

2014 Landmark Q2 Report Prepared by Adventurers and Scientists for Conservation August 14th, 2014



http://www.adventurescience.org/landmark.html

Abstract

Land**mark** 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 sagegrouse 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	
Animal Observation Summaries: Transects, Cameras, & Scoping	
Bison	22
Mule Deer	23
White-Tailed Deer	24
Pronghorn	25
Elk	
Badger	
Coyote	
Bobcat	
Raccoon	
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	
Observer Reliability	44
Acknowledgements	45
Norks 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 Land**mark**. Land**mark** 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 Land**mark** project, built-in scientific leadership provides a strong foundation for crews' data collection.

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

One of ASC's Land**mark** 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 Land**mark** 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. 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 $1' \times 1'$ 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 Land**mark** 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

a. location, date/time, and any

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 Land**mark** 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

Land**mark** 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 2^{nd} and June 28^{th} , 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.

]	Behavior	
	Species	Events	Obser.	Cros	sed	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

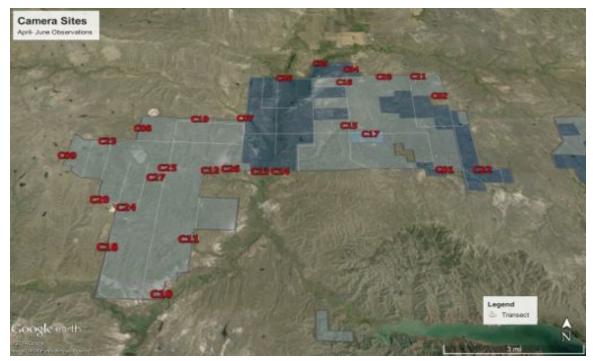


Figure 1. Q2 Camera sites on internal and external reserve fence lines.

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, Land**mark** 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	4	75	29	19
	Grouse				



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.

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

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

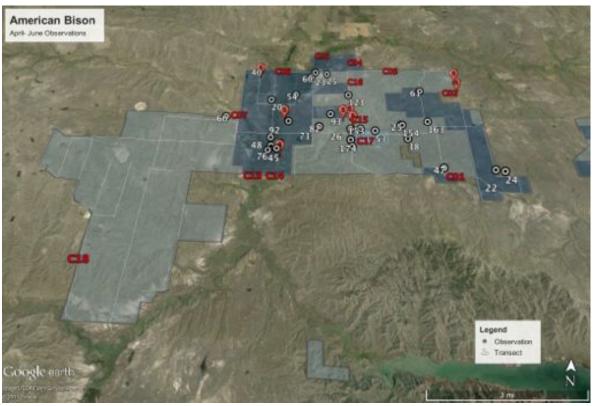


Figure 3. Bison observations with numbers indicating group size.

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.

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

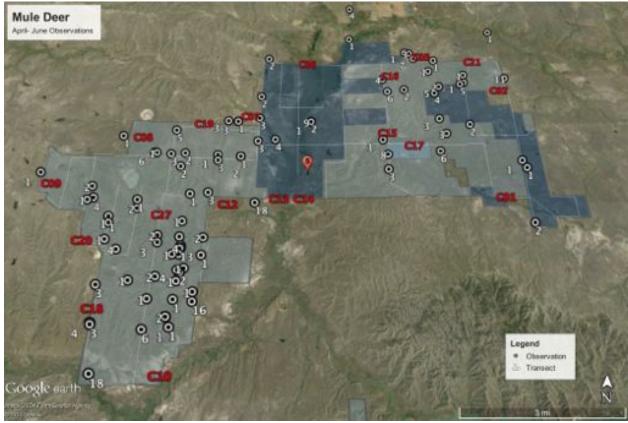


Figure 4. Mule deer observations with numbers indicating group size.

White-Tailed Deer

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

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

<u>Scoping</u> - No white-tailed deer were observed during scoping sessions.

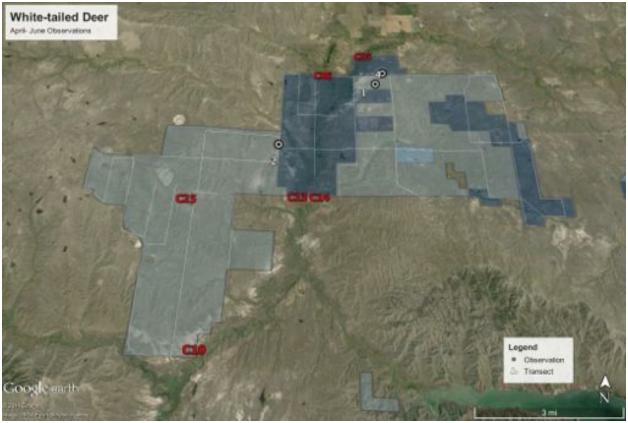


Figure 5. White-tailed deer observations with numbers indicating group size.

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.

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

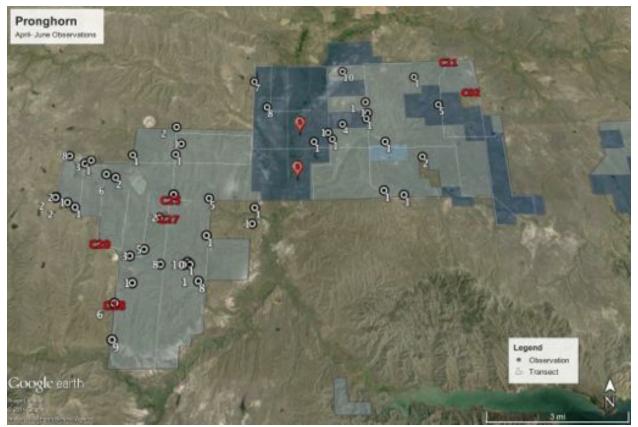


Figure 6. Pronghorn observations with numbers indicating group size.

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.

<u>Transects</u> - No elk were observed during transects.

<u>Cameras</u> - 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

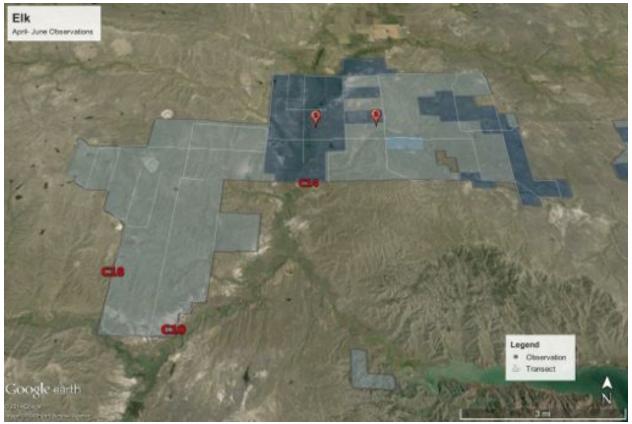


Figure 7. Elk observations with numbers indicating group size.

Badger

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

<u>Transects</u> - No badgers were observed during transects.

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

Scoping - No badgers were observed during scoping sessions.

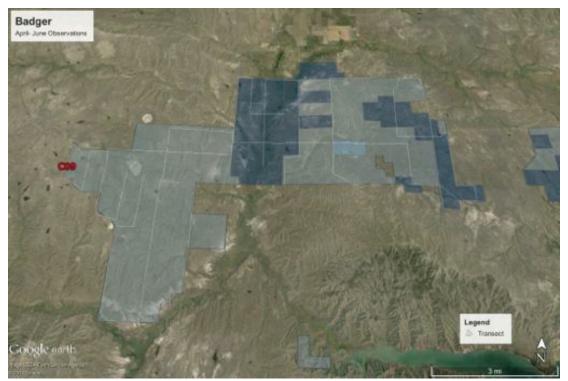


Figure 8. Badger observations with numbers indicating group size.

Coyote

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

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

<u>Scoping</u> - Three coyote sighting events occurred during scoping totaling three animals.

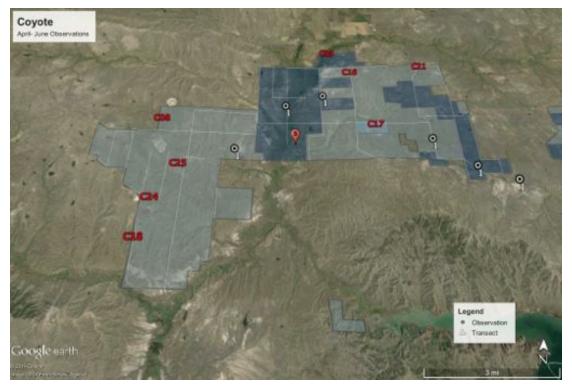


Figure 9. Coyote observations with numbers indicating group size.

Bobcat

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

<u>Transects</u> - No bobcats were observed during transects.

Cameras - One bobcat was observed at camera 21.

<u>Scoping</u> - No bobcats were observed during scoping sessions.

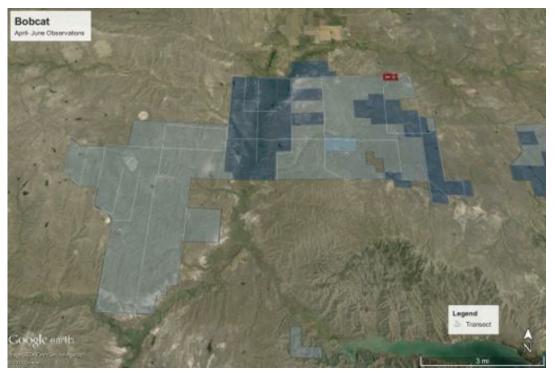


Figure 10. Bobcat observations with numbers indicating group size.

Raccoon

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

<u>Transects</u> - No raccoons were observed during transects.

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

<u>Scoping</u> - No raccoons were observed during scoping sessions.

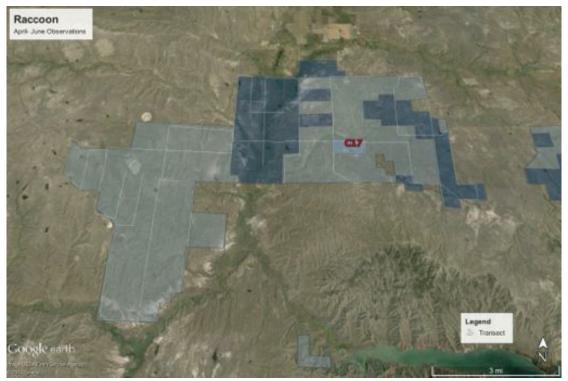


Figure 11. Raccoon observations with numbers indicating group size.

Porcupine

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

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

<u>Cameras</u> - 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.

<u>Scoping</u> - No porcupines were observed during scoping sessions.

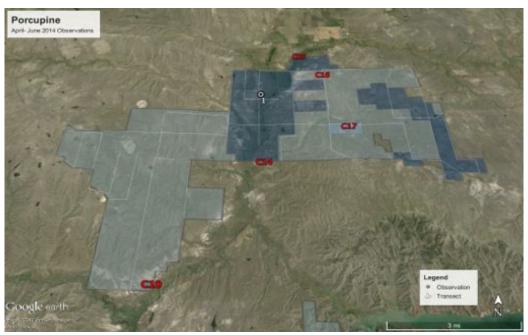


Figure 12. Porcupine observations with numbers indicating group size.

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.

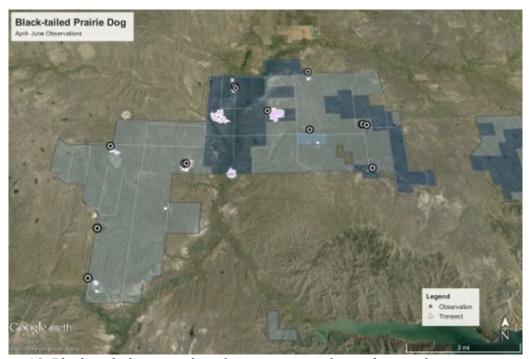


Figure 13. Black-tailed prairie dog observations with numbers indicating group size.

Desert Cottontail

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

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

<u>Scoping</u> - No desert cottontails were observed during scoping sessions.

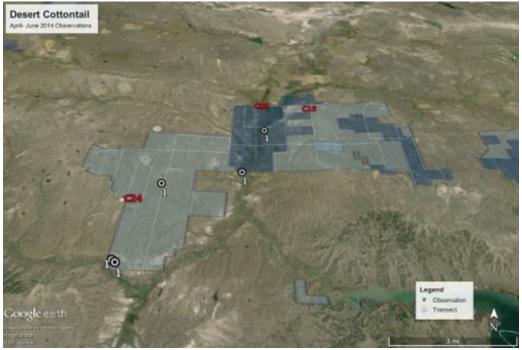


Figure 14. Desert cottontail observations with numbers indicating group size.

White-tailed Jackrabbit

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

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

<u>Cameras</u> - 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.

<u>Scoping</u> - No white-tailed jackrabbits were observed during scoping sessions.

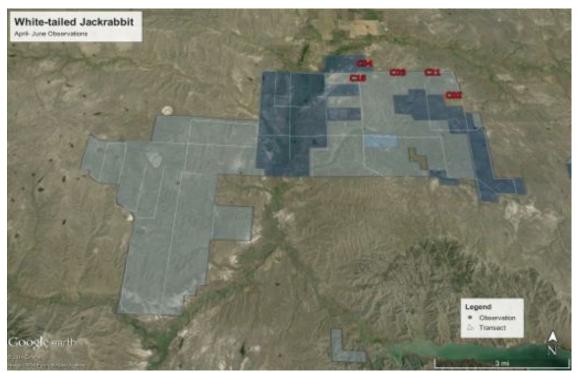


Figure 15. White-tailed Jackrabbit observations.

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.

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

<u>Scoping</u> - No sharp-tailed grouse were observed during scoping sessions.

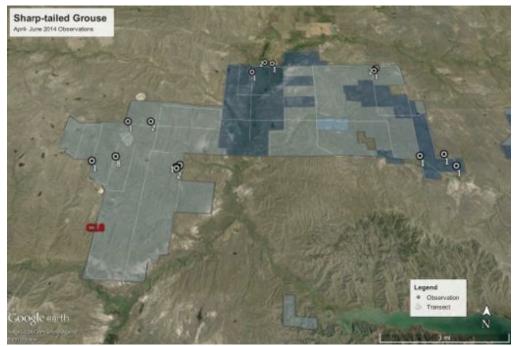


Figure 16. Sharp-tailed grouse observations with numbers indicating group size.

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.

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

<u>Scoping</u> – Four sage grouse sighting events occurred during scoping sessions totaling 75 grouse observations.

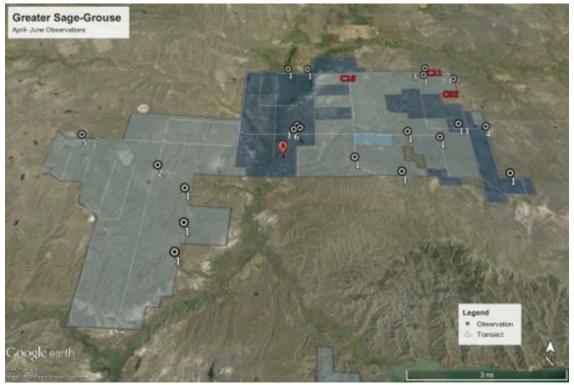


Figure 17. Greater Sage-Grouse observations with numbers indicating group size.

Ring-Necked Pheasant

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

<u>Transects</u> - 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.

<u>Cameras</u> - 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.

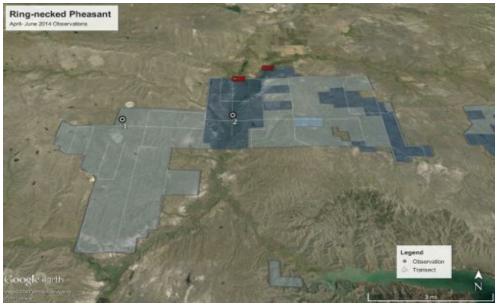


Figure 18. Ring-necked pheasant observations with numbers indicating group size.

Reptiles

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

Snakes

<u>Transects</u> - 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.

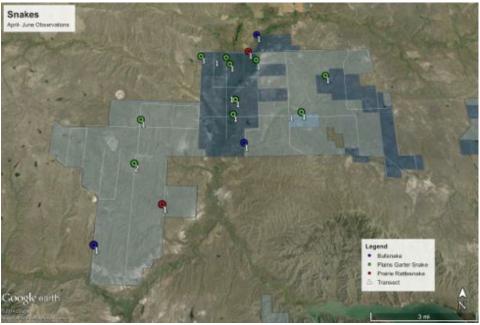


Figure 19. Snake observations with numbers indicating group size (species in map legend).

Painted Turtles

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

<u>Transects</u> - 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.

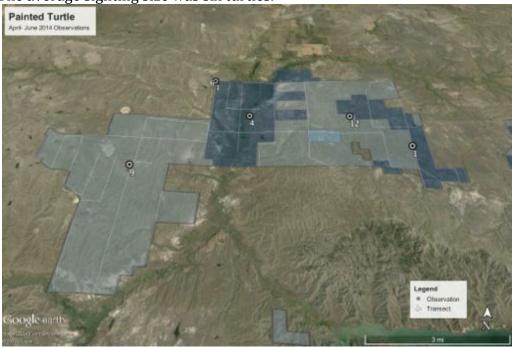


Figure 20. Painted turtle observations with numbers indicating group size.

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.

<u>Transects</u> - 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.

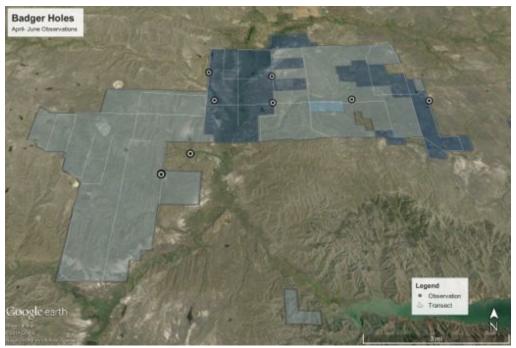


Figure 23. Badger hole observations.

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 locaitons.

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

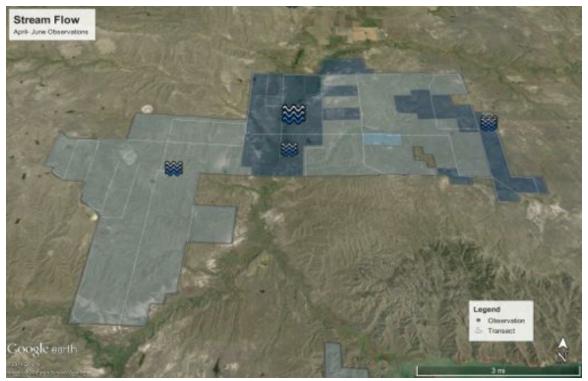


Figure 24. Hydrologic feature observations with size indicating depth of flow.

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.

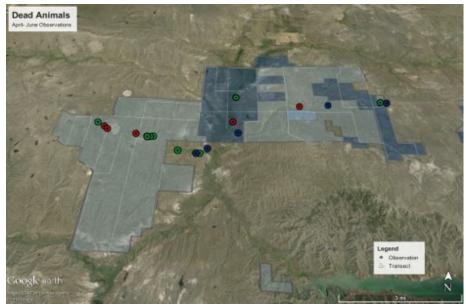


Figure 25. Dead animal observations. Red= Unknown, Blue= Bison, Green= Western Meadowlark.

Other Waypoints of Interest

32 distinct 'Other Waypoints of Interest' were recorded during Land**mark** 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.

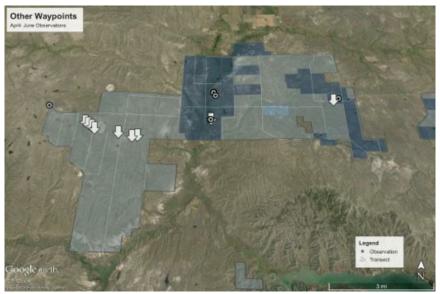


Figure 26. Dots indicate human artifacts and arrows indicate breaks in Sun Prairie fences

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.

Bison Count Data	
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
Total Animal Observations	3,363

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.

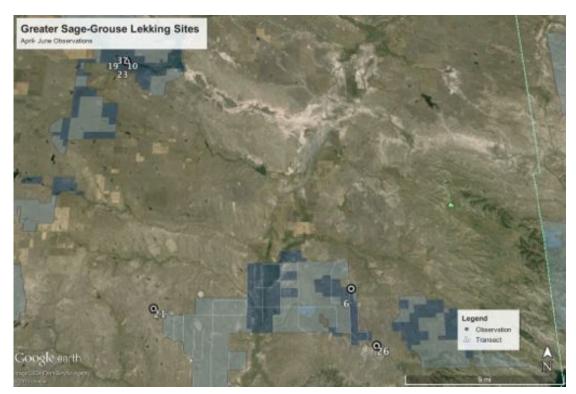


Figure 27. Sage lek counts and locations.

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 defendable, 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 Landmark 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 Land**mark** 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, Land**mark** 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 is 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.

We'd also like to thank the Reserve and Visitation teams, Betty, Ellen, James, Lars, Damien, Whitni, Meghan, Meg, Siri, Branden, Laura and Eli for continuing to welcome and support the crews and the ASC staff. Whether delivering a Flavia machine in the cold days of May, allowing a hot shower in their quarters, or delivering water to Buffalo Camp in the heat of June their operational support has been much appreciated.

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 Land**mark** 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%20cal/%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.	Desert Cottontail	24	26	2	1
Mammals					
	Jack Rabbit	20	20	1	1
	Porcupine	7	7	1	1
	Raccoon	2	2	1	1
Game Birds	Greater Sage Grouse	27	130	29	8
	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

Appendix 2 - Transect Animal Observation Data

Bison:

DISUI	1.											
Cinamania e	Surecust Time	Taxascrification		Annahuda bisal	No. Accessor	Dissource Group Garner (who)	A size of Section is a	Dispersion of Toward	Please	Waster	Ground Conditions	Obsesser
1	42 XM D.D	Other tre ne	6.70956	-1274808	2	40	Station early	Statement	Tex	Own/Cate		Sabey Such
2	423403	Order/Driving	62,525,607	-1CF 2555008		26	Grading/Freeling	Switzery	Tes.	Clean/Calm		Wa Peletin
3	A/17/2004 50:58	773	6.70(80)	-10718007007	1	605	Laying Down	Stationary	No.	Chan/Eate		Tip Peters
4	40/ XH II GI	107	67,7708111	-101 N. ORK T	-	300	Grant say Frend ing	Determine	761	Chan/Calm		Rebey Back
5	48/2049/2 48/2049/2	713	47 74580M 47 7500M	-107.7761.4 -107.7761.48		50	Sucing Feeding	SW	765	Cloudy	Bry	Great Service
-	98/204##D	713	67,75,602	-1278000	1	30	Casing Freeling	NW.	Tex	Cheely	By By	Greg Spine
	48/201000	TER	67.7860277	107.78135	- 6	m)	Garing/Frenting	160	Yes	Cloudy	Gry	Greg Tairs
	46/2010/6	773	67,7917949	-107774090	2	141	Stating Treating	w	766	Doelly	Bry	Greg Spring
10	48/XH1142	Other/Driving	£250720	-10077Y0W52		- 60	Laying Down	Stations	Tes.	Cloudy	Dry	functions.
18.	ARCESTS.	Other fire ing	67.7M04703	-10777-0074	2	39	Seven from	Statement	768	Doety	Stry	familioch
12	48/201201	712	67,747586	-1077K2H0	2		Santay Freding	1	761	Made	Div	Green Territor
- 10	48/TH-0-9	718	67,7500306	10776606	-	5%	Gracing/feeding		761	Winds	- Ony	Greg Swine
18	UND THE O	TER	67,714,300	-107 ETHOR?	94	26	County Feeding	Stationers	Tes.	Strangfalm	Dry Dry	Salary Start
16	410 21 415	TEP	67.77EF	-10777 2001	2	29	Sacing Feeding		744	Chan/Calm		Greg Tairs
17	4/E/214/208	TER	67,7710965	-10F7811552	20	40	taying from	- 5	766	Description		Greg Sein
18	4/myzes mozz	TER	£ 2000001	100.700.00	3	40	Court og Frending	Desirary	- 10	Oran/Calm		Figure Street
100	4/10/214:1040	710	47,7616594	-10F7676607	3	30	Gracing/Tenting	*	766	Windy	Bry	Greg Sairs
20	4/EYZ0A ED04	TER	0.7800	-107 705000	4	20	Laying Owner	Stationcy	- 10	White	Dry	Raw Rock
3	410/Z(A)104	Other Draving	634300	10777/874	12		lasing/from	Swinner	765	Made	- Bry	IIIa Peleka
22	4TO THE LIE	759	er nome	-07.76559	- 2	30	Sansa/fredma	Statement	764	Made	-	Constitute
3	4YO/ZOALISH 4YO/ZOALISO	Order/Driving	67.90 (K.S.)	-1077480307 -107798098	9	20	Station Tenting	Statement	761	Windy	Dry Dry	Great Taries
2	4/EVZ0ALZEZ	TER	67.75 61.00	-12796216	1	4/2	Grant on Females	Determy	Tes	Winds	Dry	Gree Territ
2	AND THE PARTY	758	47,765330	107707998	2	125	Gracing/Freeding		No.	Windy	By	Page Rock
2	\$10/2043456	TER	6.TDMCF	-107 7070 DR	2	80	Course/Frenche		No.	Whele	Div	Raper Rock
	をTO/IDMで相	TER	e regione	-107709479	12	- 60	Stating Tenting	Statemy	No.	White	Dry	Ryan Rock
3	4/8/2049	TOR	672034	10,8300	2	45	Gueing/Freeling		Yes	Windy	Dry	figure Force
90	4/17/2014:1119	713	6.5 mg	-107 (ROMB)		60	Swingfenling	Stationary	***	Windy	they	Greg Spire
74.	ACCUPATION	773	C75400	-107 (HOULZ	2	307	Making .	-	Tes.	Mindy	Dry	Greg Nation
20	4/2/(DIA)(ES	713	67,733480	-12 654W	- 24	70	Sincing/Tenting Mobile	- S	Tes	Sharp Sales	Div	Greg Spire
34	4/2/X14/450	773	67,7104	129030	- 2	23	Secing/freeding		No.	Gran, Kalin		Greg Tairs
20	4/2/2040	TER	6.258(34	-12730004	25	200	Marking.	5	766	Chan Calm		Tip Peters
30	4/3/XH4008	TER	67.769.7500	107.70709	1	40	Javing Down	Switzery	No.	Clean/Calm		Wa Peletin
77	4/2//E18/004	Other Driving	#F.PHOMOST	-107.00088	34	20	Laying Down	Stationary	764	-Chess/Eater	Dry	Habey South
	4/2/2000m	TO	67.77GMB	-107 HH-6090	_1_	-60	Coulog/freeling	Districtory	Tes.	Chan/Calm		Face South
30	4/2/(D14:100)	7108	C360	-10F70ee02	- 1	- 0	Gracing/feeding		765	Description	- Dry	His Peless
0	4/2/(2441236	TES	67.754.380	-10779800 -10779-6800	-	300 330	GraningTenting	NW.	166	Gran Faire		Tip Peless
40	4/2/204/03F	752	67.724.234	12 8107	- 1	28	Starting/Feeding Laying/Securi	Stationary	Yes	Chan/Calm Chan/Galm		Mitoria Rock
	4/2/E14/252	TER	67,7900,000	-12.75.03	30	40	Smire/freshme	Swinner	766	Chan Calm		Tip Peters
-	4/2/2014/4/2	TER	67.79(20).20	107.759403	- 10	514	Statio many	Switzery	Yes	Clean/Calco		Hip Peletin
	42/EH55	YES	47,7405.234	-107709090		- 171	Section/Fred in	Swinney	764	Description	Bry	Tip Peters
	4/T/THE DOS	TER	67,75,647	-10773H3W	1	20	Stationary	Switcher	Tex	Oran/Calm		Green Teacher
	470/THE000	770	67.75 (600)	107752042		300	Gracing/freeding		765	Gran/Galon		Greg Nairk
	4T/THEDS	Other Triving	6:NIDB7	-107.75HIBS	-	80	Santay Tending	Stationary	764	Chen/Cath		Sabey South
50	477/THEORY	Order/Driving	CHRSC CHRSC	-10775HB01 -1077555011	10	60	Swingfred in	Station v	Tes.	Chan/Calm		Rebey Buch
50	4/27/24A:004 4/27/24A:009	TEP	C.5403	-10F/POMEN	10	30	Station Tenting	Stationary	744	Windy	Bry	Greg Spice
12	@TD/T08111.22	TES	67.7736712	100.707039	2	107	Darte rany		Tes	Oran/Calm		Marie Rower
59	470/EHAD	TEP	C.5400	-10F779004	5	£9	taying/from	Swinney	166	Gran/Eater		Greg Saint
54	4/D/DM:DD	712	67,7758465	-10770888	1		States easy	Statement	Tex	Chang States	Dry	Mari Rose
- 55	470/X14107	712	67,7796863	107757396		.20	Section/Feeding	Statemy	765	Desc/Salm	Stry	Michigan Street
. 20	◆四/正体日申	753	0.5330	107707038	1		No. by Marine	61	744	Own/Sales		Mell Room
57	4/27/2014 (207	Other/Driving	@ 2570012	-127 76960	10	30	Sixolog/Tending		-	Chan/Calm		Rebey Ruch
9	4円/至6本1256 4円/至6本2217	713	67.76.00 S	-1077463 -1077463	3	10	Gracing/Feeding	Statement Datement	766	Chan/Estra Windy	Div.	Milyania Rowin. Milyania Rowin
60	470/THARDS	758	67,7197004	1079047		30	Good on Frending		Tes Tes	Water	By	Milyela New It
66	WINTERSON	7720	67,7787540	-1270236		40	Marking.		No.	Winds	Div	Millard Rock
62	WINDSHIP OF	773	C.THM	-107790LD0	4	367	Laying Down	Swinney	Tex	Whelly	Dry	Milloria Rowin
40	4T/THERE	TER	67.7903668	1077880014		760	Guning/Frenting	Stationary	Yes	Windy	Dy	Greg Tairis
68	4/D/Eskipss	TER	47.5650H	-177683		200	Sungfeeing	Stationary	764	Whitely	thry	Greg Spire
-	4/20/20/05/	TER	67.771.8677 67.1781.8677	-107.78.7778b		30	Santay Fred in	Desiracy	761	White State	Dry	Gray Notes
-	4/36/20/40 SE	752	67665 67565	-107 KHOSERA -107 7HHEFT	- 22	- M	Sincing Tenting	Statement .	761	Chan Eate		Million's New In-
-	478/THATE		67.740MB	107 (57 (57 (57 (57 (57 (57 (57 (57 (57 (5	2 2	500	Station Frentise Station Frentise		Yes	Chan/Calm Windy	Div Gry	Rate South West South
	47/Diamin	TER	67,00,00074	-107812000	5	70	Carlon Tentine	Statement	700	Chan Calm		Sabry Such
70	UR THIO IS	TER	Ø25320	107720908	100	10	Gooding/Femilies		Tes.	Chan/Calm		Cong Winkerd
71.	5/8/2014/025	773	0.5500	-107707098		298	Mybine	98	766	dissoftein.		Cold Websel
72	NUMBER	TEF	67,719,0004	-101870708		30	Jayles Down	Districtory	Jes.	Make	Div	Seite Einh
77	1/6/2011/09	773	67.79(2807)	-12/8602	14	- 6	Gualing/Femiling		Tes	Chan/Calm		Culg Websit
74	5.6-2010.4	10	67748708	10.00		90	Markey	the transit	765	Windy	Gry	No tie Black
70	SECTION A	107	67.775-8078 67.7813-864	-107 W/GDR	95	6	Course Tending Course Tending		Tes Tes	Windy	Dry Dry	No the Block
IT	STI/ENATION	752	6770000	-127974		10	Sacra/feet no		744	Windy	Metry	Maria Street
78	SUCCESSION	TER	67.7596.074	- 107 796783		30	Stanling/Femiling		Tes	Chan/Calm		Sectifications
79	5/31/20443156	718	67,74606	127100	2	30	taxing/from	Stationary	761	Mindy	Matery	Bay i Sik Some my
90	STATEMENT	Other/Driving	67,7940613	-107,77560	2	20	Society Freeling		Tex	Chan/Calm		Sug Weinst
- H	\$15,/2014(24)	713	C3588	107.755007	- 1		Laying Down	Stationary	No.	Gran/Galor		Ryl Welenamy
82	5/11/2041251	713	67.788674	-10775276		45	Laying Down	Stationary	764	Chan/Calm		By title beauting
-	SHI/DIADOR	773	C3862	-107.79sp4	- 2	10	Sacing Fred in		761	Winds Com-Color	Matthy	Mart Store
	1/0/2040 1/0/2040	TER	67.77BX35 67.7553Rb	-1077094D8	- 1	40-	Gracing/Freeding States easy	Stationary Stationary	701	Clean/Calm		Ratery Force h
*	1/0/254/8	TER	C7149	-10775 (SIGN)	82	- 6	Cooling/Feeding		701	ChanGaire ChanGaire		Corp Websel
	1/0/2019	TER	67,75564	1975262	75		Gracing/Feeding		761	Gran/Salm		No tie Sinch
	SUDVENA EXP	TER	67,7610002	-107.75.76ET	2	100	Layer of Common	Statement	Tes	Chan/Calm		Retirey Coop b
-	5/87/3014/8014	TER	47,51208	127620		40	Statik rans	Stationary	. Yes	Gran/Galor		Note But
90	SYD/ENABOD	Other Streets	67,7940000	-12775000		307	Swingfredma	Statement	766	Own/Date	Dry	By I Stelle stamp
94.	SW/XW KINE	Other/Driving	67,7540/60	-12779000	- 76	342	Sacing Feeding		No.	Chan/Calm		Sectifications on
92	5/0/204 E09	708	67,783965	-107706467	- 1	40-	Laying Down	Swimmer	764	Description		Kathey Kinox b.
- 40	SUD/ESSESS	TER	0.584	-1077BHENG		- 65	Deck stary	Determy	764	Minty	Div	Care Weight

Bison Cont'd:

940	5/19/2040040	TES	6778960	-17.73(7.0)	2	20	Guying Divers	Districts to	Tes	Disay/Grim	Dy	Kelleny Elmoh
96	5107 X14 m 25	YEA	47770904	-107 70090M	9	100	Swinney	Stations to	100	Windy	Musely	fune flich
90	NOTE THAT	TER	40°7778700	-127 FWED	4	60)	Stationary	Station ty	Tex	Windy	Multily	face flich
97	5/02/2014/205	TWO	477540004	-90F 714.5985	90	40)	Social feeling	Station to	166	Windy	Bry	Relaty Excels
-	5/10/2014/01/7	TTO	477546072	-02F.7546F28	2	604	Walking	MW.	Tex	Windy	Dig	Delany Emph
90	STREET	TTO	477546362	-07:75N(R)	20	60)	Contrapt entire	Stationary	94	Winds	Dry	Selvey Emply
9000	STREET	TTO	47739417	-107-XX1388	2		Stationery	Stations	701	Clear/Grim	0v	Matt Nove
301	5/10/2014:225	TEN	47.7386022	-57 MB (22)	2	409	Cracing/resting		764	Charling Inc	Div	Mall Score
102	5/19/2011/68	1100	4774001	103353	- 2	- 65	Graning/Femilie	*	761	Disay/Grim	0v	Contribution Contribution
307	5/19/2014:0013	THE	4P7790006	-sar arromas	,	60	Description .		744	Orale	Div	Con Wiebed
104	5/10/201005	773	47799460	-107721708	-	40	Cooling/feeding	Owner or	Yes	Addison	Maddy	Same Sinch
105	5/19/2014:00:00	7107	477390549	- SCF STOREGA	-	404	Southea Down	Stationaru	766	Winds	Dry.	Contribut
100	5/10/2040042	773	4779460	-107721708	-	98	Cooling/Femilie	Switches	761	Winds	Multily	face Sinch
307	5/3/204000	THE COLUMN	677554903 673014629	-6772709	- 5	207	Contrag Feeding	Station to Ow	744	Ches (C) In	Dry.	Contribut
109	5/3/284(23) 5/3/284(23)	Other/Driving TYPE	47.758803	-107.7531489 -107.7502942	92	90	Working	1	765	Charling in	Dry Dry	Teleny Elevah
180	5/3/2841200	Other/Driving	Ø 78677.27	- 927 771 7800	1	24	Contract entire	District to	Tes.	Disas/Gain	Div	Keltey Emph
58.9	5/3/2040/0	TYPE	677790988	- NF 7907EB	2	400	Socieg/series	Stationary	766	Ches / Co to	by	face fiech
10.7	5/3/204048	TES	47.7704947	-9777778	2	30	Contraptembry		No.	Clear/Grim	Dy	Cug/Wirked
18.75	5/3/20459	TWO	47759818	-10F 7107085	9	140	Social testing	Station to	700	Cinnel Or Inc.	Bry	Salany Sauch
10.4	5/29/2014/0004	TTO	477771.00	- NOT TO 1200	4	20	Gayling Direct	Districts to	Tex	Clear/Crim	Diy	Referry Emple
185	5/20/2014/090	TWO	477909625	-62F X2H29	9	200	Source Street	Station to	Yes	Clear Control	Bry	Relatey Executs
10.6	1/2/2014/028	TES	47.7927604	-07:FB-651	5	60)	Saying Direct	Station to	Tex	Charliff in	Diy	Selvey Execut
667	5/20/204/0009	7708	4778804	-107 725 MM	2	400	Gueing/feming	Station to	Yes	Citac/Grin	Gry	Relatey Excels
168	5/2/204 sids	TTO	47:773608	107.753(6)	121	30	Graning/Femilier	Stationary	Yes	Clear/Grim	0ry	Coat Winked
10.0	Symposium and the state of the	TEN	477704014	-107004000	2	60)	Contract entire	Station to	766	Winds	Dry	Stellary Emply
130	5/2/204845	TRO	4774064	-107/30402N	2	30	Goaling Down	Station to	Yes	Clear/Grim	One	Satist Flock
121	6/9/2010/1257	TEX	47748022	-00F3005000	2	90	Contract eating	58	766	Winds	Dry	face flich
122	6/9/2011/258	TTO	477/46776	- KET (KK) 5785	2	80	Graning/Femiling	Stations	- Sea	Winds	Dy	Same Stock
129	6/4/2041258	TTO	#7MERCE	-00F-00E5008	2	304	Station/Feeding	SW	766	Winds	by	face flech
124	6,6/2X4090	TICE	47.757MLW	- KEY MICHIG		179	Other	Station to	Tes.	Disap(Grim	Dy	Nex Suest
125	6,6/20149.36	TYP	47790428	- NOT THE SEED	- 1	908	Stationary	Stationaru	766	Winds	by	tiene franct
139	6,6/21 to 2	TER	47.7513404	-107 (807 1007	1	400	Cooling/Femilier	District to to	Yes	Winds	Dry	Teri Ress
sP_	5.56 335 1059	THE	4273069.2	-10769799	1		Stationery	Station to	766	Winds	. fry	Seri Ness
138	6/9/2001D-6	Other/Driving	Ø.7611095	-10770002	2	90	Contrag@embra		Tes.	Disay Sales	Dy	Earlied Remitte
120	610 2046.0	770	67746283	-10°790006		40	Station/Feating	Station to	766	Character (n)	5ry	State on Patricial
200	6/30/23/68 46	TES	4776902	-937.78C/2965	_	20	Distincts	Districts to	744	Charliff in	Div	State of the mine
501	610/204108	Order/Driving	417380	- N.P. 788 F.OR		40+	Walking	586	766	Cataly Control	Bry	tions tigan
10.7	6/32/2014/0014	Other/Drining	40300004	- 507 700 CFG		404	Contropfeeding	Stations ty	Tex	Clear/Crim	Dry	Desc Digest
99	6/10/204/2018	Other/Driving	6,8003.9	-93F 74E 2011		90	Gracing/Feating	Station to	766	Citta (Kin Inc	0ry	fiere figure
224	6/10/2015/00	773	47.787664	-937,707475.2	60	604	Contegfeeing		744	Charging Inc.	Dy	The sace Released
95	6/10/2014/2015	THE	477 4 18602	-60F 257 TROS	-	391	Swinney	Station ty	766	Cita (Grin)	0ry	Eachel Henring
Ø4	6/1/204808	7708	477506428	127.777 MBH		LL#	Stationary	Swinner	765	Winds	0v	Niev Guest
207	6/12/20/EGF	TTO	47,754798	-9773431	200	604	County Freship	Stations	764	Winds	Div	best Mobile
24	6/1J/204890	TTO	4775843	107.751.692	-	604	Graning/fembling	Switch	761	Winds	0v	leaft Mateur
29	6/10/204850	Other/Driving	47.7500 (25	-927 (BIZ7404	2	540	Spokes Street	Station to	766	Windy	by	fiere franci
140	6/11/2048/51	TTO	47755042	-107.751.1601	-	- 65	Graning/femiling	Oleric m to	761	Winds	0v	leaft Matter
191	6/12/2009 CB	Other/Driving	477500341	-977979	-	60	Walking	58	766	Winds	0v	Seri Seco
142	6/11/2004:00	TRE	4775-800	- 527 785 7500		207	Cooling/Femiliae	district to	- 100	Winds	Dv.	leak Mater
164	6/14/2009/F	Other/Driving	47:79(270)	- 507 7405427 - 507 746098	2	127	County Females	Station to Disting to	Tes.	Winds	Dy	Teri Sess
16	STATISTICS.	THOS	4774400	-10F /5459(F	174	404	Backway	WW	761	Winds		Marriage
146	6/1/23/01/08	Other/Driving	67,79,270.0	-327.7WOMM	87	400	Other	*	Tes.	Winds	Dry	Date Count
147	\$10 E84m12	YWO	67774007	107 755 3622	5	202	Swinney	Stations	766	Winds	By	Mexicon
140	6/10/284(282	TER	47.7900.60	-327 700-0000	40	400	Contract entire	Districts to	No.	Winds	Dy	leaft Malme
140	SUMMERS.	YWA	477999055	-50F 77M60F5	2	200	lineing/fewa	Stationary	700	Winds	By	Next See
200	WINDSHEET	TES	47779796.2	-907.711.0314	2	609	Stationary	Districts to	Tes	Winds	Dy	River Queen
151	910/204/00F4	TWO	47/779740	-90F 71110W		300	Social testing	WW	Yes	Winds	By	Mary Guerr
202	6/10/2014 (008	TER	477723903	-07 840419	1	11.7	Stationary		Tex	Charliff in	Dy	We do Suraner 20
69	6107204-0094	7704	47709464	474790		(790	Social testing	Station to	No.	Winds	Bry	We in Suramer 20
254	6/10/2014 (0.40)	TEE	4F77XIII.12	-37 ADWN	1	60	Saying Down	Station ty	Tee	Charliffe Inc	Diy	We de Suremen II
255	STREET, STREET	OthersBrising	401300000	-97.77704	3	200	Contract entire	58	No.	Winds	Div	Marriel Warner
28	6/10/2014 (208	TROP	47/290(E) 1	107 301 303	60	60	Graning/Femiline	Stations	701	Winds	0v	Teri New
207	6/30/2014:2215	TTO	47750KTH	-17.757.757	2	60	Contract eating	Stationary	766	Cloude	Muster	tions times
20	6/8/2010426	TTO	47.7535521	107.751.798	2	(D)	Souling Down	Owner or	Tes.	Clear/Grim	0v	Teri New
200	N/EP/ERADOR	Other/Driving	477 RMC7	-17 87558	2	60)	Description .	Stationary	766	Character (m.	. Day	Max Guest
90	6/29/2014/2018	Other/Driving	477/6/2016	-107 BHT 2704	2		Stationary	District to	- Str.	DisapiGrim	Dy	Teri Ness
3F3	WWINES.	Other/Driving	47710000	-107793833		.200	Socies/feeting	58	766	Charge to	5tv	Site and a Rebinsi
962	6/39/2003/8	Other/Driving	47.750760	-93.154.005	2	300	Sealing Down	Districts to	- Yes	Clear/Grim	Dv	Silvanon Relation
967	STANDARDS	Order/Driving	47754837	-10F 715 0251	1	60)	Section Francisco	Station to	766	Checkly in	5ry	Stereo e Patrico
384	6/3V234H-2	TER	67.75 CR 1	-927.727.2540	1		Stationary	District to ty	Tes.	Clear/Grim	Dy	Earlied the mine
95	6/39/2014:008	TER	67,750,041	- NF (N1118)	10	300	Society/series	Station to	768	Ches / Co th	5ty	boat Meteor
388	6/36/301000	Other/Drinking	47303683	- 927 779 9279		40	Cooling*redire	Districts to	- Ten	Design in	Dy	Test Ress
967	6/39/2014:0008	710	67.75WB02	- 10F-9014F912		80	Gracing/feeting	Station to	766	Chearling Inc.	. Dry	lated: Medical
360	6/36/2010/04		477900748	-07/14/03		65	Distinsiy	Districts to	Tes	Charging Inc	Dy	Teri Sess
90	6/39/2014/2015	YES	47/53/2	- 907-980-4967		303	Swinney	Stations ty	766	Cataly Carte	Bry	Eachel the ring
570	6/39/33/4/2014	THE	47770004	- SET STOCKES	-	65	Contegitenting	Station ty	764	Charging in	Diy	book Molece
971	6/3/2015	Order/Driving	47.7536404	- 60F 7203BK2	-	80	Gracing/Feeding	Swinwy	941	Cita (Grin	0ry	Alex Guest
27	6/2/2000	7708	47.7544035	- 67 759851	-	90	Contegit entire	Station to ty	764	Circle	Dy	tions (ment
650	6/2/2041/3	THOS	6779828	-107.754768	4	604	Gracing/Feeding	Switce to	765	Graty	0y	Teni Neus
94	6/3/2048-0	OtherShire	4775924	-909 7222910	14	65	Graning/Femilier	Station to	761	Grate	0v	leah Mater
275	62/2002	Other/Driving		-037.7579.007	1	500	Crossing/Feeding	Station to	744	Ciraly	0v	Max Guest
279	6/3/204867	TRA		- KSF 778 1207	100	604	Cooling/Femiline	Station to	761	Gradu	Dv.	Teri New
27	6/2/2004/37	7708	47730500	-937 7907007	,	24	Working	58	766	Circle	Div.	Seri Sees
27	6/20/2004/90	TES	4779.000	-107.71000.20	-	90	Sections:	direction or	765	Clouds	Ov.	Siera Deport
279	6/29/204009	Order/Driving		- 50F (FF0091)	2	100	Cracing/Feeting	Station to	766	Charles in	by	New Guest
80	4/20/204 KINS	Other/Driving	47,750,000	-127 (1712)29	-	-	Sections:	OW.	761	Clear/Grim	Div.	Micro Guard
901	6/20/2043048	Other/Driving	67.754657	- NF 894 M S	5	30	Souther Down	Station to	744	Chearling Inc	Dry.	Next Seed
W2	6/3/384 mos		47.7565803	-10770396	24	100	Contragification	District to	765	Design to	Dry	Miles Guest
90 214	6/3/354811	OrdentString	47 T T T T T T T T T T T T T T T T T T T	-507 (638 PBO4	-	(E)	Connects Senon	11	765	Character in	Dry.	Seat Mades
40.0	6/36/3384-02 6/36/3384-009	TRE	677 64 35	- 527 JOSEPH	-		Walter		700	Charging Inc	Div	Teriffeen
985				- 90F RM 1900	-	.500	Walking	5	765	On why	0ry	Mid-County

Mule Deer:

Seenatics.	Ormani Time	Toront Scot		Miles Semilaria Mari	No. Below	Distance in Countries and other	Animal Parket	Disease Plant	Proper?	Negther	Crossi Continue	Otenner
-		7704			4	Distance in Group Center (yels)						Mile Note
-	4/5/ 23A 1005 4/5/ 23A 1208	THE	47.79(30%) 47.79(346)	-17/700402	-	300	State any Walking		300	Charlton	Div.	String State
ź	477.238.1402	THE	477220	-127/170871	- 2	200	Savine Down	DW:	-	Charlton	Div	String State
4	WEND IN	Orbey Orbins	4770706	-1077890752	-	29	Guring/feeting	Stationery	160	Deuty	- Gry	No of fact
5	MOUTH 10	TROS	4 Phoese	-1777018W		10	layinglious	5	80	Charles	line.	Misch Nov
	WOYERSTED	Other/Driving	47,7900362	-127.738.290		900+	Statement	Stationary	Time	Windy	Div	You feet on
7	AND THE 22	TTOP	47,704.0	-17.791000	4	201	Res Rodge		Time .	Windy	Dig	Milark Ros
	VIOLENS 6	7708	4748793	3775461		360	Fax Avery	- 1	80	Windy	Gry.	No of facili
	AVEV ZBARGE	7706	4770710	-1742/79	9	238	Walking	NW.	Se-	County	Gry	Milete Nov
30	AND/EBASOES	TEXT	6.80630	-1790104	2	125	See Bretty	19	Ten	Windy	Div	Vip Relete
31	AVE/TRALIDS	TT04	45 MITTER	-1712284	100	34	Res. Avenue		Yes	Clear (Carles	0nu	No offset
52	AVEY ZIMALOSI	TTO	E-517243.	107/896737	- 58	300	Statis may	Stationery	'Mas	Windy	Gry.	Was Peters
27	ALC: THE TAX TO	TEST	617017W	-17 MONH	2	900	Our regified reg	Statement	-	Windy	One	You Peters
34	AND DIAL 200	7706	41,732,700	-17/EORT	-1	594	See Anter	NW.	54	Chestr	One	No effect
	ARVENIOR	7704	47,70800	13733647	- 2	90	Feet Average		'Wes	Windy	0ry	No offset
	VEVENIOR	7706	470840	-12/12013	4	100	Part Avery	86	Se.	Windy	Gry	Milata No.
27	AUG/EDALS OF	TTOR	47.7128812	-13°403861	-	516	Gos ing/feeding	-	-	Windy	Div	Mitaria Nov
	40/33434	TTOR	477226	-17/21/EXA	-	40	Part Relay		80	Clearly	Dy	Sys or Book
	4/2//24499	7706	47.70000F	-10° X0'8502	-	RO.	Successfronting.	Setimen	- None	ClearCarin	Sty	Viju Pelelo
2	4/3/Estacos	7700		-17,731014	- 1		Residence Sections	NW Texts and	-	CHARCOTT	Div	You Periods
2	4/2/21A0000	7708	47.77%396 47.7903946	-17.53HC2		20	2965 W.Y	Steinway	-	CHARLESTA	Div.	You Penkin
2	42/2M110 42/2M118	TTGB	47.76 MICT	107717948	7	900 200	Gueing/feeting.	Stations	-	Clear(Galler Windy	0y 0y	Vija Peletii Vija Peletii
2		TTOP	47.7EE04	-17.75000		900	Gozing/heating		Se.			
2	4/3/25AL257 4/3/25AL257	7708	47.748016B	-17 (2010)		56		State any Ser	-	Cwarform	Ow	You Read
2	4/37/2841.238	TTO	C 76460	-17 70mC6	-	*	State way for from	98	80	Windy	Dy	Greg Thairi
2	ASMERANCE.	7702	47,7577,200	-1774303	5	200	Gozing/heating	Stationery	Yes	Charlton	0v	No office
ž.	WWW.EBAGGEZ	7702	47.7517.702	-17 850.00	- 1	20	Walking.	Section and	-	Charleton	Sty.	the other
2	VOV ZBALLZ	TTO	47.75 mm	-17/25/10	2	107	Stationary	-	Ven	Charltain	Dry	Misek No
30	43V2M127	7702	47,760.2	-17.76601	1	28	Sea frame	*	No.	CharlGrim	9v	Spenifical
21	VIV.EM.20	7702	47/40/07	-13'546002		494	Gozing/outing		100	Cwedow	Ow	to other
22	AGVERAGE	1700	477400	-10"/8 2461	2	200	Laying flows	584	100	Cwectore	thy	Greg Year
33	WW/ TRANSFER	THE	47707207	-12 40000	4	310	Sen Avenue	*	No.	Charltrin	Dy	Gree Thair
34	4/2/ 2341 20E	TEST	47.75BH.22	-173000	3	379	Face Renny		No.	Clear(Calm	Dy	Mem Hour
25	WINDALDS	7706	6.001B	-127/EUT01A	1	20	Part Retty	NW	160	Charlery	. One	Skiller Son
36	4/2//23412.00	TTOR	C MILES	107/07/2014	- 1	200	Sea Avenue		No.	Clear(Caller	Ow	Seine Sta
37	42/2M32	TTOR	47,777,234	-127/2008 IA	- 4	900	Designation	Stations	View	ClearCate	Dry	Serboy Ros
38	WW/ENALOSE	7706	47.734ETN	-17/8/0942	10	200	Successfreeding.	Stationery	160	Charley	(fry	Skille for
39	WWW.MARACE	7709	47.7980772	-10° (MCRC)	1:	200	Gozing/heating.		1600	Charles	thy	Greg State
40	55V 23M 1262	TTCB	47,707046	-107.770.200	2	100	Our ing/feed ing.	1 1	Yes	Windy	One	Redney Was
4	MYZMERO	TTCE	47,763066	-107,770,220		10	fan Avey	100	No.	Clear(Caller	Dry	Retire No.
42:	SAVEMENTS.	7709	47,700041	-107,775,000		40)	Socieg/resting	Statement	160	Windy	5w	Skille Stor
40	100/2343402	TEXT	CT.TROB	-17/9-090		400	One implies into	w	Time .	Windy	Div	Sales Disc
44	SYSTEM OF	TTOP	47,7147000	-107.7007111	-4	298	Res Rody	w	No.	Charlton	Day	Mem those
	SYNTHALLA	7706	47.7571102	-107.705.201		40	Gracing/feeding	Stationery	1600	Cita (Corre	6ru	Referry Cou
	SWAME	TTOP	AP. POSSERIE	-17 /mes a	2	405	Walking		100	Windy	Matth	Since Fire
47	MACHINE	7702	67630	-17 ETHO	- 2	70	Our ing/freeling		- Ten	Charltrin	Div	Carle Mela
•	MATHEMA	7700	47.7WCBIG	-17/10/0X		200	Res Avery		-	Clear(Carin	Dry	Carly Wells
	514/20424	7708	47.7907507	10'07798			Part Restu	-	Se.	Cita of Galen	Dry.	Marti Now
90	514/2041451	TFOR.	4778255	-107304000	-	35	for the by	60	Se-	CHARGOVE	Ony	Mem Now
51	\$/0/23AL33	7706	#75#PUP	-17 EXCHAN		27	San Some	WW.	300	Charlton	One	Kayl Me le si
52	5/6/204129L	77(8	47.596262	-10°348708	-	40	Guzing/foreting	Stations	***	Windy	- One	Referry Cour
52	5/35/2341.202	TYON	47,944.3	-10'964863	-	10	Part Avenue	-	-	Windy	- One	Referentian
56	SCHOOL SEC	1102	47.79(380)	-17/1063	-	207	Our ing/feed ing	200	Se Se	Charles	Dry	Sales Too
	1/3/2340403	7702	67.79(2002) 67.79(296)	-1731063	-	200	Res Britis			Charles	Div.	Sales Titol
92	66/2M9:II	1107	47030	-12"46.2615 -12"46.254	-	50	Gueing/heating. fan Avery	Stationers	-	Windy	Gry Gry	Alex Guer Deve Engi
19	SAV ZIM DON	THE	47630	-17 MBCB		20	Statement	Statement	-	Windy		Desir from
20	6/10/EMIDE	OtherDaving	47.00.00	-177304		72	Our ing/feeding	Statement	-	Charleton	Div	Selection.
60	\$11/2041112	Other/Driving	4771380	1713913		140		Stationery	West	Windy		Tari Sea
61	NIVERSON	TTOP	47.70.23	-107/100012	-	362	Special rainy Special rains	5	No.	Windy	Dry Dry	Alex Gard
62	SALE EMODE	Otherstein	47,799080	-337.73MH4L	2	22	Talking	100	St.	Winds	Stre	Terr Sea
60	WINDAM.	TTOM	Ø 71/8/5	107320072	3	29	Walking	5	No.	Windy	0ny	Watefumme
64	445/2341.20	TEGS	@ XBCB	12,500,50	2	30	Part Home	98	No.	CitacGaire	Gry	WriteSumme
	WIN ERRORD	1700	47.735901	-17/200014	-	70	Part Retails	NE NE	No.	Cwedfare	Ow	Westware
	9/13/ E341.7.39	TTOR	47.73947	-1717948	- 1	8000	LayingDown	State way	84	Windy	Day	Western
67	SW/THER.	7704	677722000	1736018	- 6	140	Sea Avenue	- 5	60	Windy	- One	Summerlat
	SYSTY EDAM OF	7700	4774007	-17940472		200	Part Retty		1000	Windy	Dry	Rechel New
	SYSTY ERADIOSE	Other Dracing	47.856708	-17.5mg	4	26	See Switz		700	Wedy	Day	Learn Made
30	WENT TRANSPORT	7702	477016B	10740531	- 6	36	Bet Benz	w	View	Windy	- Dry	Rechal New
75	NW ZMALE	T102	47,745488	-10'90521	- 2	20	Part Rena	NW.	No.	Windy	- Ony	Rubel Non
72	NYSY ZIBAGOSE	TTOP	47.791729	-137.MIDN2	2	26	Statement		1900	Cwedfare	Matthe	Terr floor
77	6/18/23A0450	7709	67661	-107,7571602		26	Part Belly		1900	Cwedore	day	Terr floor
24	6/3/3MIGB	77(3)	47.7904753	-9790704		(36	Sea Avery	98	No.	Clear(Galler	Malify	Louis Main
75	6/3YZMIO3	TTOE	471203	12,130.00		307	Ren Avery	500	No.	Clear(Galler	Dry	Teri Nes
76	6/3/23A1058	TTOM	4F.70084	-1712896	-	200	for their	98	100	Charlen	. Dhe	Teri Nea
22	6/3/284122	7708	47.890892	-87900000	-4	21	Consents femin	-	View	Clear(Galler	Dhy	Louis Main
3	6/3/23A1290	TTOR	47,900236	-17/20064		20	Sea Avey	NW.	- View	ClearState	Dry	Teri Nes
79	NEVERNOR	TTOR	6.0850	-17 (0770)	- 1	404	Gozing/feeting	Nt.	***	Windy	Dry	Sec New
MO	6/39/23A0054	7707	er menue	-17 W P.DI		80	Part Belly		84	Charleton	thry	Learn Made
	4/3V ZBALLO	Other/Orlein	47.79502%	-937723648	-		See Average		- Ven	CharlCrim	Dy	Teri Nes
82	eppendia.	Other/Driving	47.546073	-10°7100171		1	Ren Avery		-	CharlGrim	Dry	Teri files
10	WWENDS	TYON	4774602	-13101364	-	155	Part Belley	- 5	80	Charlotte	thy	Less Made
н	4/3/2840036	Other/Orlean	4'3000	-12 (1380)	-	10	See Average		-	CharlCrim	- Dw	Alex Gue
	6/3/23463	7702	67966	-173040	_	7	Res Auto		Se.	Charlton	One	Alex Gue
	N/W/ESANSE	7702	47,7487794	-17/04/60	- 2	20	Part Away		80	Charles	. Dry	Deve the
g/	6/3/23ALOS	7702	47430	-17 810907	-		Part Reday		84	Death	- Dry	Akvilor
-	6/3/234138	7704	47.73mms	-17 274424	_	D	See Average	-	- 944	Clearly	Div	Teri Nes
	4/2/23AISS	Other/Orbring	42400	-17300HE	-	10	Ren Avery	- 11	No.	Clear(Crim	Matte	Teri Nes
10	NW BANKS	YYOM	-		- 1	28	Gueing/feeting		No.	Charlen	- Dry	Davis Evan
91	6/2/2046年	77(8	47.500.000	-17 SAM 2	_	D	Part Away		84	Clearly	Bry	Shamelat
82	4/2/23AM	Other/Orleins	67,7567,200	-137 (CUES)	-		Res Rolly		No.	Clearly	Malife	Teri New
60	NOVEMBER NOVEMBER	770A	47,12875	-17/200638	-	9	Part Away	95	Se.	Deaty	Matth	Direction
94.		770A	4F.755162	-17/20021		360	Part Away		160	Obsert Green	0ru	Pag No. 1 Mount

White-Tailed Deer:

			Loc	ation								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
1	4/2/2014 15:41	Other/Driving	47.7910277	-107.7396033	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:

bservation												
4	Date and Time	Transect Number	Latitude (degi	Longitude (deg)	No Anima's	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
	4/3/000419:25	Other/Driving	47.78748613	-007.7480046	10	320	Rankway	· · ·	Yes	Clear/Calm	Dry	Kelsey Nosh
2	4/1/000410:06	TTOL	47.7296095	-907.8902946	1	114	Bankway	N	Yes	Cloudy	Dity	Mile Kaytr
3	4/9/000410:29	TTOL	47.7507607	-107.901163	2	418	Crossed a Fence	N	Yes	Cloudy	Diry	Vija Pelekis
4	4/8/2004/9:00	Other/Driving	47.75036643	-507.796842	1	474	Grazing/Feeding	5	Yes	Cloudy	Dry	Ryan Rock
5	4/10/2014 10:26	TTOP	47.771/51/55	-007.790.7364	8	400	Grating Feeding	NW	Yes	Windy	Dry	GregTssens
6	4/10/2014 10:34	TTOS	47.76546769	-007.795802	1	700	Stationary	Stationary	No	Clear/Dains	Dry	Ryan Rock
7	4/10/2014 12:00	Other/Driving	47.769462	-907.7490297	4	300	Bankway		560	Windy	Dry	Puran Rock
	4/30/2004 15:34	TTDS	47.73368774	-507.7576969	1	400	Randovay	N	160	Windy	Dey	Ryan Rock
9	4/15/2014 9:20	TTOA	47.7506905	-007.0032905	5	507	Stationary	Stationary	No	Cloudy	Diry	Miksels Howle
39	4/15/2004 10:36	TTOS	47.69582342	-007.8695943	6	2400	Grating/Feeding	Stationary	Yes	Windy	Dry	Vija Pelekis
11	4/15/2004 10:37	TTOS	47.68415051	-007.8680008	9	800	Stationary	Stationary	Yes	Windy	Dey	Vija Pelekis
12	4/21/2014 10:44	TTOP	47.7709644	-007 6941 308	- 5	450	Grazing Feeding	W	Yes	Clear/Dains	Diry	Ryan Rock
13	4/21/20041250	TT06	47.7726729	-107.795347	1	116	Rankway	N	Yes	Windy	Dry	VijaPelekis
14	4/22/2004 10 19	TTOS	47.757072	-907.7549034	1	250	Walking	N	Yes	Clear/Cain	Dity	Mikaela Howle
15	4/22/2004 12:42	TTOP	47.7601992	-007.7985206	7	600	Graring/Feeding	Stationary	Yes	Windy	Dity	GregTseris
36	405/00041050	Other/Driving	47.74332368	-007 875 3975	2	2000	Graving/Feeding	Stationary	Yes	Clear/Carn	Dry	Powe-Rock
17	4/25/200411:05	TTO	47.73.44734	-007.0522406	- 5	340	Rankway	N	No	Clear/Calm	Dry	Greg Topinis
19	5/13/200410:39	TTOP	47.7562764	-507.7450367	- 1	367	Stationary	Stationary	Yes	Clear/Calm	Muddy	Katie Birch
19	5/13/2014 10 97	TTOS	47.75393.69	-907.7964944	1	229	Stationary	Stationary	Yes	Clear/Cain	Dry	Kelsey Knosh
20	5/13/00/41157	TTDS	47.7887943	-007.7989004	- 1	228	Stationary	Stationary	Yes	Clear/Cain	Dey	Kelsey Knosh
20	5/14/008412/05	7702	47.7553097	-507.090243	1	440	Gracing Feeding	· · · · · · · · · · · · · · · · · · ·	Yes	Clear/Cain	Dry	CraigVileland
22	5/21/000412:05	TIES	47.75541.90	-907.7257098	1	290	Bankwar	- ;	No	Clear/Cain	Dry	CraigVileland
29	5/25/2004 13:09	7706	47.7955269	-007.7280704	-	125	Randway	NE.	Yes	Clear/Calm	Dry	Kelsev Knosh
24	5/26/2014 10 43	TTG.	47.7868047	-007 8889442	-	400+		Stationary	Yes	Windy	Dry	
25	4-4	TTOS.			-	290	Graving Feeding			Windy		Kelsey Knosh
	6/4,000.419.46	TTOL	47.7506/57 47.750/649	-007.903.2944		400+	Laying Down	Stationary	Yes	Windy	Dey	
26 27	6/4/300413:46	TTG.	47.75364642	-507.903.2898 -507.903.2813		290	Stationary	Stationary	Yes	Windy	Muddy	
	6/4/200419:47	Other/Driving		-907 7978935	- :		Laying Down				Dry	Barrier and
28 29	6/10/2014 8:95	TT06	47.7239056 47.3680773	-007.7944296	- 1	209	Graving Feeding Randovay	Stationary	Yes	Clear/Carn Windy	Dry	Benefingert Alex Guest
30		TT04	47.7547294	-007.0097125	-	300		Stationary	No	Windy		Marin Survey 20
35	G/13/2014 8:46	1106				105	Walking	W			Dry	
	6/15/2014 8:46		47.7547512	-107.899790	-		GraingFeeding		No	Clear/Calm	Dry	Marin Summer 20
50	6/13/2004 10:02	1705	47.7292557	-507.6422967	-	400+	Stationary	Stationary	Yes	Clear/Dains	Dry	Marin Summer 20
33	6/13/00841918	TTOS	47.702541	-507.8959864	- 1	500	Stationary	Stationary	No	Clear/Carn	Dry	Marin Summer 20
34	6/13/00041319	TT04	47.7091087	-507.8384522	- 1	224	Randovay	w	No	Clear/Carn	Dry	Marin Summer 20
95	6/13/200414:00	TT04	47.7090900	-507.0396799	- 1	295	Rankway	5	No	Clear/Calm	Dry	Marin Summer 20
36	6/13/2014 14:12	1708	47.7122708	-007 8590900	-	100	Bankway	NE.	Yes	Clear/Caim	Dry	Marin Summer 20
37	6/13/202415:29	TTOS	47.736036	-507.8460446	- 2	500	Stationary	Stationary	Yes	Clear/Carn	Dry	Marin Summer 20
30	6/14/00541117	Other/Driving	47.7505221	-507.8640572	- 1	500	Stationary	Stationary	No	Clear/Calm	Dry	Merri II Warren
39	6/15/2014 9:52	7702	47.7506768	-507.6407054	1	901	Rankway	N	Yes	Windy	Dry	Rachel Herring
40	6/15/2004 11:29	TTOL	47.7401.9	-507.0859546		400+	Grazing/Feeding	N	Yes	Windy	Dry	Alex Guest
41	6/15/200412:39	TTOL	47.7506758	-007.8946390	1	200	Stationary	Stationary	Yes	Windy	Dry	Shannon Rabi na
42	6/18/2014 13:08	TTOS	47.7599709	-007,7571,069	1	95	Bankway	果	Yes	Cloudy	Dry	Benadrigert
43	6/20/2024 10:49	TT04	47.7034096	-507.0290949		110	Rankway	MY	Yes	Clear/Dain	Dey	Teri Ness
44	6/20/2004 14:33	TT04	47,7089769	-507.0356750	30	200	Walking	t t	Yes	Windy	Dry	Teri Ness
45	6/20/2004 14:35	7708	47,7091995	-007.843905		358	Strukway	w	Yes	Windy	Dity	Lesh Misbee
46	6/26/2014 8:29	Other/Driving	47.7500031	-907.8877706		430+	SanAway	MY	No	Clear/Carn	Dey	Leah Mabee
47	6/26/20241159	TTGS	47.3622592	-507.0456629	2	950	Rankway	W	No	Cloudy	Dey	Alex Guert
49	6/27/2004 14:00	TT04	47.7594642 47.3426967	-507.8051337	1	400+	Grating Feeding	NE.	Yes	Cloudy	Muddy	Benefigert

Coyote:

			lor	Location								
Observation	Date and Time	Transcot North or	Latitude (deg) Longitude (deg)		No Animole	Distance to Group Conton (cds)	Animal Dahadas	Discation of Tours	Dhata?	Manthau	Cround Conditions	Observer
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animais	Distance to Group Center (yds)	Animai Benavior	Direction of Travel	Photor	weather	Ground Conditions	Observer
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 Mellencam
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:

			Los	cation								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
1	5/11/2014 12:38	TT05	47.7721136	-107.7787494	1	0	Stationary	Stationary	Yes	Windy	Muddy	Matt Howe

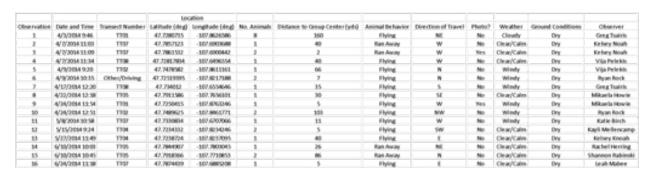
Black-Tailed Prairie Dog:

			Loc	ation								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
1	4/15/2014 10:43	TTOS	47.68411743	-107.8631873	2	156	Stationary	Stationary	Yes	Windy	Dry	Vija Pelekis
2	4/13/2014 14:06	TTOS	47.7941321	-107.6850037	- 6	200	Stationary	Stationary	Yes	Clear/Calm	Dvy	Greg Tsairis
3	4/21/2014 11:47	TT06	47,799885	-107.7240709	*	288	Stationary	Stationary	Yes	Clear/Calm	Dvy	Vija Pelekis
4	4/22/2004 10:57	TT05	47.7674862	-307,7555364	30	45	Stationary	Stationary	Yes	Clear/Calm	Dvy	Matt Howe
5	4/22/2014 13:22	TT05	47.7852077	-107,7901374	15	45	Stationary	Stationary	Yes	Windy	Dry	Mikaela Howle
6	4/34/2014 10:14	Other/Driving	47.73730229	-16F.8522611	33	500	Stationary	Stationary	Yes	Windy	Dry	Greg Tsairis
7	4/25/2004 13:43	Othe (/Driving	47,79609433	-107.8641709	2	125	Stationary	Stationary	No	Clear/Calm	Dyy	Pyan Rock
	5/8/2014 15:11	TTOP	47,7579418	-307.6896257	28	120	Stationary	Stationary	Yes	Windy	Dry	Katlie Birch
9	\$/11/2014 17:13	TT05	47.7859548	-107,7790909	- 1	0	Stationary	Stationary	No	Windy	Dry	Matt Howe
10	5/14/2014 12:54	Other/Driving	47,73752998	-107.8109685	30+	0	Stationary	Stationary	Yes	Clear/Calm	Dry	Kelsey Knoah
11	5/19/2014 12:26	TTOP	47,758104	-107.6870991	*	0	Stationary	Stationary	Yes	Cloudy	Dvy	Craig Wieland
12	5/21/2014 12:47	TT05	47.7554193	-107.7257038	35+	55	Stationary	Stationary	Yes	Clear/Calm	Dvy	Craig Wieland
13	5/21/2014 14:10	TT05	47,7554193	-367,7257038	25+	0	Stationary	Stationary	No	Clear/Calm	Dry	Craig Wieland
14	6/13/2014 13:51	TT05	47.7053526	-107.8626090	- 4	400	Stationary	Stationary	No	Clear/Calm	Dry	Marin Summer 205
15	6/13/2014 13:51	TTOS	47.7051628	-107.8626099	- 4	400	Stationary	Stationary	Yes	Clear/Calm	Dry	Marin Summer 205
16	6/9/2004 8:45	TTOP	47.7575203	-107.6852136	11	46	Stationary	Stationary	Yes	Cleary/Calim	Dvy	Alex Guest

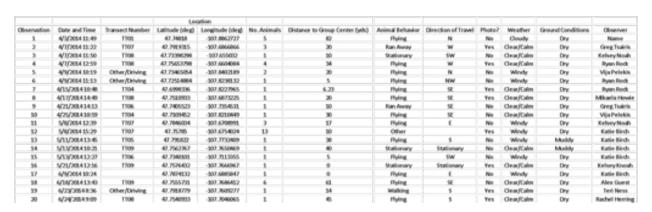
Desert Cottontail:

			Loc	ation								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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 Noah
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:



Greater Sage-Grouse:



Ring-Necked Pheasant:

			Loc	ation								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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	Drv	Craig Wieland

Bullsnake:

			Location									
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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	Drv	Teri Ness

Plains Gartersnake:

			Location									
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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	38	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	47.7550164	-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 201/
11	6/15/2014 10:01	TT02	47.7512015	-107.840611	1	1	Other	w	No	Windy	Dry	Rachel Herring

Prairie Rattle Snake:

			Location									
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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:

			Loc	Location								
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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 20

Greater Short-Horned Lizard:

			Location									
Observation	Date and Time	Transect Number	Latitude (deg)	Longitude (deg)	No. Animals	Distance to Group Center (yds)	Animal Behavior	Direction of Travel	Photo?	Weather	Ground Conditions	Observer
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	47.73023591	-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	47.98563	-107.978	Grouse	Bones and Skin	1	Vija Pelekis
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	47.73879	-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	47.73469	-107.842	Unkown	Feathers	1	Kelsey Knosh
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	47.73346	-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	Katie 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	Mikaela 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	47.75542	-107.726	Unkown	Feathers	1	Craig Wieland
6/18/2014 14:01	47.7566	-107.704	Bison	Just Bones	1	Tori 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	Pronghom	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	47.75846	-107.66	Western Meadowlark (i)	Slightly Deteriorated (carcass is opened)	1	Teri Ness