

Livestock Water Quality During Drought



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NDSU

EXTENSION

Livestock Water Concerns During Drought

- **Total Dissolved Solids (TDS)**
- **Sulfates**
- **Cyanobacteria**



TDS

TDS	Comments
(ppm or mg/L)	
< 3,000	Usually satisfactory for most livestock
3,000-5,000	May not cause adverse effects to adult livestock. Growing/young livestock could be affected by loose stool or poor feed conversion. Levels near 5,000 ppm are unacceptable for poultry.
5,000-7,000	Should not be consumed by pregnant or lactating females. Usually a laxative and may result in reduced water intake
7,000-10,000	Do not use for swine. Do not use for pregnant or lactating ruminants or horses.
> 10,000	May cause brain damage or death

Sulfates

- Recommendations
 - < 500 ppm calves
 - < 1,000 ppm mature cattle
- Maximum sulfur and sulfate levels

Livestock Type	Diet	Sulfur in Diet	Sulfate in Water ppm
Cattle & Sheep	> <u>85% concentrate</u> , <15% forage	0.3% - 0.4%	<600
Cattle & other ruminants	>40% forage	0.5%	<2,500
Swine		0.4%	<3,000
Chicks		~0.4%	<1,000

As rumen pH decreases, the amount of H₂S in rumen gas cap increases

Sulfates

- Symptoms
 - Copper Deficiency
 - Loose stool
 - Central nervous system symptoms
 - Polioencephalomalacia

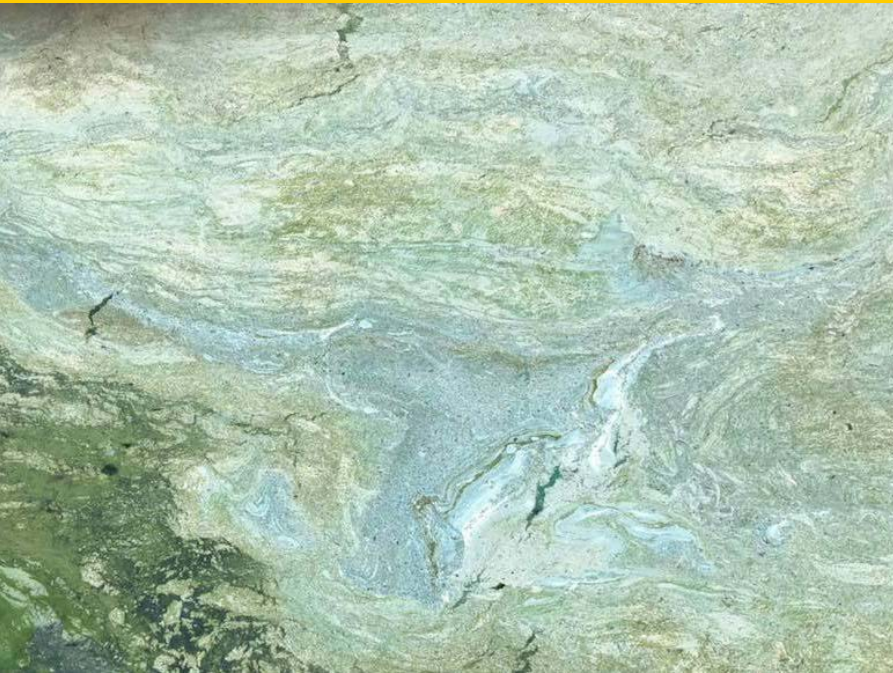


Monitoring TDS & Sulfates

- TDS/EC Meter
 - Submit sample if TDS is $> 4,500$ ppm
- Sulfate Test Strips
 - Submit sample if sulfate is > 800 ppm



Cyanobacteria



- Toxins
 - Neurotoxins
 - Hepatotoxins



Cyanobacteria Monitoring

- Visual observation
- Test water for the presence of the algae species



Water Testing

- Sample Kits
- Sample Protocol
- Sampling Assistance
- Analysis for Livestock
 - TDS
 - pH
 - Nitrates
 - Sulfates
- Cyanobacteria

Livestock Water Testing GUIDELINES

Miranda Meehan, NDSU Extension Service Livestock Environmental Stewardship Specialist
Mike Eli, North Dakota Department of Health Surface Water Program Manager
Michelle Mostrom, NDSU Veterinary Toxicologist

Sample Protocol

- 1 Collect sample in clean 1-quart or larger plastic (preferred) or glass container
 - a. Sample containers can be obtained from your county office of the NDSU Extension Service or the watershed coordinator with your local Soil Conservation District.
 - b. The Astro Chem Lab prefers you contact it to get a sample kit/container.
- 2 Collect sample from area where livestock are drinking. If collecting cyanobacteria (blue-green algae), take a sample in the bloom and wear gloves because it can be toxic to humans.
- 3 Rinse container several times using water to be sampled
- 4 Fill container completely. Being sure to collect water from deeper in the water and the surface.
- 5 Label the container with following information:
 - a. name of waterbody
 - b. name of sampler
 - c. date collected
 - d. time collected
- 6 Seal the container tightly and wrap the top with tape to prevent leaking. Place the water in a sealed plastic bag.
- 7 Complete laboratory sample custody form required to be submitted with the sample; contact the laboratory if needed
- 8 If submitting a cyanobacteria sample, **ship immediately** on an ice pack (**no wet ice please**) by next-day delivery. Do not freeze the sample or leave it on the dashboard of your vehicle (avoid temperature extremes).

*We recommend collecting and shipping samples before Friday to avoid shipping delays.

Testing Labs

NDSU Veterinary Diagnostic Laboratory

701-231-7527 or 701-231-8307

www.vdl.ndsu.edu

- Water screen: nitrates, pH, total dissolved solids (TDS), sulfates
 - Cost: \$25 for test and \$10 submission fee (submission paid once when submitting multiple samples)
- Cyanobacteria (blue-green algae)
 - Cost: \$20 for test and \$10 submission fee (submission paid once when submitting multiple samples)
- Turnaround: within one day of samples arriving at lab
- Shipping:

U.S. Postal Service

Veterinary Diagnostic Laboratory
NDSU Dept. 7691
PO Box 6050
Fargo, ND 58108-6050

FedEx/UPS

Veterinary Diagnostic Laboratory
NDSU Van Es Hall
1523 Centennial Blvd.
Fargo, ND 58102

Minnesota Valley Testing Laboratories Inc.

701-258-9720

www.mvmtl.com

- Water screen: nitrates, conductivity, total dissolved solids (TDS), sulfates
- Cost: \$49
- Turnaround: seven days
- Shipping: Minnesota Valley Testing Laboratories
2616 East Broadway Ave.
Bismarck, ND 58501

Astro Chem Lab Inc.

701-572-7355

<http://astrochemlab.com>

- Water screen: pH, conductivity, residual sodium carbonate, hardness, sodium adsorption ratio, total dissolved solids, sodium chloride, calcium, magnesium, sodium, iron, potassium, chloride, carbonate, bicarbonate, sulfate and nitrate-N
- Cost: \$60
- Turnaround: seven days
- Shipping: Astro Chem Lab
4102 2nd Ave. W.
PO Box 972
Williston, ND 58802

NDSU EXTENSION SERVICE

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2021 Drought Impacts

- Water Testing
 - 505 Field Tests
 - 35 toxic TDS
 - 43 toxic Sulfate
 - 3 Cyanobacteria
 - 39 sent to laboratory

Sulphate in water, dehydration and heat killed 200 Sask. cattle

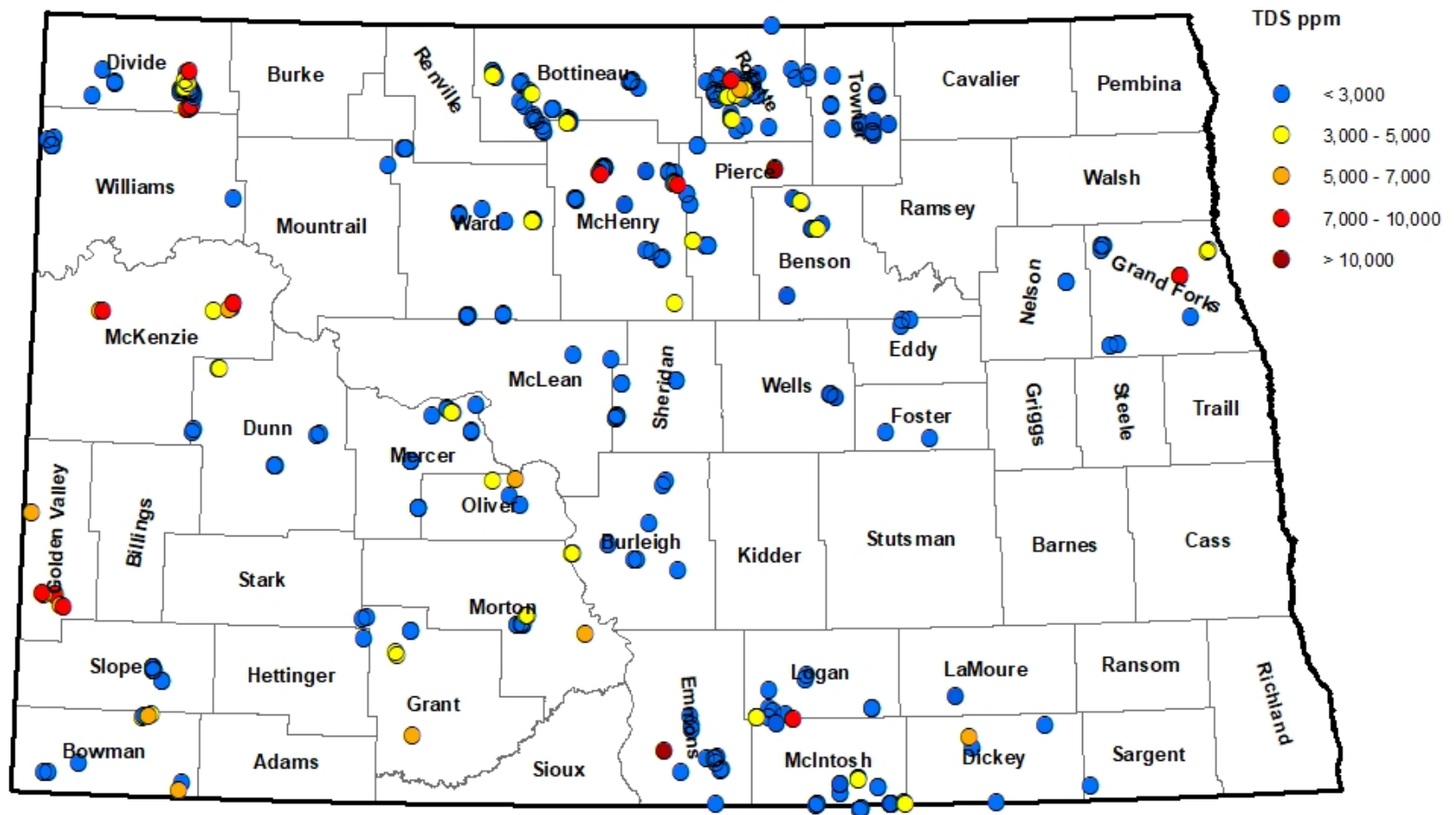


Water had more than 3 times the lethal concentration of sulphate

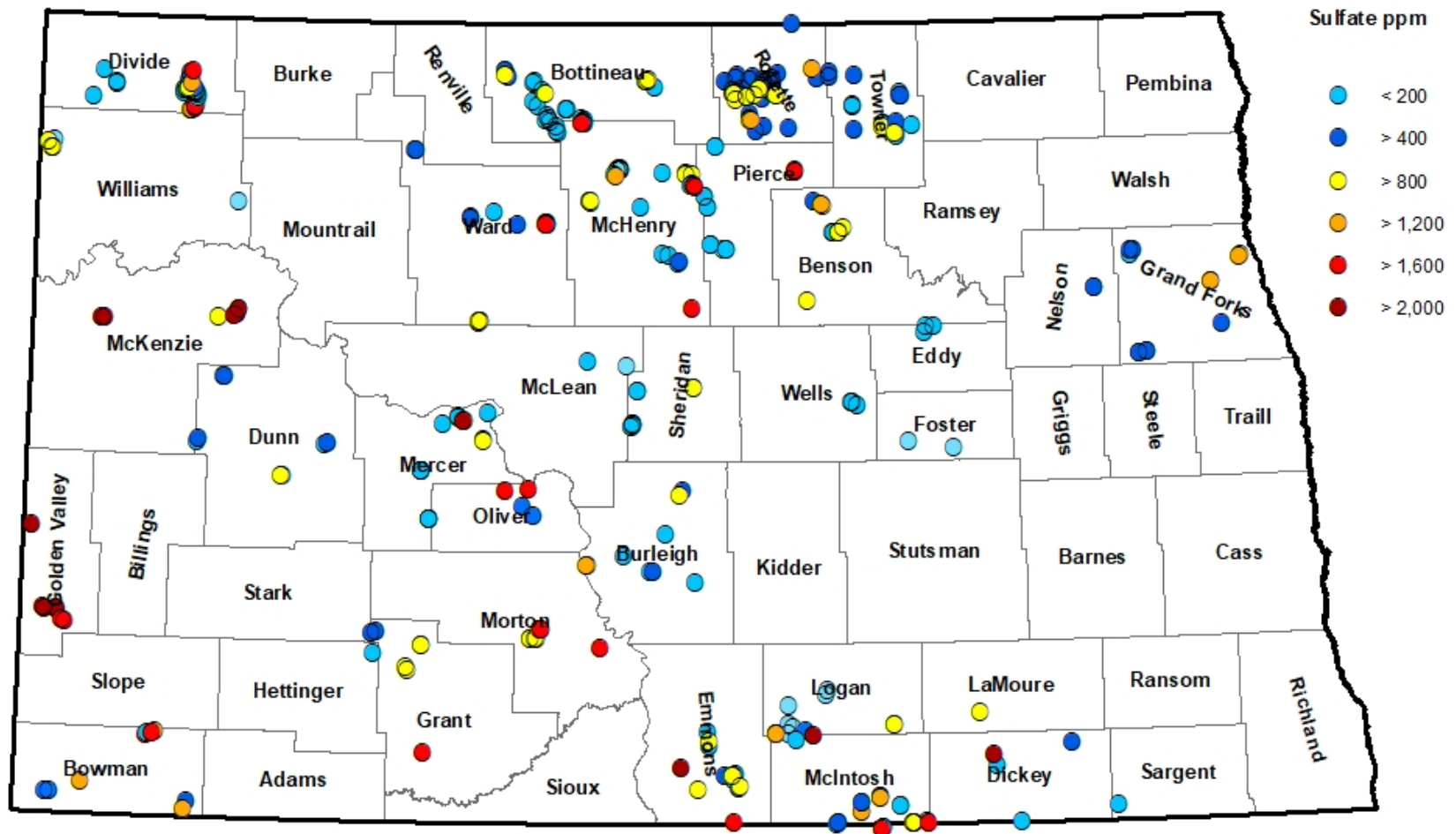
Creedon Martell - CBC News - Posted: Jul 13, 2017 1:20 PM CT | Last Updated: July 13, 2017



2021 Livestock Water Quality Total Dissolved Solids (TDS)



2021 Livestock Water Quality Sulfates



Managing Water Quality

- Restrict or Eliminate Access
- Provide/Use Alternative Water
- Develop Water
- Assistance Programs



Discussion



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