SURVEYS FOR THE STATE-ENDANGERED LINED SNAKE (*TROPIDOCLONION LINEATUM*) ALONG THE LOWER JAMES RIVER VALLEY

Final Report to
South Dakota Department of Game, Fish and Parks

Drew R. Davis, Ph.D.

School of Earth, Environmental, and Marine Sciences
University of Texas Rio Grande Valley
100 Marine Lab Drive, South Padre Island, TX 78597

Division of Amphibians and Reptiles, Department of Vertebrate Zoology
National Museum of Natural History, Smithsonian Institution,
P.O. Box 37012, MRC 162, Washington, DC 20560

e-mail: drew.davis@utrgv.edu

31 December 2018

SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS
WILDLIFE DIVERSITY SMALL GRANTS PROGRAM
2018 – Final Report

Project Title: Surveys for the state-endangered Lined Snake (*Tropidoclonion lineatum*) along the lower James River Valley

Personnel: Drew R. Davis, Ph.D.
Associate Research Scientist; School of Earth, Environmental, and Marine Sciences, University of Texas Rio Grande Valley
Research Collaborator; Division of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution

Period Covered: 15 April–31 December 2018

PROJECT DESCRIPTION

The Lined Snake (*Tropidoclonion lineatum*) is a small, state-endangered, terrestrial snake that is distributed across a large portion of the Great Plains. Populations of the Lined Snake span from southern Texas and reach their northern limit in southeastern South Dakota and southwestern Minnesota. Within South Dakota, the Lined Snake was thought to occur only in habitats along the Big Sioux River watershed (Backlund 2000; Ballinger et al. 2000; Kiesow 2006), until a specimen was collected near the James River in Hutchinson County on 20 October 2017 (Davis and Farkas 2018). This specimen represented the most northwestern occurrence for this species, provided evidence that populations of Lined Snakes exist outside of the Big Sioux River watershed, suggesting that the distribution of Lined Snakes in South Dakota may be greater than expected. To better understand the distribution and occurrence of Lined Snakes in southeastern South Dakota, I conducted a series of targeted surveys for Lined Snakes along the lower James River Valley. Additionally, information on all other species of amphibians and reptiles encountered, including several species tracked by the Natural Heritage Program (Blanchard's Cricket Frog, False Map Turtle, Spiny Softshell, Western Foxsnake, Red-bellied Snake) was also collected.

PROJECT NEED

This project addresses two important needs highlighted in both Smith and Quinn (2012) and the most recent T&E species status review: 1) to gain additional information on the complete range of Lined Snakes in South Dakota, and 2) determine the status and connectivity of populations. The Lined Snake is one of the rarest species of snakes in South Dakota, with limited occurrence data, despite numerous survey efforts (Backlund 2000; SEH 2002; Fogell 2003; Jessen 2002, 2003, 2005; Davis 2014). Given the cryptic nature of this species, relatively few voucher specimens have been collected in South Dakota (n = 28 as of 1 February 2018; DRD, unpubl. data), with only two individuals collected from 2005–2017 and fewer than 10 unique observations in the Natural Heritage Database (C. Heimerl, pers. comm.). Continued surveys for Lined Snakes are needed in order to fully understand its distribution in South Dakota. Should information from this survey suggest that Lined Snakes are abundant along the James River,

there may be potential for downgrading their listed status, which would allow for limited resources to be allocated to more vulnerable species.

Current understanding of the distributions of amphibians and reptiles in South Dakota is limited compared to that of many other vertebrate groups, which also was reported by Smith and Quinn (2012). Though this project was primarily focused on Lined Snakes, additional information was collected on all other amphibians and reptiles encountered, including five heritage-list species. The generation of new species observations allows for a more current understanding of species distributions in South Dakota, which is especially important given that approximately 73% of amphibian and reptile records are more than 20 years old (DRD, unpubl. data). A thorough understanding of the current distribution of species is important as it is critical to understanding how factors such as development and land-use change threaten South Dakota's natural heritage.

PROJECT OBJECTIVES

Objective 1—To conduct surveys for the state-endangered Lined Snake (*Tropidoclonion lineatum*) along the lower James River Valley.

Objective 2—To generate occurrence records for amphibians and reptiles, particularly heritage-list species, along the lower James River Valley.

PROJECT METHODS

Study Area: The need for these surveys arose when I collected an adult Lined Snake near the James River, Hutchinson County on 20 October 2017 (DRD 4468), which suggested that this species occurs outside of the Big Sioux River watershed. Lined Snakes reach their northern range limit in South Dakota (latitude = approximately 43.7°N) and likely do not occur along the entire length of the James River. Surveys targeted suitable habitats along the lower reach of the James River, including the counties of Hanson, Hutchinson, and Yankton. Within these counties, public lands such as Game Production Areas (GPAs), Waterfowl Production Areas (WPAs), Walk-in Areas (WIAs), and Conservation Reserve Enhancement Program (CREP), as well as private lands, were targeted and surveyed for Lined Snakes as outlined below.

Survey Methods: Three survey methods were used during this study: 1) visual encounter surveys, 2) artificial cover boards, and 3) road surveys. Visual encounter surveys included visiting suitable habitats, looking for active amphibians and reptiles, and flipping over existing cover objects such as rocks, woody debris, and trash (e.g., boards, carpet, tin). To supplement visual encounter surveys, I also used tarpaper (ca. 1-m^2 black, lightweight, construction material) that I placed along south-facing hillsides and woodland edges. These cover objects serve as additional refuge habitat for Lined Snakes, other reptiles, and occasionally amphibians. Cover objects were checked during visual encounter surveys and opportunistically throughout the survey periods. In evenings, road surveys were conducted to look for Lined Snakes on the road. Roads function as relatively clear transects running through potential habitat where active or thermoregulating snakes can be easily detected.

Specimen Collection: Any Lined Snake encountered was photographed, measured (mass, SVL, tail length), sexed, and tail-clipped to collect a non-destructive tissue sample. After processing, snakes were either released at the site of capture or were collected as a representative voucher specimen. Voucher specimens of all other amphibians and reptiles encountered were collected during surveys. During road surveys, numerous road-killed amphibians and reptiles were encountered. Road-killed individuals were either collected and prepared as a voucher specimen

or photographed and submitted as an observation to either HerpMapper (HM) or iNaturalist (iNat), two citizen-science reporting platforms. Collection of voucher specimens (usually one individual per species per site) serves as an important tool in documenting species occurrence through space and time and has been a major component of field surveys conducted during my previous research in South Dakota. Locality (GPS, descriptive location), date, and time were recorded when any amphibian or reptile was encountered.

Citizen Science Observations: The recently launched Amphibians and Reptiles of South Dakota website (*www.sdherps.org*) serves as an online portal for information about native species but also encourages the submission of photographic observations by the public. In 2017, there was success in recruiting individuals to submit photos of amphibians and reptiles, including state-listed species. For example, photos of the state-threatened Eastern Hog-nosed Snake submitted by the public report localities for this species over 300 km from the nearest known occurrence of this species in southeastern South Dakota (Davis 2018a). In 2018, I used social media to provide information on the ecology and conservation of Lined Snakes and encouraged individuals to submit their sightings of Lined Snakes along with other South Dakota species.

PROJECT TIMETABLE

Date	Milestones
31 March 2018	Notification of award
April–May 2018	Raise awareness of project through social media advertising; encourage submission of photographic observations of Lined Snakes (and other species)
25 April–4 May 2018	Survey period #1
1 June 2018	Submit interim report
28 September–5 October 2018	Survey period #2
31 December 2018	Submit final report

RESULTS

Surveys: I conducted surveys for Lined Snakes (*Tropidoclonion lineatum*) from 25 April–4 May 2018 and 28 September–5 October 2018. These dates were chosen to capture the first warm days of the year corresponding with spring emergence from hibernacula and the last warm days of the year (sometimes called "Indian Summer") before snakes enter hibernacula for the winter. During the spring survey period, ambient high temperatures ranged from 16.7–30°C (mean = 20.2°C), while during the fall survey period, ambient high temperatures ranged from 4.4–31.1°C (mean = 13.1°C). Overcast days occurred throughout most of the fall survey trip, with the sun only emerging in the afternoon of 2 October 2018 and throughout the day on 3 October 2018, which corresponded with most of the detections of amphibians and reptiles during this trip (Appendix 1, 2). Flooding was extensive along the James River during the spring survey period due to recent snowmelt and many parcels of land occurring in the floodplain were not surveyed (Figure 1A, 1B). As a result, efforts were restricted to areas near, but just above or beyond the floodplain of the James River as well as drainages that flow into the James River (e.g., Wolf Creek). Sites along the James River that I believed to be suitable Lined Snake habitat were limited in both

Yankton and Hanson counties, and as a result, I primarily focused on sites within Hutchinson County.

A total of 10 sites were visited over the spring and fall survey periods, with some sites surveyed multiple times each survey period. Sites surveyed included Dulcie Thompson GPA (Yankton County), Beaver Lake GPA (Yankton County), Happy Home Farm GPA (Yankton County), Walz GPA (Hutchinson County), Solay GPA (Hutchinson County), Dimock Lake WAA (Hutchinson County), Mayer WPA (Hutchinson County), Hogrefe GPA (Hutchinson County), CREP lands at the junction of County Road 9 and County Road 11 (Hutchinson County), and private property along County Road 11, east of Milltown (Hutchinson County; Figure 1C–F). When private property was surveyed, landowner permission was granted. At each site, I actively searched for Lined Snakes by seeking out natural and artificial cover objects (e.g., logs, rocks, discarded trash, building materials). Cover objects were flipped over to search for any snakes that were located underneath them. All objects were flipped back over after searching underneath them to maintain habitat quality. A total of six Lined Snakes were found alive under cover objects during the spring survey period (Table 1; see *Specimen Collection* below), but no live Lined Snakes were found under cover objects during the fall survey period.

To increase the amount of cover objects available, I placed tarpaper at most of these sites (excluding the CREP property). When available, I placed tarpaper on south-facing hillsides (to maximize sun exposure) or near potential overwintering habitat (e.g., mammal burrows). Tarpaper has been used with success to survey for Lined Snakes and other small species of snakes in Kansas (G. Sievert, pers. comm.). Recent placement of tarpaper limited its use as habitat by snakes during the spring survey period. During the fall survey period, few amphibians or reptiles were collected under tarpaper, a likely consequence of cool temperatures and overcast days during the survey period.

In addition to visual encounter surveys and actively searching under cover objects, I also conducted road surveys for Lined Snakes. A total of 840 miles were driven during the spring survey period and 730 miles were driven during the fall survey period in Yankton, Hutchinson, and Hanson counties. Roads driven included both paved asphalt roads and gravel roads. Most habitat surrounding paved roads was cropland (Figure 1G–H), though most gravel roads driven followed bluffs along the James River and transected habitats I perceived as suitable for Lined Snakes. During the spring survey period, two Lined Snakes were found dead on asphalt roads, and during the fall survey period, eight Lined Snakes were found dead on asphalt roads, including SD Hwy 44 (Table 1; see *Specimen Collection* below). No Lined Snakes were found dead on gravel roads, though numerous Red-bellied Snakes (*Storeria occipitomaculata*) were found on gravel roads during road surveys (Appendix 1, 2). Cropland was adjacent to all sites where Lined Snakes were found dead on the road, but less-developed rangelands or grasslands (typically along draws or hillsides) were also in close proximity to these sites, which may reflect relict habitat still occupied by this species (Figures 1G–H, 2).

Specimen Collection: A total of 16 Lined Snakes were detected during the spring (n = 8) and fall (n = 8) survey periods, all from Hutchinson County (Table 1; Figure 2; Appendix 1). Six live specimens were found during the spring survey from private property along a small area at the base of hillsides on the east side of the James River (Figure 3; localities 1, 2, 4–6). This site contained derelict structures, with abundant artificial cover objects (e.g., tin, railroad ties, tires; Figure 1C–F), under which all six specimens were found. Included with these live specimens was a juvenile (DRD 4704; Figure 3C), likely born in 2017, suggesting that this is a reproducing population of Lined Snakes. I collected photographs, measurements, and tissue samples (tail

clips) from four adult individuals (DRD 4702, 4703, 4706, 4707) before releasing them at the site of capture (Table 1). Two individuals (DRD 4704, 4705), both males, were collected as voucher specimens from this site (Table 1).

The remaining ten specimens were collected dead on the road: two from the spring survey period (DRD 4699, 4724) and all eight from the fall survey period (DRD 5062–5069; Table 1; Figure 2; Appendix 1). All Lined Snakes found dead were on asphalt roads, including SD Hwy 44. Individuals were found on both sides of the James River, though most were from the east side of the river (Figure 2). The two individuals (DRD 5068, 5069) found dead on SD Hwy 44 were likely killed the day(s) prior to 3 October 2018 and were heavily damaged, though still identifiable as Lined Snakes. All Lined Snakes found dead on the road were adult individuals. Complete information on all Lined Snakes found during surveys can be found in Table 1 and Appendix 1.

During surveys, a total of 115 voucher specimens (spring: n = 63; fall: n = 52) from 16 species of amphibians and reptiles were collected (Appendix 1; Figures 4, 5). Of these 16 species, there were seven species of amphibians (Great Plains Toad [*Anaxyrus cognatus*], Woodhouse's Toad [*A. woodhousii*], Blanchard's Cricket Frog [*Acris blanchardi*], Boreal Chorus Frog [*Pseudacris maculata*], Northern Leopard Frog [*Rana pipiens*], Plains Spadefoot [*Spea bombifrons*], Western Tiger Salamander [*Ambystoma mavortium*]; Figures 4, 5) and nine species of reptiles (Snapping Turtle [*Chelydra serpentina*], Painted Turtle [*Chrysemys picta*], Prairie Skink [*Plestiodon septentrionalis*], Western Foxsnake [*Pantherophis ramspotti*], Gophersnake [*Pituophis catenifer*], Red-bellied Snake [*Storeria occipitomaculata*], Plains Gartersnake [*Thamnophis radix*], Common Gartersnake [*Thamnophis sirtalis*], Lined Snake; Figures 3, 5). Four of these 16 species are included on the heritage-list: Blanchard's Cricket Frog, Western Foxsnake, Red-bellied Snake, and Lined Snake. Surprisingly, only a single Western Foxsnake was encountered during fieldwork: a young adult found dead on the road in Lesterville, Yankton County (DRD 5095). Further, despite numerous Northern Leopard Frogs being detected during visual encounter and road surveys (Appendix 1, 2), no Plains Leopard Frogs were detected during either survey period.

In addition to voucher specimens, I collected photographic vouchers of amphibians and reptiles (Appendix 2). A total of 141 photographic observations (spring: n = 74; fall: n = 67) of eleven species of amphibians and reptiles, which includes three species of amphibians (Woodhouse's Toad, Northern Leopard Frog, Plains Spadefoot) and seven species of reptiles (Painted Turtle, False Map Turtle [*Graptemys pseudogeographica*], Spiny Softshell [*Apalone spinifera*], Prairie Skink, Plains Hog-nosed Snake [*Heterodon nasicus*], Red-bellied Snake, Plains Gartersnake, Common Gartersnake; Appendix 2). A portion of the James River, with numerous submerged trees providing basking substrate for turtles, flows alongside County Road 11 in Hutchinson County just north of SD Hwy 44. As I would drive this stretch of road looking for Lined Snakes, I was able to opportunistically photograph turtles basking in the river. Included in these photographic vouchers are two heritage-list species: Spiny Softshell and False Map Turtle. Both the records of Spiny Softshell and False Map Turtle are new county level distributional records (Davis 2018b); however, the range extension of the False Map Turtle into Hutchinson County is noteworthy, as all verifiable records of this species are restricted to localities along the Missouri River or tributaries close to the Missouri River. Further, I recorded two observations of False Map Turtles, a male (HM 219275) and a female (HM 219274), which may suggest that a population of turtles occurs in the James River from the Missouri River to north-central Hutchinson County. Future survey efforts should aim to understand if the False

Map Turtle occurs in the James River further upriver of the locality where these two individuals were observed.

Data on both voucher specimens and photographic vouchers were uploaded to the Amphibians and Reptiles of South Dakota website (*www.sdherps.org*) on 8 May 2018 and 18 October 2018. Most of the species detected during surveys were previously represented by recent vouchered specimens or photographs, most as recent as 2017 (Davis and Farkas 2018). However, only a single record of Prairie Skink in Hutchinson County (from 1959; University of Nebraska State Museum [UNSM] 16598) existed prior to this survey, and I generated an additional 14 records of Prairie Skink from the county (Appendix 1, 2). Additionally, an observation of a Plains Hog-nosed Snake during the fall survey period is only the second observation of this species in Hutchinson County (previous specimen collected in 2005; James Ford Bell Museum, University of Minnesota [JFBM] 19036) and is one of only three known records of this species in the eastern half of the state in in the past 40 years. Blanchard's Cricket Frogs are previously known from both Hanson and Hutchinson County, though contemporary records for Hanson County are lacking with the most recent record from 1972 (UNSM 19421, 19429, 19432). The collection of an adult Blanchard's Cricket Frog from Walz GPA, Hutchinson County (DRD 5056) represents the furthest north locality where I have collected this species in South Dakota despite several trips to the James River in Hanson County.

This fieldwork has also helped to increase what is known about the distribution and occurrence of amphibians and reptiles in Hutchinson County. Prior to 2017 there were 32 records of amphibians and reptiles from Hutchinson County, exceeding the total number of records for 17 other counties (49th out of 66 counties; 27th percentile; Figure 6A). After collecting trips in fall 2017, during which I first collected a Lined Snake from Hutchinson County, another 41 records were generated totaling 73 records (37th out of 66 counties; 45th percentile; Figure 6B). With the addition of records from the 2018 spring and fall survey trips, there are now 301 records of amphibians and reptiles from Hutchinson County (12th out of 66 counties; 83rd percentile; Figure 6C). Despite only 16 of these 229 new records for Hutchinson County being Lined Snakes, the drastic increase in number of non-target taxa records highlights the importance of opportunistic collections, which has clearly increased our understanding of amphibians and reptiles in both Hutchinson County and the region.

Resulting Publications: In total, seven new county records of seven species were collected during the survey periods. There were six species with new distributional records from Hutchinson County (Great Plains Toad [DRD 4720, 4721], Woodhouse's Toad [DRD 4722], Snapping Turtle [DRD 4681, 5101], False Map Turtle [HM 219274, 219275], Spiny Softshell [HM 219267, 219276], Gophersnake [DRD 5083]; Appendix 1, 2) and one new species for Hanson County (Red-bellied Snake [DRD 4725]; Appendix 1). A short manuscript detailing these records has been published in *Herpetological Review* (Davis 2018b). An additional result from fieldwork is a natural history note describing copulation in Red-bellied Snakes on 28 April 2018. This represents the first account of copulation of Red-bellied Snakes in South Dakota, which is likely one of the earliest dates reported for this species (Davis, in press).

Citizen Science Engagement and Observations: On 6 May 2018, I created a post on the Amphibians and Reptiles of South Dakota Facebook page (*www.facebook.com/sdherps*) documenting the discovery of additional Lined Snakes along the James River (Figure 7). This post had a reach of over 14,000 individuals (through shares, comments, likes) and had over 2,900 post clicks from the Facebook community. This post has had the largest reach out of all previous posts. On 11 May 2018 and 11 October 2018, additional posts were created, highlighting results

from recent fieldwork. Thus far in 2018, a single observation of a Lined Snake (HM 243002), an adult found on 30 October 2018 in Minnehaha County during construction efforts, has been submitted to *www.sdherps.org*. Though previously documented from Minnehaha County, this observation helps better map species occurrence and continued existence in the region. Further, posting to Facebook has helped to generate 18 observations of heritage-list species: four observations of Cope's Gray Treefrog (HM 234931 [Clay Co.], 236302 [Yankton Co.], 236426 [Day Co.], 237516 [Union Co.]), one observation of Ornate Box Turtle (HM 236322 [Pennington Co.]), one observation of Smooth Softshell (HM 230232 [Gregory Co.]), one observation of Spiny Softshell (HM 232191 [Grant Co.]), one observation of Smooth Greensnake (HM 236425 [Day Co.]), four observations of Western Foxsnake (HM 219810 [Lincoln Co.], 234227 [Gregory Co.], 237515 [Clay Co.], 238701 [Minnehaha Co.]), and six observations of Red-bellied Snake (HM 219283 [Roberts Co.], 219836 [Hutchinson Co.], 236130 [Day Co.], 236912 [Codington Co.], 240307 [Roberts Co.], 240694 [Minnehaha Co.]). I have created a 'Current Research' page on the Amphibians and Reptiles of South Dakota website (*www.sdherps.org/research*) which highlights these survey efforts for Lined Snakes along the James River. I will continue to post on the Facebook page, highlighting recent work, disseminating information on Lined Snakes and other species, and to encourage South Dakotans to submit their observations of amphibians and reptiles. In addition to social media, I also wrote an article for *South Dakota Conservation Digest* (Davis 2018c), introducing efforts to better understand the distributions of amphibians and reptiles in the state and to encourage citizen science participation. During the spring survey period, I notified Thea Ryan (The Outdoor Campus Sioux Falls) of my recent success of finding Lined Snakes and she posted about these snakes on their social media accounts, further generating interest in these snakes (Figure 8). I continue to work with The Outdoor Campus Sioux Falls and staff to help spread information about amphibians and reptiles in the state and assisted them with the summer 2018 program "Reptiles and Amphibians of South Dakota" that encourages citizen science participation. Though the results from efforts to encourage the public to submit observations of amphibians and reptiles are difficult to track, this initiative remains important and should be continued in various forms.

CONCLUSIONS

Through repeated survey trips along the lower James River Valley, 16 records of Lined Snakes from 14 individual localities have been generated, helping to better understand the distribution of this species in South Dakota. This work has expanded from a single collection of a Lined Snake from Hutchinson County in October 2017 to documenting a much more widespread, though likely isolated, population of Lined Snakes near Milltown, Hutchinson County, South Dakota. Attempts to locate additional individuals from other regions along the James River were unsuccessful, suggesting that this population of Lined Snakes may be limited in in their distribution. With these 16 records, as well as one photographic observation submitted from Minnehaha County, the total number of verifiable records of Lined Snakes from South Dakota increases from 28 to 45 (60.7% increase; DRD unpubl. data). Initial data suggests that this is a reproducing population and that road mortality may be a major threat to individuals, given that 10 of the 16 encountered individuals were dead on the road. It remains unclear if there is gene flow between this population of Lined Snakes and the previously recognized population along the Big Sioux River. Future work should continue to strive to better understand the distribution of this species along the James River and survey for other populations along other drainages,

such as along the Vermillion River. Should populations be discovered along the Vermillion River, gene flow among these three drainages in southeastern South Dakota may be plausible. In addition to detections of Lined Snakes, opportunistic collections of other non-target amphibian and reptile species, including heritage- and state-listed species, such as Blanchard's Cricket Frogs, False Map Turtles, Spiny Softshells, and Red-bellied Snakes, has helped better document species occurrence in the region.

REFERENCES OR CITATIONS

Backlund D. 2000. The lined snake. *South Dakota Conservation Digest* 67:22–23.

Ballinger RE, Meeker JW, Thies M. 2000. A checklist and distribution maps of the amphibians and reptiles of South Dakota. *Transactions of the Nebraska Academy of Sciences* 26:29–46.

Davis DR. 2014. Detection of the lined snake (*Tropidoclonion lineatum*) in the Cactus Hills area of South Dakota. Report to HDR, Inc. 15 pp.

Davis DR. 2018a. Geographic distribution: USA, South Dakota, Brule Co.: *Heterodon platirhinos* (eastern hog-nosed snake). *Herpetological Review* 49:76.

Davis DR. 2018b. Distributional records of amphibians and reptiles from the lower James River Valley, South Dakota, USA. *Herpetological Review* 49:720–721.

Davis DR. 2018c. Mapping amphibians and reptiles in South Dakota. *South Dakota Conservation Digest* 85:34–37.

Davis DR. In press. Red-bellied snake (*Storeria occipitomaculata*) copulation in South Dakota. *The Prairie Naturalist*.

Davis DR, Farkas JK. 2018. New county records of amphibians and reptiles from South Dakota, USA from 2017. *Herpetological Review* 49:288–295.

Fogell DD. 2003. Amphibian and reptile surveys of southeast South Dakota with an emphasis on the state-endangered lined snake (*Tropidoclonian lineatum*). Report to South Dakota Game, Fish and Parks. 23 pp.

Jessen T. 2002. Blanding's turtle and herpetology survey of northeastern South Dakota. Report to South Dakota Game, Fish and Parks. 6 pp.

Jessen T. 2003. A survey of the herpetofauna of the Big Sioux River Valley. Report to South Dakota Game, Fish and Parks. 38 pp.

Jessen T. 2005. Herpetological survey of eastern South Dakota. Report to South Dakota Game, Fish and Parks. 44 pp.

Kiesow AM. 2006. Field Guide to the Amphibians and Reptiles of South Dakota. South Dakota Department of Game, Fish and Parks, Pierre, South Dakota. 178 pp.

[SEH] Short Elliot Hendrickson Inc. 2002. Faunal survey for rare, threatened, or endangered species with special emphasis on the lined snake (*Tropidoclonion lineatum*). Sioux Falls East Side Corridor Environmental Assessment. SEH No. A-SIOUX0104.00. 38 pp.

Smith BE, Quinn H. 2012. Threats, management, and suggested harvest and collection policy for herpetofauna of South Dakota. Report to South Dakota Game, Fish and Parks (#T-57-R-1). 308 pp.

Table 1. Lined Snakes (*Tropidoclonion lineatum*) encountered during spring (25 April–4 May 2018) and fall (28 September–5 October 2018) surveys from Hutchinson County, South Dakota. Site numbers correspond to locations in Figure 2. Acronyms used: DRD = Drew R. Davis Field Series; TNHC = Biodiversity Collections, University of Texas at Austin; M = male; F = female; WB = whole body; T = tissue. Additional information can be found in Appendix 1.

Site #	DRD #	TNHC #	Locality	Latitude	Longitude	Sex	Date Collected	Time Collected	Voucher Type
1	4702	111574	E side of Co Rd 11, ca. 0.4 rd km N jct 273rd St (Keiper Rd); near barn	43.42972	-97.79432	F	28 April	1439hrs	T-tail
2	4703	111430	E side of Co Rd 11, ca. 0.4 rd km N jct 273rd St (Keiper Rd); near barn	43.43005	-97.79426	F	28 April	1815hrs	T-tail
3	4699	111535	421st Ave (Keiper Rd), ca. 0.2 rd km N jct 273rd St	43.43038	-97.77872	F	30 April	1549hrs	WB
4	4704	111536	hillside E of Co Rd 11, ca. 0.5 rd km N jct 273rd St (Keiper Rd)	43.43045	-97.79340	M	30 April	1705hrs	WB
5	4705	111537	hillside E of Co Rd 11, ca. 0.5 rd km N jct 273rd St (Keiper Rd)	43.43043	-97.79379	M	1 May	0957hrs	WB
5	4706	111431	hillside E of Co Rd 11, ca. 0.5 rd km N jct 273rd St (Keiper Rd)	43.43043	-97.79379	M	1 May	0957hrs	T-tail
6	4707	111434	hillside E of Co Rd 11, ca. 0.5 rd km N jct 273rd St (Keiper Rd)	43.43042	-97.79380	F	1 May	1001hrs	T-tail
7	4724	111538	418th Ave, ca. 0.3 rd km N jct Keiper Rd	43.42413	-97.83804	F	2 May	1535hrs	WB
8	5062	111758	272nd St, ca. 0.3 rd km W jct 422nd Ave	43.44320	-97.76244	F	3 October	1241hrs	WB
8	5063	111759	272nd St, ca. 0.3 rd km W jct 422nd Ave	43.44320	-97.76244	M	3 October	1241hrs	WB
9	5064	111760	421st Ave, ca. 0.9 rd km N jct 272nd St	43.45087	-97.77903	M	3 October	1338hrs	WB
10	5065	111761	421st Ave, ca. 0.4 rd km N jct 273rd St	43.43223	-97.77884	M	3 October	1407hrs	WB
11	5066	111762	273rd St (Keiper Rd), ca. 0.5 rd km E jct Co Rd 11	43.42793	-97.78735	M	3 October	1410hrs	WB
12	5067	111763	418th St, ca. 0.1 rd km N jct 273rd St	43.42692	-97.83805	-	3 October	1420hrs	WB
13	5068	111755	SD Hwy 44 (276th St), ca. 0.5 rd km E jct 422nd Ave	43.38605	-97.75151	-	3 October	1607hrs	WB
14	5069	111756	SD Hwy 44 (276th St), ca. 0.3 rd km E jct 422nd Ave	43.38594	-97.75397	-	3 October	1612hrs	WB

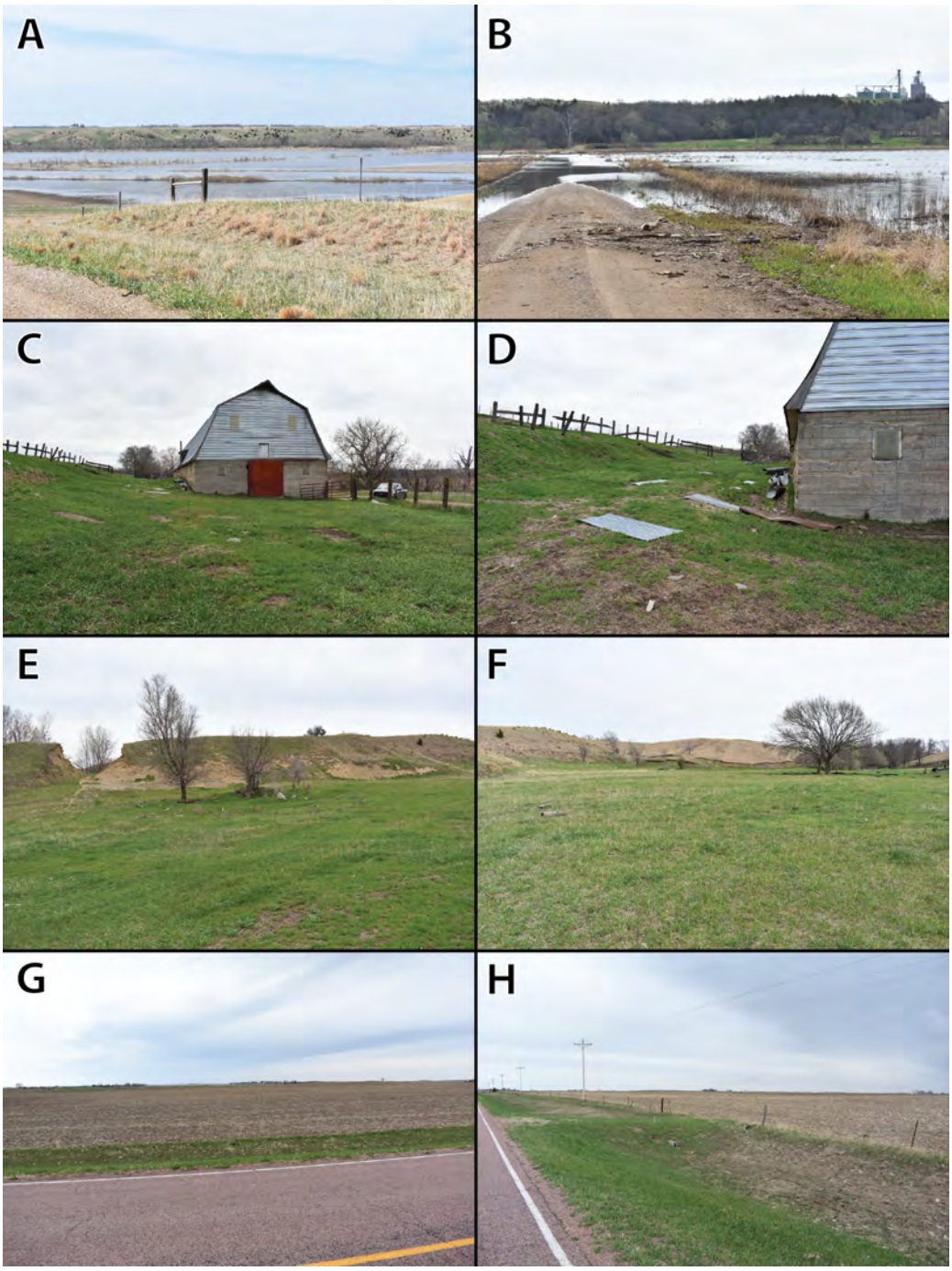

Figure 1. Surveyed sites and habitats surveyed for Lined Snakes from 25 April–4 May 2018. A) flooding along the James River (427th Rd, facing southwest); B) flooding along the James River (268th St, facing southeast); C) abandoned barn (private property along County Road 11); D) cover objects (private property along County Road 11); E) pasture land (private property along County Road 11); F) cover objects in pasture (private property along County Road 11); G) cropland adjacent to where a Lined Snake (DRD 4724) was collected (facing west); H) cropland adjacent to where a Lined Snake (DRD 4724) was collected (facing northeast). All photos by DRD.

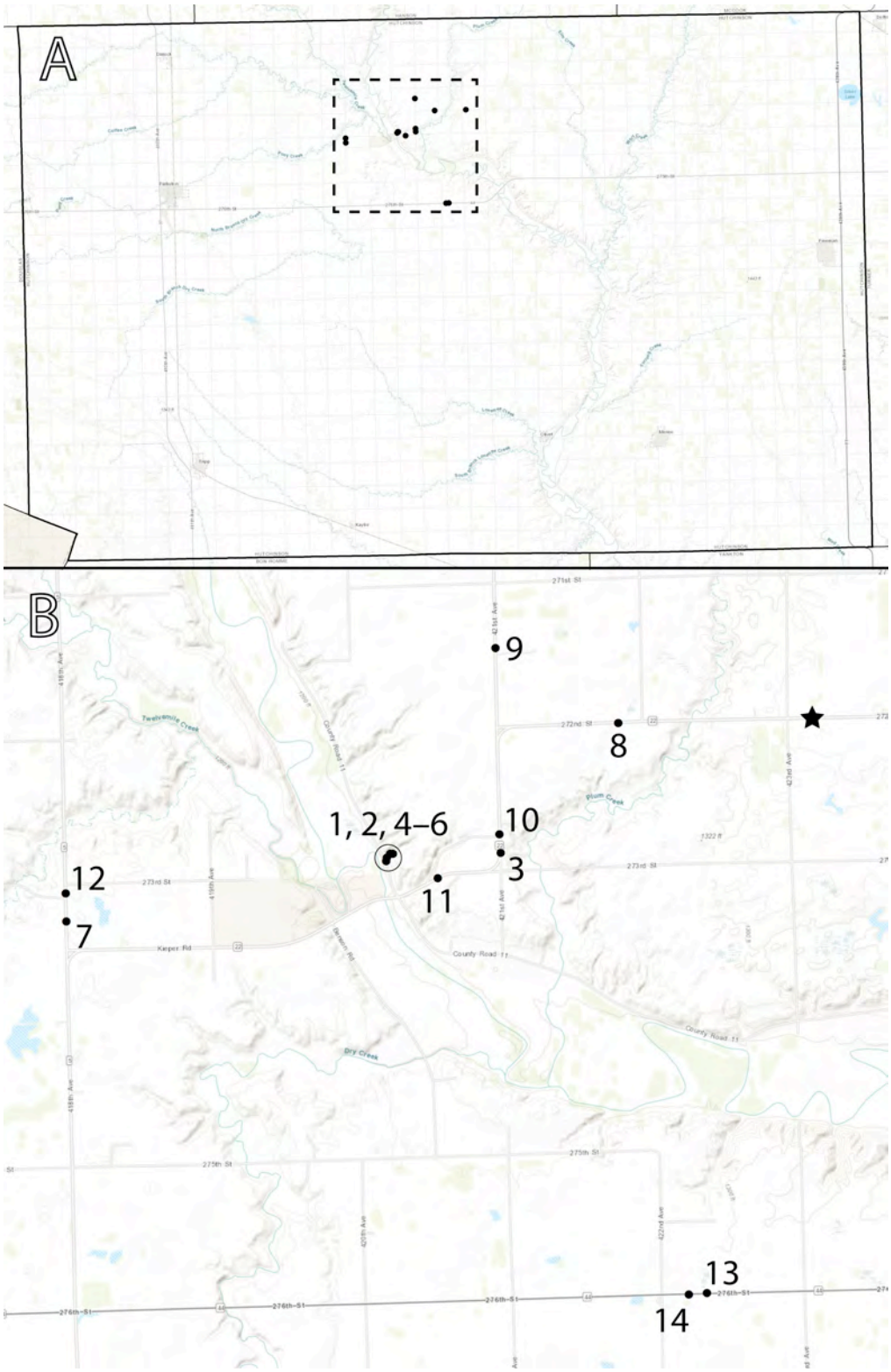

Figure 2. Map of localities where Lined Snakes (*Tropidoclonion lineatum*) were detected. A) Localities in Hutchinson County, South Dakota indicating inset (dashed box); B) Expanded view of localities. Numbers indicate localities listed in Table 1. Star indicates locality where a Lined Snake was collected on 20 October 2017.

Figure 3. Photographs of Lined Snakes (*Tropidoclonion lineatum*) encountered during surveys efforts from 25 April–4 May 2018. A) DRD 4702, adult female; B) DRD 4703, adult female; C) DRD 4704, juvenile male; D) DRD 4705, adult male; E) DRD 4706, adult male; F) DRD 4707, adult female. All photos by DRD.

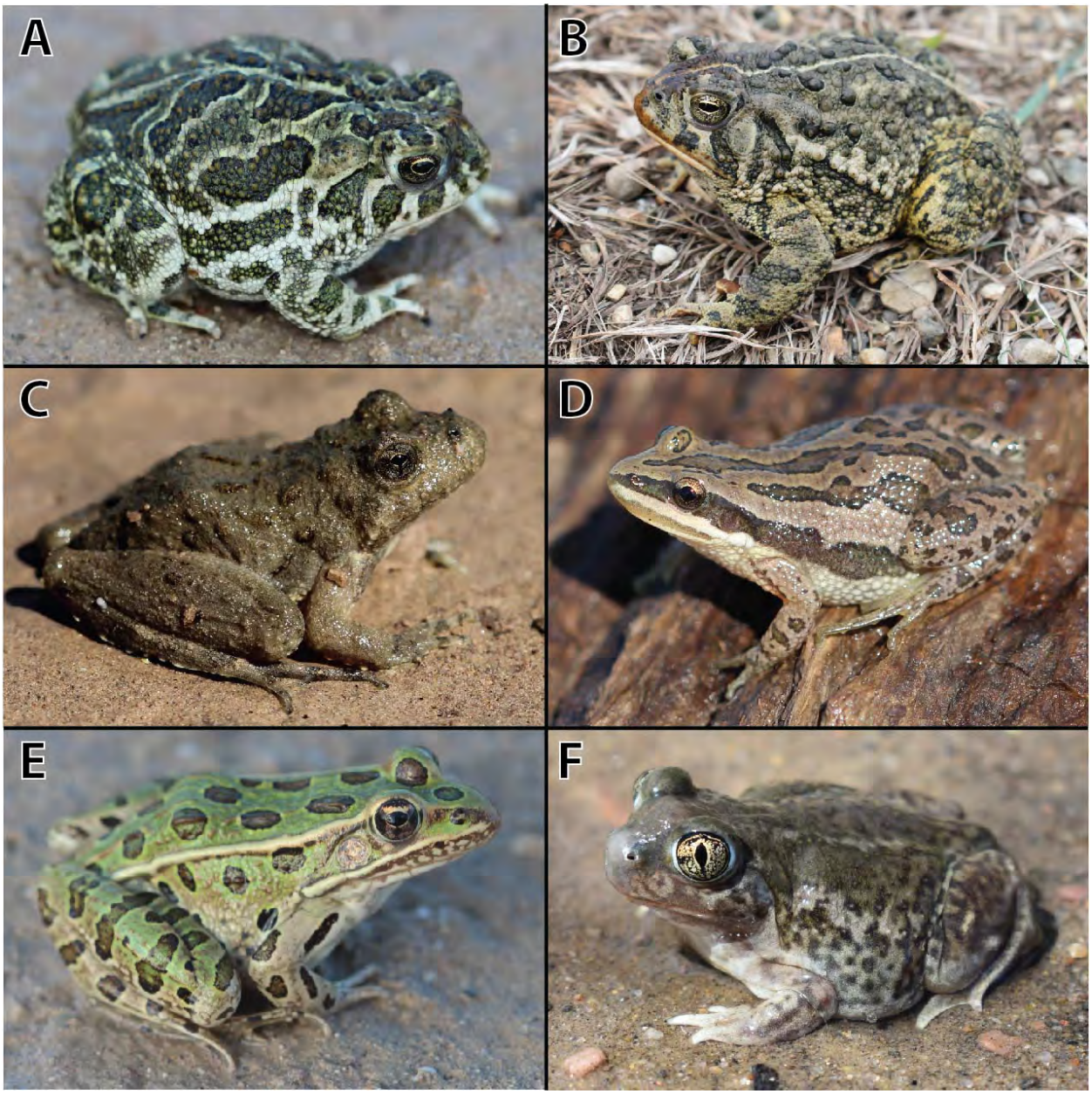

Figure 4. Additional species of amphibians collected during fieldwork from 25 April–4 May 2018 and 28 September–5 October 2018 along the lower James River. A) Great Plains Toad (*Anaxyrus cognatus*), DRD 5112; B) Woodhouse's Toad (*Anaxyrus woodhousii*), DRD 4722; C) Blanchard's Cricket Frog (*Acris blanchardi*), DRD 5056; D) Boreal Chorus Frog (*Pseudacris maculata*), DRD 5110; E) Northern Leopard Frog (*Rana pipiens*), DRD 5109; F) Plains Spadefoot (*Spea bombifrons*), DRD 4733. All photos by DRD.

Figure 5. Additional species of amphibians and reptiles collected during fieldwork from 25 April–4 May 2018 and 28 September–5 October 2018 along the lower James River. A) Western Tiger Salamander (*Ambystoma mavortium*), DRD 5111; B) Snapping Turtle (*Chelydra serpentina*), DRD 4681; C) Prairie Skink (*Plestiodon septentrionalis*), DRD 4713; D) Red-bellied Snake (*Storeria occipitomaculata*), DRD 4725; E) Plains Gartersnake (*Thamnophis radix*), DRD 5113; F) Common Gartersnake (*Thamnophis sirtalis*), DRD 4709. All photos by DRD.

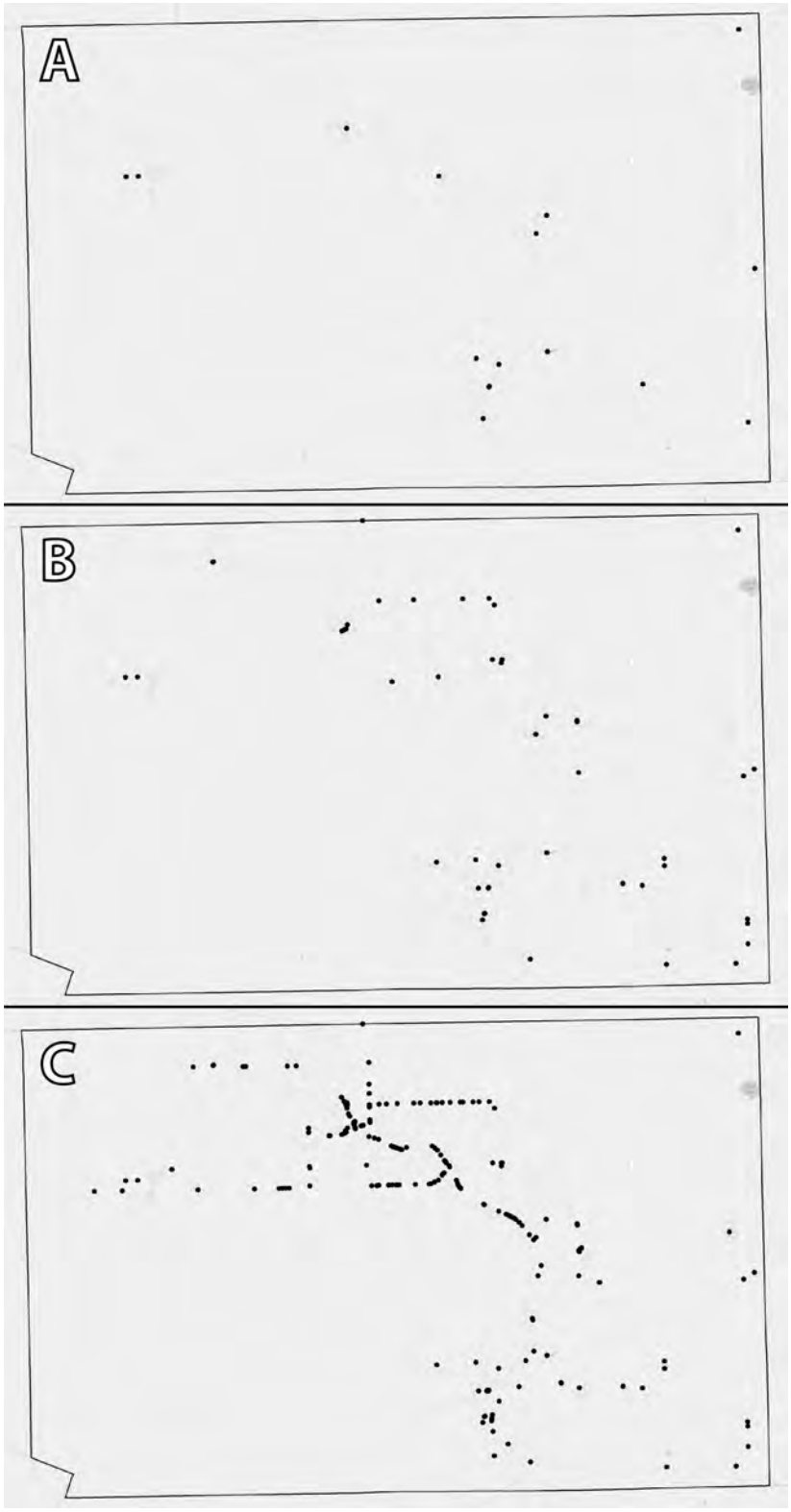

Figure 6. Map of Hutchinson County, South Dakota, showing vouchered records of amphibians and reptiles (physical specimens and photo vouchers). A) 1958–2016, n = 32 records; B) 1958–2017, n = 73 records; C) 1958–2018, n = 302 records. Some localities include multiple records.

Figure 7. Facebook post from the Amphibians and Reptiles of South Dakota page bringing attention to Lined Snakes and encouraging users to submit observations.

Figure 8. Instagram post (shared on Facebook) from The Outdoor Campus on recent surveys for Lined Snakes.

Appendix 1. Summarized list of 115 amphibian and reptiles specimens collected from 25 April–4 May 2018 (n = 63) and 28 September–5 October 2018 (n = 52). All specimens were collected by DRD. Some fields are excluded for brevity. Acronyms used: M = male; F = female; SVL = snout–vent length (where applicable); CL = carapace length (where applicable); PL = plastron length (where applicable); WB = whole body; T = tissue; S = Skin; SE = skeletal elements. Brackets indicate incomplete measurements.

DRD #	Species	County	Latitude	Longitude	Sex	Mass (g)	SVL/CL (mm)	Tail/PL (mm)	Date Collected	Time Collected	Voucher Type
5056	*Acris blanchardi*	Hutchinson	43.33744	-97.57917	M	1.78	27	-	1 October 2018	-	WB
5061	*Acris blanchardi*	Hutchinson	43.23986	-97.66815	F	1.91	27	-	2 October 2018	2200hrs	WB
5074	*Acris blanchardi*	Hutchinson	43.34928	-97.62629	F	1.38	25	-	3 October 2018	1000hrs	WB
5075	*Acris blanchardi*	Hutchinson	43.34928	-97.62629	M	1.09	24	-	3 October 2018	1000hrs	WB
5111	*Ambystoma mavortium*	Hutchinson	43.36125	-97.64097	F	22.23	93	75	3 October 2018	1015hrs	WB
4720	*Anaxyrus cognatus*	Hutchinson	43.38440	-98.01861	M	31.06	63	-	30 April 2018	2221hrs	WB
4721	*Anaxyrus cognatus*	Hutchinson	43.44108	-97.77899	M	57.17	76	-	30 April 2018	2356hrs	WB
5112	*Anaxyrus cognatus*	Hutchinson	43.43489	-97.79812	juv.	7.97	41	-	3 October 2018	1227hrs	WB
4722	*Anaxyrus woodhousii*	Hutchinson	43.29040	-97.62502	M	69.05	85	-	1 May 2018	2136hrs	WB
5072	*Anaxyrus woodhousii*	Hutchinson	43.36220	-97.64333	juv.	11.75	43	-	3 October 2018	1017hrs	WB
5076	*Anaxyrus woodhousii*	Hutchinson	43.38359	-97.69284	juv.	7.42	40	-	3 October 2018	1038hrs	WB
5077	*Anaxyrus woodhousii*	Hutchinson	43.38871	-97.69611	juv.	6.04	39	-	3 October 2018	1045hrs	WB
5078	*Anaxyrus woodhousii*	Hutchinson	43.44345	-97.72989	juv.	11.04	46	-	3 October 2018	1323hrs	WB
5079	*Anaxyrus woodhousii*	Hutchinson	43.36420	-97.64858	juv.	11.94	48	-	3 October 2018	1022hrs	WB
5080	*Anaxyrus woodhousii*	Hutchinson	43.43045	-97.79430	juv.	12.67	41	-	3 October 2018	1145hrs	WB
5094	*Anaxyrus woodhousii*	Hutchinson	43.40651	-97.71073	F	21.31	57	-	3 October 2018	1056hrs	WB
4681	*Chelydra serpentina*	Hutchinson	43.33940	-97.57643	M	-	330	250	27 April 2018	2312hrs	T-skin
5101	*Chelydra serpentina*	Hutchinson	43.38634	-97.72137	-	-	-	-	3 October 2018	-	SE
4675	*Chrysemys picta*	Hutchinson	43.44360	-97.67294	M	318.5	152	131	27 April 2018	1752hrs	WB
5102	*Chrysemys picta*	Hutchinson	43.21110	-97.66441	-	-	-	-	3 October 2018	1736hrs	SE
5095	*Pantherophis ramspotti*	Yankton	43.03694	-97.59564	-	-	-	-	3 October 2018	1833hrs	S
5083	*Pituophis catenifer*	Hutchinson	43.22282	-97.66466	-	-	-	-	3 October 2018	1728hrs	WB
4698	*Plestiodon septentrionalis*	Hutchinson	43.42681	-97.79309	-	-	-	-	30 April 2018	-	T-tail
4713	*Plestiodon septentrionalis*	Hanson	43.61581	-97.76685	M	9.26	74	110	30 April 2018	1528hrs	WB
4737	*Plestiodon septentrionalis*	Hutchinson	43.44307	-97.80038	M	5.72	66	[36]	1 May 2018	1751hrs	WB
4738	*Plestiodon septentrionalis*	Hutchinson	43.44311	-97.80039	juv.	2.34	48	73	1 May 2018	1753hrs	WB
4742	*Plestiodon septentrionalis*	Hutchinson	43.40103	-97.70560	M	7.8	73	68	2 May 2018	1123hrs	WB
5054	*Plestiodon septentrionalis*	Hutchinson	43.42969	-97.79435	M	5.67	67	114	1 October 2018	1645hrs	WB
5055	*Plestiodon septentrionalis*	Hutchinson	43.44266	-97.80101	juv.	2.43	50	[52]	1 October 2018	-	WB
4682	*Pseudacris maculata*	Hutchinson	43.31498	-97.55952	M	1.22	28	-	27 April 2018	2219hrs	WB
4683	*Pseudacris maculata*	Hutchinson	43.31490	-97.55963	M	1.1	29	-	27 April 2018	2219hrs	WB
4684	*Pseudacris maculata*	Hutchinson	43.31494	-97.55952	M	0.93	26	-	27 April 2018	2219hrs	WB
4685	*Pseudacris maculata*	Hutchinson	43.33939	-97.57639	M	1.05	28	-	27 April 2018	2300hrs	WB
4686	*Pseudacris maculata*	Hutchinson	43.33959	-97.57630	M	0.91	26	-	27 April 2018	2315hrs	WB
4690	*Pseudacris maculata*	Hutchinson	43.23980	-97.67005	M	0.89	25	-	28 April 2018	2300hrs	WB
4691	*Pseudacris maculata*	Hutchinson	43.23983	-97.67006	M	0.9	24	-	28 April 2018	2300hrs	WB

4692	*Pseudacris maculata*	Hutchinson	43.23979	-97.67007	M	1.01	25	-	28 April 2018	2300hrs	WB
4693	*Pseudacris maculata*	Hutchinson	43.24460	-97.59812	M	0.73	25	-	28 April 2018	2330hrs	WB
4694	*Pseudacris maculata*	Hutchinson	43.24437	-97.59809	M	1.07	26	-	28 April 2018	2330hrs	WB
4695	*Pseudacris maculata*	Hutchinson	43.24477	-97.59813	M	1.07	26	-	28 April 2018	2330hrs	WB
4716	*Pseudacris maculata*	Hutchinson	43.39884	-97.83722	M	0.81	25	-	30 April 2018	2322hrs	WB
4717	*Pseudacris maculata*	Hutchinson	43.44442	-97.80056	M	0.9	26	-	1 May 2018	1806hrs	WB
4718	*Pseudacris maculata*	Douglas	43.32267	-98.34282	M	0.92	23	-	30 April 2018	2126hrs	WB
4719	*Pseudacris maculata*	Douglas	43.32269	-98.34286	M	1.21	28	-	30 April 2018	2126hrs	WB
5110	*Pseudacris maculata*	Hutchinson	43.44253	-97.80145	F	1.73	30	-	3 October 2018	1223hrs	WB
4687	*Rana pipiens*	Hutchinson	43.33939	-97.57639	F	61.77	88	-	27 April 2018	-	WB
4688	*Rana pipiens*	Hutchinson	43.33949	-97.57627	M	18.72	63	-	27 April 2018	-	WB
4689	*Rana pipiens*	Hutchinson	43.33939	-97.57649	M	24.48	68	-	28 April 2018	-	WB
4701	*Rana pipiens*	Hutchinson	43.40014	-97.78266	F	42.07	75	-	1 May 2018	0026hrs	WB
4736	*Rana pipiens*	Douglas	43.38391	-98.11258	F	33.74	71	-	30 April 2018	2202hrs	WB
5048	*Rana pipiens*	Yankton	43.00906	-97.44522	M	28.79	71	-	1 October 2018	-	WB
5049	*Rana pipiens*	Yankton	43.00894	-97.44583	M	32.36	72	-	1 October 2018	-	WB
5050	*Rana pipiens*	Yankton	43.08529	-97.46588	M	25.37	67	-	1 October 2018	1430hrs	WB
5051	*Rana pipiens*	Hutchinson	43.33860	-97.57795	F	45.39	80	-	1 October 2018	1540hrs	WB
5052	*Rana pipiens*	Hutchinson	43.33699	-97.57860	F	36.22	70	-	1 October 2018	1554hrs	WB
5053	*Rana pipiens*	Hutchinson	43.42927	-97.79403	F	47.66	82	-	1 October 2018	1650hrs	WB
5081	*Rana pipiens*	Hutchinson	43.43104	-97.79328	M	42.68	80	-	3 October 2018	1145hrs	WB
5082	*Rana pipiens*	Hutchinson	43.39407	-97.70767	F	39.4	77	-	3 October 2018	-	WB
5109	*Rana pipiens*	Hutchinson	43.24018	-97.66936	F	21.59	64	-	2 October 2018	2220hrs	WB
4700	*Spea bombifrons*	Hutchinson	43.38422	-98.04573	F	17.39	54	-	30 April 2018	2212hrs	WB
4731	*Spea bombifrons*	Douglas	43.38422	-98.30761	F	16.56	55	-	30 April 2018	2142hrs	WB
4732	*Spea bombifrons*	Hutchinson	43.38462	-97.86737	F	15.38	54	-	30 April 2018	2252hrs	WB
4733	*Spea bombifrons*	Hutchinson	43.38612	-97.83755	F	12.94	49	-	30 April 2018	2305hrs	WB
4734	*Spea bombifrons*	Hutchinson	43.42126	-97.81841	M	15.13	50	-	30 April 2018	2329hrs	WB
4735	*Spea bombifrons*	Hutchinson	43.42128	-97.81725	M	12.88	49	-	30 April 2018	2332hrs	WB
4678	*Storeria occipitomaculata*	Hutchinson	43.42874	-97.79411	F	2.18	183	43	28 April 2018	1501hrs	WB
4679	*Storeria occipitomaculata*	Hanson	43.50252	-97.80733	F	4.41	225	58	28 April 2018	1707hrs	WB
4680	*Storeria occipitomaculata*	Hutchinson	43.42957	-97.79433	-	-	-	-	28 April 2018	1406hrs	SE
4714	*Storeria occipitomaculata*	Hanson	43.50247	-97.80735	M	1.34	133	38	28 April 2018	1707hrs	WB
4725	*Storeria occipitomaculata*	Hanson	43.50278	-97.80678	F	5.02	220	52	28 April 2018	1703hrs	WB
4726	*Storeria occipitomaculata*	Hanson	43.50281	-97.80665	F	5.36	235	55	28 April 2018	1703hrs	T-tail
4727	*Storeria occipitomaculata*	Hutchinson	43.42933	-97.79403	F	5.67	247	60	28 April 2018	1450hrs	T-tail
4728	*Storeria occipitomaculata*	Hutchinson	43.42681	-97.79309	M	3.08	188	61	28 April 2018	1508hrs	WB
4729	*Storeria occipitomaculata*	Hutchinson	43.42681	-97.79309	F	3.6	205	60	28 April 2018	1508hrs	WB
4730	*Storeria occipitomaculata*	Hutchinson	43.42681	-97.79309	M	3.27	207	54	28 April 2018	1508hrs	T-tail
4739	*Storeria occipitomaculata*	Hutchinson	43.44815	-97.80570	F	6.2	242	60	28 April 2018	1801hrs	WB
4740	*Storeria occipitomaculata*	Hutchinson	43.36271	-97.64460	F	5.89	238	59	2 May 2018	1058hrs	WB
5047	*Storeria occipitomaculata*	Hutchinson	43.44545	-97.80347	F	10.49	278	62	1 October 2018	1714hrs	WB
5070	*Storeria occipitomaculata*	Hutchinson	43.37111	-97.66940	M	2.38	169	52	3 October 2018	1030hrs	WB
5071	*Storeria occipitomaculata*	Hutchinson	43.42605	-97.79286	F	6.61	256	62	3 October 2018	1125hrs	WB

5073	*Storeria occipitomaculata*	Hutchinson	43.45733	-97.77908	M	3.47	210	62	3 October 2018	1341hrs	WB
5105	*Storeria occipitomaculata*	Hutchinson	43.38270	-97.69189	F	8.08	255	60	3 October 2018	1036hrs	WB
5117	*Storeria occipitomaculata*	Hutchinson	43.36628	-97.65561	F	0.82	-	-	3 October 2018	1026hrs	SE + S
4676	*Thamnophis radix*	Hutchinson	43.24087	-97.58064	F	42.67	470	[65]	28 April 2018	1011hrs	WB
4677	*Thamnophis radix*	Hutchinson	43.43653	-97.79926	M	40.92	483	140	28 April 2018	1806hrs	WB
4741	*Thamnophis radix*	Hutchinson	43.40103	-97.70560	M	5.72	227	72	2 May 2018	1123hrs	WB
5089	*Thamnophis radix*	Hutchinson	43.44352	-97.70081	F	10.49	265	74	3 October 2018	1253hrs	WB
5090	*Thamnophis radix*	Hutchison	43.38596	-97.75140	F	8.54	268	74	3 October 2018	1605hrs	WB
5091	*Thamnophis radix*	Hutchinson	43.32751	-97.61540	M	51.31	475	150	3 October 2018	1658hrs	WB
5092	*Thamnophis radix*	Yankton	43.10175	-97.57787	M	35.14	450	145	3 October 2018	1819hrs	WB
5093	*Thamnophis radix*	Yankton	42.99749	-97.59592	M	36.89	445	148	3 October 2018	1842hrs	WB
5113	*Thamnophis radix*	Hutchinson	43.38411	-97.69331	F	10.57	281	[78]	3 October 2018	1040hrs	WB
4708	*Thamnophis sirtalis*	Hutchinson	43.42320	-97.80287	M	29.84	462	[130]	28 April 2018	1110hrs	WB
4709	*Thamnophis sirtalis*	Hutchinson	43.42313	-97.80276	F	79.19	585	[108]	30 April 2018	2335hrs	T-blood
4715	*Thamnophis sirtalis*	Hutchinson	43.42320	-97.80269	M	24.95	420	136	1 May 2018	1655hrs	WB
4723	*Thamnophis sirtalis*	Hutchinson	43.44337	-97.80169	F	92.2	565	[137]	1 May 2018	-	T-blood
5085	*Thamnophis sirtalis*	Hutchinson	43.47089	-97.85776	F	83.61	650	168	3 October 2018	1433hrs	WB
5086	*Thamnophis sirtalis*	Hutchinson	43.42207	-97.80606	F	85.68	600	178	3 October 2018	1547hrs	WB
5087	*Thamnophis sirtalis*	Hutchinson	43.24244	-97.63865	M	14.27	335	106	3 October 2018	1716hrs	WB
4699	*Tropidoclonion lineatum*	Hutchinson	43.43038	-97.77872	F	3.91	247	40	30 April 2018	1549hrs	WB
4702	*Tropidoclonion lineatum*	Hutchinson	43.42972	-97.79432	F	6.47	225	38	28 April 2018	1439hrs	T-tail
4703	*Tropidoclonion lineatum*	Hutchinson	43.43005	-97.79426	F	7.74	253	40	28 April 2018	1815hrs	T-tail
4704	*Tropidoclonion lineatum*	Hutchinson	43.43045	-97.79340	M	0.9	110	22	30 April 2018	1705hrs	T-tail
4705	*Tropidoclonion lineatum*	Hutchinson	43.43043	-97.79379	M	2.91	168	31	1 May 2018	0957hrs	T-tail
4706	*Tropidoclonion lineatum*	Hutchinson	43.43043	-97.79379	M	4.04	200	42	1 May 2018	0957hrs	T-tail
4707	*Tropidoclonion lineatum*	Hutchinson	43.43042	-97.79380	F	8.24	240	42	1 May 2018	1001hrs	T-tail
4724	*Tropidoclonion lineatum*	Hutchinson	43.42413	-97.83804	F	6.53	240	39	2 May 2018	1535hrs	WB
5062	*Tropidoclonion lineatum*	Hutchinson	43.44320	-97.76244	F	7.07	250	37	3 October 2018	1241hrs	WB
5063	*Tropidoclonion lineatum*	Hutchinson	43.44320	-97.76244	M	4.07	205	42	3 October 2018	1241hrs	WB
5064	*Tropidoclonion lineatum*	Hutchinson	43.45087	-97.77903	M	4.23	223	42	3 October 2018	1338hrs	WB
5065	*Tropidoclonion lineatum*	Hutchinson	43.43223	-97.77884	M	4.35	215	40	3 October 2018	1407hrs	WB
5066	*Tropidoclonion lineatum*	Hutchinson	43.42793	-97.78735	M	3.69	195	40	3 October 2018	1410hrs	WB
5067	*Tropidoclonion lineatum*	Hutchinson	43.42692	-97.83805	-	4.82	240	[2]	3 October 2018	1420hrs	WB
5068	*Tropidoclonion lineatum*	Hutchinson	43.38605	-97.75151	-	-	-	-	3 October 2018	1607hrs	WB
5069	*Tropidoclonion lineatum*	Hutchinson	43.38594	-97.75397	-	-	-	-	3 October 2018	1612hrs	WB

Appendix 2. Summarized list of 141 amphibian and reptiles specimens photographed, but not collected, from 25 April–4 May 2018 (n = 74) and 28 September–5 October 2018 (n = 67). All observations deposited at HerpMapper, Inc. (HM; *www.herpmapper.org*) or iNaturalist (iNat; *www.inaturalist.org*).

Catalog Number	Species	County	Latitude	Longitude	Age	Deceased	Date Collected	Time Collected
HM 218955	*Anaxyrus woodhousii*	Hutchinson	43.38510557	-97.69423649	Adult	Yes	1 May 2018	2045hrs
HM 239998	*Anaxyrus woodhousii*	Hutchinson	43.28955702	-97.62458267	Adult	Yes	3 October 2018	0935hrs
HM 240043	*Anaxyrus woodhousii*	Hutchinson	43.39874135	-97.70275335	Juvenile	Yes	3 October 2018	1053hrs
HM 240045	*Anaxyrus woodhousii*	Hutchinson	43.41151069	-97.71625388	Juvenile	No	3 October 2018	1101hrs
HM 240047	*Anaxyrus woodhousii*	Hutchinson	43.41818402	-97.77043714	Juvenile	No	3 October 2018	1117hrs
HM 240048	*Anaxyrus woodhousii*	Hutchinson	43.41928919	-97.77481789	Juvenile	Yes	3 October 2018	1119hrs
HM 219267	*Apalone spinifera*	Hutchinson	43.411368	-97.750537	Adult	No	2 May 2018	1229hrs
HM 219276	*Apalone spinifera*	Hutchinson	43.412605	-97.755747	Adult	No	2 May 2018	1233hrs
HM 217044	*Chrysemys picta*	Hutchinson	43.38587917	-97.76136806	Adult	Yes	27 April 2018	1936hrs
HM 217045	*Chrysemys picta*	Hutchinson	43.38585972	-97.76158194	Adult	Yes	27 April 2018	1937hrs
HM 217046	*Chrysemys picta*	Hutchinson	43.38591944	-97.75422639	Adult	Yes	27 April 2018	1944hrs
HM 217050	*Chrysemys picta*	Hutchinson	43.38574167	-97.77268889	Adult	Yes	27 April 2018	2359hrs
HM 217324	*Chrysemys picta*	Hanson	43.545001	-97.943594	Adult	No	28 April 2018	1641hrs
HM 217325	*Chrysemys picta*	Hanson	43.545477	-97.943768	Juvenile	No	28 April 2018	1641hrs
HM 217053	*Chrysemys picta*	Hanson	43.5426	-97.94547222	Adult	Yes	28 April 2018	1645hrs
HM 217373	*Chrysemys picta*	Hutchinson	43.412537	-97.755452	Adult	No	28 April 2018	1833hrs
HM 219263	*Chrysemys picta*	Hutchinson	43.410737	-97.748384	Adult	No	30 April 2018	1808hrs
HM 219264	*Chrysemys picta*	Hutchinson	43.411149	-97.749542	Adult	No	30 April 2018	1809hrs
HM 219265	*Chrysemys picta*	Hutchinson	43.411249	-97.749868	Adult	No	30 April 2018	1815hrs
HM 218936	*Chrysemys picta*	Hutchinson	43.39251967	-97.70979627	Adult	Yes	30 April 2018	1826hrs
HM 218937	*Chrysemys picta*	Hutchinson	43.38642406	-97.72091147	Adult	No	30 April 2018	1833hrs
HM 218938	*Chrysemys picta*	Hutchinson	43.3864112	-97.72169541	Adult	Yes	30 April 2018	1835hrs
HM 218939	*Chrysemys picta*	Hutchinson	43.38629274	-97.72227006	Adult	Yes	30 April 2018	1836hrs
HM 218951	*Chrysemys picta*	Hutchinson	43.44338591	-97.75205608	Juvenile	Yes	1 May 2018	0931hrs
HM 219266	*Chrysemys picta*	Hutchinson	43.410947	-97.748949	Adult	No	2 May 2018	1228hrs
HM 219268	*Chrysemys picta*	Hutchinson	43.411343	-97.750383	Adult	No	2 May 2018	1229hrs
HM 219269	*Chrysemys picta*	Hutchinson	43.412051	-97.753343	Adult	No	2 May 2018	1230hrs
HM 219271	*Chrysemys picta*	Hutchinson	43.412426	-97.755136	Adult	No	2 May 2018	1231hrs
HM 219272	*Chrysemys picta*	Hutchinson	43.412613	-97.755908	Adult	No	2 May 2018	1232hrs
HM 219273	*Chrysemys picta*	Hutchinson	43.412481	-97.755475	Adult	No	2 May 2018	1232hrs
HM 219277	*Chrysemys picta*	Hutchinson	43.412654	-97.755932	Adult	No	2 May 2018	1233hrs
HM 219278	*Chrysemys picta*	Hutchinson	43.412796	-97.756445	Adult	No	2 May 2018	1234hrs
HM 219279	*Chrysemys picta*	Hutchinson	43.412878	-97.75664	Adult	No	2 May 2018	1235hrs
HM 219280	*Chrysemys picta*	Hutchinson	43.41294	-97.756938	Adult	No	2 May 2018	1236hrs
HM 219281	*Chrysemys picta*	Hutchinson	43.412879	-97.756702	Adult	No	2 May 2018	1237hrs
HM 219282	*Chrysemys picta*	Hutchinson	43.413151	-97.75755	Adult	No	2 May 2018	1237hrs
HM 218968	*Chrysemys picta*	Hutchinson	43.47102197	-97.89792909	Adult	Yes	2 May 2018	1552hrs
HM 218976	*Chrysemys picta*	Hutchinson	43.47108043	-97.90043335	Adult	Yes	2 May 2018	1554hrs

HM 218969	*Chrysemys picta*	Hutchinson	43.4711389	-97.94876556	Adult	Yes	2 May 2018	1604hrs
HM 218970	*Chrysemys picta*	Hanson	43.5368614	-97.82541402	Adult	Yes	3 May 2018	1126hrs
HM 218971	*Chrysemys picta*	Hutchinson	43.41305198	-97.7188778	Adult	No	3 May 2018	1245hrs
HM 240053	*Chrysemys picta*	Hutchinson	43.44147617	-97.77888647	Adult	No	3 October 2018	1238hrs
HM 219274	*Graptemys pseudogeographica*	Hutchinson	43.412481	-97.755475	Adult	No	2 May 2018	1232hrs
HM 219275	*Graptemys pseudogeographica*	Hutchinson	43.412488	-97.755491	Adult	No	2 May 2018	1233hrs
HM 241766	*Heterodon nasicus*	Hutchinson	43.42033	-97.77984	Juvenile	No	3 October 2018	1120hrs
HM 218956	*Plestiodon septentrionalis*	Hutchinson	43.40103254	-97.7057304	Adult	No	2 May 2018	1124hrs
HM 218957	*Plestiodon septentrionalis*	Hutchinson	43.40119545	-97.70591941	Adult	No	2 May 2018	1130hrs
HM 218958	*Plestiodon septentrionalis*	Hutchinson	43.40176248	-97.70632089	Adult	No	2 May 2018	1139hrs
HM 218959	*Plestiodon septentrionalis*	Hutchinson	43.40183216	-97.70642374	Adult	No	2 May 2018	1141hrs
HM 218960	*Plestiodon septentrionalis*	Hutchinson	43.40249775	-97.70706678	Adult	No	2 May 2018	1149hrs
HM 218961	*Plestiodon septentrionalis*	Hutchinson	43.40261846	-97.707256	Adult	No	2 May 2018	1151hrs
HM 218967	*Plestiodon septentrionalis*	Hutchinson	43.44344313	-97.80161863	Adult	No	2 May 2018	1410hrs
HM 240050	*Plestiodon septentrionalis*	Hutchinson	43.4308732	-97.79388523	Juvenile	No	3 October 2018	1155hrs
HM 217047	*Rana pipiens*	Hutchinson	43.40030694	-97.65257639	Adult	Yes	27 April 2018	2014hrs
HM 217048	*Rana pipiens*	Hutchinson	43.33959167	-97.57636389	Egg	No	27 April 2018	2310hrs
HM 218973	*Rana pipiens*	Hutchinson	43.44050056	-97.80071198	Adult	Yes	30 April 2018	1745hrs
HM 218940	*Rana pipiens*	Hutchinson	43.38614131	-97.73577853	Adult	Yes	30 April 2018	1840hrs
HM 218942	*Rana pipiens*	Douglas	43.38370653	-98.18266704	Adult	Yes	30 April 2018	2156hrs
HM 218943	*Rana pipiens*	Hutchinson	43.38436798	-97.94547657	Adult	Yes	30 April 2018	2238hrs
HM 218944	*Rana pipiens*	Hutchinson	43.38441994	-97.89090455	Juvenile	Yes	30 April 2018	2249hrs
HM 239378	*Rana pipiens*	Yankton	42.91177945	-97.35631497	Adult	Yes	1 October 2018	1317hrs
HM 239379	*Rana pipiens*	Hutchinson	43.33693396	-97.57854023	Adult	No	1 October 2018	1558hrs
HM 239381	*Rana pipiens*	Hutchinson	43.42363822	-97.83809829	Adult	Yes	1 October 2018	1851hrs
HM 239382	*Rana pipiens*	Hutchinson	43.35587533	-97.63329031	Adult	Yes	1 October 2018	1929hrs
HM 240000	*Rana pipiens*	Hutchinson	43.35819899	-97.63605245	Adult	No	3 October 2018	1011hrs
HM 240040	*Rana pipiens*	Hutchinson	43.3634537	-97.64672876	Adult	No	3 October 2018	1023hrs
HM 240046	*Rana pipiens*	Hutchinson	43.41215857	-97.74376988	Adult	No	3 October 2018	1110hrs
HM 240051	*Rana pipiens*	Hutchinson	43.43075591	-97.79402589	Adult	No	3 October 2018	1158hrs
HM 240054	*Rana pipiens*	Hutchinson	43.44346956	-97.71437653	Adult	Yes	3 October 2018	1250hrs
HM 240055	*Rana pipiens*	Hutchinson	43.44346652	-97.71358668	Adult	Yes	3 October 2018	1251hrs
HM 240056	*Rana pipiens*	Hutchinson	43.44354445	-97.7084139	Adult	Yes	3 October 2018	1313hrs
HM 240057	*Rana pipiens*	Hutchinson	43.44354889	-97.70876957	Adult	Yes	3 October 2018	1314hrs
HM 240058	*Rana pipiens*	Hutchinson	43.4434126	-97.71958613	Adult	Yes	3 October 2018	1232hrs
HM 240059	*Rana pipiens*	Hutchinson	43.45062066	-97.77903673	Adult	Yes	3 October 2018	1339hrs
HM 240061	*Rana pipiens*	Hutchinson	43.44287345	-97.77896807	Adult	No	3 October 2018	1400hrs
HM 240062	*Rana pipiens*	Hutchinson	43.38475287	-97.8638143	Adult	Yes	3 October 2018	1548hrs
HM 240064	*Rana pipiens*	Hutchinson	43.38568433	-97.77778294	Adult	Yes	3 October 2018	1554hrs
HM 240065	*Rana pipiens*	Hutchinson	43.3856637	-97.77285749	Adult	Yes	3 October 2018	1602hrs
HM 240066	*Rana pipiens*	Hutchinson	43.38578766	-97.77087831	Adult	Yes	3 October 2018	1603hrs
HM 240067	*Rana pipiens*	Hutchinson	43.38595666	-97.75351955	Adult	Yes	3 October 2018	1616hrs
HM 240073	*Rana pipiens*	Hutchinson	43.3874712	-97.71759188	Adult	Yes	3 October 2018	1629hrs
HM 240074	*Rana pipiens*	Hutchinson	43.38760792	-97.71702629	Adult	Yes	3 October 2018	1631hrs

HM 240075	*Rana pipiens*	Hutchinson	43.39372608	-97.70818255	Adult	Yes	3 October 2018	1636hrs
HM 240076	*Rana pipiens*	Hutchinson	43.39333265	-97.70869987	Adult	Yes	3 October 2018	1638hrs
HM 240077	*Rana pipiens*	Hutchinson	43.39252939	-97.70976776	Adult	Yes	3 October 2018	1639hrs
HM 240078	*Rana pipiens*	Hutchinson	43.39253911	-97.70980825	Adult	Yes	3 October 2018	1640hrs
HM 240079	*Rana pipiens*	Hutchinson	43.36232908	-97.64366909	Adult	Yes	3 October 2018	1653hrs
HM 240081	*Rana pipiens*	Hutchinson	43.26721587	-97.62384882	Adult	Yes	3 October 2018	1712hrs
HM 240082	*Rana pipiens*	Hutchinson	43.26077429	-97.63172546	Adult	Yes	3 October 2018	1714hrs
HM 218941	*Spea bombifrons*	Douglas	43.38432194	-98.30226721	Adult	Yes	30 April 2018	2126hrs
HM 218945	*Spea bombifrons*	Hutchinson	43.38483797	-97.86045043	Adult	Yes	30 April 2018	2257hrs
HM 218947	*Spea bombifrons*	Hutchinson	43.39963547	-97.83767834	Adult	No	30 April 2018	2313hrs
HM 218948	*Spea bombifrons*	Hutchinson	43.42133401	-97.81795945	Adult	No	30 April 2018	2331hrs
HM 218949	*Spea bombifrons*	Hutchinson	43.42823721	-97.7862404	Adult	No	30 April 2018	2340hrs
HM 218950	*Spea bombifrons*	Hutchinson	43.42838274	-97.78507659	Adult	No	30 April 2018	2343hrs
HM 218977	*Storeria occipitomaculata*	Hutchinson	43.42606594	-97.79310417	Adult	Yes	1 May 2018	1302hrs
HM 218954	*Storeria occipitomaculata*	Hutchinson	43.44844423	-97.80589349	Adult	Yes	1 May 2018	1713hrs
HM 219355	*Storeria occipitomaculata*	Hutchinson	43.362642	-97.644526	Adult	Yes	2 May 2018	1058hrs
HM 218962	*Storeria occipitomaculata*	Hutchinson	43.41361551	-97.75831939	Adult	Yes	2 May 2018	1238hrs
HM 218963	*Storeria occipitomaculata*	Hutchinson	43.42610321	-97.7928152	Adult	Yes	2 May 2018	1249hrs
HM 218964	*Storeria occipitomaculata*	Hutchinson	43.42608683	-97.7928278	Adult	Yes	2 May 2018	1250hrs
HM 218965	*Storeria occipitomaculata*	Hutchinson	43.42606996	-97.79262699	Adult	Yes	2 May 2018	1251hrs
HM 218975	*Storeria occipitomaculata*	Hutchinson	43.42690101	-97.79308695	Juvenile	No	2 May 2018	1256hrs
HM 241768	*Storeria occipitomaculata*	Hutchinson	43.32031	-97.61864	Adult	No	3 October 2018	0943hrs
HM 239999	*Storeria occipitomaculata*	Hutchinson	43.34579542	-97.62222962	Juvenile	No	3 October 2018	0953hrs
HM 240088	*Storeria occipitomaculata*	Hutchinson	43.36039699	-97.63943076	Adult	No	3 October 2018	1014hrs
HM 240041	*Storeria occipitomaculata*	Hutchinson	43.38662946	-97.69501256	Adult	No	3 October 2018	1045hrs
HM 240042	*Storeria occipitomaculata*	Hutchinson	43.39810681	-97.70220526	Adult	No	3 October 2018	1051hrs
HM 240044	*Storeria occipitomaculata*	Hutchinson	43.40139296	-97.70565663	Juvenile	No	3 October 2018	1055hrs
HM 240052	*Storeria occipitomaculata*	Hutchinson	43.42670302	-97.79331321	Adult	No	3 October 2018	1234hrs
HM 240060	*Storeria occipitomaculata*	Hutchinson	43.47268441	-97.77902097	Adult	Yes	3 October 2018	1347hrs
HM 240063	*Storeria occipitomaculata*	Hutchinson	43.38478813	-97.85752864	Adult	Yes	3 October 2018	1550hrs
HM 240068	*Storeria occipitomaculata*	Hutchinson	43.38595101	-97.75355579	Adult	Yes	3 October 2018	1616hrs
HM 240070	*Storeria occipitomaculata*	Hutchinson	43.38594339	-97.75314137	Adult	Yes	3 October 2018	1620hrs
HM 240071	*Storeria occipitomaculata*	Hutchinson	43.38591247	-97.75315902	Adult	Yes	3 October 2018	1621hrs
HM 240072	*Storeria occipitomaculata*	Hutchinson	43.385958	-97.75314303	Adult	Yes	3 October 2018	1621hrs
iNat 17438604	*Storeria occipitomaculata*	Hutchinson	43.44352	-97.70081	Juvenile	Yes	3 October 2018	1753hrs
iNat 17448975	*Storeria occipitomaculata*	Hutchinson	43.44362	-97.6912	Adult	Yes	3 October 2018	1806hrs
iNat 17438671	*Storeria occipitomaculata*	Hutchinson	43.38594	-97.75397	Adult	Yes	3 October 2018	2112hrs
HM 217042	*Thamnophis radix*	Yankton	43.08218333	-97.465125	Adult	Yes	27 April 2018	1301hrs
HM 217043	*Thamnophis radix*	Hutchinson	43.19386806	-97.66365833	Adult	No	27 April 2018	1522hrs
HM 217051	*Thamnophis radix*	Davison	43.542574	-97.990349	Adult	Yes	28 April 2018	1632hrs
HM 217052	*Thamnophis radix*	Hanson	43.54261667	-97.94602222	Juvenile	Yes	28 April 2018	1636hrs
HM 218946	*Thamnophis radix*	Hutchinson	43.38478757	-97.86081602	Adult	Yes	30 April 2018	2259hrs
HM 218974	*Thamnophis radix*	Hutchinson	43.37127136	-97.66997782	Adult	Yes	1 May 2018	2054hrs
HM 219220	*Thamnophis radix*	Hutchinson	43.41009	-97.714	Adult	No	2 May 2018	1216hrs

HM 240069	*Thamnophis radix*	Hutchinson	43.38593763	-97.75319026	Adult	Yes	3 October 2018	1618hrs
HM 240080	*Thamnophis radix*	Hutchinson	43.28914869	-97.62441735	Juvenile	Yes	3 October 2018	1706hrs
iNat 17449116	*Thamnophis radix*	Hutchinson	43.44365	-97.67872	Adult	Yes	3 October 2018	1802hrs
HM 240086	*Thamnophis radix*	Yankton	43.12960429	-97.57773937	Juvenile	Yes	3 October 2018	1809hrs
HM 240087	*Thamnophis radix*	Yankton	43.00790699	-97.59618291	Juvenile	Yes	3 October 2018	1841hrs
iNat 17449068	*Thamnophis radix*	Hutchinson	43.202	-97.65012	Adult	Yes	3 October 2018	2240hrs
iNat 17449205	*Thamnophis radix*	Yankton	43.08026	-97.59718	Adult	Yes	3 October 2018	2325hrs
iNat 17438540	*Thamnophis radix*	Yankton	43.04538	-97.59661	Adult	Yes	3 October 2018	2330hrs
HM 218952	*Thamnophis sirtalis*	Hutchinson	43.4247433	-97.80222141	Adult	Yes	1 May 2018	1411hrs
HM 240049	*Thamnophis sirtalis*	Hutchinson	43.42927428	-97.79424736	Adult	No	3 October 2018	1138hrs
HM 240083	*Thamnophis sirtalis*	Hutchinson	43.23234494	-97.65811146	Juvenile	Yes	3 October 2018	1725hrs
HM 240084	*Thamnophis sirtalis*	Hutchinson	43.21865102	-97.66550142	Adult	Yes	3 October 2018	1735hrs
HM 240085	*Thamnophis sirtalis*	Yankton	43.13374318	-97.57760694	Juvenile	Yes	3 October 2018	1803hrs
iNat 17449151	*Thamnophis sirtalis*	Hutchinson	43.47089	-97.84909	Adult	Yes	3 October 2018	1931hrs
iNat 17449181	*Thamnophis sirtalis*	Hutchinson	43.22033	-97.66526	Adult	Yes	3 October 2018	2230hrs