



WISEROADS
A PROJECT OF WESTERN DAKOTA ENERGY ASSOCIATION



Weather Information System to Effectively Reduce Oilfield Delays and Disruption

July 22, 2024

Presented by Geoff Simon and Jonathan Rosencrans to North Dakota Oil & Gas Research Council



Wise Roads Project

Problem: When inclement weather strikes, local governments impose weight restrictions on gravel roads that prohibit the movement of oilfield truck traffic until road conditions improve.

Solution: Provide accurate weather information, especially precipitation data, to allow road managers to more precisely identify roads that require temporary weight restrictions, and exclude those that do not.



Wise Roads Project

- Oil industry truckers justifiably complained that road restrictions are at times imposed more broadly than necessary



Local Government and Oil Industry Roundtable – Watford City 12/12/18

Wise Roads Project

- Install research-grade weather stations in areas with heavy oilfield traffic
- Make data publicly available through NDAWN network & LoadPass restriction map
- Provide training to road managers through LTAP



ND Oil & Gas Research Council Grants

- The Oil & Gas Research Council supported the project with two matching grants:
 - \$250,000 for the weather stations
 - \$60,000 for a meteorologist to manage the project



Installation Process

- Gaps within the existing network were identified.
- Target road segments were selected with input from county road superintendents.
- Road segments were scouted for suitable locations
- Landowners were contacted for approval
- Station is installed



Transition to Rain Gauge Only Sites

- Within an extremely dense network, many weather parameters (temperature, wind speed) do not vary significantly
- Precipitation is most important and most varied
- 13 weather stations were installed as “Rain Gauge Only” sites
 - 8 located on well pads and connected to AC power
 - Heated rain gauge works in early spring and late fall events
 - IR Camera operates 24/7. Very useful in winter months

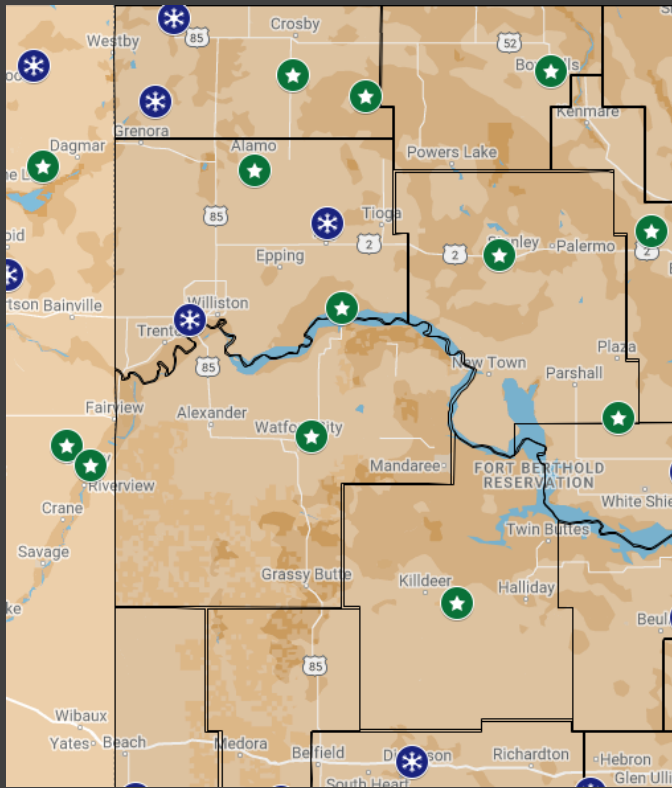
Industry Cooperation

- Companies that host stations and provide AC power:
 - Continental
 - Petro-Hunt
 - Chord
 - Hess
 - Marathon
 - Conoco-Phillips

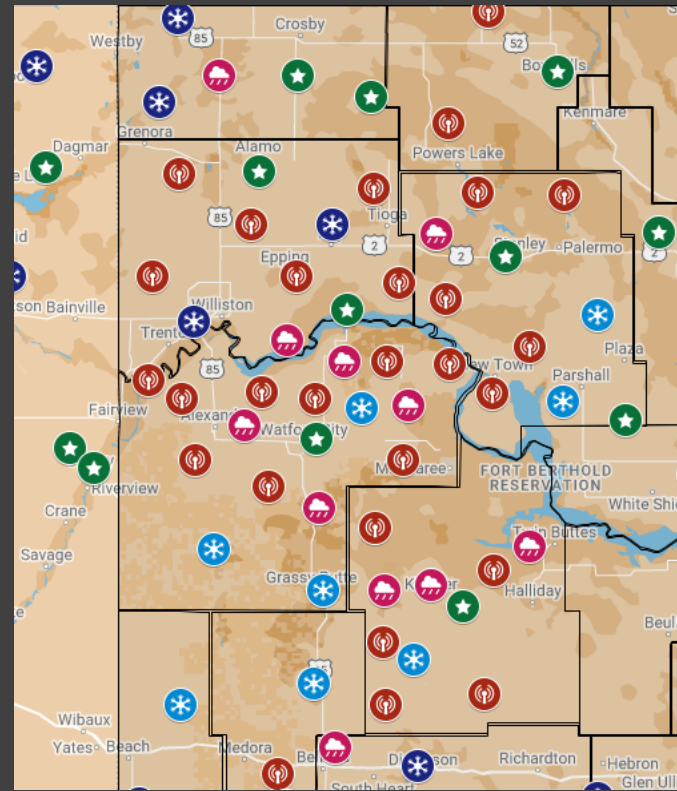


Station Density

Spring 2019



Summer 2024



Data Collected

- Data collected at all stations:
 - Rain
 - Temperature
 - Humidity
 - Dew Point
 - Wind Speed & Direction
 - Bare & Turf Soil Temp (4 in)
 - Temperature Inversion
 - Solar Radiation
- Data collected at select stations:
 - Winter Precipitation
 - Soil Temperature & Moisture(2,4,8,20,40 in)
 - Frost Depth (>7 ft deep)
 - Barometric Pressure
 - Road Probes

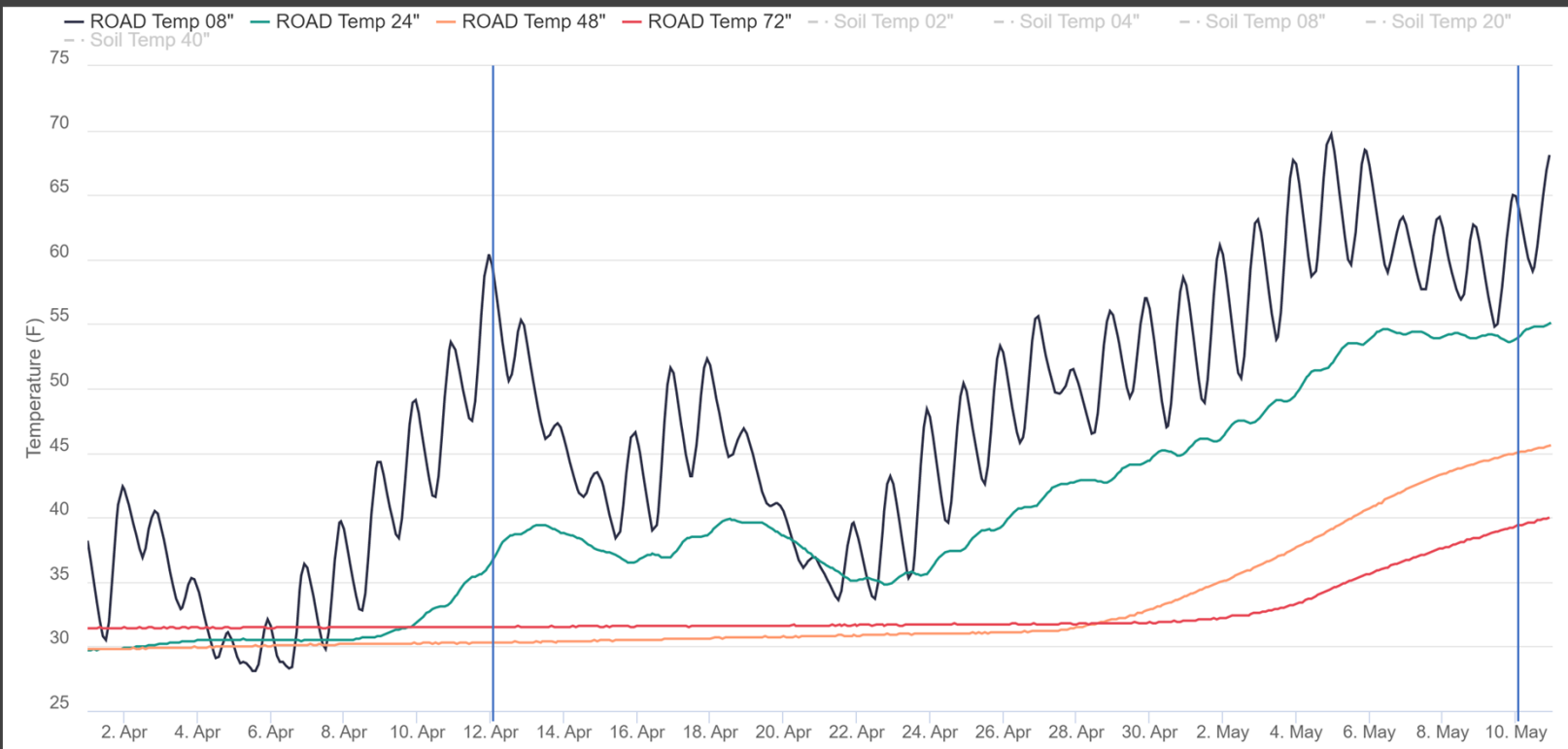
Road Temperature & Moisture Probes

- Installed at four locations
- Probes installed at 4 depths: 6-8", 24", 48", 72" from surface
- Temperature and volumetric water content (VWC) measured at each depth
- Used for monitoring frost depth and moisture infiltration



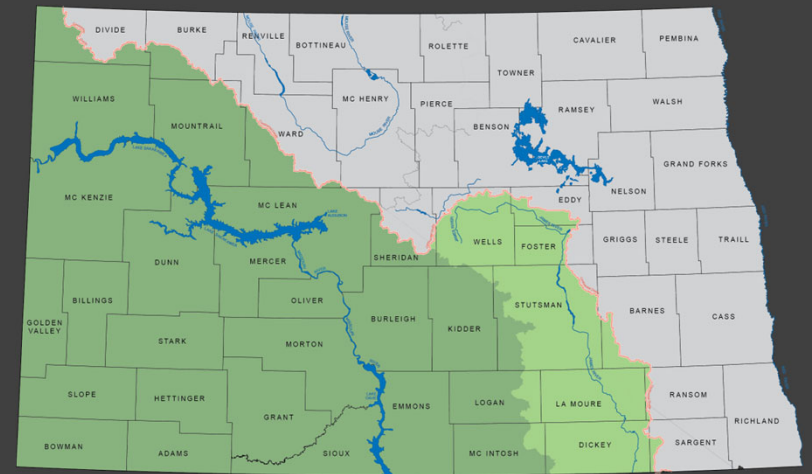
McKenzie County Frost Law 2023

- April 12, 2023 – May 10, 2023



U.S. Army Corp Upper Missouri River Basin Project

- 5 state, 5 year project to increase precipitation and soil moisture observations
- Primary upgrade is an all-season precipitation gauge and soil temperature & moisture probes
- 58 NDAWN stations upgraded/installed since 2021
- 8 Wise Roads stations have been upgraded so far, 2 more will be completed in 2024



North Dakota Agricultural Weather Network

- Full weather stations are fully integrated into NDAWN
 - Real-time data
 - Historical data
 - Crop & disease models
- Data available at NDAWN.org, NDAWN.info, and the NDAWN Inversion App



NDDOT Travel Map

North Dakota nd.gov Official Portal for North Dakota State Government

NORTH Dakota | Transportation

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ND ROADS

LAYERS **LEGEND**

SAVE VIEW DELETE VIEW LOAD DEFAULT

Last Update: 7/19/2024 8:11:13 PM CDT

- CLOSED / BLOCKED
- INCIDENT
- ROAD CONDITIONS
- TRAVEL ALERTS
- WORK ZONES
- CAMERAS

WARNINGS / EVENTS

SIZE AND WEIGHT RESTRICTIONS

MORE INFORMATION

WEATHER

- Weather Radar
- NWS Wind Speeds
- NWS Alerts
- Weather Stations (RWIS)
- Ag Weather Network (NDAWN)

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, OpenStreetMap contributors, and the



Tools Available to Counties

- Rainfall notifications - Text or email is sent when a station exceeds a custom preset threshold
- Live camera – access to live video feeds with ability to pan, tilt, and zoom camera lens.



NDNW Williams/Long Creek/Campbell PakBus Logger/RG

Active Daily Total

Long Creek: .50" Daily Rain

Current value is 0.559 in [.50" Rain Collection Threshold]

Narrowing the Scope

- 5 counties – including the Big 4 – have created zones for road restrictions
- Using these zones, counties can better apply road restrictions after a rain event

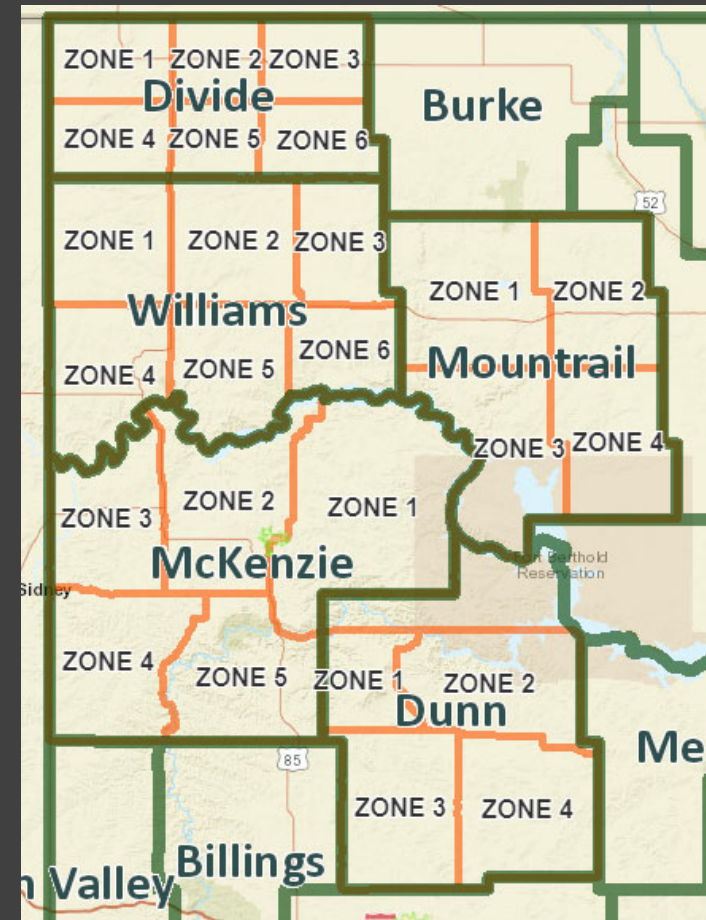
The following Restriction has been Added:

From: Williams
Title/Road: RAIN RESTRICTION UPDATE
Restriction:

EFFECTIVE AT 12:00PM (CST) - NOON - THE INCLEMENT RAIN RESTRICTIONS FOR ZONES 2 & 3 WILL BE LIFTED AND WILL GO BACK TO THE NORMAL POSTED ROAD WEIGHTS.

ZONES 4, 5 & 6 WILL REMAIN AT THE 20,000 LBS GVW UNTIL FURTHER NOTICE.

PLEASE REFER TO THE LOAD PASS RESTRICTION MAP & WILLIAMSND.COM - HIGHWAY DEPARTMENT ROAD MAPS - INCLEMENT WEATHER ZONE MAP.



Eastern Kingbird Habitat

Home



NDAWN - Grenora 8N

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Contact Information

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