



LANDMARK

Adventure Science on American Prairie Reserve



2014 Landmark Q2 Report
Prepared by
Adventurers and Scientists for Conservation
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<http://www.adventurescience.org/landmark.html>

Abstract

Landmark is an ongoing collaboration between Adventurers and Scientists for Conservation (ASC) and the American Prairie Reserve (APR). This project is designed to gather information to aid the Reserve's management team in understanding multiple parameters related to wildlife usage of and interaction with the prairie landscape.

Our use of emerging technologies and adventure scientist crews to collect data brings a diverse variety of backgrounds and skills to assist this highly ambitious conservation effort.

In our second quarter of survey work 15 Adventure Scientists surveyed 907 miles of transects, documented 3,573 animal observations, 17 hydrologic measurements, eight badger holes, 29 animal remains, 10 fence-breaks, and hundreds more observations catalogued in this report. Additionally, crews spent 37 hours scoping from high points on the Sun Prairie property, documenting 125 wildlife observations. Moreover, 26 remote sensing camera locations were monitored along fence-lines and maintained at regular intervals, providing a total of 503 documented wildlife observations recorded in HD video.

In addition to the work that was completed during the first quarter of the project, we report on season-specific wildlife observations including bison adult/calf counts and sage-grouse lek counts.



Table of Contents

Abstract.....	2
Project Overview and Goals	5
Project Design & Methodology	5
Volunteers	5
Recruitment	5
Screening - Who is an “Adventure Scientist”?	6
Stint Length and Stipend	7
Oversight	7
Wildlife Transects	8
Transect placement/selection	8
1. Animal Observations	8
2.....	10
2. Human Artifacts	10
3. Badger Holes	11
4. Stream Flows.....	11
5. Russian Olive Trees	12
6. Dead Animals	12
7. Other waypoints of interest.....	13
Camera Trapping and Fences	13
Location Selection - Perimeter Fences.....	13
Camera Placement.....	14
Lens Direction.....	14
Camera Servicing	14
Camera Settings.....	14
Fence Interaction Videos.....	14
Scoping	15
Bison Counts.....	16
Sage Grouse Lek Counts.....	17
Results and Discussion	18
Animal Observations: Transects	18
Animal Observations: Camera Trapping	19
Animal Observations: Scoping	21
Animal Observation Summaries: Transects, Cameras, & Scoping.....	22
Bison.....	22
Mule Deer	23
White-Tailed Deer.....	24
Pronghorn.....	25
Elk.....	26
Badger	27
Coyote	28
Bobcat	29
Raccoon	30
Porcupine	31

Black-tailed Prairie Dog	32
Desert Cottontail	33
White-tailed Jackrabbit	33
Sharp-Tailed Grouse	34
Greater Sage Grouse	35
Ring-Necked Pheasant.....	36
Reptiles.....	37
Snakes.....	37
Painted Turtles	38
Greater Short-Horned Lizard	38
Human Artifacts.....	39
Badger Holes	39
Hydrologic Features	40
Russian Olive Trees.....	41
Dead Animals.....	41
Other Waypoints of Interest	42
Bison Counts.....	43
Greater Sage-Grouse Lek Counts	43
Additional Notes.....	44
Observer Reliability	44
Acknowledgements.....	45
Works Cited	47
Appendix 1- Cumulative Animal Observations: Transects, Camera Traps, and Scoping.....	48
Appendix 2 - Transect Animal Observation Data.....	49



This document is intended to present the data ASC has collected in a manner that is digestible to both an academic and non-scientific audience. The numeric data is supplemented with digital maps, photography, videos, and other interactive materials, which are available upon request.

Project Overview and Goals

Adventurers and Scientists for Conservation (ASC) and the American Prairie Reserve (APR) have joined forces to create an innovative collaboration called **Landmark**. **Landmark** is an ongoing effort to collect information that can be used by a variety of stakeholders to improve decision making on and surrounding the Sun Prairie property of the American Prairie Reserve. The data reported in this document was compiled in the second quarter of 2014 (April 1 - June 30). The goal of APR is to move toward biodiversity centered management along the “Freese scale” including increasing wildlife abundance and decreasing fragmentation of the Reserve.

Our efforts managed crews consisting of four to six individuals at a time, who lived full-time on the American Prairie Reserve during April, May, and June 2014. Throughout the second quarter, crews hiked transects that were between 8-11 miles, searching for wildlife and wildlife signs in addition to collecting data on human artifacts, sage grouse leks, bison calves, hydrologic features, and more. Additionally, crews repositioned three first quarter camera locations and maintained 23 additional remotely triggered camera trapping sites in an effort to better understand wildlife interactions with the temporary fences on the reserve.

In addition to the collection of scientific data, we have placed a strong emphasis on recording the experience of living on the prairie. During the second quarter of this endeavor crew members have persevered through deep mud in April, transitioned to living in an outdoor field camp during snow showers in May, and weathered tent-shredding tempests in June. Throughout their time on the Reserve, volunteers regularly documented their experiences through social media, blogging, documentary photographs and video diaries.

This effort brings non-scientists to work on scientific data collection, hence ASC methodology has included extra precautions to ensure the integrity of the data collected.

Project Design & Methodology

Volunteers

Recruitment

Beginning in November 2013, ASC launched a recruiting website, created blog posts, and leveraged social media to solicit applications for volunteers. Posts were also aired on Gregg Treinish’s (ASC’s Executive Director) National Geographic blog, the NOLS listserve, the Texas A&M (TAMU) website, as well as the Society for Conservation Biology’s webpage. For

the 18 positions available in Q2 ASC had 85 total applicants from 30 states and 5 countries.

Screening - Who is an “Adventure Scientist”?

ASC screened and selected applicants based on several factors, including the following:

1. Backcountry experience:

Applicants were screened for experience in remote settings and prior experience camping. Applicants were evaluated via video interviews using Skype, Facetime or Google Hangouts.

2. Prior experience working in remote conditions and/or on a small team:

Applicants with experience in other challenging environments (field work in the Aleutian Islands, college semester programs in East Africa, horse-packing in Glacier National Park, etc.) were given priority because of the remote setting of the project and the outdoor living conditions of field camp during summer on the Reserve.

3. Prior scientific experience:

Because of the large applicant pool, ASC was able to select for individuals who had prior data collection experience. The ASC model is based on placing scientists and non-scientists alike into opportunities to contribute to conservation through data collection. However, especially in the beginning of the **Landmark** project, built-in scientific leadership provides a strong foundation for crews’ data collection.

4. Creative interests (writing, photography, and videography):

One of ASC’s **Landmark** goals is to document the experience of traversing and living on the prairie. Crew members were selected with an eye towards building teams with a mix of media skills from writing to photography. Over time, their recorded experiences will form a narrative of living and working on an expanding wildlife reserve.

5. Interest in conservation:

Walking 12 miles across the prairie and remaining attentive requires a strong work ethic, but also a sense of purpose. ASC gave priority to crew members who demonstrated a strong interest in large landscape conservation.

6. Sense of adventure:

Intangible, but critically important, this quality of spirit was a commonality to members of the second quarter crews. Crew members were selected who had a history of pursuing new experiences and personal challenges.



Stint Length and Stipend

During Q2, 15 Adventure Scientists contributed more than 2,240 hours of work to the Land**mark** project. Individual crewmembers committed to stints between three weeks and two months and worked an average of 35 hours each week.

ASC has worked to maintain consistency with data collection by encouraging “stay-overs” from crew to crew who can provide leadership and guidance to incoming crew members. Three individuals were “stay-overs” moving into April and two into May. In June, the entire crew rotated, providing a training challenge, but also an opportunity to recalibrate expectations and further standardize protocols. June was also the first month the project had a comprehensive Operations Manual to serve as a written reference for both the data collection and project logistics on Land**mark**.

At the completion of their service crew members were reimbursed \$300 to defray expenses while living on the prairie.



Oversight

At the beginning of each month, ASC staff conducted an intensive three-day training session during which volunteers learned project protocols and practiced these protocols in a hands-on supervised manner.

Volunteers were then expected to continue data collection with regular check-ins with ASC staff. ASC staff members were readily available for troubleshooting over the phone and made eight independent visits to the

reserve during the Q2 months. Additionally, phone calls were attended once per week between APR, ASC, and the Land**mark** crews.

ASC staff regularly monitored incoming data, which was available over the web and updated on a daily basis thanks to the use of tablets. This technology provided the opportunity to catch any data inconsistencies and to troubleshoot collection methods on a frequent basis.

Several crew members had had extensive leadership and scientific data collection experience prior to joining Land**mark** crews. These members were encouraged to serve in

leadership roles while in the field.

Equipment

Data were recorded using Google Nexus 7 tablets, customized “GoFormz”, Garmin Etrex 20 GPS units, Canon sx50 cameras, compasses, Vortex optics ranger 1000 rangefinders, Brunton binoculars and spotting scopes, and a tape measure. Data were uploaded on a daily basis via a satellite internet connection available at the Reserve Headquarters.

The tablets are equipped with 8MP cameras and GPS sensors. Various software have been installed to ensure uniformity, simplicity, and usability.

The use of emerging technologies in data collection helped to ensure the accuracy of data collected and enabled troubleshooting of data inconsistencies on a regular basis.

Wildlife Transects

Transect placement/selection

The Sun Prairie section of the APR (31,000 acres) was divided by ASC staff into nine transects of similar length and difficulty and routed to provide between .5 and 1-mile resolution coverage of the entire Sun Prairie property. Starting and ending points for transects were chosen primarily based on accessibility from roads and with a desire to maintain a <1 mile distance that volunteers would need to walk on either end of a transect.

Transects were generally 8-11 miles in length and were followed via GPS tracks. Crew members hiked each transect twice each month by teams of two observers instructed to record the following:

1. Animal Observations
2. Human Artifacts (when not previously documented)
3. Badger Holes
4. Hydrologic Features
5. Russian Olive Trees
6. Dead Animals
7. Other Waypoints of Interest

Crew members made additional observations from existing roads. These were recorded as transects that are labeled as “driving/other.”

1. Animal Observations

Background and Justification

Many species abundances on the Reserve are unknown and believed to be below carrying capacity (Kunkle and Austin 2014). Additionally, very little fine scale and local data are currently available for these species (Kunkle and Austin 2014).

Our Q2-2014 objective was to determine local seasonal density or relative use of each species utilizing the Sun Prairie property through counts of species observed and documentation of distance to and bearing to the species. Future analysis will be conducted using “DISTANCE” software to determine the density and variance of use by these species.

Method

Crew members were trained on prairie species identification, with special attention given to similar-looking species such as white-tailed deer, mule deer, and pronghorn. Upon observation of a living animal, multiple parameters were recorded using GPS-enabled tablets that auto-populate location and date/time fields. Garmin handheld GPS units, Canon sx50 superzoom cameras, compasses, and electronic rangefinders (Vortex Optics Ranger 1000) were also used to standardize data collection.

Observers were instructed to record their location at the time of sighting and to obtain a bearing and distance from the location in which an animal was first observed.

When counting numbers of animals, each of two or more individual observers was instructed to count silently and once each team member had his/her count, numbers were shared and averaged.

Habitat types were recorded at the location the observer was standing when he or she viewed the animal, not at the location of the animal itself. This was done to avoid guessing, especially when animal observations took place from large distances away.

Weather and ground conditions were recorded at the moment of initial animal sighting.

All crew members were instructed to obtain a photo of the animal if possible using Canon sx50 cameras that were provided to each team of two observers.

In order to better understand species identification reliability, acknowledging that each individual observer brings various levels of identification skills, ASC required observers to record their identification certainty on a 1-3 scale where 1 = sure, 2= probable, and 3 = not sure. All observations are displayed in map figures in the results sections; however, these reliability rankings should be referenced in the supplemental digital data when utilizing raw data.

In cases where duplicate observations were suspected (mostly this had the potential to occur with bison observations), crew members were instructed to record only 1 sighting per ¼ mile. While it is possible that an individual or group of animals moving across the Reserve were counted more than once due to being observed by more than one Landmark crew. This occurrence was highly unlikely due to the fact that crews walking transects on the same day were often miles apart at any given time and only able to observe wildlife from their singular location within in a vast landscape. Additionally, because direction of travel, bearing, and distance was recorded, it is possible to eliminate suspected cases of

dual counting.



2.

2. Human Artifacts

Background and Justification

Human artifacts including trash, agricultural remnants, and archeological artifacts have been observed throughout the Sun Prairie property. The objective is to record locations of these objects so that they might be removed or protected by APR staff as needed.

Method

Human artifacts were defined as any man-made object present on the Reserve with the exception of standing fences. This includes trash, farming equipment, discarded or dilapidated fences, Native American relics, well heads, and more. Objects were recorded regardless of age, size, or other factors.

To avoid duplicating entries of individual artifacts observed on repetitive transects, volunteers may refer to an ever-evolving set of notes on each transect which outlines obvious artifacts that have previously been recorded.

Observations of objects not previously documented were recorded with photo and GPS enabled tablets.

Subjective assessments as to whether items can be moved by hand were intended to aid the Reserve team in assessing the equipment that may be needed should they choose to remove any of the objects.

Counts of the number of items present at any given location were the result of individual

counts conducted by each team member present, which were then averaged and recorded.

3. Badger Holes

Background/Justification

Limited data currently exists statewide on badgers whose numbers are likely low due to prairie fragmentation and loss of prairie dogs (Clark 1982). Our objective is to begin establishing a baseline of badger relative abundance through a combination of animal observations and documentation of their holes

Methods

Crew members received training on the size, shape, and habitat of a badger hole along with additional signs that may be present near badger entrance or exit holes. All crew members were instructed to err on the side of caution and to record suspected badger holes even if the observers were not sure about the species responsible for the hole. As a result, some holes may be recorded as badger holes when they are in fact the result of the actions of other species.



Holes were measured for length and width across the hole-center. A general rule of thumb provided to volunteers was that holes with an opening size of 1' x 1' or larger were potential badger holes.

All observations were recorded with GPS and photo-enabled tablets.

In all cases, photos were taken to assist with hole identification.

4. Stream Flows

Background and Justification

Water is often in short supply throughout northeast Montana (NOAA 2014). The objective was to gain a temporal and spatial distribution of water flowing across the Sun Prairie in order to determine what, if any, affect stream flow might have on wildlife behavior throughout the property.

Methods

Crew members were instructed to record all observations of naturally occurring water sources encountered during transects. Stock ponds were not recorded.

Observers ranked the presence of water using the following five categories:

1. Standing Puddles
2. Flowing Trickle
3. Flowing Up to One Foot Deep
4. Significant Current More Than One Foot Deep
5. Waist-Deep Flow

Stream flow waypoints were recorded on a GPS-enabled tablet.

In all cases, photos were taken to assist with observations.

5. Russian Olive Trees

Background and Justification

Russian Olive Trees, which have been identified near the Sun Prairie, are considered an invasive species, and concerns exist that they could out compete native species (Katz 2003). The objective was to record locations of these trees, if found, and present them to the Reserve team for future actions.

Method

Crew members received training on identification of this invasive species mostly through tree images.

If trees were encountered during transects, each team member was instructed to estimate the height of the tree. The results would be averaged and recorded along with the tree location and a photo. No trees have been encountered thus far on the Landmark project.

6. Dead Animals

Background and Justification

Animal deaths on the prairie can occur on account of both natural and anthropogenic causes. Predation, age, disease, fence collisions, fights, etc. can cause animal death, an important piece of ecosystem life. Dead and decaying animal corpses revitalize soils and serve as food and hosts to animals large and small. Our objective in recording animal deaths is to help APR understand the species, the frequency, and potentially the causes of animal death to help complete a picture of animal existence on the prairie.

Method

Crew members were instructed to record all observations of animal deaths while walking transects. When possible, crew members were told to record species, number of animals, degree of death, location, date/time, and any other



clarifying notes. The degree of death was to be categorized into one of the following stages: new death, slightly deteriorated, bones and skin, feather, just bones.

All observations were recorded on GPS and photo-enabled tablets.

7. Other waypoints of interest

Crew members were instructed to record observations of animal signs, apparent grouse collisions with fences, and/or anything else they noticed while on transects that might have been considered of interest to the Reserve team or others.

When observations were related to wildlife, observers were instructed to make a best guess of the species responsible. These guesses are intended to assist with identification and should not be considered reliable species identifications.

All observations were recorded on GPS and photo-enabled tablets.

Camera Trapping and Fences

Background and Justification

With the intention of holding bison while ensuring ready passage of other wildlife, APR has implemented the use of high voltage (3,000 – 9,000 volts) electrified fences consisting a barbed top wire, a smooth and electrified second wire, a barbed third wire, and a smooth and raised bottom wire. Our objective in Q2-2014 was to record observations of wildlife interacting with these fences on HD videos in order to observe whether various species appeared to cross, interact with, or avoid APR's perimeter fences.

Additionally, we placed cameras on traditional barbed wire fences located within the Sun Prairie property to begin understanding whether there is a measurable difference in permeability between different fence types.

Location Selection - Perimeter Fences

In Q2-2014 26 different camera sites were active at various times throughout the reserve. Their locations were mostly selected during Q1-2014 when GIS layers provided by APR informed the site-selection of eighteen general areas at the intersections of riparian zones and fences. These sites were selected with the hope of observing a variety of charismatic species that typically utilize riparian areas. Q1 crews then located these pre-selected waypoints using Garmin handheld GPS units and hiked along the fence in the immediate vicinity of these points looking for areas that met the following criteria:

1. Largely clear of brush and tall grasses that could provide false-triggers.
2. Areas that contain natural features that might concentrate wildlife traffic.
3. Areas showing a high concentration of tracks in snow that was present for much of the initial months of the Landmark project.

An additional five cameras were placed at areas of high wildlife traffic identified by tracks in snow or mud, or from hairs caught on fence barbs during Q1. These placements were not

standardized and are distributed in grassland, sagebrush and riparian zones.

During Q2, a number of initial camera placements were moved based on wildlife inactivity, fence deconstruction, or malfunctioning cameras. Each time a camera was moved, the camera was renamed one number higher than the previous highest-number camera, and placed in a location deemed appropriate by crew members based on wildlife presence and the above criteria.

Camera Placement

Cameras were placed on vertical metal fence posts above the top rung. Using a foam anchor that allowed easy tightening of the camera and lens -direction adjustment

Lens Direction

Cameras were generally placed facing north and east to minimize false triggers from glare.

Camera Servicing

In order to ensure functionality, cameras were visited on average every two weeks. Weather and road conditions commonly determined the variability in camera servicing. Memory cards were changed with each servicing, and, if needed, batteries were replaced.

Camera Settings

Cameras maintained the following settings with exception of the ‘sensitivity level’ which was manually switched to ‘low,’ ‘medium,’ or ‘high’ based on the number of videos recorded that were absent of wildlife. If the ratio of wildlife videos to non-wildlife videos was less than 1:5, the ‘sensitivity level’ was lowered one level.

CAMERA SETTING:	SET TO:
Mode:	Video
Image Size*:	5M Pixel
Image Format*:	Full Screen
Capture Number*:	3 Photo
LED Control:	Medium
Camera Name:	(this should be the camera site number)
Video size:	1280x720
Video length:	30S
Interval:	5S
Sensor level:	Auto
NV shutter:	Low
Camera mode:	24 hours
Format:	Execute
TV out:	NTSC
Time stamp:	On
Set clock:	(chose set to set the time and date)
Field scan:	Off
Coordinate Input:	On (enter lat/long location of the camera site)
Video sound:	On
Default set:	Cancel

Fence Interaction Videos

Wildlife observations caught on camera were categorized into four groupings based on individual interactions with fences: fence interaction (FI), no interaction/unknown (NI), fence crossing deterred (D), and fence crossing success (C). Any activity not explicitly

captured in the video clip was not assumed to have taken place.

“FI” – Fence Interaction

Cases in which an animal approached the fence within 1.5 feet and oriented its head perpendicular to (facing) the fence were considered fence interactions and received the label “FI.” “FI” videos included instances of, sniffing, licking, scratching, and contacting the fence.

“NI” – Non-interaction

Partial crossings, cases without an approach to a fence, and cases proximate to a fence but at too far a distance to observe interactions received an “NI” label.

“C” - Crossing

A “C” label was counted as such only when the entire animal’s body crossed the plane of the fence. Each fence crossing (C) was labeled to specify if the animal went over (O), under (U), or through (T) the fence. The O, U, or T was only assigned to crossing observations that were clear and obvious in each clip.

“D” – Deterred

Interactions received a “D” label when an animal started to cross a fence and then left the camera view in the opposite direction.

When more than one animal was present in an individual clip, their interactions were documented as separate observations. Because individuals could not be identified with any degree of accuracy from one recording to the next, even when repeat observations of the same animal were suspected, each recording was counted as an independent observation.

Scoping

Background and Justification

Scoping data was collected to supplement animal observations recorded during transects. Stationary positioning accompanied with animal observation is commonly used to determine animal abundance and densities (Gese 2001).

Location Selection

Scoping sites were chosen based on visibility of the surrounding terrain. Hills that provided at least 180-degrees of visibility were considered acceptable as observation points.



Methods

Teams of two volunteers remained at each chosen location for up to two hours. Using a combination of high-power spotting scopes and binoculars that were provided to the

project by ASC sponsor Brunton Outdoors, the teams scanned for wildlife and recorded each animal sighting as a wildlife observation. When spotting from a particular location yielded no observations after 30 minutes the crews were allowed to relocate, with a minimum total spotting time of one hour for any given outing.

Distance to animal individual or group center was recorded using Vortex Optics Ranger 1000 rangefinders.

Bearings to individual or group centers were recorded using a standard hand compass.

Numbers of animals present were counted silently by each individual observer and averaged.

Bison Counts

Background and Justification

Bison counts were completed from mid-April through the end of June for the purpose of finding the ratio of adult bison to bison calves. Knowing when calves are born and the quantity by which the herd is multiplying will inform APR's bison management practices as they seek to grow the herd.

Location Selection

The location of bison count transects was selected based on achieving wide spatial coverage on foot of the 20,000 acres grazed by the bison herd coupled with locations of four radio collared cow bison which were checked in the morning before each transect was walked. Counts occurred primarily on NE and SE trending transects of the Sun Prairie (Map 1.) that ran from Buffalo Camp to Grouse Camp on the north and south sides the Box Elder Crossing (BEC). Crews followed high points on these transects to allow the widest possible viewsheds. The north transect team counted only bison north of the BEC road, and the south team bison on the south side of the road. The teams maintained radio contact to minimize double counting in the event that a group crossed the BEC. The vehicle-based team coordinated pick-ups and drop-offs of the hiking teams, as well as surveyed the western portion of the 20,000 acres by road and by foot. From vantage points on the Indian Lake Road and from north of the Prairie Union School the vehicle team counted any bison present in the valley bottom.



Map 1. Location of transects for bison counts

Methods

Transects were completed two times each week by teams of two crew members. When a bison individual or herd was sighted, each member of a crew counted the number of adults and calves in the herd four different times. After each silent count, crew members averaged and recorded their numbers. The resulting four averages were then averaged together to find a final count of adult and calf bison. The calves were distinguished by their reddish coat and small size. During initial counts attempts were made to differentiate yearlings, however, this distinction was eliminated from our protocols on later counts due to the difficulty of accurately identifying yearlings vs. adults at long distances (400+ yards) and when the herd was bedded down. Brunton binoculars were used to aid in counting. Date/time observer location at the time of sighting, distance and direction to the herd were also recorded on Google Nexus 7 tablets.

Sage Grouse Lek Counts

Background and Justification

Sage Grouse are currently a candidate for listing under the Endangered Species Act (USFWS). Monitoring of active leks on the Sun Prairie gives an idea of the density of the species and allows the Reserve to track changes in lek usage over time.

Location Selection

Sage grouse lek count locations were selected based on known lek locations provided by APR management staff and Montana FWP. Observation points were selected at a minimum distance of 100 yards was maintained from leks to reduce chances of altering the behavior of the birds.

Methods

After training sessions conducted by ASC staff in which crews watched videos and looked at photos in order to accurately distinguish males from females, crews followed FWP protocols (provided by Scott Thompson, MTFWP) for counting sage grouse leks. Per FWP protocols the lek sites were counted once each week during April. Volunteers were instructed to be in place at observation sites 30 minutes before sunrise and to stay one hour after sunrise; each count occurred at dawn between 5:45 am and 6:45 am.

Four distinct lek locations were visited four times each throughout the month. Upon arrival at a suitable vantage point, crew members recorded ambient conditions including wind and temperature, sage-brush coverage expressed as a percentage estimate of ground cover (0 to 100), and vegetation disturbance levels (high, medium, low, or unknown). Two or more team members counted male and female sage-grouse individuals three times each beginning one side of the lek and scanning to the other. The highest count for each gender was recorded. Four count days were performed to cover the lek-surveying season and to note changes in the gender ratio throughout the season. All data was recorded using FWP provided data sheets.

Results and Discussion

Animal Observations: Transects

Landmark crews drove a total of 339 miles and hiked 568 miles. Each transect was surveyed during Q2 on average, five times.

A total of 453 wildlife sighting events recorded 3,573 animal observations between April 2nd and June 28th, 2014, including observations of 15 different species. On average, four animal sightings were logged per mile. Observations are grouped below by family. A summary of animal observations from transects can be found in Table 1.



Users of this data should be aware that substantial spatial sampling bias is likely present in the data due to limited coverage, repetition of transects, and repeated use of existing roads.

As temperatures warmed up in June (above 80 - 85 degrees F) the laser rangefinders became unreliable at ranges above 250 yards due to the presence of reflective heat waves. For distances greater than 250 yards the crews made calibrated estimates. During training crews practiced observing objects at 300 and 400+ yards and while completing transects teams of two independently estimated and then averaged distances (i.e. if one partner estimated 300 yards, and the other 350 the observation was recorded with a distance of

325 yards).

Table 1. Summary of transect animal observations by species.

	Species	Sighting Events	Animal Observations	Largest Group	Average Group Size
Ungulates	Bison	186	2667	174	14
	Mule Deer	94	298	18	3
	Pronghorn	49	150	10	3
	Whitetail Deer	3	7	4	2
Carnivores	Coyote	6	6	1	1
Sm.Mammals	Desert Cottontail	5	5	1	1
	Porcupine	1	1	1	1
Game Birds	Greater Sage Grouse	20	49	13	2
	Ring-Necked Pheasant	2	3	2	2
	Sharp-tailed Grouse	16	28	8	2
Reptiles	Bullsnake	3	3	1	1
	Greater Short Horned Lizard	6	6	1	1
	Painted Turtle	6	33	12	5
	Plains Gartersnake	6	14	3	1
	Prairie Rattlesnake	3	3	1	1

Animal Observations: Camera Trapping

Camera traps were set up throughout Sun Prairie primarily to investigate wildlife-fence interactions. Cameras were regularly maintained and crew members visited each camera approximately every two weeks to replace memory cards and check batteries

In Q2, twenty-six remotely triggered camera trapping sites recorded a total of 503 wildlife sighting events, totaling 1416 animal observations of 15 different species between April 2nd and June 28th, 2014. Several observations of birds and rodents that were deemed to be of lesser importance to the Reserve management team were intentionally omitted from the following results and will be made available through supplemental digital data. Camera locations are shown in Figure 1. A summary of the camera trap observations by species can be found in Table 2.

Table 2. Summary of camera trap results by species highlighting animal-fence interactions.

	Species	Events	Obser.	Behavior				
				Crossed		Det.	Inter.	No Int./ Unknown
				Under	Over			
Ungulates	Bison	268	1069				35	1034
	Elk	8	8				3	5
	Mule Deer	104	194	51	10	2	35	96
	Pronghorn	21	25	17		1	2	5
	Whitetail Deer	24	39	8	1		4	26
Carnivores	Badgers	1	1	1				
	Bobcat	1	1					1
	Coyote	10	11	2				9
	Desert Cottontail	21	19	2				17
	Jack Rabbit	20	20	5				15
	Raccoon	2	2					2
	Porcupine	6	6	2			1	3
Game Birds	Greater Sage Grouse	3	6	3				3
	Ring-Necked Pheasant	12	12	5				7
	Sharp-tailed Grouse	1	3	1				2

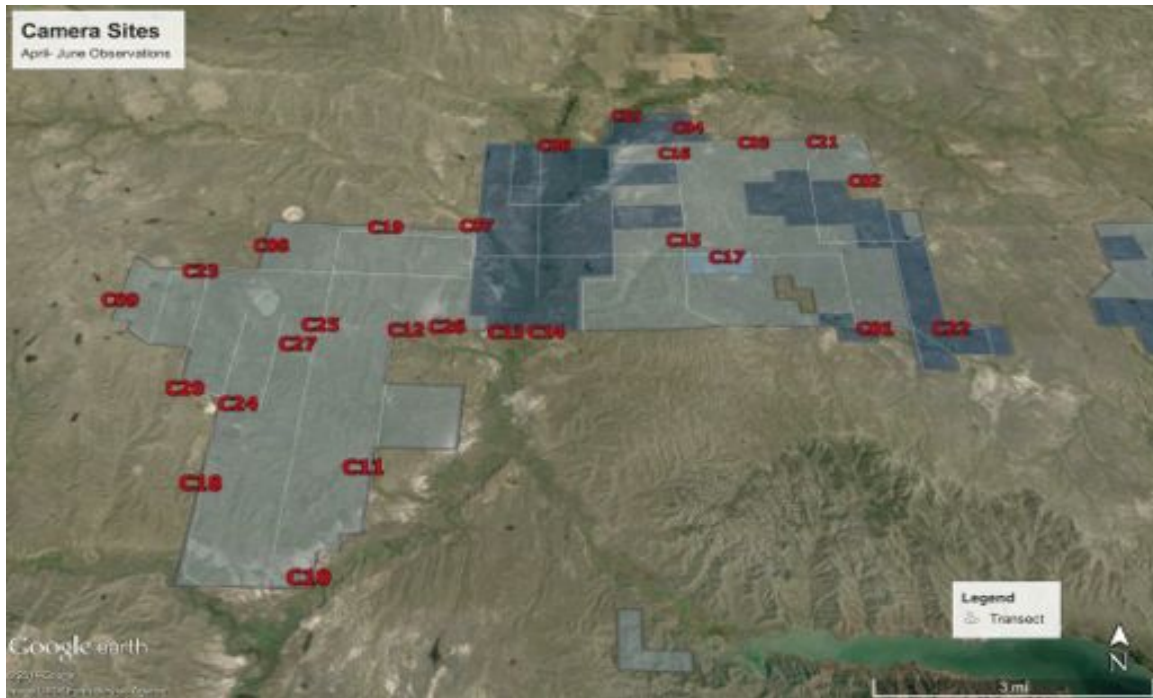


Figure 1. Q2 Camera sites on internal and external reserve fence lines.

Animal Observations: Scoping

High points were selected throughout Sun Prairie for scoping wildlife as an additional way to survey prairie animals. Scoping took place at eight primary locations shown in Figure 2. Through 32 independent scoping sessions, or roughly 37 hours of scoping, Landmark crews recorded 125 independent wildlife sighting events that included 2,186 observations of six species. Table 3 provides a summary of the species observed.

Table 3. Summary of species observed at scoping locations.

	Species	Sighting Events	Animal Observations	Largest Group	Average Group Size
Ungulates	Bison	76	1722	252	22
	Elk	6	31	12	5
	Mule Deer	12	36	12	3
	Pronghorn	8	25	9	3
Carnivores	Coyote	3	3	1	1
Game Birds	Greater Sage Grouse	4	75	29	19



Figure 2. High points designated as scoping sites.

Animal Observation Summaries: Transects, Cameras, & Scoping

Bison

Throughout the observation period, bison movements were confined to roughly 20,000 acres by the use of an external electrified fence surrounding the Sun Prairie property and an internal fence that separated the western portion of the Sun Prairie. During this period APR management allowed five bison individuals to roam in the western portion of the Sun Prairie.

Similar to Q1, movement within the fence system was distributed widely.

Transects - Crews recorded a total of 186 independent transect sighting events during Q2. Included in these sightings were a total of 2,667 animal observations. The largest single herd consisted of 174 animals. The average herd size was 14 animals, and the median herd size was 3.

Cameras - Bison were observed at 13 of the camera traps. A total of 1069 animal observations were logged, among them 331 were observed filing through an open gate near Camera 3. Of all the animals observed, 35 interacted with the fence, and 1034 did not interact with the fence.

Scoping - 76 distinct bison sighting events totaling 1,722 bison observations occurred in Q2.

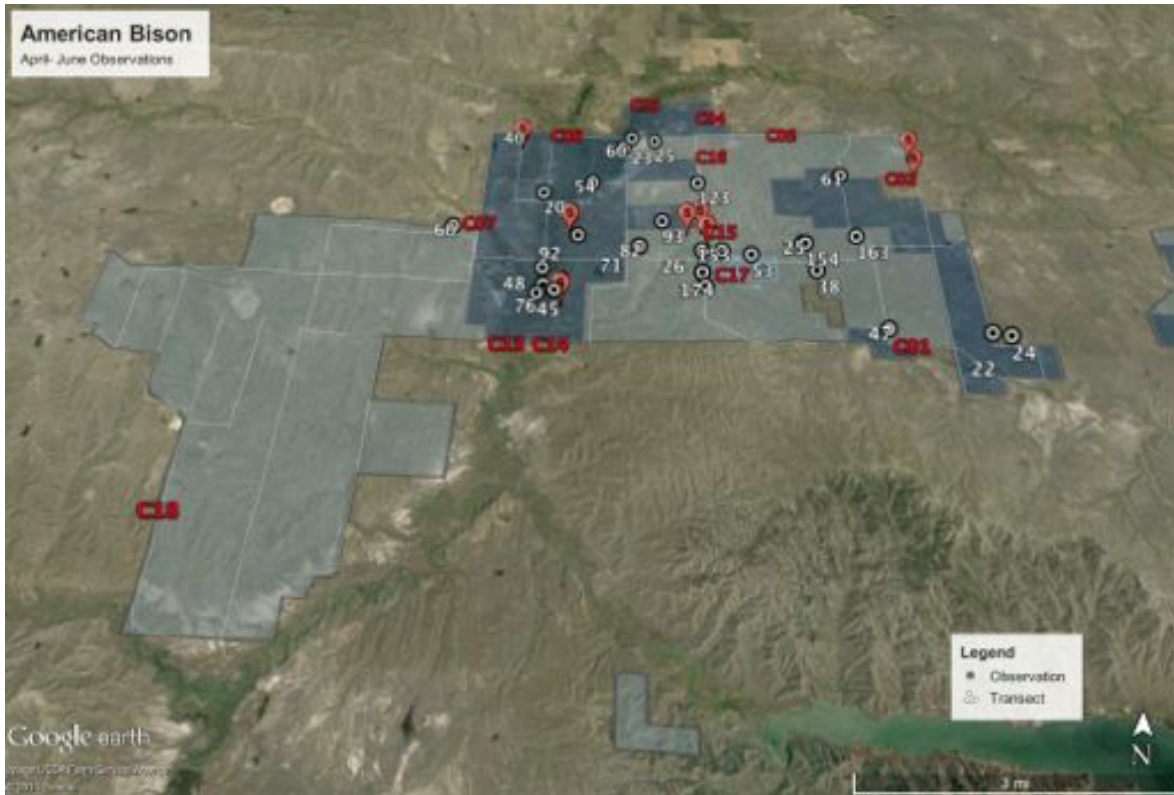


Figure 3. Bison observations with numbers indicating group size.

Mule Deer

Mule deer were observed throughout the Sun Prairie property; more mule deer sightings were recorded on the western and eastern portions of the property and fewer were recorded in the central portion of Sun Prairie. Mule deer sighting distribution in Q2 appears consistent with the distribution observed in Q1.

Transects - Crews recorded a total of 95 independent mule deer sightings, which amounted to a total of 299 animal observations. The largest single herd count consisted of 18 animals. The average herd size was three individuals.

Cameras - Mule deer were observed at nineteen of the camera locations, with 104 sighting events amounting to a total of 194 observations. Of the mule deer observed, 61 crossed the fence, the fences deterred two mule deer, 35 interacted with the fence, and 96 did not interact with the fence. Of the mule deer that crossed the Sun Prairie fences, 10 crossed over, and 51 crossed under.

Scoping - 12 distinct mule deer sighting events took place totaling 36 observations.

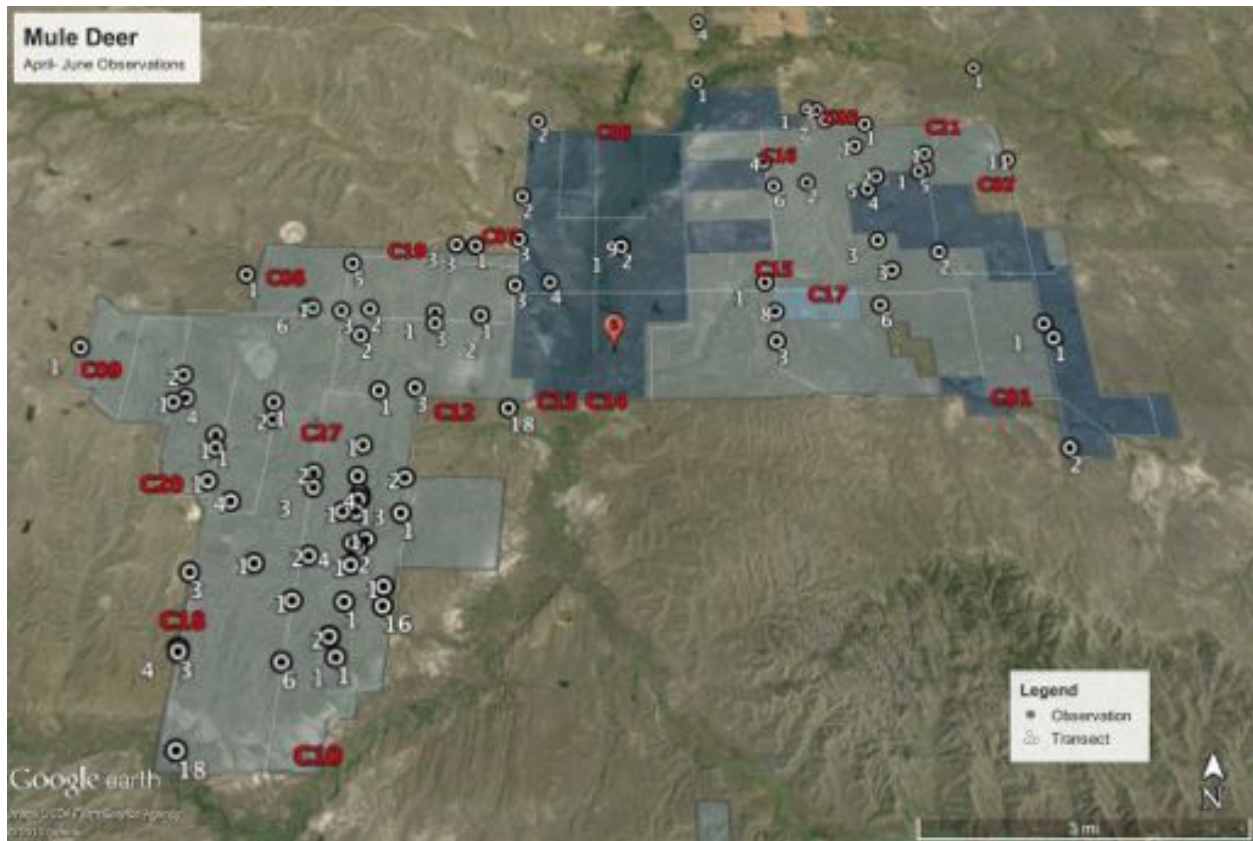


Figure 4. Mule deer observations with numbers indicating group size.

White-Tailed Deer

White-tailed deer observations were recorded in noticeably fewer numbers than in Q1.

Transects - Crews recorded a total of three independent white-tailed deer sighting events, which amounted to a total of seven animal observations. The largest single herd count consisted of four animals. The average herd size was two individuals.

Cameras - White-tailed deer were observed at six of the camera locations, with 24 independent sightings amounting to a total of 39 animal observations. Of the animals observed, nine crossed the fence, zero animals were deterred by the fences, four interacted with the fence, and 26 did not interact with fence. Of the white-tailed deer that crossed the Sun Prairie fences, one crossed over, and eight crossed under.

Scoping - No white-tailed deer were observed during scoping sessions.

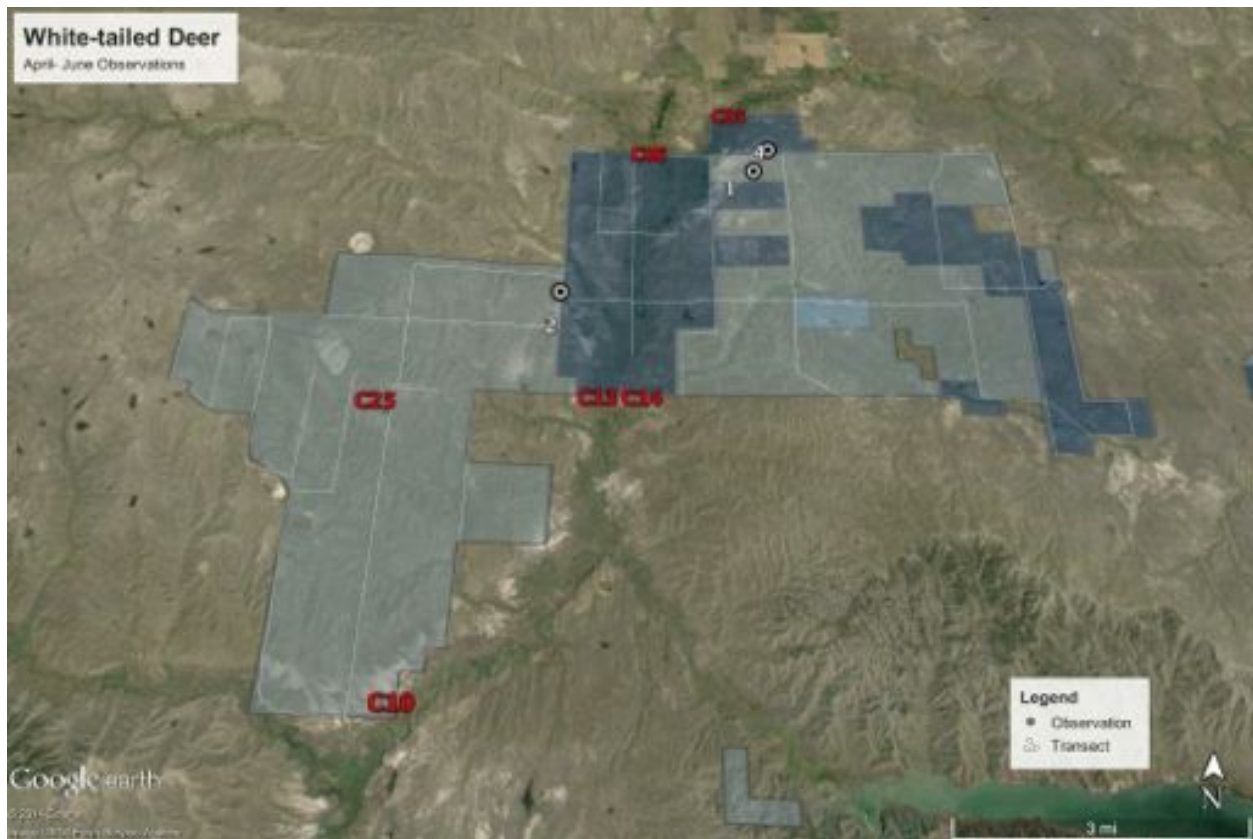


Figure 5. White-tailed deer observations with numbers indicating group size.

Pronghorn

Pronghorn were observed throughout the Sun Prairie property, though there appeared to be a slightly higher concentration in the western portions of the property. There were considerably more pronghorn sightings in the western portions of Sun Prairie in Q2 than in Q1.

Transects - Crews recorded a total of 49 pronghorn sighting events, which amounted to a total of 150 animal observations. The largest single herd count consisted of 10 animals. The average herd size was three individuals.

Cameras - Pronghorn were observed at six of the camera locations, with 21 independent sightings amounting to a total of 25 animal observations. Of the animals observed, 17 crossed the fence, one animal was deterred, two interacted with the fences and five had no interactions with the fence. Of the pronghorn that were observed crossing the Sun Prairie fences, all 17 crossed under the fence.

Scoping - Eight pronghorn sighting events, totaling 25 animal observations occurred in Q2.

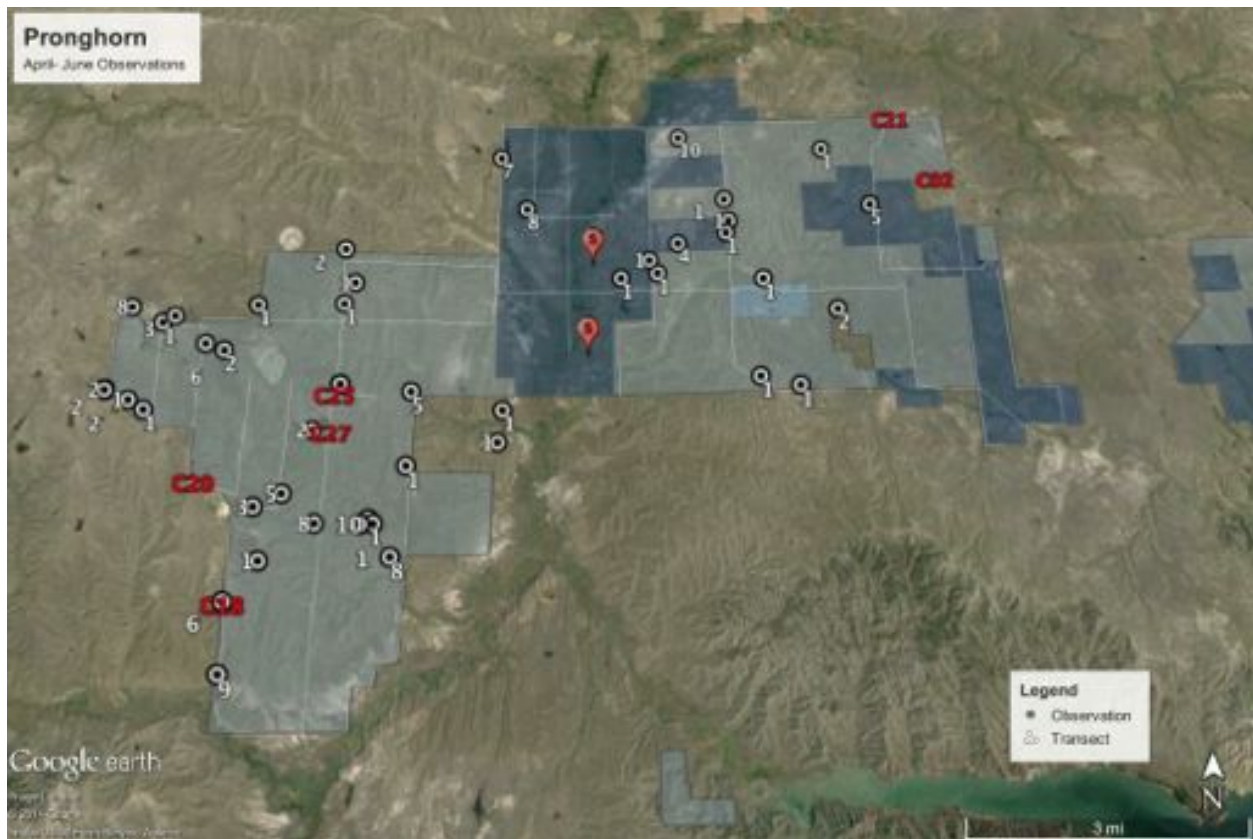


Figure 6. Pronghorn observations with numbers indicating group size.

Elk

Similar to Q1, elk were observed only in the southernmost portions of the Sun Prairie and in far lower numbers than other ungulates present on the Reserve.

Transects - No elk were observed during transects.

Cameras - Elk were observed at three of the camera locations, with eight sighting events amounting to a total of eight animal observations. Of the animals observed, none crossed the fence, no elk were deterred by the fences, three interacted with the fence, and five did not interact with fence.

Scoping - Six elk sighting events, totaling 31 observations occurred in Q2

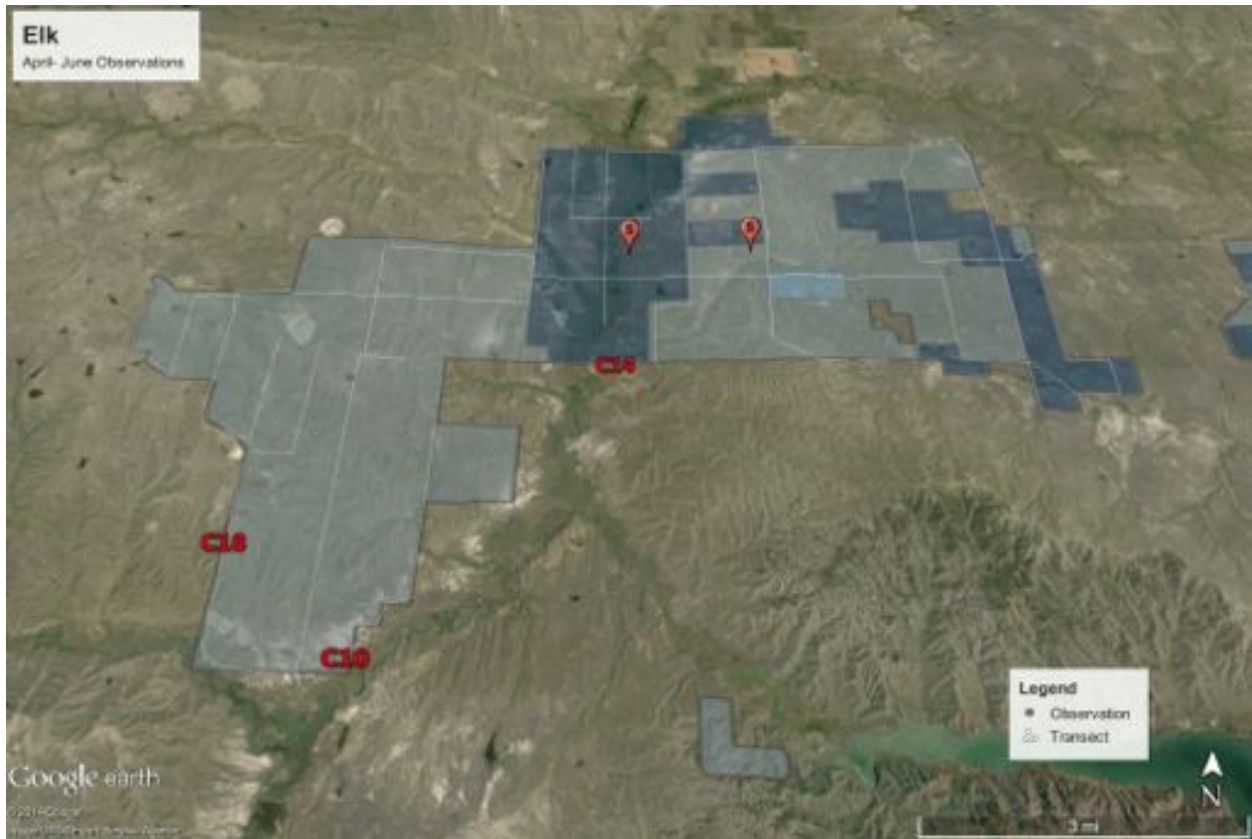


Figure 7. Elk observations with numbers indicating group size.

Badger

A lone badger was observed on the far western perimeter of Sun Prairie. There were no badger sightings recorded in Q1.

Transects - No badgers were observed during transects.

Cameras - A badger was observed at Camera 9 as it crossed under the fence.

Scoping - No badgers were observed during scoping sessions.

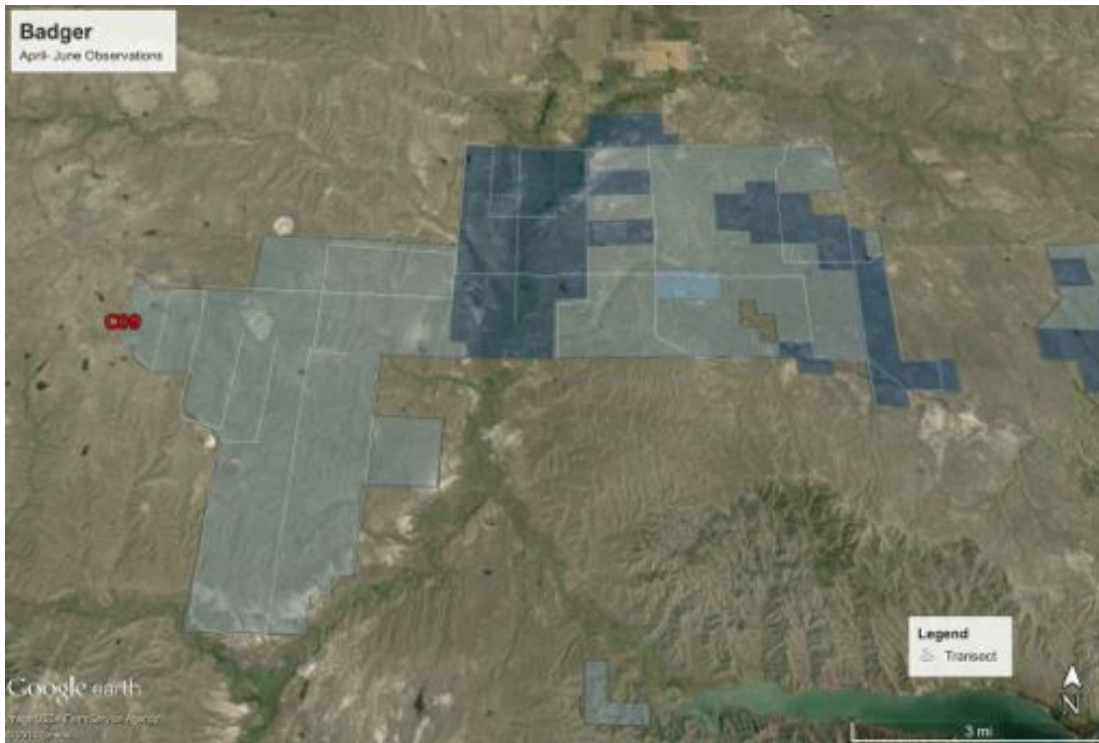


Figure 8. Badger observations with numbers indicating group size.

Coyote

Similar to Q1, coyotes were observed throughout the Sun Prairie property with the vast majority moving as lone individuals.

Transects - Crews recorded a total of six coyote sighting events, which amounted to a total of six animal observations. Each sighting was of an individual coyote.

Cameras - Coyotes were observed at eight of the camera locations, with 10 independent sightings amounting to a total of 11 animal observations. Of the animals observed, two crossed the fence, no animals were deterred by the fence, and nine did not interact with the fence. Of the coyotes that crossed the Sun Prairie fences, both crossed under the fence.

Scoping - Three coyote sighting events occurred during scoping totaling three animals.

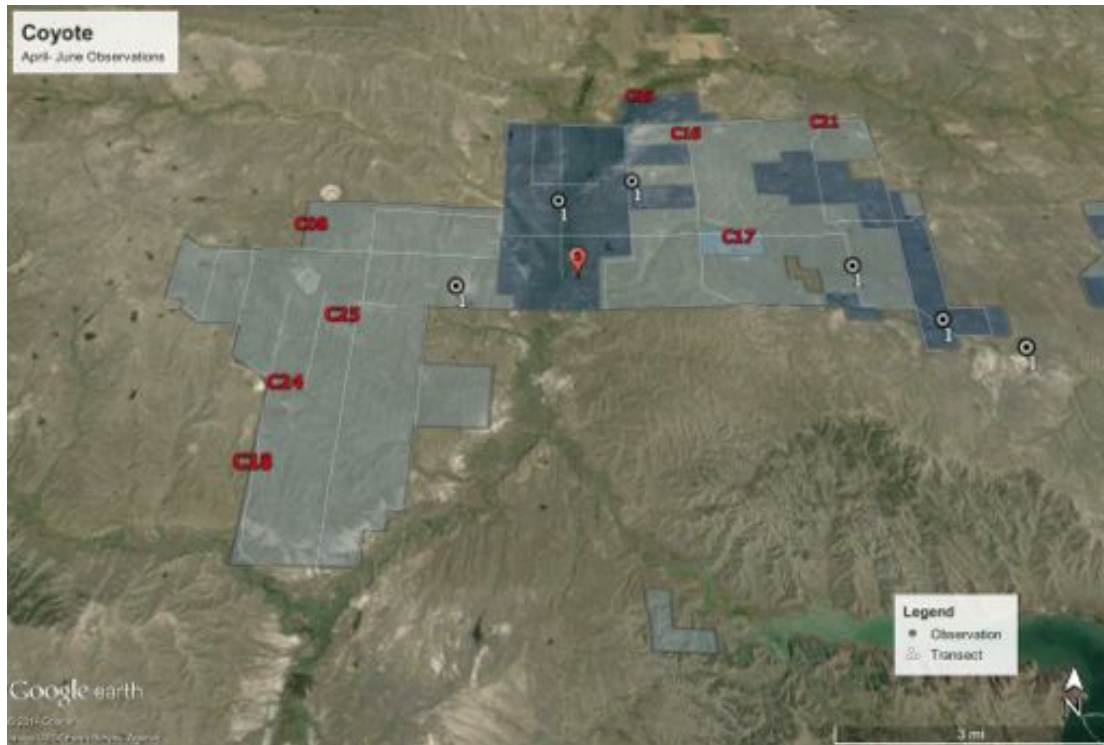


Figure 9. Coyote observations with numbers indicating group size.

Bobcat

A lone bobcat was captured on camera in the northeastern corner of Sun Prairie. There were no bobcat sightings recorded in Q1.

Transects - No bobcats were observed during transects.

Cameras - One bobcat was observed at camera 21.

Scoping - No bobcats were observed during scoping sessions.

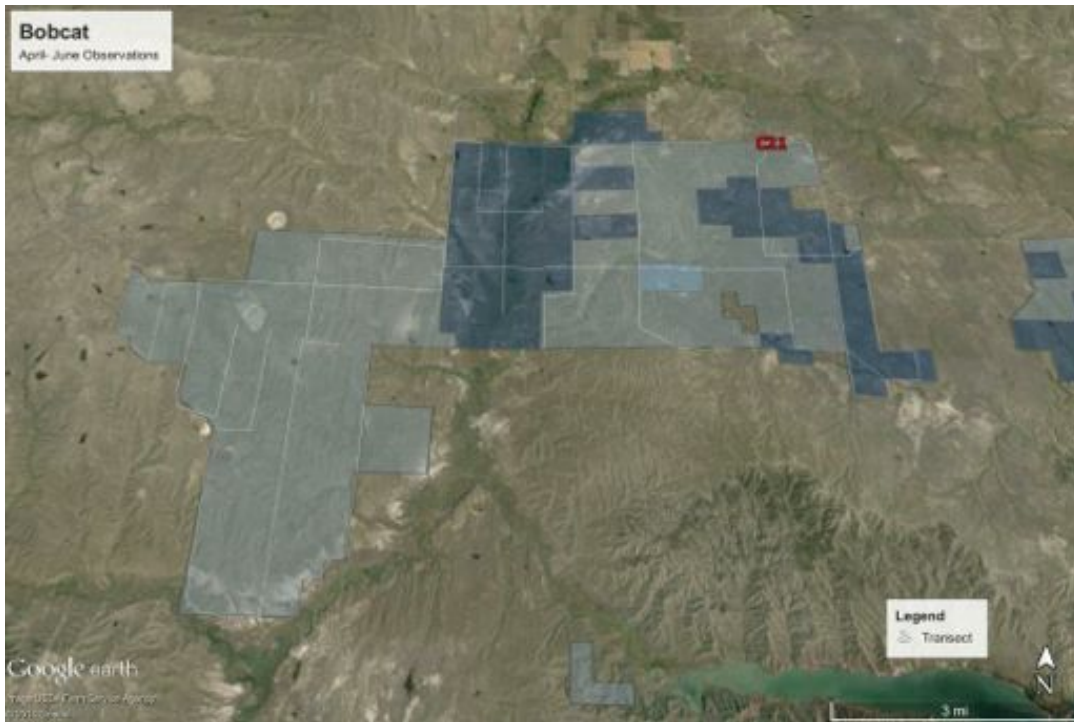


Figure 10. Bobcat observations with numbers indicating group size.

Raccoon

Similar to Q1, only one camera in the central Sun Prairie captured a raccoon observation.

Transects - No raccoons were observed during transects.

Cameras - Raccoons were observed at one of the camera locations, with two sighting events amounting to a total of two animal observations.

Scoping - No raccoons were observed during scoping sessions.

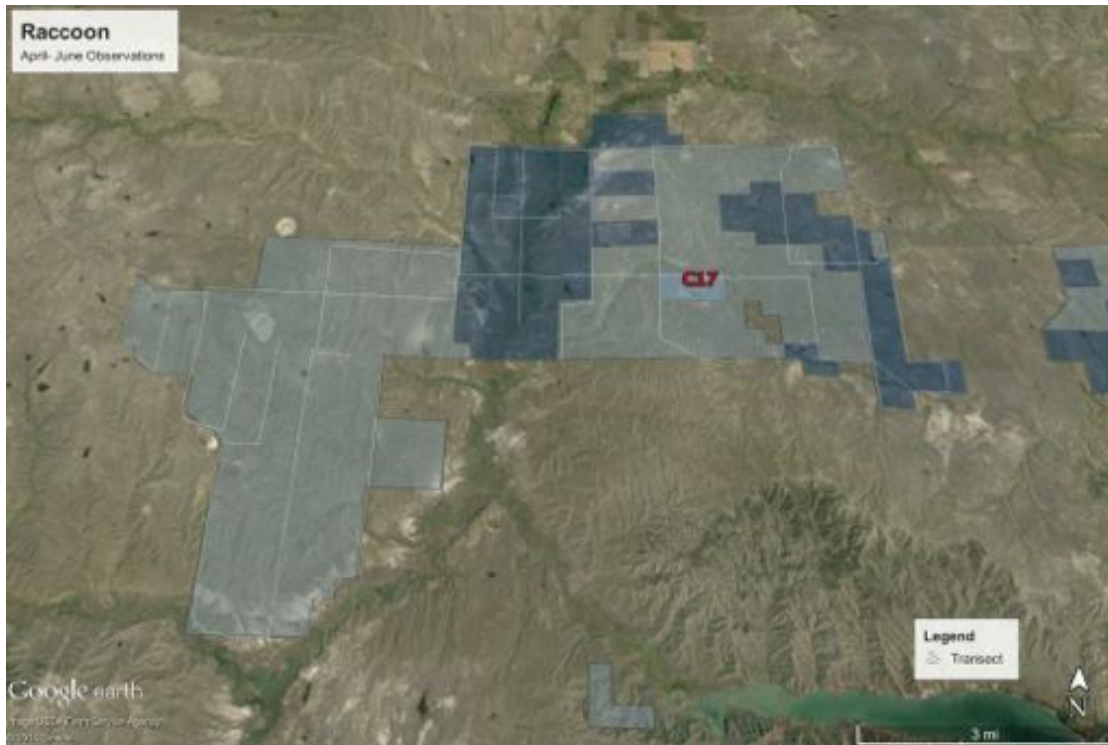


Figure 11. Raccoon observations with numbers indicating group size.

Porcupine

Porcupine were observed throughout the center of Sun Prairie, always as lone individuals.

Transects - Crews recorded one porcupine sighting event, which amounted to a total of one porcupine observation.

Cameras - Porcupine were observed at five of the camera locations, with six sighting events amounting to a total of six animal observations. Two porcupines were observed crossing the fence.

Scoping - No porcupines were observed during scoping sessions.

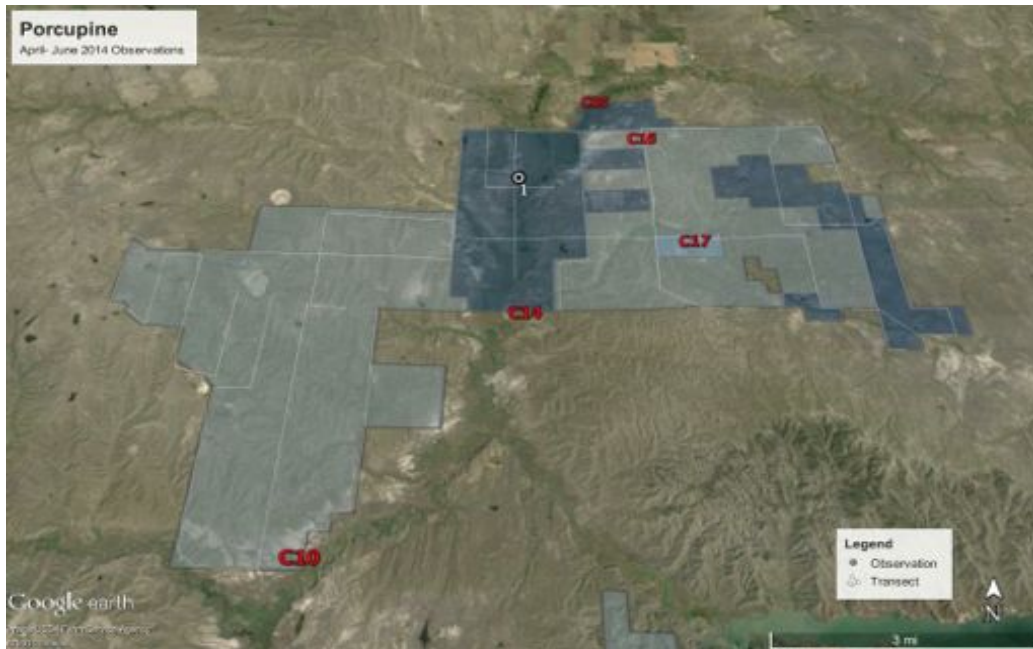


Figure 12. Porcupine observations with numbers indicating group size.

Black-tailed Prairie Dog

Accurate prairie dog counts were often difficult to obtain. While the locations where prairie dog observations were recorded are accurate, the number of animals observed should be treated as estimates. Prairie dogs were observed at 10 distinct locations on the property in Q2.

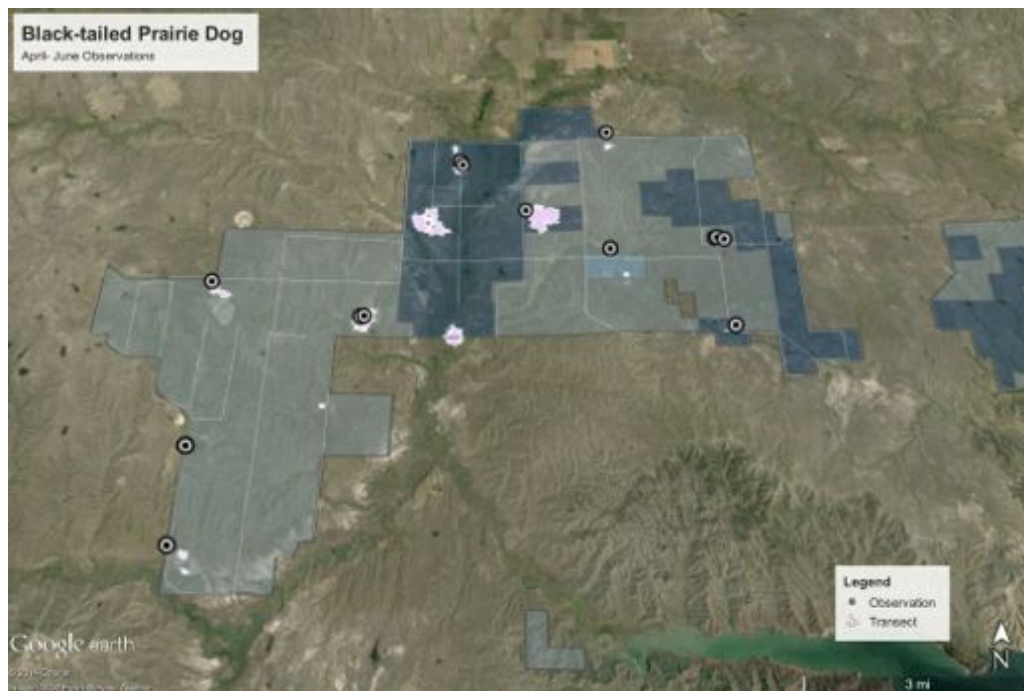


Figure 13. Black-tailed prairie dog observations with numbers indicating group size.

Desert Cottontail

Desert Cottontail were observed in both the center and western areas of the property.

Transects - Crews recorded a total of five independent Desert Cottontail sightings, which amounted to a total of five animal observations. Each sighting was of a lone individual cottontail.

Cameras - Desert Cottontails were observed at three of the camera locations, with 19 independent sightings amounting to a total of 21 animal observations. Of the animals observed, two crossed the fence.

Scoping - No desert cottontails were observed during scoping sessions.

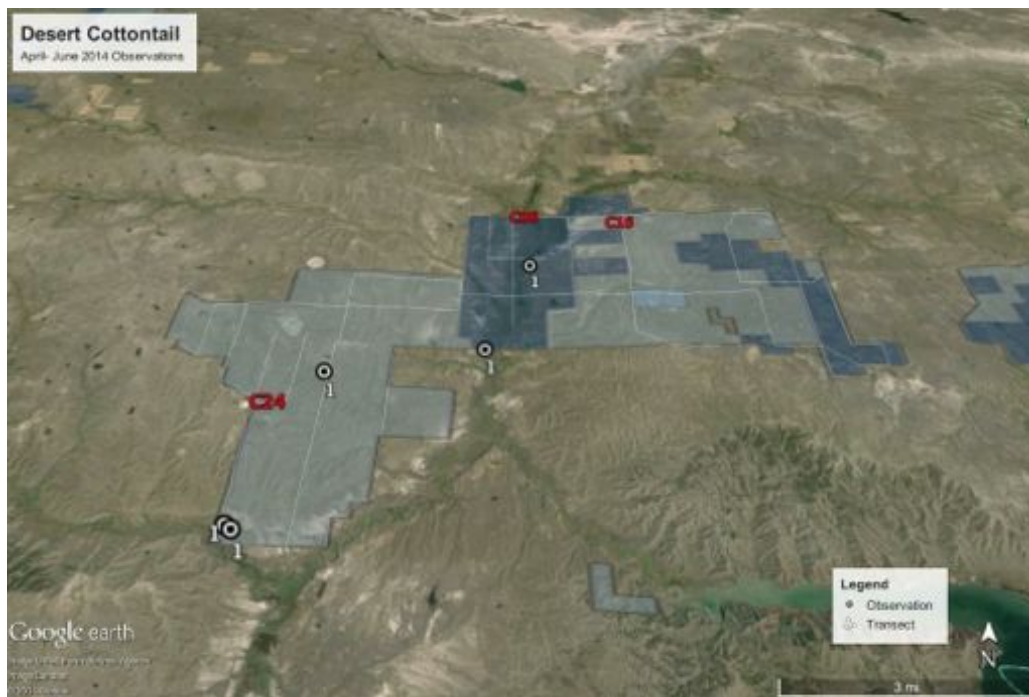


Figure 14. Desert cottontail observations with numbers indicating group size.

White-tailed Jackrabbit

Jackrabbit sightings were fully concentrated in the northeastern corner of Sun Prairie.

Transects - No white-tailed jackrabbits were observed during transects.

Cameras - White-tailed jackrabbits were observed at five of the camera locations, with 20 independent sightings amounting to a total of 20 animal observations. Of the animals observed, five crossed the fence.

Scoping - No white-tailed jackrabbits were observed during scoping sessions.

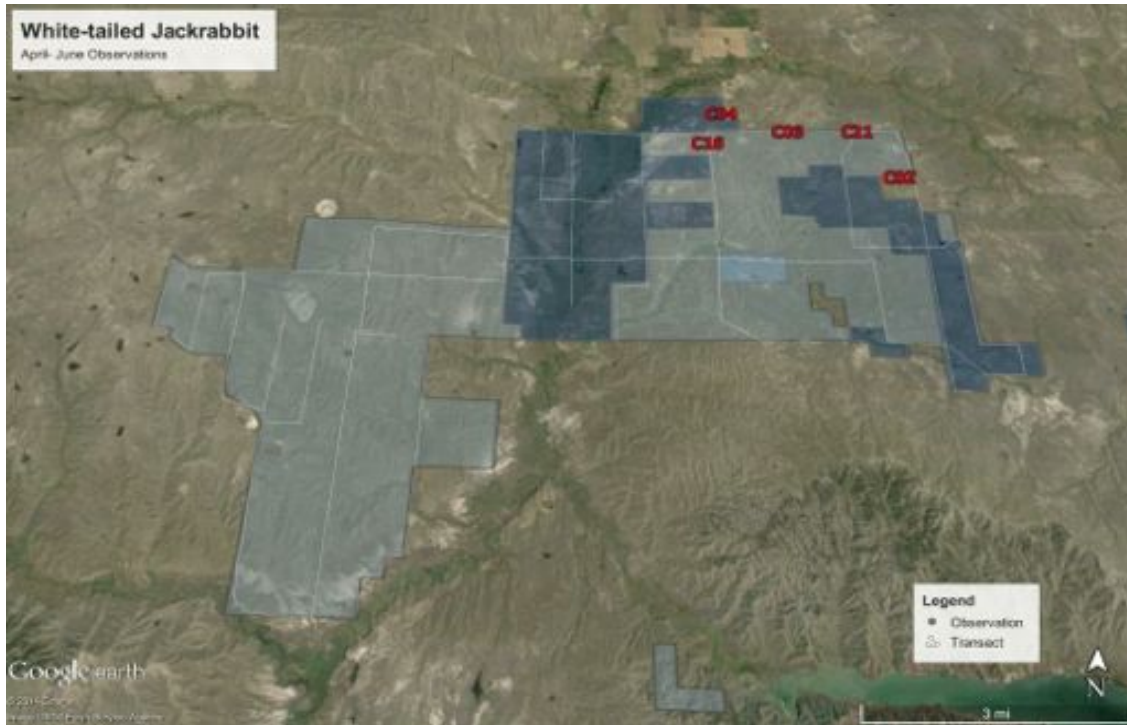


Figure 15. White-tailed Jackrabbit observations.

Sharp-Tailed Grouse

Sharp-tailed grouse were observed throughout Sun Prairie, there appeared to be fewer sightings in the central Sun Prairie that occurred in Q1.

Transects - Crews recorded a total of 16 independent sharp-tailed grouse sightings, which amounted to a total of 28 animal observations. The largest single flock count consisted of eight animals. The average sighting size was two individuals.

Cameras - Sharp-tailed Grouse were observed at one of the camera locations, with one independent sighting events amounting to a total of three grouse observations. Of the animals observed , one crossed under the fence.

Scoping - No sharp-tailed grouse were observed during scoping sessions.

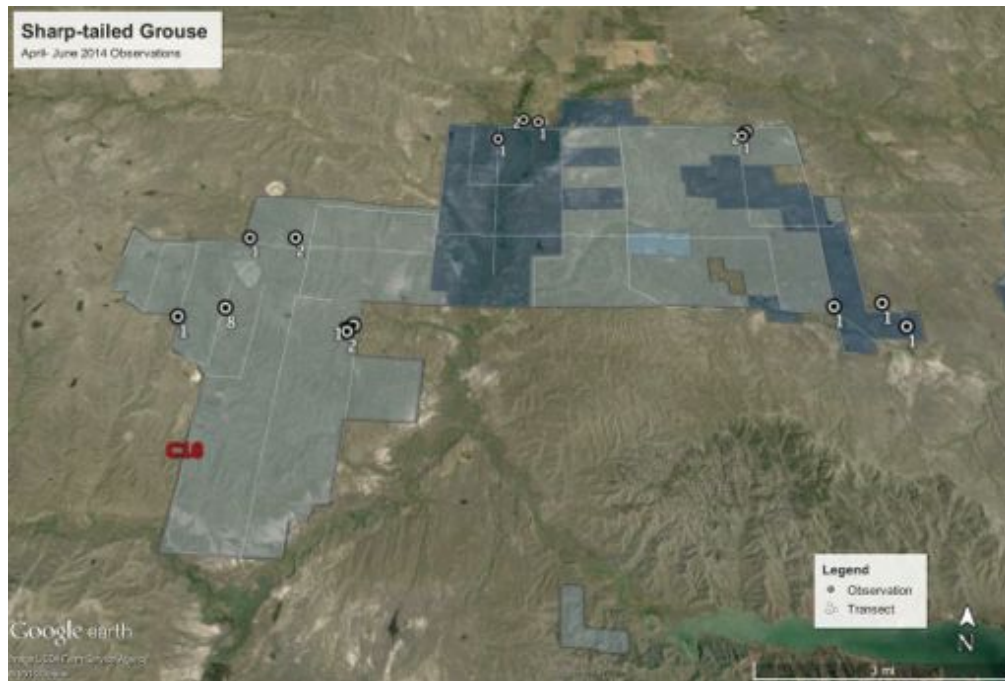


Figure 16. Sharp-tailed grouse observations with numbers indicating group size.

Greater Sage Grouse

Similar to Q1, sage grouse were observed throughout the Sun Prairie with slightly higher sightings on the eastern portion of Sun Prairie.

Transects - Crews recorded a total of 20 independent sage grouse sighting events, which amounted to a total of 49 grouse observations. The largest single flock count consisted of 13 animals. The average sighting size was two individuals.

Cameras - Greater Sage Grouse were observed at three of the camera locations, with three independent sightings amounting to a total of six animal observations. Of the animals observed, 3 crossed the fence.

Scoping - Four sage grouse sighting events occurred during scoping sessions totaling 75 grouse observations.

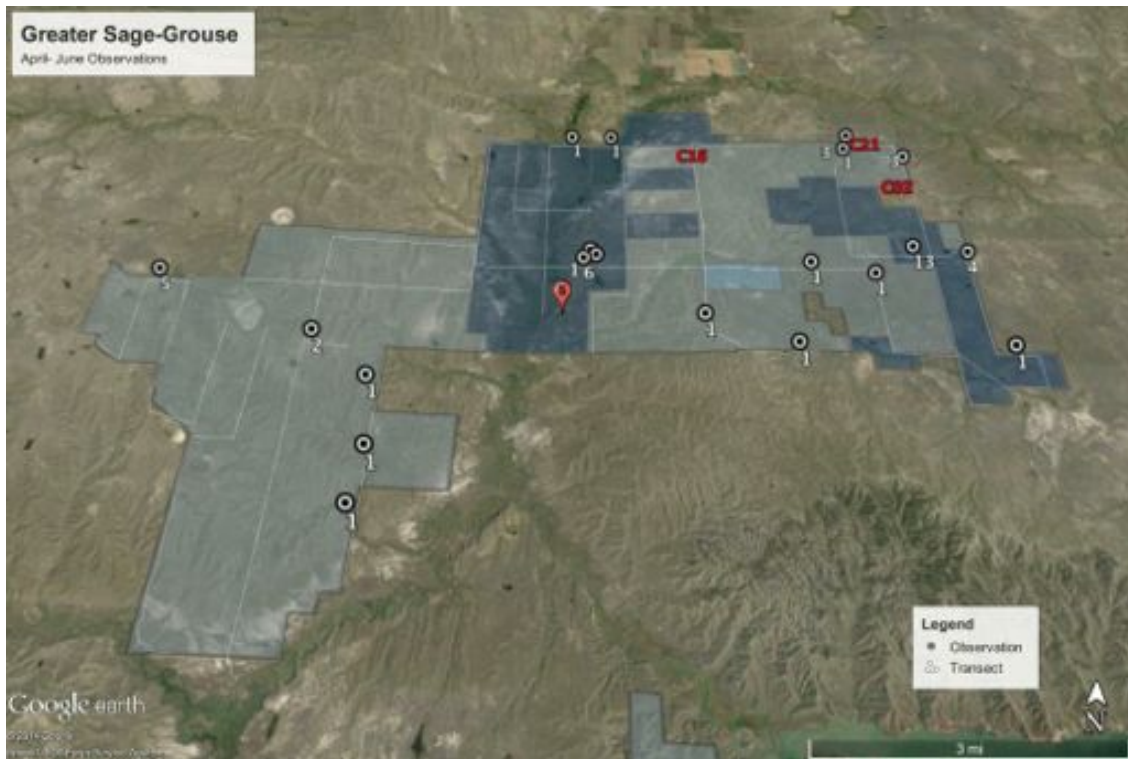


Figure 17. Greater Sage-Grouse observations with numbers indicating group size.

Ring-Necked Pheasant

As was the case in Q1, ring-necked pheasants were observed only as lone males.

Transects - Crews recorded a total of two independent ring-necked pheasant sighting events, amounting to a total of three animal observations. The largest single flock count consisted of two animals. The average flock size was two birds.

Cameras - Ring-necked pheasants were observed at two of the camera traps with 12 independent sighting events, amounting to a total of 12 animal observations. All 12 birds were males.

Scoping - No ring-necked pheasants were observed during scoping sessions.



Figure 18. Ring-necked pheasant observations with numbers indicating group size.

Reptiles

No reptiles were observed on camera traps or during scoping sessions. The following detail reptile observations recorded on transects.

Snakes

Transects - Crews recorded a total of 17 independent snake sightings, which amounted to a total of 20 animal observations. Observations included three bull snakes, two prairie rattle snakes, and 15 garter snakes. The largest single group count consisted of three garter snakes together.

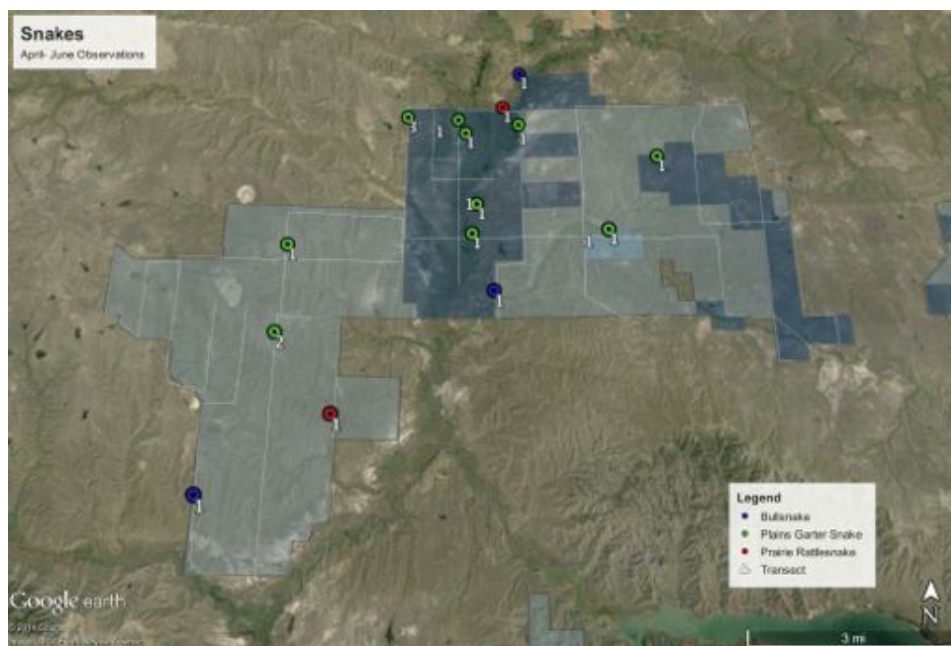


Figure 19. Snake observations with numbers indicating group size (species in map legend).

Painted Turtles

Turtles were observed in various locations across the property during transects.

Transects - Crews recorded a total of six independent painted turtle sighting events, which amounted to a total of 33 turtles observed. The largest single group count consisted of 12 turtles. The average sighting size was six turtles.

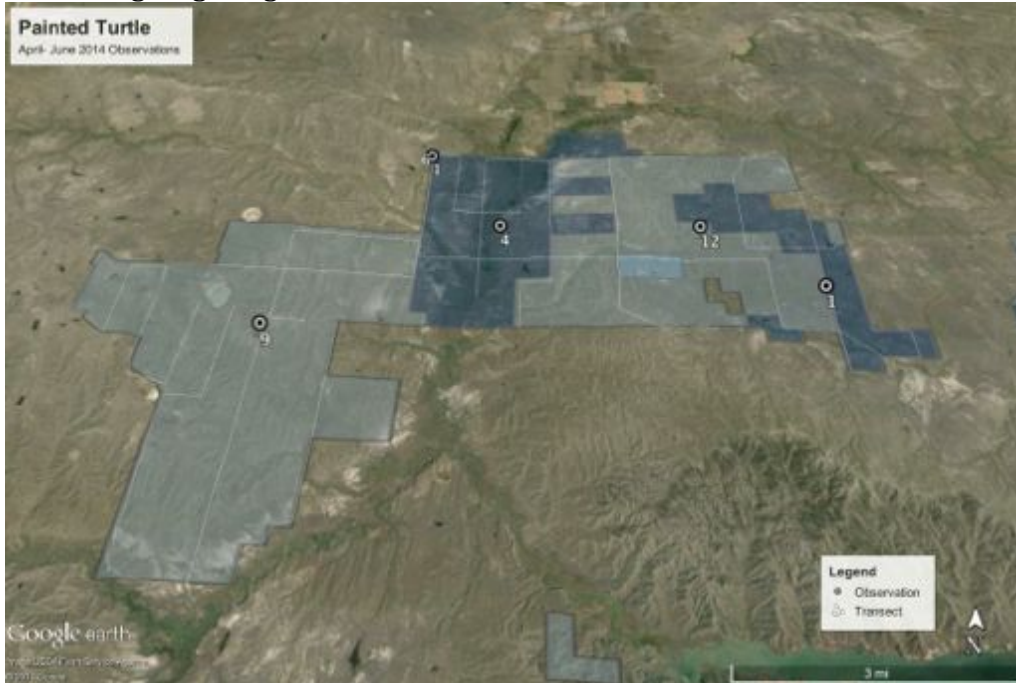


Figure 20. Painted turtle observations with numbers indicating group size.

Greater Short-Horned Lizard

Greater Short-Horned Lizards were observed primarily in the western portion of the property with one lone sighting in the east.

Transects - Crews recorded a total of seven independent greater short-horned lizard sightings, which amounted to a total of seven animal observations. Each sighting size was of one animal.

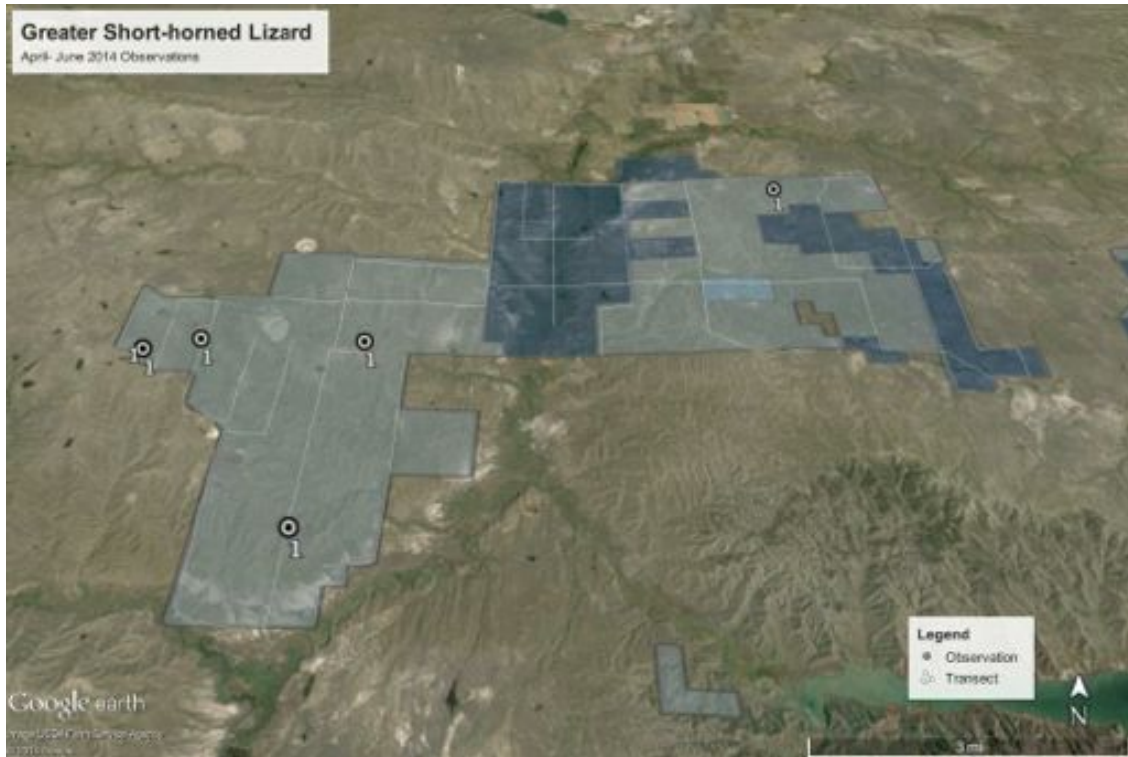


Figure 21. Greater short-horned lizard observations with numbers indicating group size.

Human Artifacts

No new human artifacts were recorded during Q2.

Badger Holes

Eight distinct badger holes were observed while on transects. There was a gap in badger hole data collection between 5/15-6/15 due to a misunderstanding with crews, though the gap is expected to have negligible impact on data results as all holes on transects were recorded before and after this time frame. All badger hole observations included photographs, which are available in the digital supplemental data. Figure 23 identifies badger hole location.

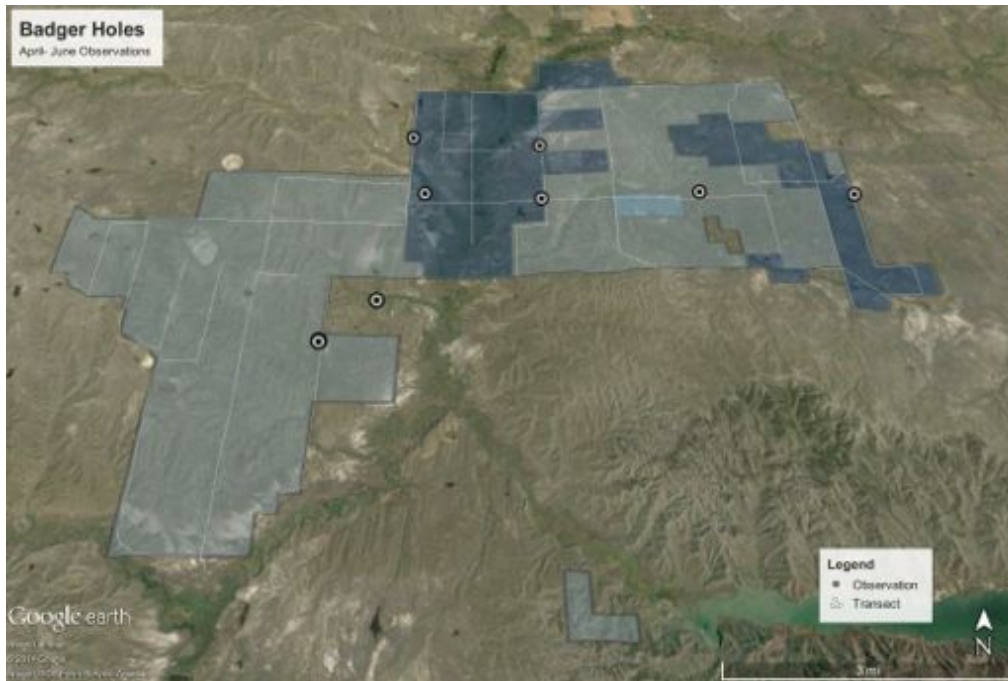


Figure 23. Badger hole observations.

Hydrologic Features

Understanding stream flow across the Reserve is important, as many of the streams are ephemeral and only flow periodically throughout the year. Volunteers recorded the hydrologic features of Sun Prairie by estimating water depth by sight. Only when water was present did crews record flow. There was a gap in hydrologic data observations from 5/15-6/30 due to a miscommunication with crews. This observation gap is expected to have little effect on the hydrologic results as streambeds became drier throughout the quarter and therefore if anything would have been over reported rather than omitted. All but one of the Q2 records were documentations of ‘Standing Puddles’ from four distinct localitons.

The following categories were used to distinguish between flow and depths:

1. Standing Puddles
2. Flowing Trickle
3. Flowing Up to One Foot Deep
4. Significant Current More Than One Foot Deep
5. Waist-Deep Flow



Figure 24. Hydrologic feature observations with size indicating depth of flow.

Russian Olive Trees

No Russian Olive Trees were found during April, May, or June.

Dead Animals

Animal remains were discovered throughout the Sun Prairie. While several bones were observed, few intact carcasses or easily identifiable species were recorded. Overall, 29 distinct dead animal observations were logged. Best guesses for deceased animal identification are as follows: songbirds (5), game birds (2), mammals (1) (e.g. coyote, fox), rabbits (1), ungulates (10), snakes (2), and unknown (8). Observations were recorded as “unknown” for remains that needed further evaluation by experts (i.e. long bones unassociated with a skull, or bird remains without strongly identifying characteristics). Dead animal locations are shown in Figure 25.

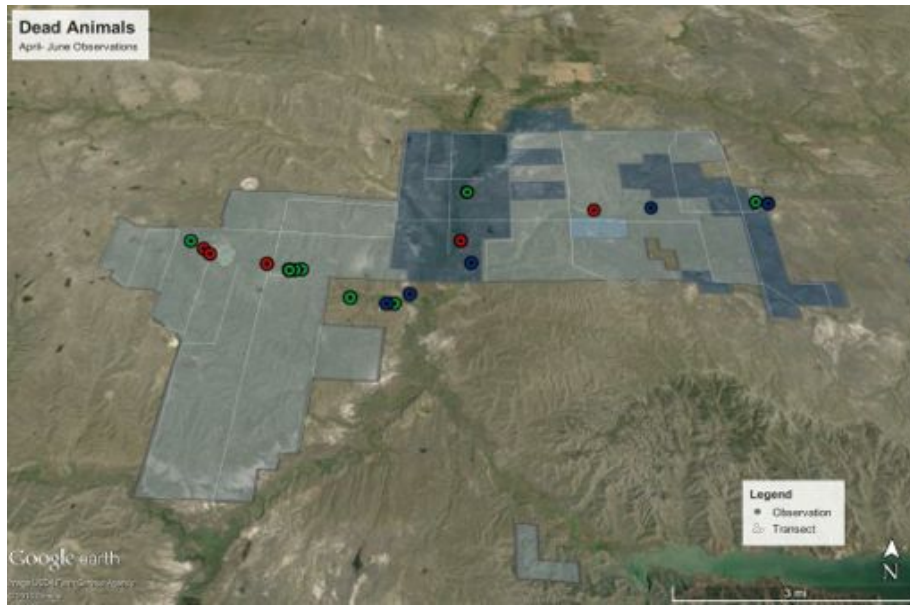


Figure 25. Dead animal observations. Red= Unknown, Blue= Bison, Green= Western Meadowlark.

Other Waypoints of Interest

32 distinct ‘Other Waypoints of Interest’ were recorded during Landmark Q2. Of the 32, 10 indicated breaks in fence-lines; 16 noted hair, feathers, or insects impaled on fence-lines; and remaining observations included a potential coyote hole, a birds nest, and other animal tracks/signs. These waypoints are shown in Figure 26.

Broken Fences - Ten fence breaks were observed on Sun Prairie’s fences. Their locations are depicted below with arrows. Photos are available of each observation in supplemental digital data.

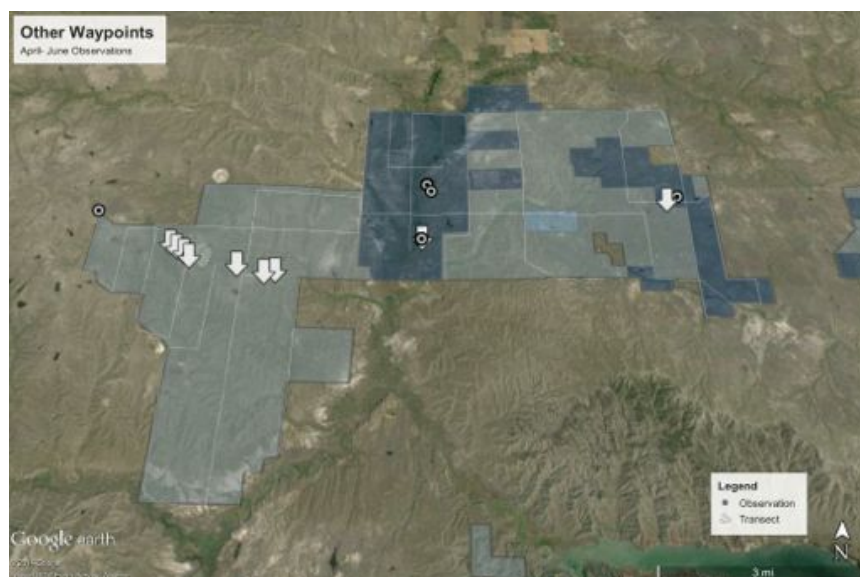


Figure 26. Dots indicate human artifacts and arrows indicate breaks in Sun Prairie fences

Bison Counts

Bison counts were completed from mid-April through the end of June for the purpose of finding the ratio of adult bison to bison calves. Two walking transects and a driving transect were completed two times each week. 466 miles of bison counts were completed from mid-April through the end of June (172 mi. walking, 294 mi. driving). Bison individuals or herds were observed 214 independent times, and 51 of those 214 observations included bison calves. The average number of adults in a herd was 15 (median 3), the average number of calves (when present) was 8 (median 4), and the average ratio of adults to calves (when present) was 7:1. On average, 5 bison were observed per transect mile. Table 4 presents a summary of Q1's bison count data.

Table 4. Summary of bison count data.

<u>Bison Count Data</u>	
Average Adult	15
Average Calf	8
Average Ratio (adult : calf)	7:1
Median Adult	3
Median Calf	4
Median Ratio (adult : calf)	5:1
Max one-day calf count	52
Mean one-day calf count	26
<u>Total Animal Observations</u>	<u>3,363</u>

Greater Sage-Grouse Lek Counts

Out of 12 distinct counts, the largest count was of 37 individuals (17 male, 20 female), and the smallest count was of six individual males. The average ratio of males to females was 14:5. The counts the first two weeks of April showed male to female ratios of 2.5:1, and the counts the second two weeks of April showed male to female ratios of 11:1. Figure 27 displays the number of greater sage-grouse at each site.



Figure 27. Sage lek counts and locations.

Additional Notes

Observer Reliability

The second quarter of the Land**mark** project harnessed the work of 15 volunteers, collected thousands of wildlife observations including fence-interactions, and documented compelling photographs, stories, and videos of the prairie ecosystem. In these quarterly reports ASC offers actionable information for the Reserve management team. Invariably there is scrutiny around the validity of wildlife data collected during volunteer driven science research. ASC views Land**mark** as an opportunity to show that when collected properly, data collected by non-scientists can be defensible, reliable, and useful for informing management decisions. ASC works in several ways to ensure the integrity of data collected by crews each month.

Because each Land**mark** volunteer has a different background in wildlife identification and their knowledge can vary widely crew members are trained thoroughly at the beginning of each month to identify wildlife species common to the American Prairie Reserve. Crew members work together to make positive identifications species, photograph the species for data validation when possible, and note any uncertainty in their identification. Similarly, counts and distances to wildlife must often be approximated, especially when there are large groups of animals or the animals are far away from observers. To reduce uncertainty, estimates are always made collaboratively by Land**mark** volunteers and are noted as estimates in the data sheets.

With uncertainty in mind, all Landmark crew members are trained with a specific emphasis on avoiding errors that could commonly be made, such as identification errors between similar-sized ungulates or small mammals. All data collected is done so under the close supervision of ASC staff in the Bozeman office. When doubt exists, Landmark volunteers are instructed to err on the side of caution and document each observation extensively, meaning that collected data is generally verifiable by more than one method. For example, when possible, each observation is paired with a photograph. All observation photos are available for review in the provided digital data supplements. Additionally, the use of technology such as tablets, GPS units, rangefinders; combined with ASC's ability to observe data collected on a daily basis minimize observer error. Carefully trained volunteers, precise technologies, and ASC-verification of data contribute to providing APR with high quality field data.

Weather and road/hiking conditions can complicate schedules and make difficult walking transects and servicing remote cameras every two weeks. Volunteers must navigate adverse conditions while making every effort to meet the transect and camera-servicing goals. Crews are given 'flex days' to accommodate such delays and are instructed to note any deviations from the schedule.

Each camera site requires its own considerations to avoid false-triggers and ensure the capture of useful data. As the crews become more familiar with each site, the sensitivity and placement of each camera is adjusted for best results.

Implications of data/results

As this report contains only our first two months of data collection, it is premature to draw any firm conclusions and this report will serve to assess and adapt our methods and analysis of data. We believe data collected to date indicates that our sampling of a few species may eventually provide enough data to estimate local seasonal and local density (e.g. grouse and deer via DISTANCE analysis). For some species the scale we are sampling is probably too small to determine density and thus including more Reserve units may better allow determination of relative use and abundance (pronghorn, coyote).

We will continue to add more camera sites along standard (non electrified) barbed wire fence to compare animal crossing rates to our electrified fences.

We will continue to train for and document any occurrences of some select imperiled species.

Acknowledgements

Without the intrepid individuals who come to the Great Plains each month, there would be no data, no stories, and no project. We'd like to thank the April, May and June crews for their dedication to adventure, science and conservation: Ryan Rock, Vija Pelekis, Mikaela Howie, Greg Tsairis, Kelsey Noah, Matt Howe, Elana Engert, Alexandra Guest, Katie Birch,

Shannon Rebinski, Meghan Riehl, Caleb Hart, Leah Mabee, Terri Ness, and Rachel Herring.

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We would sincerely like to thank Kyran Kunkel, Curt Freese, Lance Craighead, Brent Brock, and Randy Matchett for their guidance on project design and scientific rigor.

Finally, thanks are due to the entire team at the American Prairie Reserve for their support of this unique collaboration. From bison release chili feasts to discussions about organizational growth, and prairie weather **Landmark** has benefited from the attention and contributions of individuals across the APR staff.

Works Cited

Clark, Tim W., et al. "Prairie dog colony attributes and associated vertebrate species." *Western North American Naturalist* 42.4 (1982): 572-582.

Gese, Eric M. "Monitoring of terrestrial carnivore populations." *USDA National Wildlife Research Center-Staff Publications* (2001): 576.

Hess, Jennifer E., and Beck, Jeffrey. "Disturbance factors influencing greater sage-grouse lek abandonment in north-central Wyoming." *The Journal of Wildlife Management* (2012): 76.8.1625-1634.

Katz, Gabrielle L., and Patrick B. Shafroth. "Biology, ecology and management of *Elaeagnus angustifolia* L. (Russian olive) in western North America." *Wetlands* 23.4 (2003): 763-777.

Kunkle, Kyran, and Austin, Damien. "Re: Landmark data collection" Message to the author. 16 May 2014. E-mail.

NOAA, Malta, Montana Average Rainfall, <http://average-rainfall.findthebest.com/l/15738/Malta-Montana>, May 27th, 2014.

United States Fish and Wildlife Service (USFWS), Sage Grouse Data Letter, <http://www.fws.gov/greatersagegrouse/documents/20140730%20GRSG%20data%20call%20letter.pdf>, August 10th, 2014

Appendix 1- Cumulative Animal Observations: Transects, Camera Traps, and Scoping

	Species	Sighting Events	Animal Observations	Largest Group	Average Group Size
Ungulates	Bison	530	5458	252	13
	Elk	14	39	12	3
	Mule Deer	210	528	18	3
	Pronghorn	78	200	10	2
	Whitetail Deer	27	46	4	2
Carnivores	Badgers	1	1	1	1
	Bobcat	1	1	1	1
	Coyote	19	20	2	1
Sm. Mammals	Desert Cottontail	24	26	2	1
	Jack Rabbit	20	20	1	1
	Porcupine	7	7	1	1
	Raccoon	2	2	1	1
	Greater Sage Grouse	27	130	29	8
Game Birds	Ring-Necked Pheasant	14	15	2	2
	Sharp-tailed Grouse	17	31	8	3
Reptiles	Bullsnake	3	3	1	1
	Greater Short Horned Lizard	6	6	1	1
	Painted Turtle	6	33	12	5
	Plains Gartersnake	6	14	3	1
	Prairie Rattlesnake	3	3	1	1

White-Tailed Deer:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/2/2014 15:41	Other/Driving	47.7910277	-107.7395033	4	240	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Noah
2	4/24/2014 11:43	TT02	47.7546964	-107.7997248	2	400	Ran Away	W	Yes	Clear/Calm	Dry	Ryan Rock
3	6/28/2014 8:48	Other/Driving	47.7853496	-107.7441613	1	109	Ran Away	E	Yes	Clear/Calm	Dry	Teri Ness

Pronghorn:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/2/2014 13:25	Other/Driving	47.7974933	-107.7490346	10	320	Ran Away	E	Yes	Clear/Calm	Dry	Kelsey Noah
2	4/3/2014 10:36	TT03	47.7929999	-107.8952946	1	314	Ran Away	N	Yes	Cloudy	Dry	Mike Kault
3	4/3/2014 10:23	TT03	47.7933607	-107.8931493	2	418	Crossed a Fence	N	Yes	Cloudy	Dry	Vija Petelis
4	4/3/2014 9:30	Other/Driving	47.7935662	-107.796942	1	474	Grazing/Feeding	S	Yes	Cloudy	Dry	Ryan Rock
5	4/3/2014 10:36	TT09	47.7705195	-107.7817364	8	400	Grazing/Feeding	W	Yes	Windy	Dry	Greg Tsairis
6	4/3/2014 10:34	TT06	47.79548789	-107.799282	1	700	Stationary	Stationary	No	Clear/Calm	Dry	Ryan Rock
7	4/3/2014 12:00	Other/Driving	47.7934952	-107.7490397	4	300	Ran Away	E	No	Windy	Dry	Ryan Rock
8	4/3/2014 15:24	TT06	47.79369774	-107.7919699	1	400	Ran Away	N	No	Windy	Dry	Ryan Rock
9	4/15/2014 9:23	TT04	47.79369495	-107.8022985	5	537	Stationary	Stationary	No	Cloudy	Dry	Mikaela Howie
10	4/15/2014 10:36	TT03	47.6982342	-107.8695943	6	2400	Grazing/Feeding	Stationary	Yes	Windy	Dry	Vija Petelis
11	4/15/2014 10:37	TT03	47.69435052	-107.8692028	9	800	Stationary	Stationary	Yes	Windy	Dry	Vija Petelis
12	4/23/2014 10:44	TT07	47.7709644	-107.6941308	5	490	Grazing/Feeding	W	Yes	Clear/Calm	Dry	Ryan Rock
13	4/23/2014 12:58	TT06	47.7728729	-107.799347	1	116	Ran Away	N	Yes	Windy	Dry	Vija Petelis
14	4/23/2014 10:39	TT03	47.7979172	-107.7843224	1	290	Walking	N	Yes	Clear/Calm	Dry	Mikaela Howie
15	4/23/2014 12:42	TT09	47.7831892	-107.7895226	7	600	Grazing/Feeding	Stationary	Yes	Windy	Dry	Greg Tsairis
16	4/26/2014 10:52	Other/Driving	47.74332388	-107.8753875	2	3300	Grazing/Feeding	Stationary	Yes	Clear/Calm	Dry	Ryan Rock
17	4/26/2014 11:36	TT09	47.7447394	-107.8622466	5	348	Ran Away	N	No	Clear/Calm	Dry	Greg Tsairis
18	5/13/2014 10:19	TT09	47.7562764	-107.7850367	1	267	Stationary	Stationary	Yes	Clear/Calm	Muddy	Kate Birch
19	5/13/2014 10:37	TT06	47.7898149	-107.7944944	1	223	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Knosh
20	5/13/2014 11:57	TT06	47.7487943	-107.7899204	2	228	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Knosh
21	5/14/2014 12:05	TT02	47.7552097	-107.806243	1	440	Grazing/Feeding	E	Yes	Clear/Calm	Dry	Craig Hestland
22	5/23/2014 12:36	TT03	47.7954189	-107.7257098	1	230	Ran Away	E	No	Clear/Calm	Dry	Craig Hestland
23	5/26/2014 13:09	TT06	47.7955269	-107.7263704	1	125	Ran Away	NE	Yes	Clear/Calm	Dry	Kelsey Knosh
24	5/26/2014 10:43	TT03	47.7465247	-107.8899442	1	400+	Grazing/Feeding	Stationary	Yes	Windy	Dry	Kelsey Knosh
25	6/4/2014 13:46	TT03	47.7936957	-107.9022944	2	290	Lying Down	Stationary	Yes	Windy	Dry	
26	6/4/2014 13:46	TT03	47.7936949	-107.9022944	2	400+	Stationary	Stationary	Yes	Windy	Muddy	
27	6/4/2014 13:47	TT03	47.7936942	-107.9022911	2	290	Lying Down	Stationary	Yes	Windy	Dry	
28	6/10/2014 8:35	Other/Driving	47.7238256	-107.7879335	1	133	Grazing/Feeding	Stationary	Yes	Clear/Calm	Dry	Elena Engert
29	6/13/2014 10:16	TT06	47.7690773	-107.7942296	1	200	Ran Away	W	Yes	Windy	Dry	Alex Guest
30	6/13/2014 8:46	TT04	47.7947294	-107.8387125	3	300	Walking	Stationary	No	Windy	Dry	Mari's Summer 2014
31	6/13/2014 8:46	TT03	47.7947532	-107.8387361	3	300	Grazing/Feeding	W	No	Clear/Calm	Dry	Mari's Summer 2014
32	6/13/2014 10:02	TT03	47.7922557	-107.8422367	1	400+	Stationary	Stationary	Yes	Clear/Calm	Dry	Mari's Summer 2014
33	6/13/2014 13:23	TT03	47.792541	-107.8998964	1	500	Stationary	Stationary	No	Clear/Calm	Dry	Mari's Summer 2014
34	6/13/2014 13:59	TT04	47.7993387	-107.8284522	1	224	Ran Away	W	No	Clear/Calm	Dry	Mari's Summer 2014
35	6/13/2014 14:08	TT04	47.7998903	-107.826799	1	235	Ran Away	S	No	Clear/Calm	Dry	Mari's Summer 2014
36	6/13/2014 14:32	TT03	47.7122708	-107.8992861	3	500	Ran Away	NE	Yes	Clear/Calm	Dry	Mari's Summer 2014
37	6/13/2014 15:29	TT03	47.736036	-107.9403446	2	500	Stationary	Stationary	Yes	Clear/Calm	Dry	Mari's Summer 2014
38	6/14/2014 11:27	Other/Driving	47.7692211	-107.9640372	1	500	Stationary	Stationary	No	Clear/Calm	Dry	Mari's Summer 2014
39	6/15/2014 9:52	TT02	47.7508768	-107.8407054	1	300	Ran Away	N	Yes	Windy	Dry	Rachel Herring
40	6/15/2014 11:28	TT03	47.74819	-107.8893446	3	400+	Grazing/Feeding	N	Yes	Windy	Dry	Alex Guest
41	6/15/2014 12:39	TT03	47.7956758	-107.8946261	1	200	Stationary	Stationary	Yes	Windy	Dry	Shannon Rabinaki
42	6/18/2014 13:08	TT03	47.7899709	-107.7971889	1	35	Ran Away	SE	Yes	Cloudy	Dry	Elena Engert
43	6/20/2014 10:49	TT04	47.7034896	-107.8289463	8	110	Ran Away	W	Yes	Clear/Calm	Dry	Teri Ness
44	6/20/2014 14:31	TT04	47.7089783	-107.8365753	10	200	Walking	E	Yes	Windy	Dry	Teri Ness
45	6/20/2014 14:35	TT03	47.7081895	-107.943800	8	358	Ran Away	W	Yes	Windy	Dry	Leah Mabere
46	6/26/2014 8:23	Other/Driving	47.7600011	-107.8977706	8	400+	Ran Away	W	No	Clear/Calm	Dry	Leah Mabere
47	6/26/2014 11:59	TT02	47.7622692	-107.8436028	2	350	Ran Away	W	No	Cloudy	Dry	Alex Guest
48	6/27/2014 14:08	TT04	47.7184842	-107.8231137	1	400+	Grazing/Feeding	E	Yes	Cloudy	Muddy	Elena Engert
49	6/27/2014 14:41	Other/Driving	47.7428867	-107.8766296	6	400+	Ran Away	NE	Yes	Clear/Calm	Muddy	Teri Ness

Coyote:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/4/2014 7:17	Other/Driving	47.7215618	-107.6414662	1	400+	Stationary	Stationary	Yes	Clear/Calm	Dry	
2	4/24/2014 10:11	Other/Driving	47.73729597	-107.8122639	1	400+	Stationary	Stationary	Yes	Windy	Dry	Greg Tsairis
3	5/11/2014 12:19	TT05	47.7694411	-107.7555265	1	400+	Stationary	Stationary	Yes	Clear/Calm	Muddy	Kayli Mellencamp
4	6/18/2014 9:44	TT05	47.763406	-107.7806175	1	22	Ran Away	NE	No	Cloudy	Muddy	Elena Engert
5	6/24/2014 9:54	TT08	47.7429721	-107.6873566	1	176	Ran Away	S	Yes	Clear/Calm	Dry	Rachel Herring
6	6/24/2014 11:08	TT08	47.7286037	-107.6636662	1	105	Ran Away	E	No	Clear/Calm	Dry	Elena Engert

Porcupine:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	5/11/2014 12:38	TT05	47.7721136	-107.787494	1	0	Stationary	Stationary	Yes	Windy	Muddy	Matt Howe

Black-Tailed Prairie Dog:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/15/2014 10:41	TT01	47.6841243	-107.8632871	2	156	Stationary	Stationary	Yes	Windy	Dry	Vija Pelekis
2	4/15/2014 14:06	TT08	47.7341321	-107.6850017	6	200	Stationary	Stationary	Yes	Clear/Calm	Dry	Greg Tsairis
3	4/21/2014 11:47	TT05	47.795881	-107.7241709	8	288	Stationary	Stationary	Yes	Clear/Calm	Dry	Vija Pelekis
4	4/22/2014 10:57	TT05	47.7624862	-107.7555164	30	45	Stationary	Stationary	Yes	Clear/Calm	Dry	Mikiela Howie
5	4/22/2014 13:22	TT05	47.7803077	-107.7809334	15	45	Stationary	Stationary	Yes	Windy	Dry	Mikiela Howie
6	4/24/2014 10:14	Other/Driving	47.73790219	-107.8122611	33	100	Stationary	Stationary	Yes	Windy	Dry	Greg Tsairis
7	4/23/2014 11:41	Other/Driving	47.78621413	-107.8642709	2	113	Stationary	Stationary	No	Clear/Calm	Dry	Ryan Rock
8	5/8/2014 15:11	TT07	47.7529418	-107.6886257	28	120	Stationary	Stationary	Yes	Windy	Dry	Katie Birch
9	5/11/2014 11:11	TT05	47.7819548	-107.7399009	1	0	Stationary	Stationary	No	Windy	Dry	Matt Howe
10	5/14/2014 11:54	Other/Driving	47.73171898	-107.8239685	20+	0	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelley Noach
11	5/18/2014 12:26	TT07	47.758204	-107.6870995	8	0	Stationary	Stationary	Yes	Cloudy	Dry	Craig Wetland
12	5/21/2014 12:47	TT05	47.7544393	-107.7252038	35+	55	Stationary	Stationary	Yes	Clear/Calm	Dry	Craig Wetland
13	5/21/2014 14:10	TT05	47.7544393	-107.7252038	25+	0	Stationary	Stationary	No	Clear/Calm	Dry	Craig Wetland
14	6/11/2014 11:51	TT08	47.7051628	-107.8626090	4	400	Stationary	Stationary	No	Clear/Calm	Dry	Marin Summer 2014
15	6/11/2014 11:51	TT08	47.7051628	-107.8626090	4	400	Stationary	Stationary	Yes	Clear/Calm	Dry	Marin Summer 2014
16	6/9/2014 8:45	TT07	47.7575203	-107.6852136	11	44	Stationary	Stationary	Yes	Clear/Calm	Dry	Alex Guest

Desert Cottontail:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/15/2014 11:02	TT03	47.67724339	-107.8595649	1	0	Ran Away	W	No	Windy	Dry	Vija Pelekis
2	4/25/2014 13:09	TT03	47.6762337	-107.8574546	1	1	Stationary	SE	No	Clear/Calm	Dry	Greg Tsairis
3	5/5/2014 14:28	TT03	47.7630491	-107.7732263	1	7	Ran Away	W	No	Clear/Calm	Dry	Kelsey Noach
4	5/5/2014 11:51	TT03	47.720194	-107.842379	1	0	Ran Away	NE	No	Clear/Calm	Dry	Gregg Treinish
5	6/10/2014 8:10	Other/Driving	47.7298255	-107.7887146	1	20	Stationary	Stationary	Yes	Clear/Calm	Dry	Elena Engert

Sharp-Tailed Grouse:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/3/2014 9:46	T301	47.7887755	-107.8626586	8	160	Flying	NE	No	Cloudy	Dry	Greg Tsairis
2	4/3/2014 11:01	T307	47.7857121	-107.6903688	1	40	Ran Away	W	No	Clear/Calm	Dry	Kelley Noach
3	4/3/2014 11:09	T307	47.7861532	-107.6909442	2	2	Ran Away	W	Yes	Clear/Calm	Dry	Kelley Noach
4	4/3/2014 11:34	T308	47.72817804	-107.6496544	1	40	Flying	W	No	Clear/Calm	Dry	Vija Pelekis
5	4/9/2014 9:28	T302	47.7478582	-107.8613161	1	66	Flying	N	No	Windy	Dry	Vija Pelekis
6	4/9/2014 10:35	Other/Driving	47.72151895	-107.8217188	2	7	Flying	N	No	Windy	Dry	Ryan Rock
7	4/12/2014 12:20	T308	47.734612	-107.6554686	1	15	Flying	S	No	Windy	Dry	Greg Tsairis
8	4/22/2014 12:58	T305	47.7911586	-107.7636301	1	30	Flying	SE	No	Clear/Calm	Dry	Mikiela Howie
9	4/24/2014 11:54	T301	47.7258425	-107.8763346	1	5	Flying	W	Yes	Windy	Dry	Mikiela Howie
10	4/24/2014 12:51	T302	47.7489625	-107.8662771	2	101	Flying	NW	No	Windy	Dry	Ryan Rock
11	5/8/2014 10:58	T307	47.7338804	-107.6707066	1	11	Flying	W	No	Windy	Dry	Katie Birch
12	5/15/2014 9:24	T304	47.7234331	-107.8234346	2	5	Flying	SW	No	Clear/Calm	Dry	Kayli Mellicamp
13	5/21/2014 11:49	T304	47.7238724	-107.8217095	1	40	Flying	E	No	Clear/Calm	Dry	Kelley Noach
14	6/18/2014 10:01	T305	47.7849977	-107.7803945	1	26	Ran Away	NE	No	Clear/Calm	Dry	Rachel Herring
15	6/18/2014 10:45	T305	47.7918366	-107.7719853	2	86	Ran Away	N	No	Clear/Calm	Dry	Sharon Rabinski
16	6/24/2014 11:38	T307	47.7874439	-107.6882938	1	5	Flying	E	No	Clear/Calm	Dry	Leah Mabee

Greater Sage-Grouse:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/3/2014 11:49	T301	47.74818	-107.8862727	5	82	Flying	N	No	Cloudy	Dry	Name
2	4/3/2014 11:22	T307	47.7919155	-107.6864666	3	20	Ran Away	W	Yes	Clear/Calm	Dry	Greg Tsairis
3	4/3/2014 11:50	T308	47.73098298	-107.6555032	1	10	Stationary	SW	No	Clear/Calm	Dry	Kelley Noach
4	4/3/2014 11:59	T308	47.75653798	-107.6604884	4	34	Flying	W	Yes	Clear/Calm	Dry	Ryan Rock
5	4/9/2014 10:19	Other/Driving	47.73462854	-107.8402189	2	20	Flying	N	No	Windy	Dry	Vija Pelekis
6	4/9/2014 11:13	Other/Driving	47.72524884	-107.8238132	1	5	Flying	NW	No	Windy	Dry	Ryan Rock
7	4/15/2014 10:48	T304	47.6998306	-107.8227965	1	6.23	Flying	SE	Yes	Clear/Calm	Dry	Ryan Rock
8	4/17/2014 11:49	T308	47.7518933	-107.6873225	1	20	Flying	SE	Yes	Clear/Calm	Dry	Mikiela Howie
9	4/21/2014 11:13	T306	47.7465523	-107.7354531	1	30	Ran Away	SE	No	Clear/Calm	Dry	Greg Tsairis
10	4/25/2014 10:59	T304	47.7309452	-107.8216449	1	30	Flying	SE	No	Clear/Calm	Dry	Vija Pelekis
11	5/9/2014 12:39	T307	47.7946334	-107.6798995	3	17	Flying	E	No	Windy	Dry	Kelley Noach
12	5/9/2014 11:59	T307	47.75785	-107.6754834	13	10	Other		Yes	Windy	Dry	Katie Birch
13	5/11/2014 11:45	T305	47.791632	-107.7732829	1	38	Flying	S	No	Windy	Muddy	Katie Birch
14	5/13/2014 10:21	T309	47.7562767	-107.7650689	1	40	Stationary	Stationary	No	Clear/Calm	Muddy	Katie Birch
15	5/13/2014 11:27	T306	47.7382301	-107.7113355	1	5	Flying	SW	No	Windy	Dry	Katie Birch
16	5/21/2014 12:16	T309	47.7576402	-107.7666967	1	0	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelley Noach
17	6/9/2014 10:24		47.7874132	-107.6885847	1	0	Flying	E	No	Windy	Dry	Katie Birch
18	6/18/2014 11:43	T309	47.7555731	-107.7684822	6	61	Flying	SE	No	Clear/Calm	Dry	Alex Guest
19	6/28/2014 8:36	Other/Driving	47.7918779	-107.7695277	1	14	Walking	S	Yes	Clear/Calm	Dry	Teri Ness
20	6/28/2014 9:09	T308	47.7548933	-107.7046065	1	45	Flying	S	Yes	Clear/Calm	Dry	Rachel Herring

Ring-Necked Pheasant:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/22/2014 14:20	TT05	47.7559763	-107.7791551	2	20	Ran Away	S	No	Windy	Dry	Mikaela Howie
2	5/14/2014 14:24	TT02	47.7504471	-107.8586395	1	10	Flying	SE	No	Clear/Calm	Dry	Craig Wieland

Bullsnake:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	5/15/2014 11:00	TT03	47.6916581	-107.8632268	1	0	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Knoah
2	6/16/2014 11:50	Other/Driving	47.7398208	-107.7670013	1	1	Stationary	Laying Down	Yes	Cloudy	Muddy	Elena Engert
3	6/24/2014 9:48	Other/Driving	47.8014682	-107.7568873	1	1	E	Other	Yes	Clear/Calm	Dry	Teri Ness

Plains Gartersnake:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/21/2014 10:22	TT06	47.7756137	-107.7061934	1	0	Ran Away	Stationary	Yes	Clear/Calm	Dry	Vija Pelekis
2	4/22/2014 11:58	TT05	47.7859678	-107.7575263	1	0	Ran Away	NE	No	Clear/Calm	Dry	Mikaela Howie
3	4/22/2014 13:09	TT05	47.787324	-107.7803204	1	0	Ran Away	W	No	Windy	Dry	Vija Pelekis
4	4/22/2014 13:25	TT09	47.7878311	-107.7996076	3	0	Other	Stationary	Yes	Windy	Dry	Greg Tsairis
5	5/5/2014 13:46	TT03	47.7630491	-107.7732263	1	1	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Noah
6	5/11/2014 13:19	TT05	47.7834327	-107.7774972	1	0	Ran Away	SE	No	Windy	Muddy	Matt Howe
7	5/19/2014 11:03	TT08	47.7554193	-107.7257038	1	0	Other	S	No	Windy	Dry	Katie Birch
8	5/21/2014 13:36	TT05	47.7554193	-107.7257038	1	0	Ran Away	N	No	Clear/Calm	Dry	Craig Wieland
9	6/11/2014 9:45	TT09	47.7500164	-107.7748272	1	1	Ran Away	N	No	Windy	Dry	Leah Mabee
10	6/13/2014 10:11	TT03	47.7288278	-107.8422165	2	10	Stationary	Stationary	Yes	Clear/Calm	Dry	Marin Summer 2014
11	6/15/2014 10:01	TT02	47.7512015	-107.840611	1	1	Other	W	No	Windy	Dry	Rachel Herring

Prairie Rattle Snake:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	5/5/2014 15:28	TT03	47.7630491	-107.7732263	1	0	Other	Stationary	No	Clear/Calm	Dry	Kelsey Noah
2	6/10/2014 10:58	TT05	47.7911531	-107.763498	1	5	Stationary	Stationary	Yes	Clear/Calm	Dry	Shannon Rabinski
3	6/27/2014 14:24	TT04	47.7098171	-107.8215955	1	1	Other	Stationary	Yes	Cloudy	Dry	Elena Engert

Painted Turtle:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	4/21/2014 9:45	TT06	47.7621722	-107.7068919	12	100	Stationary	Stationary	Yes	Clear/Calm	Muddy	Vija Pelekis
2	4/22/2014 13:31	TT09	47.7880882	-107.7997074	1	20	Laying Down	Stationary	Yes	Windy	Muddy	Greg Tsairis
3	5/5/2014 11:15	TT03	47.7630491	-107.7732263	4	6	Stationary	W	No	Clear/Calm	Other	Kelsey Noah
4	5/21/2014 14:14	TT09	47.7882581	-107.7996742	6	10	Other	Stationary	Yes	Clear/Calm	Muddy	Katie Birch
5	5/8/2014 11:23	TT07	47.7436415	-107.6713243	1	40	Other	Stationary	Yes	Windy	Dry	Katie Birch
6	6/13/2014 9:51	TT03	47.7293929	-107.8423882	9	0	Stationary	Stationary	No	Clear/Calm	Dry	Marin Summer 2014

Greater Short-Horned Lizard:

Observation	Date and Time	Transect Number	Location		No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
			Latitude (deg)	Longitude (deg)								
1	5/13/2014 10:43	TT06	47.7835296	-107.7064774	1	0	Ran Away	W	Yes	Clear/Calm	Muddy	Kelsey Knoah
2	5/15/2014 12:36	TT03	47.6906932	-107.8406103	1	0	Ran Away	W	Yes	Windy	Dry	Kelsey Knoah
3	6/4/2014 14:37	TT01	47.730264	-107.8922998	1	0	Ran Away	Stationary	Yes	Windy	Dry	
4	6/4/2014 14:38	TT01	47.7302591	-107.8922717	1	0	Stationary	Stationary	Yes	Windy	Dry	
5	6/15/2014 8:54	TT02	47.7334792	-107.8322137	1	1	Stationary	Stationary	Yes	Windy	Dry	Rachel Herring
6	6/15/2014 10:35	TT01	47.7332939	-107.8775764	1	0	Stationary	N	Yes	Windy	Dry	Shannon Rabinski

Dead Animals:

Date Time	Latitude	Longitude	Species Name	Degree of Death	How Many Animals	Name
4/21/2014 13:10	47.98663	-107.978	Grouse	Bones and Skin	1	Vija Pelekiis
6/23/2014 9:15	48.21823	-107.872	White-tailed Jackrabbit	Meat is mostly gone	1	Teri Ness
5/14/2014 12:57	47.7413	-107.871	Western Meadowlark (i)	Feathers	1	Craig Wieland
5/14/2014 14:29	47.73679	-107.866	Unkown	Feathers	1	Craig Wieland
4/24/2014 10:38	47.73721	-107.863	Unkown	Feathers	1	Ryan Rock
5/15/2014 9:40	47.73489	-107.842	Unkown	Feathers	1	Kelsey Knoah
6/27/2014 15:22	47.73314	-107.834	Western Meadowlark (i)	New Death	1	Shannon Rabinski
4/25/2014 11:55	47.73304	-107.834	Sharp-tailed Grouse (i)	New Death	1	Kelsey Noah
4/25/2014 13:41	47.73304	-107.834	Mule Deer	Just Bones	1	Kelsey Noah
6/26/2014 10:05	47.73316	-107.832	Plains Gartersnake	Bones and Skin	1	Teri Ness
6/27/2014 17:11	47.73348	-107.83	Mule Deer	Bones and Skin	1	Elena Engert
5/26/2014 11:37	47.72542	-107.812	Brown Creeper (r)	Slightly Deteriorated (carcass is opened)	1	Kate Birch
6/20/2014 15:03	47.72389	-107.799	Bison	Just Bones	1	Teri Ness
6/20/2014 10:42	47.72398	-107.796	Mule Deer	Bones and Skin	2	Teri Ness
6/15/2014 15:05	47.72701	-107.792	Bison	Just Bones	1	Teri Ness
5/5/2014 11:25	47.74483	-107.775	Unkown	Just Bones	1	Mikaola Howie
5/21/2014 12:02	47.7448	-107.775	Unkown	New Death	1	Kelsey Knoah
6/13/2014 12:11	47.76301	-107.773	Mule Deer	Just Bones	1	Merrill Warren
6/9/2014 13:14	47.76297	-107.773	Western Meadowlark (i)	New Death	1	Teri Ness
5/5/2014 15:32	47.76305	-107.773	Unkown	Feathers	1	Kelsey Noah
6/4/2014 13:06	47.76299	-107.773	Unkown	Bones and Skin	1	Craig Wieland
6/25/2014 13:56	47.76293	-107.773	Coyote	Bones and Skin	1	Rachel Herring
6/18/2014 13:10	47.73727	-107.771	Bison	Just Bones	1	Shannon Rabinski
5/21/2014 13:00	47.75642	-107.726	Unkown	Feathers	1	Craig Wieland
6/18/2014 14:01	47.7566	-107.704	Bison	Just Bones	1	Teri Ness
6/24/2014 10:25	47.75874	-107.665	Plains Gartersnake	Slightly Deteriorated (carcass is opened)	1	Teri Ness
6/24/2014 12:09	47.75874	-107.665	Pronghorn	Just Bones	1	Teri Ness
6/25/2014 8:08	47.75815	-107.66	Bison	Just Bones	1	Teri Ness
6/25/2014 9:21	47.75848	-107.66	Western Meadowlark (i)	Slightly Deteriorated (carcass is opened)	1	Teri Ness