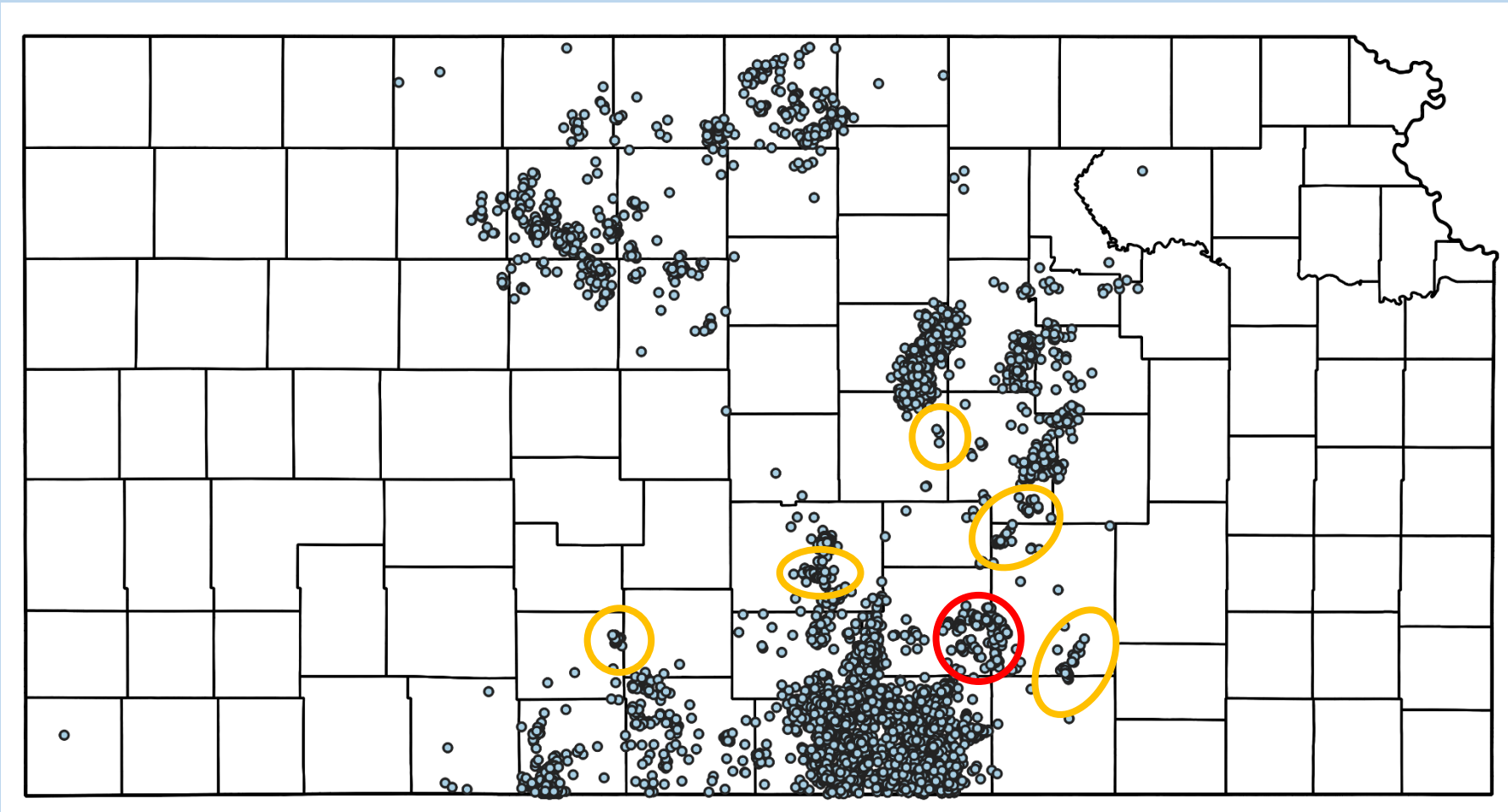


Hutchinson Cluster $M < 1.5$

6mo running average in red



$M < 2$ Clusters



M < 2 Clusters

Eastern Segwick / Western Butler
counties

6mo running average in red

