

AE1360 (Reviewed February 2022)

Irrigation Water Sample Analysis

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Soil-Water Compatibility Recommendations

The NDSU Soil and Water Testing Laboratory has been making soil-water compatibility recommendations since the early 1960s. These recommendations are based on the electrical conductivity (EC) and sodium adsorption ratio (SAR) determined on the irrigation water and the soil series present on the land to be irrigated.

Soil surveys of every county in North Dakota have been completed and documented. Many counties have printed copies, but official, up-to-date soil survey information can be found only on the internet at <http://websoilsurvey.nrcs.usda.gov>. Your local Natural Resources Conservation Service office or county office of NDSU Extension can help you obtain soil series information for your fields.

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For more information on this and other topics, see www.ag.ndsu.edu

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Each soil series in North Dakota has been classified as unsuitable for irrigation, conditional or irrigable. The irrigation classification for specific soils can be found in the publication "Compatibility of North Dakota Soils for Irrigation" (<https://www.ndsu.edu/agriculture/ag-hub/publications/compatibility-north-dakota-soils-irrigation>).

Soil-water compatibility recommendations are made based on how high the irrigation water salinity and sodicity are relative to the tolerance limits of the soils to be irrigated. For example, we may have an irrigation water with an EC of 1,585 micromhos per centimeter ($\mu\text{mhos/cm}$) and an SAR of 5.9. We could use this water on a soil such as a Hecla, which has tolerance limits of 3,000 $\mu\text{mhos/cm}$ for EC and 12 for SAR. On the other hand, this water would not be compatible with a Bearden soil, which has tolerance limits of 1500 $\mu\text{mhos/cm}$ for EC and a SAR of 6.

Soil-water compatibility determinations should be done before irrigation systems are established. Failure to obtain compatibility recommendations can result in soil hardening. The soil becomes impenetrable and loses productivity.

Even where soil-water compatibility recommendations have been obtained, and soils and water have been found to be compatible, soils should be sampled to a minimum depth of 6 feet in 1-foot increments and analyzed for pH, EC and SAR. This should be done before irrigation commences in a field and again every three to five years.

This allows the irrigator to monitor any detrimental changes that may occur due to irrigation and become problems before they cause major soil degradation.

Soil-water compatibility recommendations can be obtained for \$60 from the Soil and Water Testing Laboratory at NDSU with the submittal of a water sample and legal description of the field to be irrigated. **Use the form on the reverse side of this sheet.**

A soil-water compatibility recommendation for irrigation can be only as good as the information supplied.

Please fill out the reverse side completely.

Note:

Water to be used for drinking is tested by the North Dakota Health Department Laboratory in Bismarck, N.D. Water to be used for livestock is tested by the Veterinary Diagnostic Laboratory at NDSU in Fargo, N.D.

Sampling Instructions

Use a clean ½- to 1-pint bottle. **DO NOT** use a bottle that contained any chemicals such as bleach or agricultural chemicals. Rinse the container several times with the sample water before filling. If the sample is from a well, pump the well for 10 to 15 minutes to obtain a uniform sample.

Irrigation Water Sample Analysis Form

Name _____

Date ____/____/____

Address _____

Phone _____

Email _____

Sample name _____

Birthdate ____/____/____

Location of area to be irrigated:

Township No. _____ Range No. _____ Section No. _____ Quarter _____

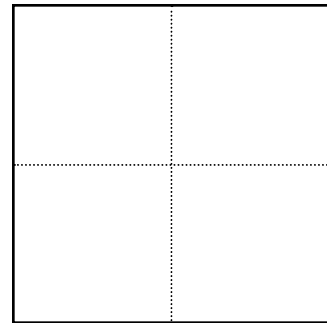
County _____

Water Source:

- Farm well
- Irrigation test well
- Irrigation production well
- Depth of well _____ ft
- Other sources, please specify



Indicate irrigated area and water source (with an X) on the section map



Kind of Soil:

Has a soil suitability for irrigation map (ND Soil 8 Form) been prepared by the Natural Resources Conservation Service? Yes No

If mapped, send copy with water sample.

If soil has not been mapped, make sure the location of land to be considered for irrigation is clearly stated above so the best available soils information can be used for the recommendation.

Would you like a recommendation? Yes No

Is field tile drained? Yes No

Expected Use:

Irrigation: field scale _____

Irrigation: lawn and/or garden _____

Other _____

Crops to be grown _____

Soil and Water Testing Laboratory • phone 701-231-8942

US Mail:

NDSU Dept. 7680
P.O. Box 6050
Fargo ND 58108-6050

FedEx, UPS, etc.:

103 Waldron Hall
1360 Bolley Drive
Fargo, ND 58102

Cost:

- \$45 per sample **without** recommendations (analysis only)
- \$60 per sample **with** recommendations (analysis and recommendations)