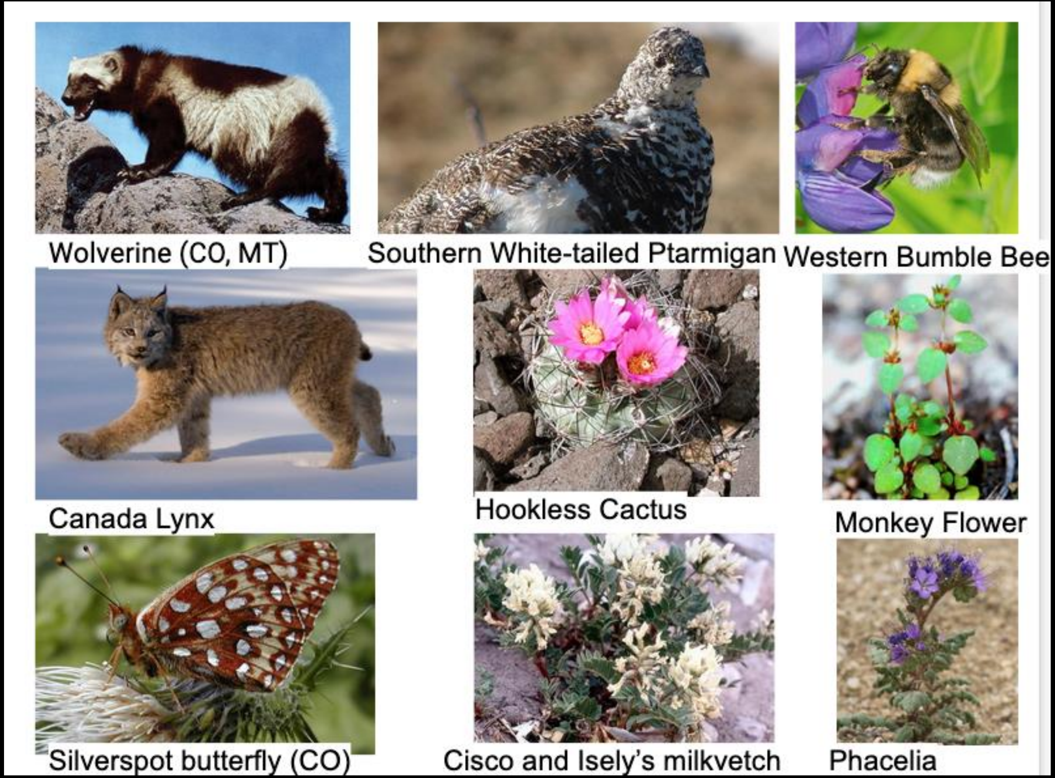
Science Support and Applications Development for USFWS Species Status Assessments in FWS Region 6

#	SSA	Year	FWS contacts
1	Wolverine (CO, MT)	2017	Steve Torbit, John Guinotte
2	Skiff milkvetch (CO)	2018	Dara Taylor, Sarah Backsen, John Guinotte
3	Southern White-tailed Ptarmigan (WY, CO, NM)	2018-19	Karen Newlon, John Guinotte
4	Rocky Mountain Monkey Flower	2018-19	Dara Suich
5	Colorado North Park Phacelia	2020	Kurt Broderdorp, Creed Clayton
6	Silverspot butterfly (CO)	2020	Terry Ireland, Creed Clayton
7	Several listed species in Mojave Desert UT	2020	Hilary Whitcomb, John Guinotte, Kimberly Smith
8	DeBeque Phacelia and CO Hookless Cactus	2020	Alexandra Kasdin, Aimee Crittendon, Creed Clayton, John Guinotte
9	Brandegee's Buckwheat (CO)	2021	Alexandra Kasdin, Laura Archuleta, John Guinotte
10	Cisco and Isely's milkvetch (UT)	2021	Karen Newlon, John Guinotte
11	Regal Fritillary Butterfly (central US, PA)	2021	Craig Hansen, Kim Daniel, Natalie Gates, Pamela Shellenberger, Sarah Furtak, Steven Choy, Brooke Stansberry, John Guinotte
12	Western Bumble Bee	2021	Tabitha Graves, William Janousek
13	Narrow Foot Hygrotus Diving Beetle	2022	Julie Reeves, Alex Kasdin, John Guinotte
14	Canada Lynx	2022	Jim Zelenak, John Guinotte
15	Ute Lady Tress	2022	Willey Lark, Karen Newlon, John Guinotte
16	Rio Grand Cutthroat Trout	2022	Nathan Allan, Jonathan Cummings
17	Topeka Shiner	2023	Laura Mendenhall
18	Sturgeon and Sicklefin Chubs	2023	Jim Boyd
19	Canada Lynx	2023	John Guinotte
20	Wolverine	2023	John Guinotte
19	Heliotrope Milkvetch	2024	Karen Newlon
20	Greenback Cutthroat Trout	2024	Karen Newlon



Images: FWS (John Guinotte)

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SSA-based collaboration informed new tools and methods development

Toolbox - Future Climate Scatter Tool

Documentation | Cite Tool | Take Tour

Future Climate Scatter

View a scatterplot of future projections for a location in the contiguous USA.

Location: 39.7708° N, 105.9069° W

Make Request ▾

To update the graph, make all of your selections and then click this button. MAKE REQUEST

Choose Location ▾

Point Location

CHOOSE LOCATION

Choose Data ▾

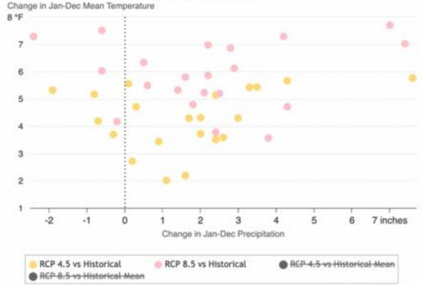
☑ Show changes

Vertical(Y)-Axis:
Projected Change
Jan-Dec
Mean Temperature
Units: °F

Horizontal(X)-Axis:
Projected Change
Jan-Dec
Precipitation
Units: inches

Choose Analysis ▾

Projections for 2040-2069
39.7708 N, 105.9069 W



Interact with the Graph
- Hover over symbols on graph to see values at different model/scenario combinations.
- Click legend label to remove/add series on graph
- Drag the legend to any location inside the graph

Toolbox - Future Scenarios Tool

Climate Scenarios

The summary table below describes changes in the future climate by 2020 (2010-2039) relative to the 1971-2000 period under climate scenarios: **Hot and Wet** (CanESM2.rcp45), **Hot** (CNRM-CM5.rcp45), **Warm and Wet** (GFDL-ESM2M.rcp45)

Climate Metric	Hot and Wet	Hot	Warm and Wet	Historical Value
Winter Mean Temperature (°F) (change relative to historical by °F)	35.71 (3.01)	34.43 (1.73)	33.54 (0.84)	32.70
Winter Precipitation (% change relative to historical)	2.35 (12.98)	2.51 (20.67)	2.19 (5.29)	2.08
Winter Potential Evapotranspiration (% change relative to historical)	4.66 (21.35)	4.20 (9.38)	3.96 (3.13)	3.84
Winter Maximum Temperature (°F) (change relative to historical by °F)	47.89 (2.26)	46.82 (1.19)	45.97 (0.34)	45.63
Coldest Winter Day (relative to historical by °F)	-3.59 (3.09)	-6.19 (1.49)	-4.37 (2.31)	-6.68
Hottest Summer Day (relative to historical by °F)	100.27 (3.46)	98.03 (1.22)	96.36 (-0.45)	96.81
Day of First Fall Freeze (relative to historical by days)	Oct. 10 (9.30)	Oct. 10 (9.30)	Sept. 25 (-5.70)	Sept. 30
Day of Last Spring Freeze (relative to historical by days)	May 1 (-4.50)	Apr. 24 (-11.50)	May 4 (-1.50)	May 5
Length of Growing Season (relative to historical by days)	162.00 (13.80)	169.00 (20.80)	144.00 (-4.20)	148.20

Quantities and projected changes described above are for the location at 40.015°N; 105.2705°W and a mean elevation of ?? ft.. Winter is Dec, Jan, Feb; Spring is Mar, Apr, May; Summer is Jun, Jul, Aug and Fall is Sep, Oct, Nov.

Dataset: MACA-METDATA v2 (4-km downscaled climate projections), VIC (v4.1.2) forced by MACAv2-LIVNEH (6-km hydrology projections) and gridMET (4-km historical).

Geospatial Layer Downloads

Climate Scenarios by 2020 (2010-2039) for the {Name of Region} {Name of Species}

The table below provides links to download the geospatial raster data (all of the contiguous US) of the future climate projections by 2020 (2010-2039) relative to the 1971-2000 period under climate scenarios: **Hot and Wet** (CanESM2.rcp45), **Hot** (CNRM-CM5.rcp45), **Warm and Wet** (GFDL-ESM2M.rcp45), **Scenario 4** (IPSL-CM5A-MR.rcp45), **Scenario 5** (20CMIP5ModelMean.rcp45)

Climate Metric	Hot and Wet	Hot	Warm and Wet	Scenario 4	Scenario 5	Historical Value
Winter Mean Temperature	Link	Link	Link	Link	Link	Link
Winter Precipitation	Link	Link	Link	Link	Link	Link
Winter Potential Evapotranspiration	Link	Link	Link	Link	Link	Link
Coldest Winter Day (relative to historical by °F)	Link	Link	Link	Link	Link	Link
Hottest Summer Day (relative to historical by °F)	Link	Link	Link	Link	Link	Link
Day of First Fall Freeze (relative to historical by days)	Link	Link	Link	Link	Link	Link

Quantities and projected changes described above are for the location at 46.7324°N; 117.0002°W and a mean elevation of ?? ft.. Winter is Dec, Jan, Feb; Spring is Mar, Apr, May; Summer is Jun, Jul, Aug and Fall is Sep, Oct, Nov.

Dataset: MACA-METDATA v2 (4-km downscaled climate projections), VIC (v4.1.2) forced by MACAv2-LIVNEH (6-km hydrology projections) and gridMET (4-km historical).

R-Shiny Apps to Plot and Extract Observed & Future Projections Data

Grassland Productivity and Climate - Observations & Future Projections

Vapor Pressure Deficit (VPD) Extremes - Observations & Future Projections

Evaporative Demand (PET) Extremes - Observations

Climate Future Toolbox (CFT) - Future Projections

Standardized Precipitation Index (SPI) - Observations & Future Projections

Standardized Precipitation Evapotranspiration Index (SPEI) - Observations & Future Projections

Evaporative Demand Drought Index (EDDI) - Observations & Future Projections

Forest Drought Stress Index (FDSI) - Observations & Future Projections

Snowfall & Rainfall Projections

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USFWS Grasslands-Climate Workshop

January 24-25, 2023

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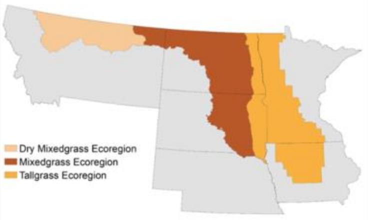
Climate Change Impacts on Introduced Cool-Season (C3) Grasses in the Prairie Pothole Region, USA

The Prairie Pothole Region

The Prairie Pothole Region (PPR) spans ~170 million acres in the northern Great Plains. The region is characterized by **mixed-grass** and **tallgrass prairies**, composed of native cool-season (C3) and warm-season (C4) grasses, interspersed with abundant wetlands or **"potholes."**

To safeguard biodiversity and maintain wildlife habitat, grassland conservation is a management priority on the **nearly 1 million acres** of National Wildlife Refuge System lands in the region.

Ecoregions that make up the PPR



source: ppjv.org

The Issue

Large areas of the PPR have been converted to agriculture and other uses, with only about **30% of native grasslands remaining overall**. Specifically in the Dakotas, only about 3% of original tallgrass prairie remains.

Remaining grasslands in the PPR are **under threat** from introduced perennial cool-season (C3) grasses such as smooth bromegrass (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*) that can outcompete native species.

Climate change – through the combined effects of increased temperature, elevated CO_2, and more variable precipitation – can affect the **growth**, **competitive ability**, and thus **spread** of introduced cool-season grasses.

To maintain resilient grasslands, we need to **better anticipate** how smooth bromegrass and Kentucky bluegrass will respond to climate change.

USGS · CIRES · Great Plains · Conservation Science Partners · University of Montana · WCS

https://nccasc.colorado.edu/sites/default/files/2023-11/PrairiePotholes_RCAP4-pager.pdf

Imtiaz with Cami Dixon at Chase Lake Refuge, ND

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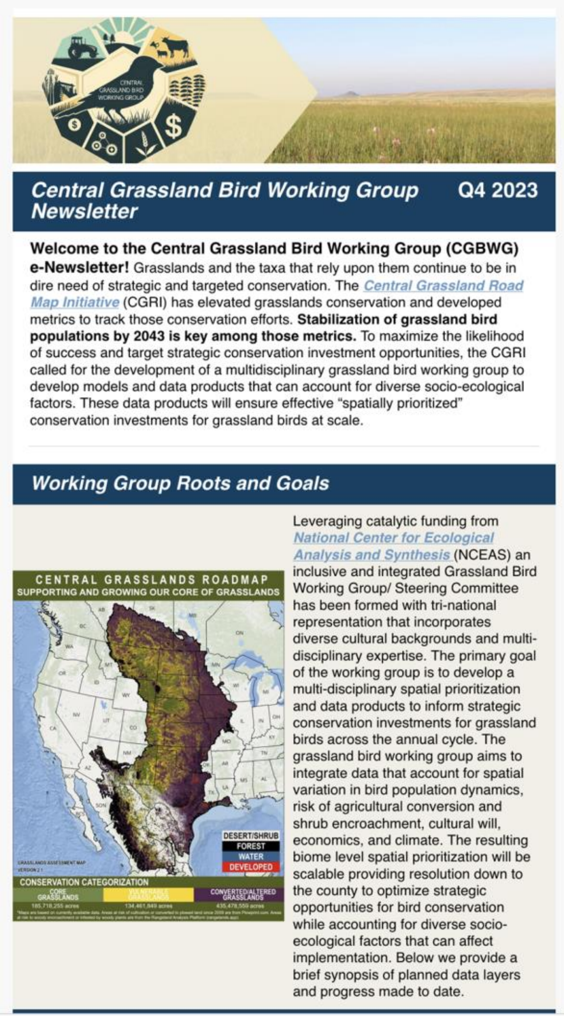

Central Grassland Bird Working Group Newsletter — Q4 2023

Welcome to the Central Grassland Bird Working Group (CGBWG) e-Newsletter! Grasslands and the taxa that rely upon them continue to be in dire need of strategic and targeted conservation. The *Central Grassland Road Map Initiative* (CGRI) has elevated grasslands conservation and developed metrics to track those conservation efforts. **Stabilization of grassland bird populations by 2043 is key among those metrics.** To maximize the likelihood of success and target strategic conservation investment opportunities, the CGRI called for the development of a multidisciplinary grassland bird working group to develop models and data products that can account for diverse socio-ecological factors. These data products will ensure effective "spatially prioritized" conservation investments for grassland birds at scale.

Working Group Roots and Goals

Leveraging catalytic funding from *National Center for Ecological Analysis and Synthesis* (NCEAS) an inclusive and integrated Grassland Bird Working Group/ Steering Committee has been formed with tri-national representation that incorporates diverse cultural backgrounds and multi-disciplinary expertise. The primary goal of the working group is to develop a multi-disciplinary spatial prioritization and data products to inform strategic conservation investments for grassland birds across the annual cycle. The grassland bird working group aims to integrate data that account for spatial variation in bird population dynamics, risk of agricultural conversion and shrub encroachment, cultural will, economics, and climate. The resulting biome level spatial prioritization will be scalable providing resolution down to the county to optimize strategic opportunities for bird conservation while accounting for diverse socio-ecological factors that can affect implementation. Below we provide a brief synopsis of planned data layers and progress made to date.

Central Grassland Birds Working Group; May 17, 2023

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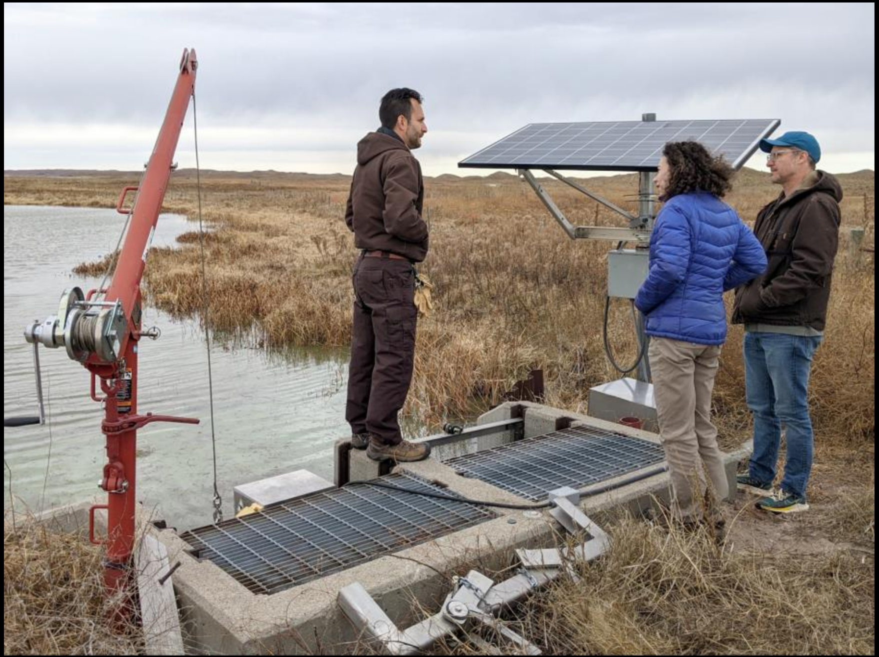
Collaborations and Climate Adaptation Planning with NE Sandhills Refuge Managers



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Nebraska Sandhills Future Ecological Scenarios

- 4 National Wildlife Refuges
- Intact mixed grass prairie
- Shallow lakes and wetlands
- Part of the High Plains aquifer

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Field Visit to Nebraska Sandhills Refuges, November 8-9, 2023

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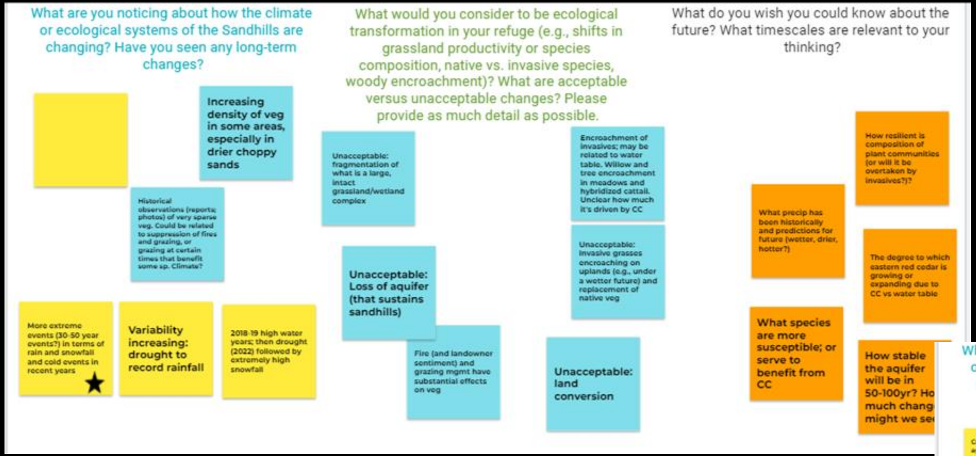
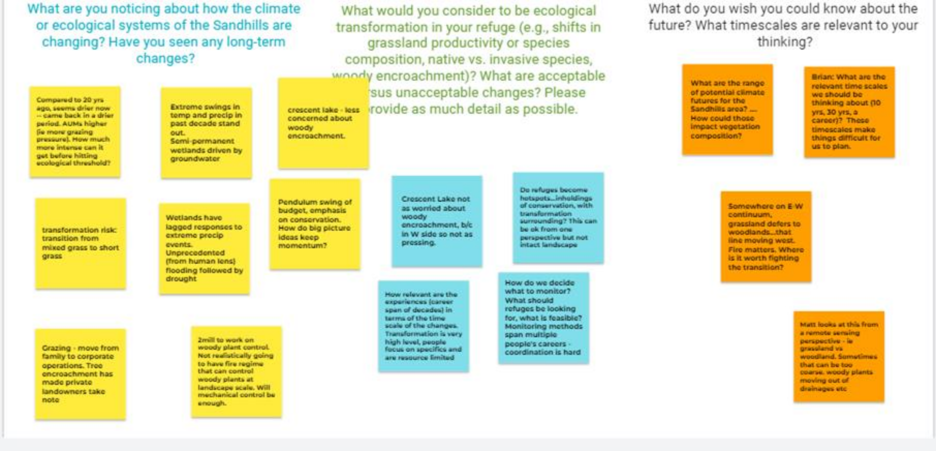
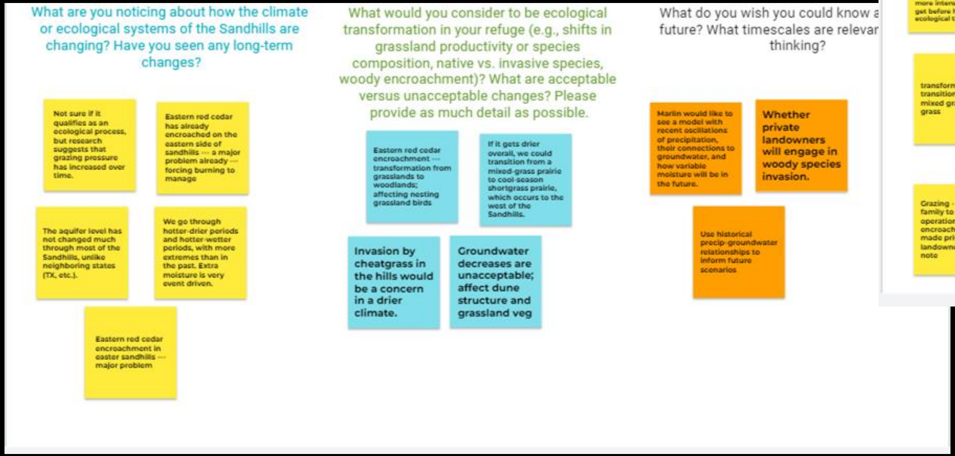


Key concerns/issues:

- Water availability
- Woody encroachment
- Land use change





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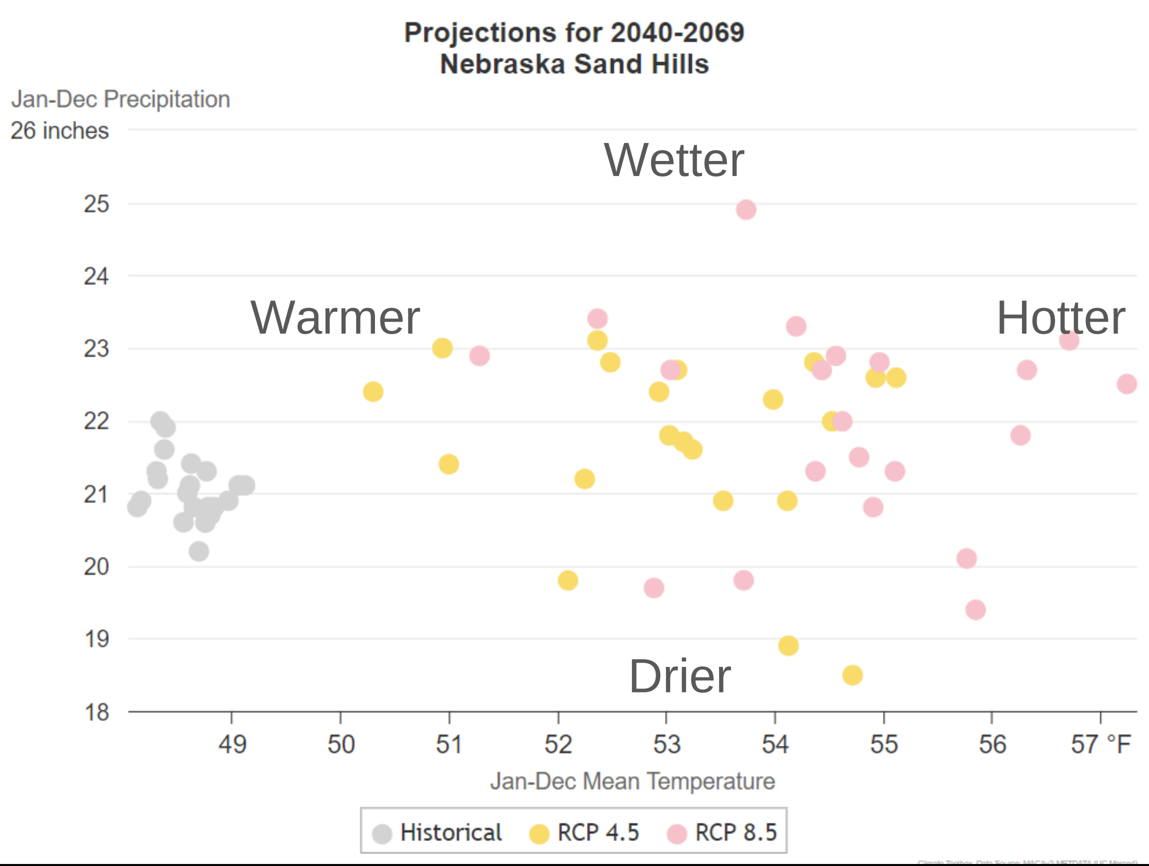

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