

# ANNUAL REPORT 2020

Conservation and Survey Division  
School of Natural Resources  
University of Nebraska–Lincoln

128 YRS

**CSD**

1893-2021



CONSERVATION AND  
SURVEY DIVISION

*School of Natural Resources*

## **Conservation and Survey Division**

# **Our Mission**

The Conservation and Survey Division (Nebraska Geological Survey), the natural resource survey component of the School of Natural Resources, is a unique, multi-disciplinary research, service and data-collection organization established by state statute in 1921.

The Division's mission is to investigate and record information about Nebraska's geologic history, its rock and mineral resources, the quantity and quality of its water resources, land cover and other aspects of its geography, as well as the nature, distribution and uses of its soils.

*Cover photo:*

*Lake Superior agates, such as this beautiful polished specimen, are frequently found in eastern Nebraska's glacial deposits.*

**Conservation and Survey Division**

# **Annual Report 2020**

**February 2021**

**R.M. Joeckel**

Director, Conservation and Survey Division  
Senior Associate Director, School of Natural Resources

University of Nebraska–Lincoln



## **CSD 2020 Accomplishments at a Glance**

**Extension contacts by CSD personnel:  
1,968**

**Number of organization/programs  
served worldwide:  
95**

**Requests for data and analysis served  
by CSD personnel:  
369**

**Footage of test holes drilled and/or  
logged by CSD personnel:  
9,530 ft**

**Automated groundwater-data entries  
overseen by CSD personnel:  
489,216**

**Groundwater quality results processed  
by CSD personnel:  
8,589**

**Teaching contribution of CSD personnel:  
CSD faculty taught 15 different courses in  
5 different programs at UNL, producing  
448 student credit hours**

**Students advised by CSD personnel  
in 2020: 21 graduate students**

**Continuing education units for  
professionals (CEUs) generated by CSD  
personnel:  
185**

**Total grant funding with which CSD  
personnel were associated: >\$3.95 million**

**Total scientific publications of all  
kinds authored or coauthored by CSD  
personnel: 37**

**Peer-reviewed scientific journal  
articles: 20**

**Book chapters: 2**

**Survey reports, bulletins, and  
field guides: 3**

**Major field trips run or co-run by  
CSD personnel:  
1**

**Presentations by CSD personnel:  
28**

**Media interviews by CSD personnel:  
3**

**Social media involving CSD: 27 Tweets,  
with 3.0% engagement rate (896 engage-  
ments); 30,091 impressions; 1,301 media  
views 11% increase in followers**

**Total page views of CSD website:  
226,058 page views**

**Downloads of archived CSD publications  
from UN-L Digital Commons: 788 total  
CSD publications downloaded from UNL  
Digital Commons; 11,667 views by users  
in 144 countries**

## Publications Authored or Coauthored by CSD Personnel in 2020

- Abimbola, O.P., A.R. Mittelstet, A.R., and **Gilmore, T.E.**, 2020. Geostatistical features of streambed vertical hydraulic conductivities in Frenchman Creek Watershed. *Hydrological Processes* [https://doi.org/10.1002/hyp.13823].
- Abimbola, O.P., Mittelstet, A.R., **Gilmore, T.E.**, and **Korus, J.T.**, 2020. Influence of watershed characteristics on streambed hydraulic conductivity across multiple stream orders. *Scientific Reports* 10:3696, https://doi.org/10.1038/s41598-020-60658-3
- Carson, E.C., Attig, J.W., Rawling, J.E., III, and **Hanson, P.R.**, 2020. Constraints on the end of the MIS 2 advance and onset of retreat for the Green Bay Lobe of the southern Laurentide Ice Sheet, south-central Wisconsin, USA, *Quaternary Research* 95: 142-153 [https://doi.org/10.1017/qua.2020.8].
- Chapman, K., **Gilmore, T.E.**, Chapman, C.D., Mehrubeoglu, M., and Mittelstet, A.R., 2020. Application of time-lapse imagery and machine learning to improve stream discharge monitoring. *AGU Fall Meeting* [https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/714982].
- Cherry, M., Gilmore, T.**, Mittelstet, A., Gastmans, D., Santos, V., and Gates, J. B., 2020. Recharge seasonality based on stable isotopes: Nongrowing season bias altered by irrigation in Nebraska. *Hydrological Processes*, 34: 1575–1586. https://doi.org/10.1002/hyp.13683
- Crago, R., **Szilagyi, J.**, and Qualls, 2020. Comment on “Complementary principle of evaporation: from original linear relationship to generalized nonlinear functions” by S. Han and F. Tian, *Hydrology and Earth System Sciences* 25: 63-68, https://doi.org/10.5194/hess-2020-310.
- Dave, N., Mittelstet, A.R., **Korus, J.T.**, and **Waszgis, M.M.**, 2020. Impact of an extreme flood event on streambank retreat: Cedar River, Nebraska, USA. *Journal of the American Water Resources Association* 56: 528–538 [https://doi.org/10.1111/1752-1688.12828].
- Delozier, J., and **Burbach, M.E.**, 2020. The need for boundary spanners in integrated water resource management. In Goldstein, M., and DellaSala, D. (eds.), *Encyclopedia of World Biomes*, p. 351-357. Amsterdam: Elsevier.
- Duboscq, S., Genereux, D.P., **Gilmore, T.E.**, Pétré, M.A., Solomon, D.K., Knappe, D.R.U., Hopkins, Z.R., and DeStefano, N.J., 2020. 3H/3He groundwater ages and discharge of PFAS from groundwater to a coastal plain stream in North Carolina. *AGU Fall Meeting* [https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/672542].
- Hallum, D., Hanson, P.R.**, Tucker, S., and **Diffendal, R.F., Jr.**, 2020. Hydrogeology and geology of the lower North and South Platte Rivers of Nebraska, Conservation and Survey Division Guidebook No. 37, 44 p.
- Humphrey, E., Solomon, D.K., **Gilmore, T.E.**, Mittelstet, A.R., Zlotnik, V.A., Genereux, D.P., Zeyrek, C., MacNamara, M.R., and Jensen, C.R., 2020. Using empirical transit time distributions to forecast stream water tracer concentrations. *AGU Fall Meeting* [https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/666576].
- Jensen, C.R., Genereux, D.P., **Gilmore, T.E.**, Solomon, D.K., Mittelstet, A.R., Humphrey, E., MacNamara, M.R., Zeyrek, C., and Zlotnik, V.A., 2020. Estimating groundwater age in the Nebraska Sand Hills from SF6 in stream

water: An application of the reach mass-balance approach to groundwater mean transit time. *AGU Fall Meeting* [<https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/674734>].

**Joeckel, R. M.**, Ludvigson, G. A., Möller, A., Hotton, C. L., Suarez, M. B., Suarez, C. A., Sames, B., Kirkland, J. I., and Hendrix, B., 2020. Chronostratigraphy and Terrestrial Palaeoclimatology of Berriasian–Hauterivian Strata of the Cedar Mountain Formation, Utah, USA. *Geological Society Special Publication* 498 [<https://sp.lyellcollection.org/content/early/2019/10/16/SP498-2018-133>].

Johnson, W.C., **Hanson, P.R.**, Halfen, A.F., and Koop, A.N., 2020. Sand dunes of the central and southern Great Plains, in Lancaster, N., Hesp., P.A., (eds), *Dunes of North America*, p. 121-179. New York, Springer.

**Korus, J.T.**, Fraundorfer, W., **Gilmore, T.E.**, and Karnik, K., 2020. Transient streambed hydraulic conductivity in channel and bar environments, Loup River, Nebraska. *Hydrological Processes*, 34: 3061–3077. <https://doi.org/10.1002/hyp.13777>

**Korus, J.T.** and Hensen, H. J., 2020. Depletion percentage and non-linear transmissivity as design criteria for groundwater-level observation networks. *Environmental Earth Sciences* 79: 382 [<https://doi.org/10.1007/s12665-020-09123-y>].

Layton, P.J., Adams, T.M., Jol, H.M., and **Hanson, P.R.**, 2020. Aeolian dune stratigraphy revealed within Niobrara River valley, Nebraska Sand Hills, USA. *Geological Society of America Abstracts with Programs* 52 (5).

Lee, J. D., Möller, A., Ludvigson, G. A., Suarez, M. B., McLean, N. M., and **Joeckel, R. M.**, 2020. Volcanogenic zircons from mudrocks: A new tool for chronostratigraphy. *Geological Society of America Abstracts with Programs* 52 (1) [<https://gsa.confex.com/gsa/2020SC/webprogram/Paper343823.html>].

Lee, J. D., Möller, A., Ludvigson, G. A., Suarez, M., **Joeckel, R. M.**, and Maxson, J. (2020). Refining the chronostratigraphy of the Cretaceous Cedar Mountain Formation, Utah, using volcanogenic zircons from mature paleosols. *Geological Society of America Abstracts with Programs* 52 (6).

Li, Y., Liu, C., Ou, G., Wang, Z., **Korus, J.T.**, and Jiang, R., 2020. Can hydraulic conductivity of fluvial sediments be informed by spectral reflectance? *Water Resources* 47: 846-854 [<https://doi.org/10.1134/S0097807820050218>].

Ma, N., **Szilagyi, J.**, Zhang, Y., and Jozsa, J., 2020. Benchmarking large-scale evapotranspiration estimates: A perspective from a calibration-free complementary relationship (CR) approach and FLUXCOM. *Journal of Hydrology* 590, 125221.

MacNamara, M., Genereux, D.P., **Gilmore, T.E.** Solomon, D.K., Mittelstet, A.R., Humphrey, E., Jensen, C.R., Zeyrek, C., and Zlotnik, V.A., 2020. Groundwater 14C Age at the point of discharge in a groundwater dominated stream: Sampling below the streambed in nested watershed sin the Nebraska Sand Hills (USA). *AGU Fall Meeting* [<https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/675554>].

Miller, M. and **Burbach, M.E.**, 2020. Cigarette butt disposal behavior: A case study of a public beach on Jekyll Island, Georgia, USA. *Environment and Natural Resources Research* 10: 27-43.

Kennedy, S.M. and **Burbach, M.E.** 2020). Great Plains ranchers managing for vegetation heterogeneity: A multiple case study. *Great Plains Research*, 30: 137-148.

**Korus, J.T.**, **Joeckel, R.M.**, and Tucker, S., 2020. Genesis of giant, bouldery bars in a Miocene gravel-bed river: Insights from outcrop sedimentology, UAS-SfM photogrammetry, and GPR. *Journal of Sedimentary Research*, v. 90: 27-47.

- Miao, X., Stohr, C., **Hanson, P.R.**, and Wang, Q., 2020. Remote sensing and three-dimensional photogrammetric analysis of glaciofluvial sand and gravel deposits for aggregate resource assessment in McHenry County, Illinois, USA. *Engineering Geology* 274, 105695.
- Smith, V. L. and **Joeckel, R. M.**, 2020. Reservoir characterization and static Earth model for potential CO<sub>2</sub> storage in Upper Pennsylvanian Cyclothems, Nebraska, USA. *Environmental Geosciences* 27: 67-86.
- Solomon, D.K., Humphrey, E., **Gilmore, T.E.**, Genereux, D.P., and Zlotnik, V., 2020. An automated seepage meter for soft-bottom streams and lakes. *Water Resources Research* [<https://doi.org/10.1029/2019WR026983>].
- Staggs, D.W., **Burbach, M.E.**, Matkin, G.S., and Burkhart-Kriesel, C., 2020. The Nebraska Water Leaders Academy graduates' influence on community capitals and community capacity. School of Natural Resources, University of Nebraska-Lincoln, Open-File Report 209.
- Szilagyi, J.**, 2020. Water balance backward: estimation of annual watershed precipitation and its long-term trend with the help of the calibration-free generalized complementary relationship of evaporation. *Water* 12, 1775.
- Szilagyi, J.**, Crago, R., and Ma, N., 2020. Dynamic scaling of the generalized complementary relationship (GCR) improves long-term tendency estimates in land evaporation, *Advances in Atmospheric Sciences* 37: 975-986.
- Szilagyi, J.** and Franz, T. E., 2020. Anthropogenic hydrometeorological changes at a regional scale: observed irrigation-precipitation feedback (1979-2015) in Nebraska, USA. *Sustainable Water Resources Management* 6: 1-10 [<https://doi.org/10.1007/s40899-020-00368-w>].
- Turk, J. K.** and Graham, R.C. 2020. Disturbance impacts on porosity and hydraulic properties of vesicular horizons. *Soil Science Society of America Journal* 84: 543-555 [doi:10.1002/saj2.20055].
- Turk, J.K.** and Young, R.P., 2020. Field conditions and the accuracy of visually determined Munsell soil color *Soil Science Society of America Journal* 84: 163– 169 [<https://doi.org/10.1002/saj2.20023>].
- Young, A.R., Burbach, M.E., Howard, L.M., Olafsen Lackey, S., and Joeckel, R. M.**, 2020. Nebraska Statewide Groundwater-Level Monitoring Report 2019. *Nebraska Water Survey Paper* 87. Conservation and Survey Division, School of Natural Resources University of Nebraska-Lincoln.
- Zeyrek, C., **Gilmore, T.E.**, Mittelstet, A.R., Zlotnik, V.A., Solomon, D.K., Genereux, D.P., Humphrey, E., MacNamara, M.R., and Jensen, C.R., 2020. A model-based study of the effects of spatial recharge patterns on groundwater transit time distributions in the Nebraska Sandhills. *AGU Fall Meeting* [<https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/682502>].
- Zlotnik, V. A., Solomon, D. K., **Gilmore, T. E.**, Genereux, D. P., and Humphrey, C. E., 2020. Dynamic seepage meter: Theory with application examples. *EGU General Assembly 2020* [<https://doi.org/10.5194/egusphere-egu2020-3718>].

# **Presentations by CSD Personnel and their Students in 2020**

## ***Full Range Leadership for Leaders in the Water Arena***

Nebraska State Irrigation Association, Water Leaders Academy, Lincoln, NE  
January 23, 2020  
(Burbach)

## ***World Water 2020 and a Geological Primer on Groundwater in Nebraska***

Nebraska Water Leaders, Nebraska State Irrigation Association, Lincoln, NE  
January 24, 2020  
(Joeckel)

## ***AEM presentation and tradeshow booth***

ENWRA annual meeting at the NRD Legislative Conference  
January 28, 2020  
(Cameron)

## ***ENWRA breakout session and panel discussion***

NARD Legislative Conference  
January 28 & 29, 2020  
(Lackey, Cameron and Korus)

## ***Interpretive Geologic Maps and Cross Sections for Phelps, Kearney, and Adams Counties in Nebraska***

Joint Tri-Basin and Little Blue NRD Board Meeting at the Nebraska Legislative Conference  
Lincoln, NE, January 29, 2020  
(Divine, Gilmore and Cherry)

## ***Watershed Science Education: Needs Assessment and Development***

North Central Agricultural and Natural Resources Water Academy, Omaha, NE  
February 12, 2020  
(Gilmore)

## ***Public meeting presentation on AEM***

Concerned Citizens for Responsible Government of Saunders County  
February 13, 2020  
(Cameron)

## ***The Nebraska Water Leaders Academy***

The Nebraska Natural Resources Commission, Kearney, NE  
February 19, 2020  
(Burbach)

## ***Platte River Resilience Fund***

Central Platte Local Leadership Team and Central Platte NRD, Grand Island, NE  
February 26, 2020  
(Burbach)

## ***Water Quality and Water Level Database Updates***

NARD Water Meeting, Kearney, NE,  
March 3, 2020  
(Divine, Young, McGuire and Virden)

## ***Writing Nebraska's Water Management Story***

Nebraska Watershed Science Collaborative Workshop, March 31, 2020, Virtual  
(Ingram, Gilmore)

## ***From Knowledge to Understanding: Lessons Learned from Integrating Research and Stakeholder Engagement in a Water & Agriculture Project***

University of Washington EarthLab & Learn Webinar Series, May 12, 2020  
(Burbach)

## ***Nebraska's Local, Integrated Approach to Water Management in the Platte River Basin: A Case Study***

International Society for River Science Special Session Planning Meeting  
May 28, 2020  
(Burbach)

## ***Groundwater Recharge Seasonality Roundtable***

June 22, 2020, Virtual  
(Powers, Gilmore, and Cherry)

## ***Nebraska GeoCloud Webinar***

July 1, 2020  
(Cameron, Korus)



**Hydrogeology and Water Quality Issues in the North Platte Valley, Nebraska**

UNL Water Center Miniconference

July 3, 2020

(Sibray)

***An Assessment of Local, Integrated Water Resource Management in the Platte River Basin, Nebraska, USA***

26th International Symposium on Society and Resource Management, Virtual Conference,

July 15, 2020

(Burbach)

***ENWRA Spring Technical Meeting***

July 23, 2020

(Cameron)

***Central Platte Local Leadership Team - From Knowledge to Understanding: Lessons Learned from Integrating Research and Stakeholder Engagement in a Water & Agriculture Project***

Nebraska Water Center Virtual Conference

August 3, 2020

(Burbach)

***Geological Overview and Commentary on Carbon Capture and Storage in Nebraska***

Capturing Carbon in Nebraska Webinar Series, Battelle Memorial Institute and the Great Plains Institute

August 3, 2020

(Joeckel)

***The Impact of Sampling Methodology on Soil Bulk Density Measurement by the Clod Method***

UCARE Virtual Symposium, UNL

August 5, 2020

(Airori, Turk, and Baker)

***Recognizing Uranium Source Rocks in the Sedimentary Environment***

AAPG Annual Convention and Exhibition

September 30, 2020

(Sibray, Hallum, and Campbell)

***Sources of Rare Earth Elements on the U.S. and the World***

AAPG Annual Convention and Exhibition

September 30, 2020

(Campbell, Gregory, Sibray, and Conca)

***Developing and Applying a Conceptual Framework to Identify the 'Participatory Culture' of Farmer Stakeholders***

Rural Sociology Graduate Student Conference

October 26, 2020

(Whitley, Eaton, Brasier, and Burbach)

***Producer Attitudes Toward Stakeholder Engagement: Opportunities for and Constraints to Participation in Water and Land Management and Policy Development***

AWRA Annual Conference, Virtual

November 10, 2020

(Burbach, Delozier)

***Water for Agriculture: Engaging with Stakeholders to Find Solutions***

AWRA Annual Conference, Virtual

November 10, 2020

(Burbach)

***UNL Pedology Updates***

Nebraska Cooperative Soil Survey Meeting, Virtual

December 2, 2020

(Turk)

***Nitrate and Uranium Water Quality Issues in the Southern Nebraska Panhandle***

Presentation for Panhandle Research and Extension Center

December 2, 2020

(Sibray)

## Organizations for which CSD Personnel Fulfilled Requests for Information, Consultation or Services in 2020

Adaptive Resources, Inc.  
American Association of Petroleum Geologists  
*Applied Sciences* (journal)  
AquaGeo Frameworks  
Audubon Nebraska, VESPR (Vision for an  
Ecologically Sound Platte River)  
Battelle Memorial Institute  
Bazile Nitrate Study  
Beijing Normal University  
Budapest University of Technology and Economics  
CASNR Community Night  
California Department of Food and Agriculture  
Central Platte NRD  
China University of Geosciences  
Chinese Academy of Sciences  
City of Firth, Nebraska  
Coordinate Solutions (St. Augustine, Florida)  
Darrah Oil Co. (Wichita, Kansas)  
Deutsches Klimarechenzentrum GmbH  
(Hamburg, Germany)  
Daugherty Water for Food Global Institute  
Downey Drilling  
Duck Creek Ranch  
*Earth Surface Processes and Landforms* (journal)  
Eastern Nebraska Water Resources Assessment  
Environmental Geosciences (journal)  
Eötvös Loránd University (Hungary)  
Fairbanks, Irrigation

Gallifrey Exploration, LLC  
*Geosciences* (journal)  
Glen-Gery Corporation (Wyomissing,  
Pennsylvania)  
*Groundwater* (journal)  
HDR, Inc.  
High Point Resources (Denver, Colorado)  
*Hydrological Processes* (journal)  
IM2 Consulting (Houston Texas)  
International Association of Hydrogeologists  
*Journal of Sedimentary Research*  
*Journal of Water and Soil Conservation*  
Legacy of the Plains Museum  
Lewis and Clark NRD  
Little Blue NRD  
Lower Loup NRD  
Lower Niobrara NRD  
Lower Platte North NRD  
Lower Platte South NRD  
Massachusetts Institute of Technology  
Middle Niobrara NRD  
Middle Republican NRD  
Missouri State University  
National Association of State Boards of Geology  
National Envirothon  
National Science Foundation  
Nebraska Association of Resource Districts  
Nebraska CarbonSAFE

Nebraska Climate Assessment Response Committee (CARC)	The Flatwater Group
Nebraska Department of Environment and Energy	The Leak Detective (Omaha)
Nebraska Department of Health and Human Services	UN-L Community and Regional Planning
Nebraska Environmental Trust	UN-L Education Abroad
Nebraska Geological Society	U.S. Department of Interior
Nebraska Legislature	U.S. Geological Survey
Nebraska Oil and Gas Conservation Commission	U.S. Geological Survey National Groundwater Monitoring Network
Nebraska Public Power District	U.S. Geological Survey Nebraska Water Science Center
Nebraska State Irrigation Association	U.S. National Park Service
North American Commission on Stratigraphic Nomenclature	University of Florida
Nebraska Water for Ag Multistate Research Project	University of Minnesota
Nebraska Well Drillers Association	University of Northern Hungary
Nemaha NRD	Upper Loup NRD
North Platte NRD	Upper Niobrara-White NRD
Olsson Associates	Upper Republican NRD
Papio-Missouri River NRD	USDA Natural Resources Conservation Service
Pennsylvania State University	VAL Energy, Inc. (Wichita, Kansas)
Quality-Assessed Agrichemical Contaminant Database for Nebraska Groundwater	Village of Clarkson, Nebraska
RDG Geoscience and Engineering	Village of Oxford, Nebraska
Spear-T Ranch	Village of Syracuse, Nebraska
Stephen Trenchard, Independent Geologist	Village of Wilber, Nebraska
Templeton University	<i>Water</i> (journal)
Texas Bureau of Economic Geology	Waverly Management Plan
Texas A&M University	William Bynog, Independent Geologist
	Wisconsin Aquatic Sciences Center

## Selected Objectives for 2021

- Bedrock core preservation project involving >1,000 ft of core at Mead, NE storage facility
- Begin inventory of geological samples at Mead, NE storage facility and rebuild CSD core database
- Characterization of soils in depressional wetlands of the Todd Valley, Nebraska
- Characterizing the geologic and hydrogeologic frameworks of eastern and southwestern Nebraska using AEM
- Collaborate with Platte Basin Timelapse project on image-based hydrology (<https://gaugecam.org>)
- Complete publication on Nebraska's Rainwater Basins
- Complete updates to CSD groundwater maps including elevation of the water table and aquifer saturated thickness
- Comprehensively characterize the geologic and hydrogeologic frameworks of eastern and southwestern Nebraska using AEM
- Conduct and supervise research to increase our understanding of the human dimensions of natural-resources management
- Contribute to upgrade of Agrichemical Database
- CSD Test-Hole Database
- Develop, improve, and add additional layers to the CSD Online Interactive Data Map
- Develop programming, facilitate sessions, and conduct evaluation of the Nebraska Water Leaders Academy
- Eastern Nebraska Water Resources Assessment (ENWRA)
- Evaluation of color and organic carbon relationships in Nebraska soils
- Evaluation of soil profile transformation after 60 years in four Nebraska counties
- Evaluation of watershed-scale groundwater transit- time distributions from field sampling and numerical modeling
- Groundwater transit times and nitrate delivery to Bazile Creek, Nebraska
- Hydrologic monitoring and groundwater age-dating in the upper Little Blue River Basin.
- Initiate a natural resource public database of the critical minerals in Nebraska
- Initiate installation of sampling network for stable isotopes in precipitation
- Meteorological-data based mapping of global land evapotranspiration rates and their long-term trends.
- Nebraska GeoCloud
- Provide technical support for Sandhills Interactive Natural Resources Educational Complex (SINREC)
- Stream-groundwater relationships in the Platte River watershed
- USGS STATEMAP Cooperative Geologic Mapping in Nebraska
- Watershed Science Education: Multi-Agency Collaboration







# CONSERVATION AND SURVEY DIVISION 2020

9,530

feet of test holes drilled and/or logged

**\$** Involvement in  
**>\$3.95 million**  
of ongoing **EXTERNAL FUNDING**



**226,058**

**PAGE VIEWS**  
related to CSD

**788 total CSD publications**  
**downloaded** from  
UNL Digital Commons;  
**11,667** views from **144** countries

Supervised  
**21**  
**GRADUATE**  
**STUDENTS**



**1,900+**

**STAKEHOLDERS**  
served by extension &  
outreach activities



**102** different organizations  
and programs served



**37**

**PUBLICATIONS**  
including

**20** peer-reviewed  
**journal articles**

**2** book chapters  
**3** survey reports, bulletins  
and field guides



**28**

Local, national  
and international  
**PRESENTATIONS**



**448**

**CREDIT HOURS**  
Taught **15** different  
courses in  
**5** programs

## GROUNDWATER DATA

**489,216**

**Groundwater-level**  
**data entries**

**8,589**

**Groundwater quality results processed**



**27**

**TWEETS**

**30,091** impressions  
**896** engagements  
**1,301** media views



**185**

**CONTINUING**  
**EDUCATION**  
**UNITS (CEUs)**  
generated for  
professionals

**3**

**MEDIA**  
**INTERVIEWS**



**CONSERVATION AND**  
**SURVEY DIVISION**

*School of Natural Resources*

**128 YRS**



**1893-2021**

<http://csd.unl.edu>

**@UNL\_CSD**

**CONTACT**  
R.M. (Matt) Joeckel  
615 Hardin Hall  
Lincoln, NE  
68583-0996  
402-472-7520  
[rmjoeckel3@unl.edu](mailto:rmjoeckel3@unl.edu)



Conservation and Survey Division  
School of Natural Resources  
University of Nebraska-Lincoln