

# Summary of the Year



## Welcome to the 2020 CGREC Annual Report

The year 2020 marked my fourth year as the interim director. The growing season for 2020 was much different from 2019.

We started the growing season dry (April – June: 55% of normal precipitation), received some much-needed rain in August (July – August: 88% of normal) and then ended with a severe drought starting in September (September – December: 16% of normal). The wet fall of 2019 saved us from experiencing drought conditions during the 2020 grazing season.

### Accomplishments for 2020:

- We survived COVID-19! We continue to follow safe guidelines to maintain a safe working environment. To date, we have had no cases of COVID-19 at the center and we conducted all research experiments as planned in 2020. We did have major adjustments within our Extension programming but still delivered numerous Extension programs virtually using Zoom and Microsoft Teams.
- We completed the first cycle of the patch-burn grazing study. Results to date show:
  - ◇ Patch-burn grazing is the best treatment for livestock performance (average daily gain), compared with continuous and rotational grazing.
  - ◇ Patch-burn grazing created the highest flowering densities and longest display of flowering, creating greater pollinator habitat, compared with continuous grazing.
  - ◇ Patch-burn grazing created greater heterogeneity in structure, compared with continuous grazing, thus attracting more upland nesting bird species.
- We published five peer-reviewed journal articles associated with the patch-burn grazing trials to date.
  - ◇ We graduated five master of science graduate students from these trials to date:
    - Megan Dornbusch (Range Science, major adviser Ryan Limb)
    - Brooke Karasch (Range Science, major adviser Torre Hovick)
    - Haley Johnson (Range Science, major adviser Limb)
    - Micayla Lakey (Range Science, major adviser Devan McGranahan)
    - Leslie Gerhard (Soil Science, major adviser Caley Gasch)
  - ◇ We have six active graduate students associated with the patch-burn grazing and rotational grazing projects:
    - Cameron Duquette (Ph.D., Range Science, major adviser Hovick)
    - Michael Hamel (M.S., Range Science, major adviser Limb)
    - Megan Wanchuk (M.S., Range Science, major advisers McGranahan and Sedivec)
    - Hayley Hilfer (M.S., Range Science, major adviser Limb)
    - Erin Gaugler (Ph.D., Range Science, major advisers Sedivec and Miranda Meehan)
    - Hailey Keen (M.S., Range Science, major advisers Hovick and Ben Geaumont)
  - ◇ We have four graduate students starting in 2021 associated with patch-burn and rotational

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grazing projects, thanks to funding from the U.S. Department of Agriculture (USDA):

- Justin Clarke (Ph.D., studying upland birds, Range Science, major adviser Hovick)
- Beth Robertson (Ph.D., studying pollinators, Range Science, major advisers Hovick and Jason Harmon)
- Elly Johnson (M.S., studying monarch butterflies, Range Science, major advisers Hovick and Harmon)
- Esben Kjaer (Ph.D., plant community dynamics, Range Science, major adviser Limb)
- We started collecting soil microbial data on the grazing trials in 2020. This is a collaborate project with the Microbiology Department at NDSU and associated with the Agrobiome Initiative funded during the 2019-2021 legislative session. This project has one graduate student:
  - Lennel Camuy-Velez (Ph.D., microbial populations and greenhouse gases, Microbiology, major advisers Samiran Banerjee and Sedivec)
- We conducted a new precision agriculture study looking at drone imagery in 2020. This is a collaborate project with the Department of Agricultural and Biosystems Engineering and funded by a precision agriculture grant in 2020. This project has one graduate student:
  - Dylan Bartels (M.S., Range Science, major advisers Sedivec and Michael Undi)
- We started a new integrated livestock cropping system project with the Animal Sciences Department, thanks to funding by USDA-Sustainable Agriculture Research and Education. This is an Extension project that involves six ranches, the Central Grasslands REC and Main Station Beef Unit. This project has two graduate students:
  - Tanner Hoffman (M.S., Natural Resource Management, advisers Meehan & Sedivec)
  - Erin Gaugler (Ph.D., Range Science, major advisers Sedivec and Meehan)
- We continue to focus on late-season grazing and feeding options, specifically bale grazing and supplementation.
  - ◇ We graduated one graduate student from these projects to date:
    - Jessalyn Bachler (M.S., Range Science, major advisers Sedivec and Undi)
- We continue to conduct basic and applied animal science projects with the NDSU Animal Sciences Department. We published 21 peer-reviewed journal articles related to minerals, energy, fetal programming, genomics, bull development and heifer development.
  - ◇ We graduated five graduate students from these trials to date:
    - Kacie McCarthy (Ph.D., Animal Sciences, major adviser Carl Dahlen)
    - Cierrah Kassetas (M.S., Animal Sciences, major adviser Dahlen)
    - Felipe A.C.C. da Silva (M.S., Animal Sciences, major adviser Dahlen)
    - Nicolas N. Pereira (Ph.D., Animal Sciences, major adviser Dahlen)
    - Jerica Hall (M.S., Animal Sciences, major adviser Alison Ward)
  - ◇ We have two active graduate students associated with the animal sciences projects:
    - Friederike Baumgaertner (Ph.D., Animal Sciences, major advisers Sedivec and

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Christopher Schauer)

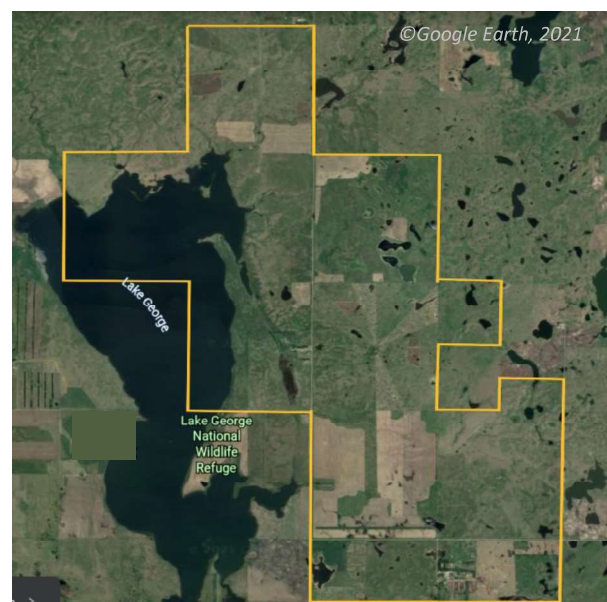
- Jennifer Hurlbert (M.S., Animal Sciences, major adviser Dahlen)
- Finally, we have expanded our forage research and Extension program the past two years, focusing on agronomic forage crops. We started trials associated with:
  - ◇ Annual cereal forage variety trial started in 2019 at the center and the tri-county agronomy plots near Wishek – a collaborative project with Carrington REC and three NDSU Extension agents (Logan, McIntosh, Emmons). This project has one graduate student:
    - Emily Leier (Extension agent - Emmons County, M.S., Range Science, major adviser Sedivec)
  - ◇ Cover crop species mixture trial in collaborations with the Plant Sciences Department. This project has one graduate student:
    - Kenneth Mozea (M.S., Plant Sciences, major adviser Marisol Berti)
  - ◇ Corn silage variety trial started in 2020. This project will be expanded to include a location with the Carrington REC
  - ◇ Winter cereal agronomy and grazing trial

The Central Grasslands REC continues to address our original mission of conducting research and outreach on range and grassland science, forage management and applied beef cattle systems production. We continue to improve our infrastructure and livestock herd phenotype, and work closely with the NDSU Main Station scientists (Range Science, Animal Sciences, Soil Science, Microbiological Sciences, Agricultural and Biosystems Engineering and Plant Sciences) and partner RECs (Carrington, Hettinger, Langdon, North Central) to conduct research and Extension programming in the areas of range and pastureland, forages, wildlife and pollinators, soil health and beef cattle in 2021.

We invite you to our 2021 annual field day on July 27. We will run two tours, one focusing on grazing management, forages and livestock from 10 a.m. to noon, and one focusing on wildlife, pollinators and prescribed burns from 1 to 3 p.m. We hope to provide lunch between the tours if COVID-19 guidelines allow.

We hope to continue serving you for many years to come. You are always welcome to stop by and visit.

**Kevin Sedivec, Interim Director**



Central Grasslands Research Extension Center