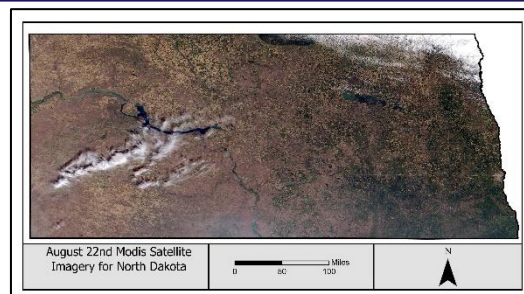


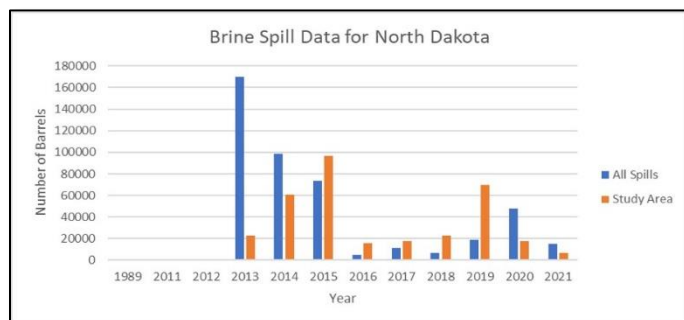
## NORTH DAKOTAVIEW 2020 - 2021 ACTIVITIES

**Remote Sensing Analysis of Brine Spills in the Bakken Formation Region of Western North Dakota.** One of the primary activities of NDView during this time period was the investigation of brine spills in western North Dakota from oil and gas development. This research was focused on updating an earlier NDView project.

- **Promotion of undergraduate and graduate research skills.** Two student interns investigated the history of oil and brine spills in ND from 2013 to 2021, and conducted research on the geospatial distribution of these spills. Landsat satellite imagery was used to create a Canopy Response Salinity Index (CRSI) to better show the locations of brine spills and their effect upon vegetation.
- **Advance Education and Training, Technology Transfer, and Outreach.** Student research focused on advanced analysis of geospatial data to detect hotspots for brine spills based on volume, and changes over time.



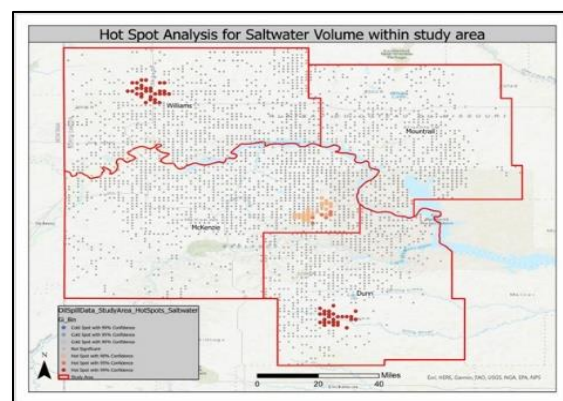
North Dakota landscape from MODIS imagery, August 22, 2020. The northwestern part of the state is the most active for oil and gas development.



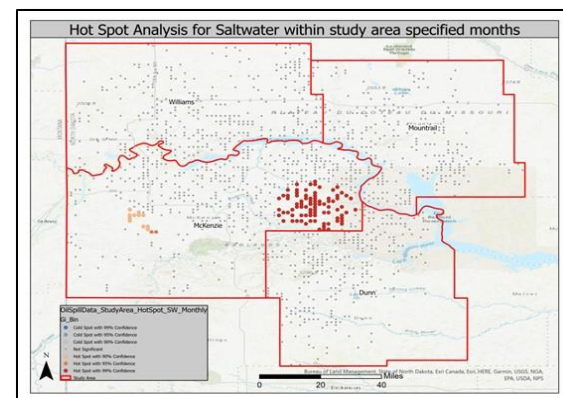
Brine spill data from 2013 – 2021.



CRSI values before and after brine spill. Bottineau County, ND (Patel 2020). Red areas indicate the most impacted areas.



Brine spill hotspot analysis for all months (2013-2021).



Brine spill hotspot analysis during June, July and August (2013-2021).

## BENEFITS TO NORTH DAKOTA

- NDView provided scholarships for undergraduate and graduate students at the University of North Dakota for research and training in remote sensing related areas. Students conducted research in duck nesting habitat, vegetation monitoring and ice patch archaeology.
- NDView led a field trip for K-12 teachers on the 1997 Red River Flood. Satellite images were used to demonstrate the extent of the flood, and damages. The teachers were part of the ND Geographic Alliance GeoFITT workshop in June 2021.
- NDView continued to provide support to local middle school teachers for online resources for remote sensing and geospatial learning during the Covid-19 pandemic.
- NDView provides access to specialty software for training and analysis on remote sensing data from satellites, aircraft, UAS and ground-based sensors.



*Student assessing ground cover for phenocam study (near Arvilla, ND).*



*NDView sponsored field trip for K-12 teachers (Grand Forks, ND and E. Grand Forks, MN).*

## NORTH DAKOTAVIEW CONSORTIUM MEMBERSHIP



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