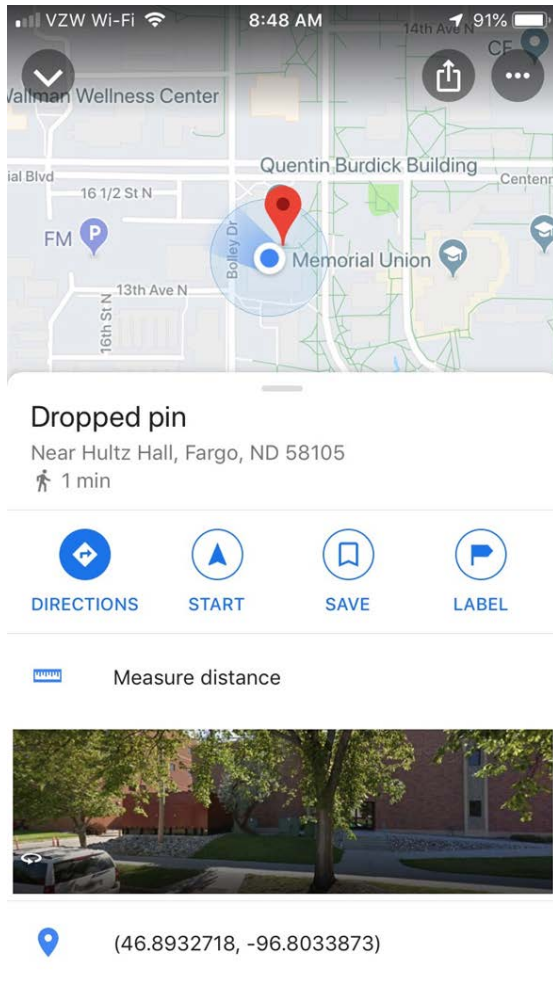


Livestock Water Monitoring Program Protocol

The goal of this project is to improve the quality of livestock water and reduce losses of livestock due to toxic water conditions. This will be accomplished by monitoring and reporting the level of total dissolved solids (TDS) and sulfates in livestock sources across North Dakota throughout the grazing season. Monitoring data will demonstrate the variability in water quality as it relates to location, source, time of year, and between years.

- Extension agent will monitor the quality of livestock water in their county. You will monitor a minimum of 4 sites. Preferably on 4 different operations but at minimum 2 in different portions of the county.
 - o 2 wells
 - o 2 surface water sources (pond, dugout)
- You are to monitor each site once a month during the grazing season (May – October). Please try to collect samples mid-month.
- **You will collect the following data.**
 - o **Site Name**
 - County/Source/Number
 - CassGW01 – Groundwater/well
 - CassSW01 - surface water
 - o **Source**
 - What type of water: well, dugout, etc....
 - o **GPS location/coordinates**
 - You can provide coordinates from a GPS or your phone.
 - iPhone/Android: using Google Maps
 1. Make sure that Location Services is ON. Navigate to Settings -> Location Services -> ON
 2. Open the Google Maps app.
 3. Press and hold the circle marking your location to drop a pin.
 4. The coordinates will appear for your dropped pin
 5. I recommend you label the pin with the site name and save it. At minimum record the coordinates.
 - iPhone: using the Compass app.
 1. Make sure that Location Services is ON. Navigate to Settings -> Location Services -> ON
 2. In the list of apps under Location Services, make sure Compass is ON
 3. Press the Home button to exit Settings
 4. Open the Compass app
 5. Your current GPS coordinates are displayed at the bottom of the screen.



- **Temperature**
- **TDS**
 - Make sure to calibrate your meter before you start sampling
 - Temperature conversion
 - TDS conversion factor
 - Make sure to provide the units you will be using to measure TDS. I prefer ppm.
 - If reading is $\geq 4,500$ ppm have a conversation with the producer about the risks and recommend they submit samples to a laboratory for analysis. Help them interpret results and submit copy for project files.
- **Sulfates**
 - Use sulfate test strips provided to screen sulfate level of water.
 - If the reading is > 800 ppm have a conversation with the producer about the risks and recommend they submit samples to a laboratory for analysis. Help them interpret results and submit copy for project files.
- **Cyanobacteria**
 - Complete a visual assessment of surface water to determine the potential for a cyanobacteria bloom.

- If a bloom is suspected discuss the risks and recommend that livestock be removed until the bloom is no longer present. Discuss testing and help submit sample to the NDSU VDL for screening if they are interested.
 - **Photo**
 - Take a photo at each visit, so we can see if the appearance of the water changes as well. Also, we can use this to identify other potential water quality issues such as cyanobacteria.
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- **Submit report/data by the first of each month by emailing to miranda.meehan@ndsu.edu**
- Share data (all resources are available in teams: https://teams.microsoft.com/_#/school/files/General?threadId=19%3A2841f4bae4584c9c8139bbf9a219d3b6%40thread.tacv2&ctx=channel&context=Livestock%2520Water&rootfolder=%252Fsites%252FLivestockManagement%252FShared%2520Documents%252FGeneral%252FLivestock%2520Water)
 - Create maps and other visuals that can be incorporated into the Livestock Water Quality Presentation and other materials.
 - Press releases/Newsletter articles/Social media
 - Presentation
 - Water quality publications and video
- **At the end of the grazing season complete follow-up survey of participating producers.**