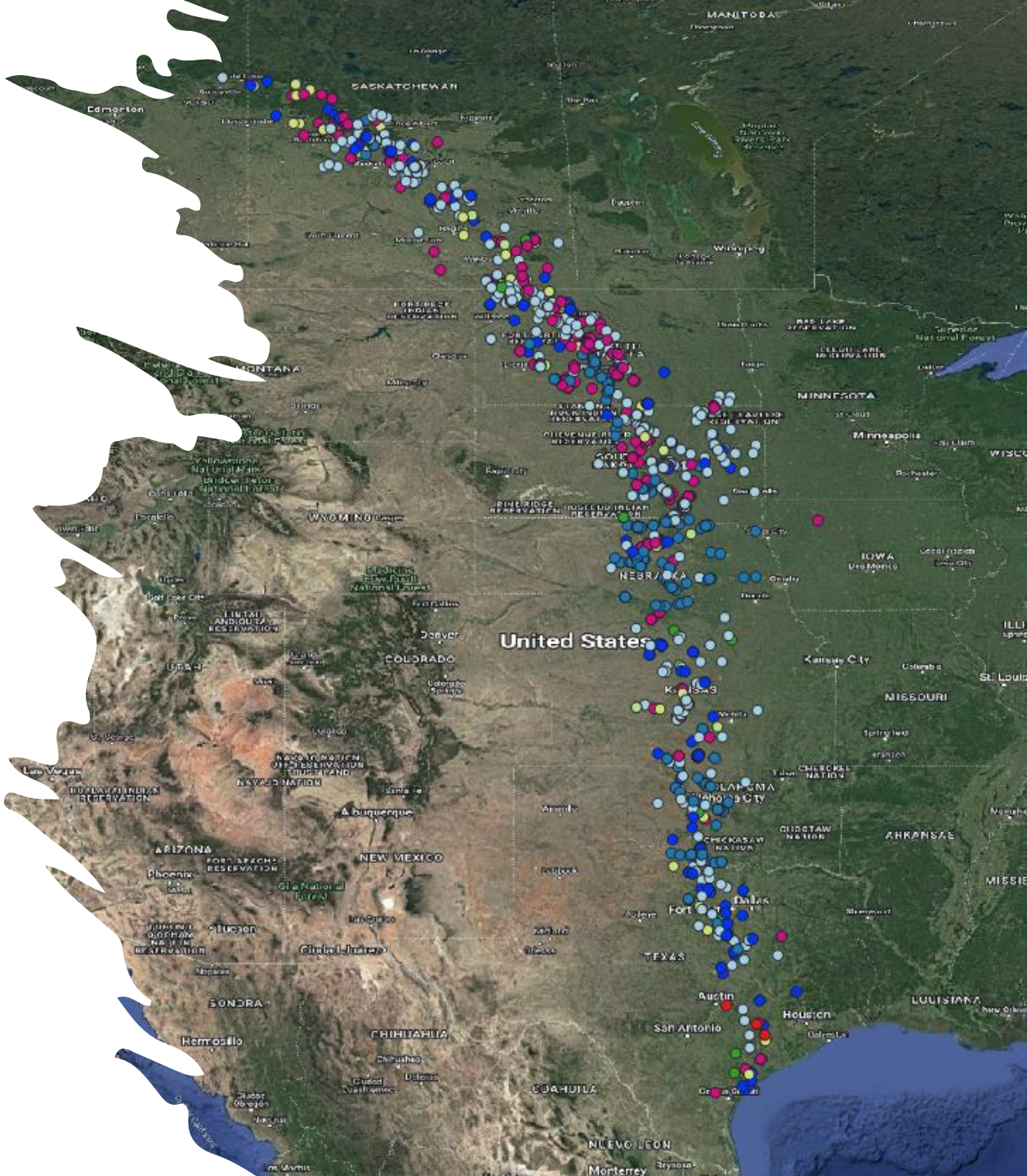
Flexible Migration and Habitat Use Strategies of an Endangered Waterbird during Hydrological Drought

Data and Methods

- 2010-2022 telemetry data
- 145 unique whooping cranes
- >8,500 night-roosts
- Landcover Classifications
  - Lacustrine
  - Lacustrine impounded
  - Palustrine
  - Palustrine impounded
  - Palustrine agriculture
  - Riverine
  - Upland (ag or grassland)



Data and Methods

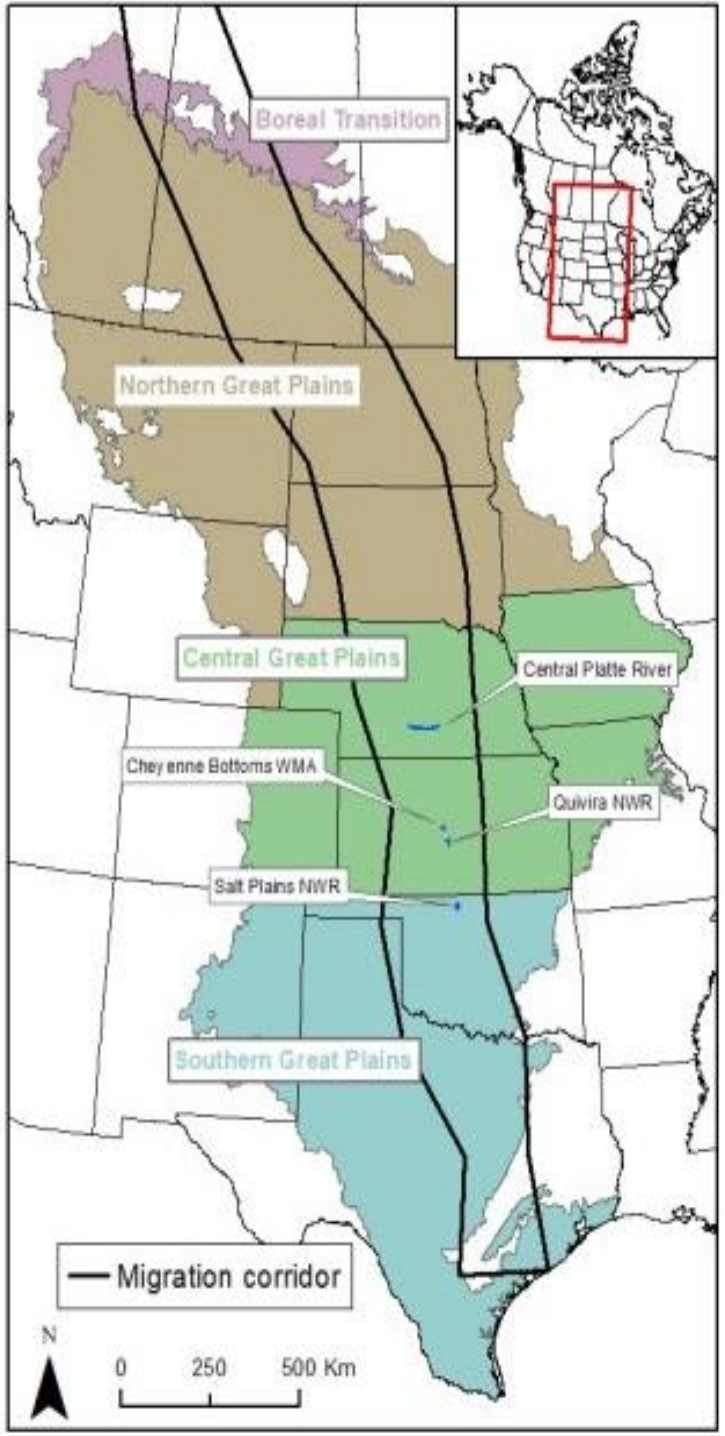
- Use Ratios
  - Summed data by region, season, and drought severity
  - Proportion of use during moderate and extreme drought divided by use during normal conditions
- Movement Distances
  - Modeled movement distances under various hydrological drought conditions
- Residency Times
  - Modeled residency times at stopovers under various hydrological drought conditions

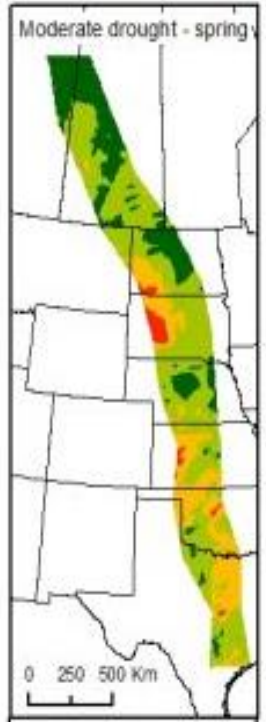
Spring

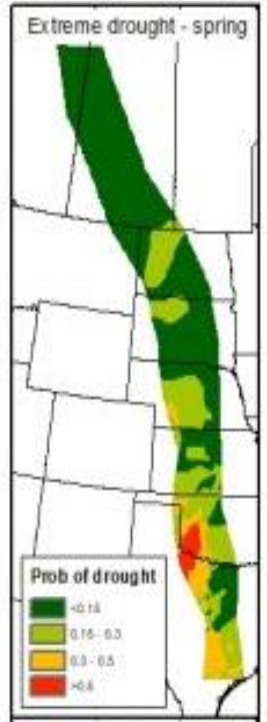
Region[1]	Type	Category	Non-drought		Moderate drought	
			n[2]	Prop[3]	*n*	Prop
BTZ	Habitat[4]	PAL	120	0.45	67	0.70
		PAL-IMP	0		0	
		PAL-AG	105	0.40	22	0.23
		LAC	16	0.06	3	0.03
		LAC-IMP	0		0	
		RIV	6	0.02	1	0.01
		UPL	18	0.07	3	0.03
	Wetland size[5]	Small	148	0.60	48	0.52
		Medium	69	0.28	34	0.37
		Large	18	0.07	10	0.11
		XL	12	0.05	1	0.01
	Ownership	Public	5	0.02	1	0.01
		Private	260	0.98	95	0.99

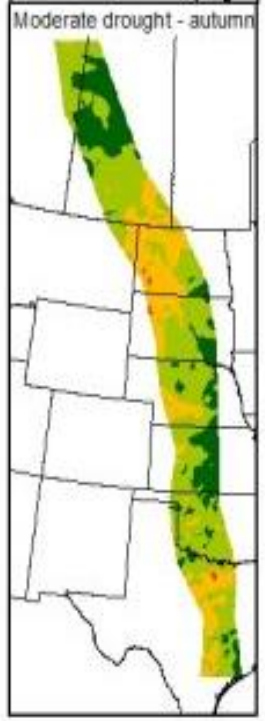
Data and Methods

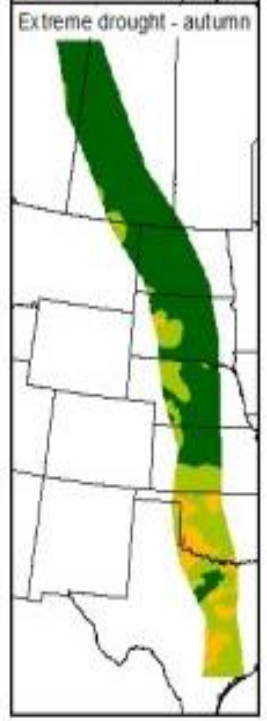
- Drought Condition Classification
  - No Drought
  - Moderate Drought
  - Extreme Drought
- Region Classification
  - Northern Great Plains
  - Central Great Plains
  - Southern Great Plains
- Other Classifications
  - Ownership (public/private)
  - Critical habitat area
  - Season (spring/fall)





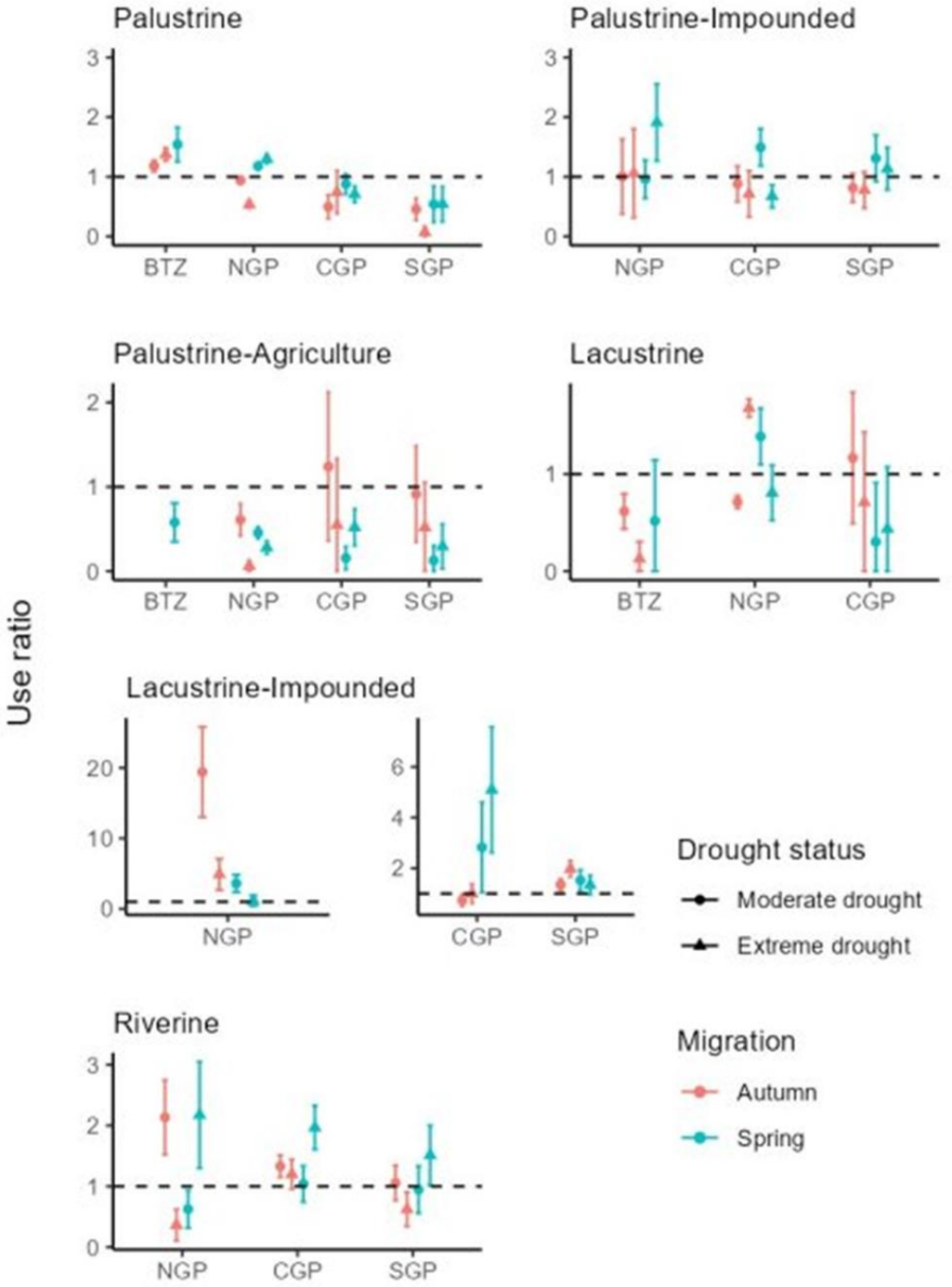






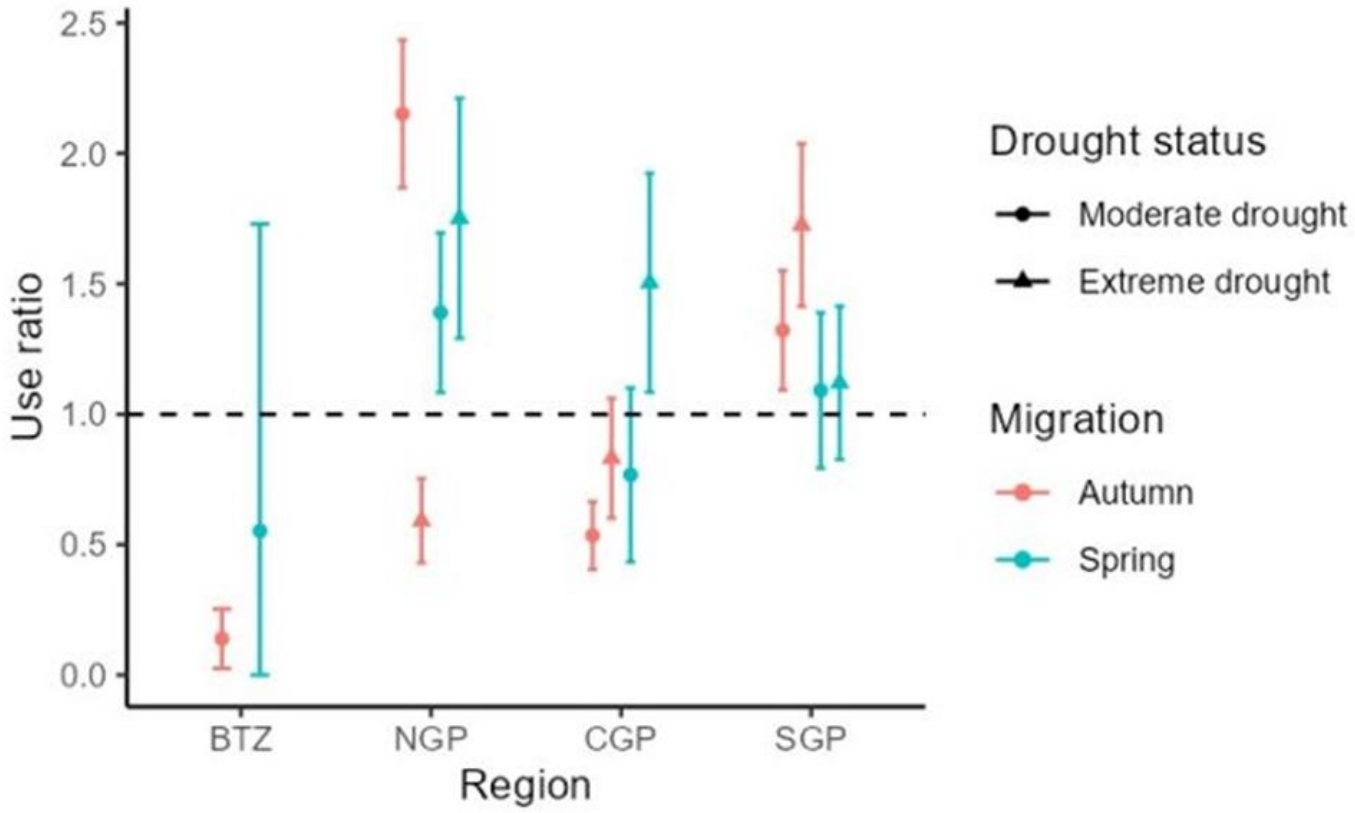
Results

- **Corridor Wide**
  - Cultivated and uncultivated palustrine and lacustrine wetlands were generally used less during droughts than non-drought conditions
  - Impounded palustrine and lacustrine systems and rivers served more frequently as drought refugia
  - Impounded surface water may function in a complementary fashion with natural wetlands
- **Central Great Plains**
  - Palustrine and cultivated palustrine wetlands were most used during non-drought condition
  - Impounded palustrine and lacustrine wetlands dominated use during moderate drought
  - River use was greatest during extreme drought conditions



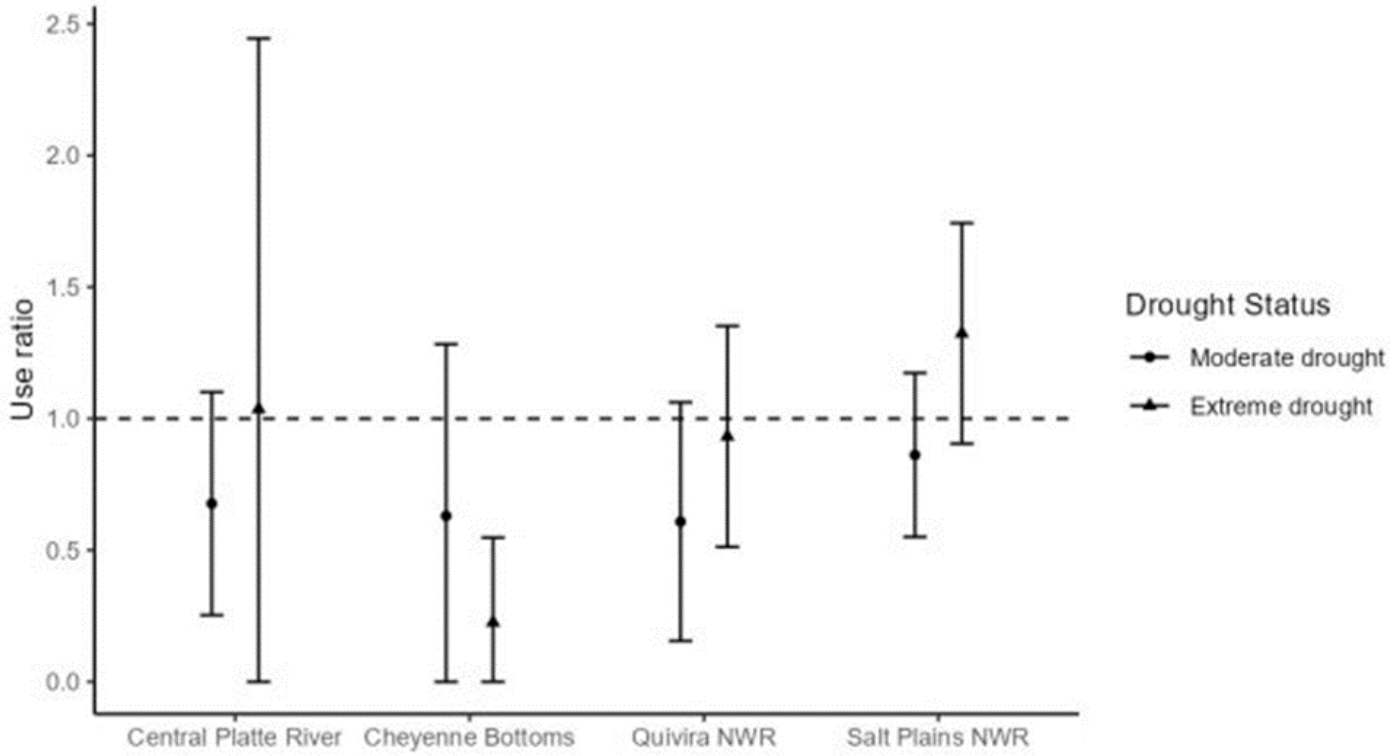
Results

- Night roosts occurred primarily on private lands (86% overall)
- However, use of public land generally increased with drought severity



Results

- Cheyenne Bottoms State Waterfowl Management Area was used less during severe drought and the Central Platte River, Quivira, and Salt Plains National Wildlife Refuge received similar or more use during extreme drought compared to non-drought conditions



Results

- Movement distance following stopovers during extreme drought conditions during SPRING were longer than movement distance following stopovers during normal conditions.
- Conversely, movement distance following stopovers during extreme drought conditions during FALL were longer than movement distance following stopovers during normal conditions.
- Stopover duration did not differ between non-drought and moderate or extreme drought conditions in the CGP during SPRING OR FALL.
- Stopover duration was slightly longer in the NGP under extreme drought conditions during SPRING and was slightly shorter during FALL.

Take Home Points

- All wetland types are important, but the importance of various wetland types change with hydrological drought conditions
- Rivers and impounded wetlands appear to be very important during extreme drought conditions
- Migration distances and durations vary in response to hydrological drought condition