CRANE TRUST

Ensuring a future for North America's Cranes

Trustees: Brad Korell, Craig Thompson and Shelley Sahling-Zart
6611 W Whooping Crane Drive
Wood River, NE 68883
p. 308.384.4633
f. 308.384.7209
cranetrust.org

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Species Detection, Collection, and Monitoring Report

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Prepared by:
Bethany Ostrom, Wildlife Biologist, Crane Trust; bostrom@cranetrust.org

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A summary of species detected during long-term monitoring at the Crane Trust and permitted collection activities in the calendar year.

Table of Contents

Introduction

During the summer of 2015, we implemented a long-term biological monitoring plot layout system through set transects establishing survey lines in all parts of the Crane Trust properties and some easements with differing soils, vegetation, management practices, and land use histories (~4,000 ha currently; main complex = 40.798306°N, -98.416298°W, NAD 1983; 597 m elevation, Hall County; Figure 1). These plots consist of two parallel transects: the vegetation line, totaling 100m; and the bird, small mammal, and butterfly species of concern line, totaling 200m. Due to the complex mosaic of soil types and management histories on the property, the total number of monitoring sites totaled 83 as of 2023;

new sites are added as additional conservation properties are acquired or incorporated into Crane Trust management efforts.

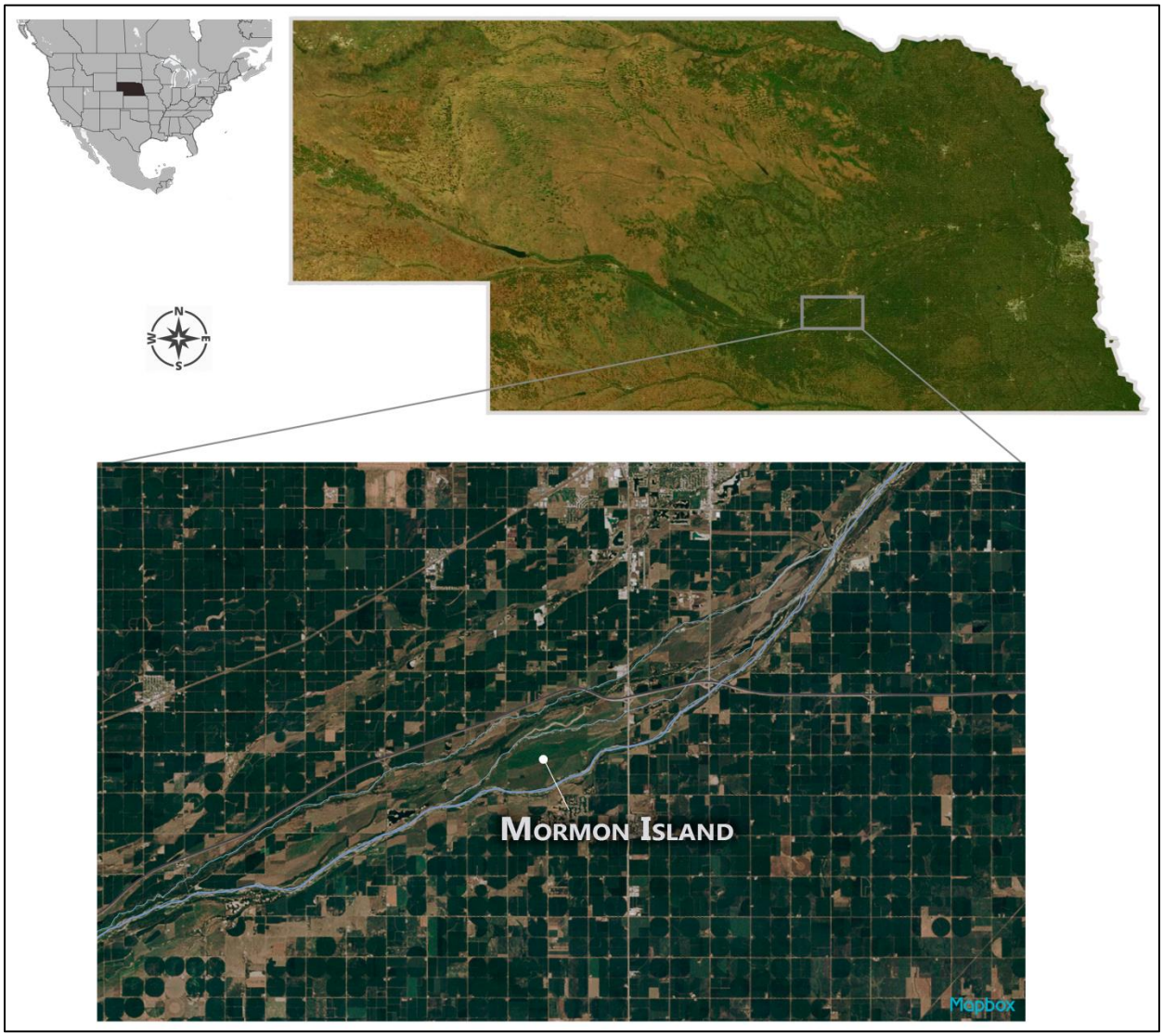
We have continued our efforts to survey the vegetation, avian community, small mammals, and butterfly species at these sites using standardized methodologies on a set rotation to monitor the effectiveness of our management techniques in promoting native biodiversity since 2015. Additionally, we have conducted surveys of native and exotic slough-dwelling fish and monitored groundwater levels since 2012 and 2011, respectively. We added anuran vocalization surveys to our monitoring program in 2018 and Whooping Crane behavioral and habitat surveys in 2019. We also took part in the Nebraska Bumble Bee Atlas project in 2020 and 2021. In 2021 and 2022, we participated in the Monarch Watch Tagging Program and Project Monarch Health. Finally, we conducted aerial Sandhill Crane counts from mid-February to mid-April, continuing a study which began in 2002. We discontinued the Institute for Bird Populations (IBS)'s Monitoring Avian Productivity and Survivorship (MAPS) program in 2020, which involved banding at four different sites throughout the breeding season (June-July) as we determined that point count data sufficed to answer most of our current management questions and the project was labor intensive while yielding data at a limited spatial scale (Federal Bird Banding Permit No. 23224, Station Permit: Platte River Whooping Crane Trust, Wood River, NE; currently inactive). In this report, we summarize all species detections from research conducted in 2022 that was subject to permitting or was supported by regional USFWS programs. All species detections were from a 13.5 km reach of the Platte River beginning 3 km west of Alda Rd. and continuing east to HWY 281 in Hall County, Nebraska, aside from aerial crane, plant, and soil macroinvertebrate surveys, which spanned the Central Platte River Valley (CPRV; Chapman to Overton, Nebraska) and/or the Western Rainwater Basins (Phelps and Kearney Counties). Earlier reports included data from Buffalo County, at Dippel Island, which we have since sold to the Platte River Recovery Implementation Program (effective 2018).

As of 12 December 2023, the Crane Trust field team performed 91 avian surveys, 36 small mammal surveys across 12 sites totaling 1800 trap nights (trap number x nights set), 37 vegetation surveys, 4 days of fish seining, 63 butterfly species of concern surveys, 9 aerial Sandhill Crane surveys, and a total of 50 anuran call surveys. Below is a summary of species detections from 2023 and general methods for surveys.

The 2023 Crane Trust research team consisted of *Wildlife Biologist* Bethany Ostrom, *Range Manager* Joshua D. Wiese, *Threatened and Endangered Species Specialist* David Baasch, *Biological Science Technician* Matthew Schaaf, *Moth Technician* Alexa Rojas, *Saunders' Conservation Fellow (2023)* Matthew Urbanski, *Saunders' Conservation Fellow (2022)* Charlie Tate, *Lila O. Wilson Biological Monitoring Intern* Megan Soldatke.

Figure 1. Map of Mormon Island, Hall County Nebraska, the largest site owned and managed by the Crane Trust since 1978

Also depicting the Big Bend Region of the Platte River and Nebraska's position within the United States



Footnote: Aerial imagery clearly depicts the prairie habitat of Mormon Island within a largely agricultural landscape.

Small Mammal Monitoring

We used Sherman Box Traps baited with a seed mixture of sterilized (autoclaved or baked) oats, sunflower seeds, and cracked corn. For general methods see Newsome (2015). Mealworms were also added in areas suspected or known to have high proportions of Soricomorpha. Traps were placed every 5m along a 200m set transect with an additional 10 traps placed within 10m of the transect for incidental detections. Small mammals were identified to species when possible; the age, sex, and reproductive status of each individual were also recorded when possible. Measurements such as weight

and length were not recorded unless necessary for identification. Our trapping began in mid-August and ended in late September. Total survey trap effort concluded at 1800 trap nights (trap number per site (50)*sites trapped (12)*trap nights per site (3)).

This year, individuals that died in traps were left on site and not collected as voucher specimen. Trap mortality was 1.5%, which is in line with mortality levels observed in 2021 (1.6%) and lower than multiple recent years: 2016 (3.3%), 2017 (3.5%), 2018 (2.9%), and 2020 (2.5%). There was only 1 case of trap mortality of 68 individuals caught (Table 1). We captured 10 total species, although we did not detect the Plains Pocket Mouse as in some past years. Overall trap success was down from last year's 198 captures.

Methods:

Newsome, S. 2015. Small Mammal Mark-Recapture Population Dynamics at Core Research Sites at the Sevilleta National Wildlife Refuge, New Mexico (1989-present). Sevilleta LTER: Long Term Ecological Research, University of New Mexico, Albuquerque, NM, USA.

Table 1. Small Mammals Detected at the Crane Trust 2023

Common Name	*Genus species*	Number	Mortality	Male	Female
Northern Short-tailed Shrew	*Blarina brevicauda*	3	1		
Least Shrew	*Cryptotis parva*	1			
Prairie Vole	*Microtus ochrogaster*	13		8	5
Meadow Vole	*Microtus pennsylvannicus*	3		1	2
White-footed Mouse	*Peromyscus leucophagus*	4		4	
Prairie Deer Mouse	*Peromyscus maniculatus bairdii*	28		12	16
Western Harvest Mouse	*Reithrodontomys megalotis*	4		2	2
Plains Harvest Mouse	*Reithrodonotmys monatnus*	7		4	2
Masked Shrew or Prairie Shrew	*Sorex spp. (cinereus or haydeni)*	1			
Meadow Jumping Mouse	*Zapus hudsonius*	4			4
Total		**68**	**1**		

Avian Monitoring

We conducted stationary focal point surveys for 15 minutes at long-term monitoring sites throughout the year, with two surveys conducted at each site during the breeding season. During these surveys, all species detected by sight and/or vocalization were recorded. The total number of individual birds detected of each species was estimated, taking efforts not to double-count individuals. Each bird

detection was recorded as within 50m or outside 50m of the observer. We did not try to estimate the real population based off the number of birds detected, but instead treated each count as an index for discerning the relative abundance of species. In some ways this data equates to *bird detection days,* as individual birds (i.e. - Whooping Cranes, breeding songbirds, etc.), which stayed for a significant length of time, were regularly counted multiple times across rotational surveys. Common names are consistent with American Ornithological Union standards.

Point-count surveys were conducted at 44 monitoring sites across Crane Trust-managed properties in 2023, thus far totaling (as of 12/19/2023) 91 surveys and 126,632 birds counted of 159 species (Includes incidental sightings). Total counts of each species are presented in Table 2. We detected several priority species for the US FWS Mountain-Prairie Region (6). Bald Eagles were common and detected throughout the year, including 2 nesting locations on/near Crane Trust properties. A significant density of Sandhill Cranes roosted between Hwy 281 and Alda Rd., along the Crane Trust's main conservation property (aerial survey estimates are presented in a later section of the report). Sandhill Cranes also concentrated on or near Crane Trust property during the fall migration with a conservative estimate of at least 30,000 around November 8th and as of December 15th there were still at least 16,000 in the area. Estimates are very conservative as methods of estimating from the ground were not as optimal as aerial surveys. Reasons for the large and unusual fall migration are unknown but hypothesized to be because of mild winter conditions in the area. We also recorded 14 Upland Sandpiper, 221 Grasshopper Sparrow, 14 Piping Plover, and 591 Bobolink during breeding season surveys as well as 465 Northern Pintail, 1 Snowy Plover, and 1 Nelson's Sparrow during migration surveys, and 6 Greater Yellowlegs and 1 Short-eared Owl in mid December.

Methods:

Gregory, R.D., D.W. Gibbons, and P.F. Donald. 2004. Bird census and survey techniques. Pages 17–56 in W.J. Sutherland, I. Newton, and R.E. Green, editors, Bird ecology and conservation: A handbook of techniques. Oxford University Press, Oxford, United Kingdom.

Table 2. Avian Detections and Abundance at the Crane Trust 2023

Common names, scientific names, alpha codes, and total counts for each species detected during Crane Trust long-term monitoring surveys. Data from point count surveys as well as incidental detections in the calendar year 2023 are included. Aerial survey data is presented separately in a later section of this report.

Common Name	*Genus species*	Alpha Code	Count
American Avocet	*Recurvirostra americana*	AMAV	14
American Bittern	*Botaurus lentiginosus*	AMBI	2
American Coot	*Fulica americana*	AMCO	49
American Crow	*Corvus brachyrhynchos*	AMCR	29
American Goldfinch	*Spinus tristis*	AMGO	205
American Kestrel	*Falco sparverius*	AMKE	7
American Robin	*Turdus migratorius*	AMRO	295
American Wigeon	*Mareca americana*	AMWI	83
American Tree Sparrow	*Spizelloides arborea*	ATSP	89

American White Pelican	*Pelecanus erythrorhynchos*	AWPE	525
Bald Eagle	*Haliaeetus leucocephalus*	BAEA	73
Baird's Sparrow	*Centronyx bairdii*	BAIS	1
Bank Swallow	*Riparia riparia*	BANS	110
Baltimore Oriole	*Icterus galbula*	BAOR	49
Barn Swallow	*Hirundo rustica*	BARS	55
Baird's Sandpiper	*Calidris bairdii*	BASA	78
Black-capped Chickadee	*Poecile atricapillus*	BCCH	4
Belted Kingfisher	*Megaceryle alcyon*	BEKI	15
Bell's Vireo	*Vireo bellii*	BEVI	27
Brown-headed Cowbird	*Molothrus ater*	BHCO	1370
Blue Jay	*Cyanocitta cristata*	BLJA	86
Black Tern	*Chlidonias niger*	BLTE	4
Black-necked Stilt	*Himantopus mexicanus*	BNST	1
Bobolink	*Dolichonyx oryzivorus*	BOBO	591
Bonaparte's Gull	*Chroicocephalus philadelphia*	BOGU	4
Brown Thrasher	*Toxostoma rufum*	BRTH	61
Bufflehead	*Bucephala albeola*	BUFF	6
Blue-winged Teal	*Spatula discors*	BWTE	101
Cackling Goose	*Branta hutchinsii*	CACG	1052
Cattle Egret	*Bubulcus ibis*	CAEG	2
Canada Goose	*Branta canadensis*	CANG	3085
Canvasback	*Aythya valisineria*	CANV	5
Carolina Wren	*Thryothorus ludovicianus*	CARW	1
Caspian Tern	*Hydroprogne caspia*	CATE	1
Clay-colored Sparrow	*Spizella pallida*	CCSP	26
Cedar Waxwing	*Bombycilla cedrorum*	CEDW	9
Chipping Sparrow	*Spizella passerina*	CHSP	35
Chimney Swift	*Chaetura pelagica*	CHSW	21
Cliff Swallow	*Petrochelidon pyrrhonota*	CLSW	474
Common Goldeneye	*Bucephala clangula*	COGO	41
Common Grackle	*Quiscalus quiscula*	COGR	15
Cooper's Hawk	*Accipiter cooperii*	COHA	3
Common Merganser	*Mergus merganser*	COME	9
Common Yellowthroat	*Geothlypis trichas*	COYE	221
Double-crested Cormorant	*Nannopterum auritum*	DCCO	15
Dark-eyed Junco	*Junco hyemalis*	DEJU	4
Dickcissel	*Spiza americana*	DICK	1178
Downy Woodpecker	*Dryobates pubescens*	DOWO	25
Dunlin	*Calidris alpina*	DUNL	1
Eastern Bluebird	*Sialia sialis*	EABL	7
Eared Grebe	*Podiceps nigricollis*	EAGR	32
Eastern Kingbird	*Tyrannus tyrannus*	EAKI	73
Eastern Meadowlark	*Sturnella magna*	EAME	124

Eastern Phoebe	*Sayornis phoebe*	EAPH	1
Eastern Wood-Pewee	*Contopus virens*	EAWP	1
European Starling	*Sturnus vulgaris*	EUST	1054
Field Sparrow	*Spizella pusilla*	FISP	42
Forster's Tern	*Sterna forsteri*	FOTE	3
Franklin's Gull	*Leucophaeus pipixcan*	FRGU	423
Gadwall	*Mareca strepera*	GADW	20
Great Blue Heron	*Ardea herodias*	GBHE	30
Great Crested Flycatcher	*Myiarchus crinitus*	GCFL	17
Great Horned Owl	*Bubo virginianus*	GHOW	6
Gray Catbird	*Dumetella carolinensis*	GRCA	50
Great Egret	*Ardea alba*	GREG	7
Green Heron	*Butorides virescens*	GRHE	2
Greater Prairie-Chicken	*Tympanuchus cupido*	GRPC	200
Greater Scaup	*Aythya marila*	GRSC	20
Grasshopper Sparrow	*Ammodramus savannarum*	GRSP	221
Greater Yellowlegs	*Tringa melanoleuca*	GRYE	26
Greater White-fronted Goose	*Anser albifrons*	GWFG	530
Green-winged Teal	*Anas crecca*	GWTE	55
Harris's Sparrow	*Zonotrichia querula*	HASP	7
Hairy Woodpecker	*Dryobates villosus*	HAWO	5
Hooded Merganser	*Lophodytes cucullatus*	HOME	5
House Sparrow	*Passer domesticus*	HOSP	9
House Wren	*Troglodytes aedon*	HOWR	198
Indigo Bunting	*Passerina cyanea*	INBU	2
Indian Peafowl	*Pavo cristatus*	INPE	2
Killdeer	*Charadrius vociferus*	KILL	210
Lapland Longspur	*Calcarius lapponicus*	LALO	2
Long-billed Dowitcher	*Limnodromus scolopaceus*	LBDO	5
Least Flycatcher	*Empidonax minimus*	LEFL	9
Least Sandpiper	*Calidris minutilla*	LESA	11
Lesser Scaup	*Aythya affinis*	LESC	4
Lesser Yellowlegs	*Tringa flavipes*	LEYE	27
Lincoln's Sparrow	*Melospiza lincolnii*	LISP	18
Loggerhead Shrike	*Lanius ludovicianus*	LOSH	1
Marbled Godwit	*Limosa fedoa*	MAGO	5
Mallard	*Anas platyrhynchos*	MALL	134
Marsh Wren	*Cistothorus palustris*	MAWR	8
Mourning Dove	*Zenaida macroura*	MODO	246
Nelson's Sparrow	*Ammospiza nelsoni*	NESP	1
Northern Bobwhite	*Colinus virginianus*	NOBO	225
Northern Cardinal	*Cardinalis cardinalis*	NOCA	60
Northern Flicker	*Colaptes auratus*	NOFL	111
Northern Harrier	*Circus hudsonius*	NOHA	15

Northern Pintail	*Anas acuta*	NOPI	465
Northern Shoveler	*Spatula clypeata*	NSHO	66
Orange-crowned Warbler	*Leiothlypis celata*	OCWA	1
Orchard Oriole	*Icterus spurius*	OROR	50
Osprey	*Pandion haliaetus*	OSPR	2
Palm Warbler	*Setophaga palmarum*	PAWA	1
Pied-billed Grebe	*Podilymbus podiceps*	PBGR	2
Pectoral Sandpiper	*Calidris melanotos*	PESA	1
Piping Plover	*Charadrius melodus*	PIPL	14
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	RBGR	19
Ring-billed Gull	*Larus delawarensis*	RBGU	21
Red-bellied Woodpecker	*Melanerpes carolinus*	RBWO	24
Ruby-crowned Kinglet	*Corthylio calendula*	RCKI	5
Redhead	*Aythya americana*	REDH	141
Red-eyed Vireo	*Vireo olivaceus*	REVI	3
Red-headed Woodpecker	*Melanerpes erythrocephalus*	RHWO	41
Rough-legged Hawk	*Buteo lagopus*	RLHA	7
Ring-necked Duck	*Aythya collaris*	RNDU	7
Ring-necked Pheasant	*Phasianus colchicus*	RNEP	166
Rock Pigeon	*Columba livia*	ROPI	19
Red-tailed Hawk	*Buteo jamaicensis*	RTHA	22
Ruddy Duck	*Oxyura jamaicensis*	RUDU	1
Red-winged Blackbird	*Agelaius phoeniceus*	RWBL	1829
Sandhill Crane	*Antigone canadensis*	SACR	104923
Sanderling	*Calidris alba*	SAND	12
Savannah Sparrow	*Passerculus sandwichensis*	SAVS	17
Short-eared Owl	*Asio flammeus*	SEOW	1
Semipalmated Sandpiper	*Calidris pusilla*	SESA	37
Sedge Wren	*Cistothorus stellaris*	SEWR	14
Snowy Egret	*Egretta thula*	SNEG	3
Snow Goose	*Anser caerulescens*	SNGO	2539
Snowy Plover	*Charadrius nivosus*	SNPL	1
Sora	*Porzana carolina*	SORA	10
Song Sparrow	*Melospiza melodia*	SOSP	216
Spotted Sandpiper	*Actitis macularius*	SPSA	38
Spotted Towhee	*Pipilo maculatus*	SPTO	31
Sharp-shinned Hawk	*Accipiter striatus*	SSHA	2
Swamp Sparrow	*Melospiza georgiana*	SWSP	2
Tree Swallow	*Tachycineta bicolor*	TRES	63
Trumpeter Swan	*Cygnus buccinator*	TRUS	10
Turkey Vulture	*Cathartes aura*	TUVU	1
Upland Sandpiper	*Bartramia longicauda*	UPSA	14
Vesper Sparrow	*Pooecetes gramineus*	VESP	1
Warbling Vireo	*Vireo gilvus*	WAVI	11

White-breasted Nuthatch	*Sitta carolinensis*	WBNU	9
White-crowned Sparrow	*Zonotrichia leucophrys*	WCSP	25
Western Kingbird	*Tyrannus verticalis*	WEKI	1
Western Meadowlark	*Sturnella neglecta*	WEME	590
Western Sandpiper	*Calidris mauri*	WESA	1
White-faced Ibis	*Plegadis chihi*	WFIB	108
Whooping Crane	*Grus americana*	WHCR	134
Willow Flycatcher	*Empidonax traillii*	WIFL	45
Willet	*Tringa semipalmata*	WILL	3
Wilson's Phalarope	*Phalaropus tricolor*	WIPH	16
Wilson's Snipe	*Gallinago delicata*	WISN	3
Wild Turkey	*Meleagris gallopavo*	WITU	3
Wood Duck	*Aix sponsa*	WODU	12
White-rumped Sandpiper	*Calidris fuscicollis*	WRSA	19
White-throated Sparrow	*Zonotrichia albicollis*	WTSP	0
Yellow Warbler	*Setophaga petechia*	YEWA	217
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	YHBL	168
Yellow-rumped Warbler	*Setophaga coronata*	YRWA	4
Totals			126632

Slough Fish Monitoring

Each survey consisted of six to eight runs totaling ~150m of the slough. Using a seine net sized to the general width of the slough channel, we ran the net at the slough bottom, capturing as many fish as possible. We then dumped those fish into a five-gallon bucket for identification and counting purposes. No individuals were collected. One slough was sampled twice. The other regularly sampled slough was only sampled once and one restored backwater slough was also surveyed once. The backwater slough consisted of a different community of fish species than our other sloughs as it was connected to the Platte River including White Crappie, Longnose Gar, and many Silver Carp. Only 6 Silver Carp were caught but many larger individuals were seen jumping during the survey. We detected 4,628 individual fish of 16 species across 30 runs in 2023, compared to 5,233 individual fish of 7 species across 27 runs in 2022. Some disparity between numbers of individuals between years is due to missing a day of surveying one of our regular sloughs. The backwater slough also was much deeper, making seining more difficult to catch larger numbers of fish. In 2022 we had a large increase in Western Mosquitofish (*Gambusia affinis*) and we experienced a similar large proportion of Western Mosquitofish in 2023 (84.6%). The Plains Topminnow, a species of concern in Nebraska, accounted for only 1.97% of captures which is a substantial decrease from 2022 and 2021 which was around 7%. These numbers continue to signal a cause for concern as the sloughs at the Crane Trust are considered quality Plains Topminnow habitat. Within a section of one of our sloughs we saw hundreds of dead Brook Sticklebacks (not included in total counts). Cause of death was uncertain but possibly due to an increase in water temperatures due to more areas of shallow water.

Methods:

Onorato, D.P., R.A. Angus, and K.R. Marion. 1998. Comparison of a small-mesh seine and a backpack electroshocker for evaluating fish populations in a North-Central Alabama stream. North American Journal of Fisheries Management 18: 361-373.

Table 3. Fish Detected at the Crane Trust in 2023

Common Name	***Scientific Name***	**Count**	
Western Mosquitofish	*Gambusia affinis*	3913	84.6%
Brassy Minnow	*Hybognathus hankinsoni*	283	6.11%
Brook Stickleback	*Culaea inconstans*	241	5.21%
Plains Topminnow	*Fundulus sciadicus*	91	1.97%
Green Sunfish	*Lepomis cyanellus*	38	0.82%
Gizzard Shad	*Dorosoma cepedianum*	11	0.24%
Brook Silverside	*Labidesthes sicculus*	10	0.22%
Black Bullhead	*Ameiurus melas*	9	0.19%
White Crappie	*Pomoxis annularis*	9	0.19%
Common Carp	*Cyprinus carpio*	7	0.15%
Silver Carp	*Hypophthalmichthys molitrix*	6	0.13%
Longnose Gar	*Lepisosteus osseus*	3	0.06%
Sand Shiner	*Notropis stramineus*	3	0.06%
Creek Chub	*Semotilus atromaculatus*	2	0.04%
Black Crappie	*Pomoxis nigromaculatus*	1	0.02%
White Sucker	*Catostomus commersonii*	1	0.02%
Total		4,628	

Vegetation Monitoring

We targeted plants in excellent condition, in fruit or flower (ideally both), to fill in distribution gaps and verify species for collection to the Crane Trust herbarium. We recorded the area where the plant was found to the nearest transect, the date it was collected, and its relative abundance in the area. We collected plant specimens from across Crane Trust properties and the Central Platte River Valley (Table 4). Collections and identifications were made primarily by J. Wiese.

Most of the plants collected were encountered on vegetation surveys which include both point-line intercept (every two meters) and quadrat (0.5m x 1.0m every 10m) ocular cover estimation methods along a 100m permanently-marked transect. We conducted 37 such surveys during the 2023 growing season from 28 June to 11 September. Despite additional surveying efforts, no Western Prairie Fringed Orchid (*Platenthera praeclara*) were detected this year in areas it had been historically (Caven 2022). In total, we made collections of just 13 plants of 13 species in 2023, as we already have quality specimens for most local species in our herbarium.

Methods:

Symstad, A.J., C.L. Wienk, and A.D. Thorstenson. 2008. Precision, Repeatability, and Efficiency of Two Canopy-Cover Estimate Methods in Northern Great Plains Vegetation. Rangeland Ecology and Management 61:419-429.

Additional Relevant Sources:

Caven, A.J. 2022. Western prairie fringed orchid management, ecology, and decline at Mormon Island. Transactions of the Nebraska Academy of Sciences. 42:1-8.

Kaul, R.B., D. Sutherland, and S. Rolfsmeier. 2012. The flora of Nebraska, second edition. School of Natural Resources, University of Nebraska-Lincoln, Lincoln, NE, USA.

Schneider, R., M. Fritz, J. Jorgensen, S. Schainost, R. Simpson, G. Steinauer, and C. Rothe-Groleau. 2018. Revision of the Tier 1 and 2 Lists of Species of Greatest Conservation Need: A Supplement to the Nebraska Natural Legacy Project State Wildlife Action Plan. The Nebraska Game and Parks Commission, Lincoln, NE

Nagel, H.G., and O.A. Kolstad. 1987. Comparison of plant species composition of Mormon Island Crane Meadows and Lillian Annette Rowe Sanctuary in central Nebraska. Transactions of the Nebraska Academy of Sciences 15:37-48.

Table 4. Plant Specimens Collected for the Crane Trust Herbarium in 2023

Collection dates, nomenclature, status as native or introduced (i.e., "exotic"), number of individual plants collected, and status as a county recorder per Kaul et al. (2012). *county record

Date Collected	Common Name	Genus	Species	Status	No. Collected
8/7/2023	Nimblewill	*Muhlenbergia*	*schneiberii*	N	1
8/7/2023	Purple Sandgrass	*Triplasis*	*Purpurea*	N	1
7/7/2023	Field Woodworm	*Artemesia*	*campestris ssp. Caudata*	N	1
6/9/2023	Missouri Violet	*Viola*	*missouriensis*	N	1
7/14/2023	Rugel's Plantain	*Plantago*	*rugelii*	N	1
7/6/2023	Toothed Spurge	*Euphorbia*	*davidii*	N	1
7/6/2023	Eastern gamagrass	*Tripsacum*	*dactyloides*	N	1
6/29/2023	Prairie Wedge Grass	*Sphenopholis*	*obtusata*	N	1
6/28/2023	Tall Wheatgrass	*Elymus*	*elongatus*	E	1
6/7/2023	American Burnweed	*Erechtites*	*hieraciifolius*	N	1
6/7/2023	Schweinitz's Flatsedge	*Cyperus*	*schweinitzii*	N	1
6/7/2023	Indian Blanket*	*Gaillardia*	*pulchella*	N	1
5/31/2023	Troublesome Sedge	*Carex*	*molesta*	N	1

Butterfly Species of Concern Monitoring

We counted butterflies using linear walking transects. Surveys were conducted by two research personnel; the observer spotted butterfly species of concern, while the recorder utilized a GPS and a compass to navigate the monitoring transect, record data, and aid in the detection of butterflies. We counted "butterflies observed ahead and to the sides to the limit at which a species can be identified with binoculars" (Swengel 1996). Detections were recorded as within 10m of the transect or outside of this area. Only Regal Fritillaries within 10m of the transect line were sexed. Males have a lower line of orange spots on the hind wing, while females have two lines of white spots. Monarchs were not sexed since male and female morphological differences are slight, and accuracy may be compromised.

Monarchs and Regals were incidentally recorded on the walk to and from biological monitoring plots using GPS as well. All sightings within 200m of the start of a monitoring transect and their corresponding GPS locations were included as incidental detections associated with specific monitoring plots. In total, we surveyed 21 monitoring sites 3 times each in 2023. Surveys lasted 15 minutes and were only conducted during favorable weather conditions (sunny, wind under 10mph) between the late morning (10:00am) and the midafternoon (4:00pm). All plots were visited three times during the Regals' active period, from June 15th to September 15th, and at least once during peak Regal activity, from June 15th to August 1st, based on the timing of Regal activity demonstrated from previous work conducted in the region. We also recorded incidental detections of Monarchs and Regal Fritillaries made off long-term monitoring plots while out conducting other survey work. Previous to 2020, we only reported abundance estimates from systematic monitoring surveys. Generally, this works well for Regal Fritillaries considering their strong associations with particular habitats and their resident life history. However, as migrants, Monarch concentrations can shift widely from year to year, and sometimes their highest densities are detected outside of our monitoring plot system. Furthermore, there is significant temporal variability in peak Monarch abundance, and the highest densities can migrate through the Central Platte River Valley outside of our standardized survey periods. Therefore, starting in 2020 we also began reporting incidental butterfly species of concern detections in our annual *Species Detection, Collection, and Monitoring Report.*

Both Monarchs and Regal Fritillaries increased from 2022, which was a notably low year for both species. However, numbers are still down from 2021 when there was 3.4 Regal Fritillaries per survey and 3.5 Monarchs per survey.

Methods:

Caven, A.J., K.C. King, J.D. Wiese, and E.M. Brinley Buckley. 2017. A descriptive analysis of Regal Fritillary (*Speyeria idalia*) habitat utilizing biological monitoring data along the big bend of the Platte River, NE. Journal of Insect Conservation 21:183–205.

Swengel, A.B. 1996. Effects of fire and hay management on abundance of prairie butterflies. Biological Conservation 76(1):73-85.

Table 5. Butterfly Detections 2023

Common Name	Regal Fritillary	Monarch
Systematic On-Plot	98	69
Count per Survey	1.55	1.10
Incidental On-Plot	36	36
Incidental Off-Plot	17	111
Total	151	216

Herpetofauna Research

In 2018, we began an anuran monitoring program estimating general abundance and species presence or absence based on vocalization activity following the methods of USGS (2012). Abundance is broken up into three differentiable categories (Weir and Mossman 2005; USGS 2012):

Table 6. Amphibian Calling Index

1 Individuals can be counted; there is space between calls
2 Calls of individuals can be distinguished but there is some overlapping of calls
3 Full chorus, calls are constant, continuous and overlapping

Surveys were conducted as early as 30 minutes after official sunset in humid and low-wind (<15 mph) conditions, with early spring temperatures above 42° F (March-15 to May-15) and late spring-summer temperatures above 50° F (May-15 forward) (Weir and Mossman 2005; USGS 2012). Surveys lasted 5 minutes per site and were conducted at least 2-4 times per survey season at each site, with 1-2 surveys conducted in the early spring period and 1-2 surveys conducted in the late spring-summer period at each site (USGS 2012). A recording device was brought to each site to record novel calls and to provide evidence for species not previously detected on Crane Trust properties. Novel calls were investigated physically following timed survey periods at a set location. Playback was also used to look for rare species following the official survey, but not during.

We detected five species in 2023. In 2023, Boreal Chorus Frogs were detected on the highest percentage of monitoring sites, but they had a significantly lower average call index compared to 2022 (2.5) which was a low year for anurans. Woodhouse's Toads had the highest average call index for the year. Cope's Gray Treefrogs were only detected at one plot which is down from 2022 (17.1%) and considerably down from 2021 (83.3%).

Table 7. Mean anuran species abundance index and percent of plots present during surveys conducted in 2023

Common Name	*Scientific Name*	Call Index	% Plots
Boreal Chorus Frog	*Pseudacris maculata*	1.8	100%
Woodhouse's Toad	*Anaxyrus woodhousii*	2.2	91.7%
Plains Leopard Frog	*Lithobates blairi*	1.4	66.7%
Cope's Gray Treefrog	*Hyla chrysoscelis*	1	8.3%
Bullfrog	*Lithobates catesbeianus*	1.6	25.0%

Methods:

US Geological Survey. 2012. North American Amphibian Monitoring Program: Protocol. Patuxent Wildlife Research Center, Laurel, Maryland, USA.
https://www.pwrc.usgs.gov/naamp/index.cfm?fuseaction=app.protocol
Weir, L. A., J.A. Royle, P. Nanjappa, and R.E. Jung. 2005. Modeling anuran detection and site occupancy on North American Amphibian Monitoring Program (NAAMP) routes in Maryland. Journal of Herpetology 39(4): 627-640.

Additional Relevant Source:

McLean, R.P., G.D. Wright, and K. Geluso. 2015. Cope's Gray Treefrog (Hyla chrysoscelis) along the Platte River, Hall County, Nebraska. Collinsorum 4(1):2-4.

Sandhill Crane Aerial Surveys

We counted a total of about 1,657,100 Sandhill Cranes in the Central Platte River Valley (Chapman to Overton, NE) across 9 weeks of surveys in 2023. Our counts accurately capture cranes on the river as well as those in post roost aggregations within 3.4 km of the river which were regularly detected but with a decrease in detectability compared to the river. However, cranes departing the river early and leaving this narrow band were potentially not counted or were counted at a reduced rate. Therefore, our numbers represent a systematic underestimation. On March 26th a flight was attempted but shortened due to weather and safety concerns. Over 75% of cranes recorded on the partial survey were roosting off-channel in snowy fields. Peak migration was also estimated to be around March 26th but due to weather and crew availability our surveys most likely missed peak numbers.

Methods:

Caven, A.J., E.M. Brinley Buckley, K.C. King, J.D. Wiese, D.M. Baasch, G.D. Wright, M.J. Harner, A.T. Pearse, M. Rabbe, D.M. Varner, B. Krohn, N. Arcilla, K.D. Schroeder, K.F. Dinan. 2019. Temporospatial shifts in Sandhill Crane staging in the Central Platte River Valley in response to climatic variation and habitat change. Monographs of the Western North American Naturalist 11(1):33-76.

Caven, A.J., D.M. Varner, J. and J. Drahota. 2020. Sandhill Crane abundance in Nebraska during spring migration: making sense of multiple data points. Transactions of the Nebraska Academy of Sciences and Affiliated Societies 40:6-18.

Table 8. Sandhill Crane Count by Survey Week 2023

Survey Date	SACR Count	Bias Corrected
2/13/2023		6,400±900
2/20/2023	24,622	27,400±6,000
2/27/2023	58,987	69,100±12,000
3/7/2023	336,181	225,000±72,000
3/14/2023	373,675	457,800±28,600
3/20/2023	296,187	378,000±40,500
4/1/2023	196,959	261,300±28,500
4/6/2023	162,776	228,600±18,200
4/12/2023		3,500

Whooping Crane Behavioral Monitoring Research

The objective of the Whooping Crane (*Grus americana*) behavioral monitoring study is to collect behavioral data that will allow us to calculate Whooping Crane time budgets and link them to the habitats they are utilizing. Behavioral monitoring data can help us determine which values various habitats provide (i.e. – forage resources, safe areas for social display, etc.) as well as how behavior varies within and across habitat types. This data can also help us document potential threats as well as specific forage resources consumed by Whooping Cranes. In short, we gathered natural history information that has the potential to inform conservation efforts through behavioral observations.

Whooping Crane locations were provided via the United States Fish and Wildlife (USFWS) managed public sightings database as well as locations of GPS-tracked Whooping Cranes that were provided by the USGS, FWS, and CWS. Once a report was received, qualified biologists were sent to confirm public reports of Whooping Cranes. In addition to filling out the traditional USFWS sightings report, biologists also conducted scan sampling to get a more comprehensive view of their behavior. Research was conducted predominantly in south-central Nebraska (Rainwater Basins, the Loup River system, Platte River system, etc.) with occasional work outside of this area (throughout Nebraska and northern Kansas) as time and funds allowed. All work was conducted following the guidelines drafted by the USFWS and the Nebraska Game and Parks Commission (NGPC) for "avoiding Whooping Crane disturbance and harassment" including making observations from >610 m (~0.4 mi, 2,000 ft.), avoiding intrusions into habitats to measure habitat parameters until after the cranes have clearly departed the area, etc., and immediately reporting any information regarding observations of injured cranes to the proper authorities.

We used an instantaneous scan sampling approach which included counting the number of Whooping Cranes displaying a particular behavior at one-minute intervals for a period of no less than 30 minutes unless the cranes left the use location or moved out of sight. We relied on high resolution long-range photography and videography to documented Whooping Crane forage consumption. We also documented eagle-crane interactions considering the recent increase in observations of Bald Eagles attempting to depredate crane species regionally. We also recorded the presence of any aircraft and documented Whooping Crane reactions them.

During the spring of 2023, we observed 19 unique Whooping Crane groups that were comprised of 94 individuals including 78 adults and 16 juveniles. We collected 6,620 individual behaviors from instantaneous scan samples of Whooping Crane groups.

During the fall of 2023, we observed 22 unique Whooping Crane groups comprised of 93 individuals including 78 adults and 15 juveniles. We collected 1,580 instantaneous behavioral scan samples which totaled 6,380 individual behaviors documented. We obtained several photographs and observed Whooping Cranes utilizing several different landcover classes including river (n=3,658), corn field (n=2,464), lacustrine wetland (n=210), and palustrine wet meadow (n=48). Seven potential aircraft-Whooping Crane interactions involving 30 adults and 2 juvenile Whooping Cranes were observed. Small fixed-wing planes (n=5) did not cause a reaction from the involved cranes. When a helicopter (n=1) or chinook (n=1) was involved, the cranes were in an alter posture and prepared to take flight.

In total, across both spring and fall migrations in 2023, we observed 41 unique Whooping Crane groups including 187 individuals of which 31 were juveniles and documented 13,000 behaviors.

Conclusion

Continued implementation of our long-term biological monitoring program will help us more critically assess the impacts of our management actions upon Whooping Cranes, Sandhill Cranes, and the other migratory and breeding bird species in the Big Bend region of the Platte River in Nebraska. These data

are all integrated into our long-term research and monitoring plan and will be used to develop models and plans to improve management actions. This report represents preliminary findings and thus should be interpreted as such; our intention with this data is to produce peer-reviewed research that addresses issues of conservation concern in the Central Platte River Valley. As we publish results from our studies they will be posted on our website and available to the public (https://cranetrust.org/what-we-do/conservation/research/). We have also included a list of recent publication activity in Appendix 1 of this report. We thank the U.S. Fish and Wildlife Service and the Nebraska Game and Parks Commission for their continued support of our research program.

Appendix 1. Recent Publication Activity by Crane Trust Research Staff in 2023

1. Baasch, D.M. 2023. Whooping Crane diurnal behavior and natural history during migration in the Central Great Plains: Summary Report - Spring 2019-Fall 2022. Submitted to the Nebraska Army National Guard. 10 p.
2. Baasch, D.M., A.J. Caven, M. Rabbe, A.H. Medaries, M.R. Schaaf, B.L. Ostrom, J.D. Wiese, J.M Malzahn, and T.J. Smith. 2023. Record-sized flock of Whooping Cranes (Grus americana) observed staging in the Central Platte River Valley during Autumn 2021. Waterbirds, 45(4):484-491
3. Baasch, D.M., A.C. Rojas, A.J. Caven, and J.D. Wiese. 2023. An investigation into the nocturnal moth community within the Central Platte River Valley with a focus on Erebidae and Sphingidae species. Platte River Natural Resources Reports eJournal 3:18-45.
4. Caven, A.J. 2023. An Updated Minimum Estimate of the Global Sandhill Crane Population. SSRN: Platte River Natural Resource Reports eJournal 2:1-14.
5. Caven, A.J., H.L. Thompson, D.M. Baasch, B. Hartup, A. Hegg, S.M. Schmidt, I. Louque, C. Allen, C.G. Crouch, C. Davis, J. Jorgensen, J.E. Austin, B.L. Ostrom, R. Beilfuss, G. Archibald, A. Lacy. 2023. Biological Case Against Downlisting the Whooping Crane ad for Improving Implementation under the Endangered Species Act. Authorea. (Preprint)
6. Caven, A.J., J.D. Wiese, K.C. King, E.M. Brinley Buckley, B. Krohn, H.B. English, B. Winter, and T.J. Smith. 2023. Migrating Swainson's Hawk (Buteo swainsoni) occurence at spring controlled burns in the central Great Plains. SSRN: Platte River Natural Resource Reports Forthcoming
7. Schaaf, M., and A.J. Caven. 2023. Occurrence of the Red-bellied Snake (Storeria occipitomaculata) on the margins of a disjunct range. Reptiles & Amphibians 30(1):e18216-e18216.