

**Inventory of nesting raptors in
South Dakota
-2011-**

Nathan Baker
Wildlife Biologist

**South Dakota Department of Game, Fish and Parks
523 E. Capitol Avenue
Pierre, South Dakota 57501**

ABSTRACT

In the spring of 2011, an aerial survey was conducted in northwest, South Dakota for nesting raptors. Species surveyed included: bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), great horned owl (*Bubo virginianus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), and Swainson's hawk (*Buteo swainsoni*). Two hundred sixty-nine previously documented raptor nest locations were visited from 17 May – 19 May. Searches for new nests were conducted while visiting previously documented nests. Thirty-three new, active nests and 22 additional inactive buteo nests were found during these flights. One hundred and seven active nests identified during the May flight period were visited again during flights from 26 June – 28 June in an attempt to document fledging success. Fledging success was difficult to document for all species and nests as the development within and among species is variable. However, fledging success was documented in the only bald eagle nest that was observed during this survey, as well as in four ferruginous hawk, 20 golden eagle, six red-tailed hawk, and four Swainson's hawk nests.

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INTRODUCTION

Northwestern South Dakota provides several unique habitat types that are utilized by numerous birds of prey for both nesting and hunting. The South Dakota Department of Game, Fish and Parks initially began raptor nesting surveys of northwestern in 1973 and continued until 1980, with the exception of 1979. These initial surveys were concentrated on the rocky outcroppings of the North and South Cave Hills, Slim Buttes, and short Pine Hills (O'Brien and Sharps 1980, Sharps 1980, Good 1979, Pulkrabek 1976, Pulkrabek and O'Brien 1974, O'Brien and Pulkrabek 1974). More recent raptor surveys in northwest South Dakota include surveys of the Grand River National Grassland (Knowles 2001, Knowles 2002). The most recent survey of nesting raptors in northwestern South Dakota was conducted primarily in Butte, Harding and Perkins counties by Knowles (2005).

In an attempt to continually monitor raptor populations in northwestern South Dakota, an aerial survey was conducted for bald eagle (*Haliaeetus leucocephalus*), ferruginous hawk (*Buteo regalis*), great horned owl (*Bubo virginianus*), golden eagle (*Aquila chrysaetos*), prairie falcon (*Falco mexicanus*), red-tailed hawk (*Buteo jamaicensis*), and Swainson's hawk (*Buteo swainsoni*) during the 2011 nesting season. Objectives of this survey were to 1) inventory active raptor nest locations within northwestern South Dakota, 2) characterize nesting substrates, and 3) determine fledging success of active nests.

STUDY AREA AND METHODS

This aerial survey was conducted in extreme northwest, South Dakota encompassing primarily Butte, Harding and Perkins Counties (Figure 1). Northwestern South Dakota is comprised of the Great Plains ecoregion, which consists of semiarid shale and clay plains including sagebrush steppe. Within this ecoregion sandstone buttes, badlands, scoria knobs, and forested buttes provide excellent nesting substrate for many raptor species, most notably golden eagles (*Aquila chrysaetos*). In addition to these substrates, the little Missouri, Grand, Moreau, and Belle Fourche river drainages provide suitable nesting sites on both cliff edges formed by the cutting rivers and in the plains cottonwood (*Populus deltoides*) and green ash (*Fraxinus pennsylvanica*) trees that are commonly found in these drainages.

Knowles (2005) identified two hundred sixty-nine raptor nests in northwestern South Dakota in 2005. Each of these nest locations were loaded into ArcPad and were displayed on a Trimble Yuma® tablet computer, which was utilized for navigating to nests and recording data. Initial flights were conducted from 17 May – 19 May from a Piper PA-18 SuperCub, flying at an altitude of ~150 feet above ground level at a speed of ~80 miles per hour. During these flights all previously documented nests locations were visited. Upon arriving at each nest location the status of the nest was documented (active, inactive, or absent), species occupying nest, and if any young were visible. During flights to previously documented nests, both the pilot and I visually searched for new nests. Active prairie falcon nests were located by searching for excrement, “whitewash” on cliff faces, which is representative of an active nest. Once a new nest was located, species occupying nest was recorded, along with the nest substrate, i.e. cliff, Badlands knob, scoria knob, tree species, hillside, and if any young were observed. In an attempt to

document reproductive success of raptor species, all active nests identified during initial flights were again visited during flights from 26 June – 28 June.

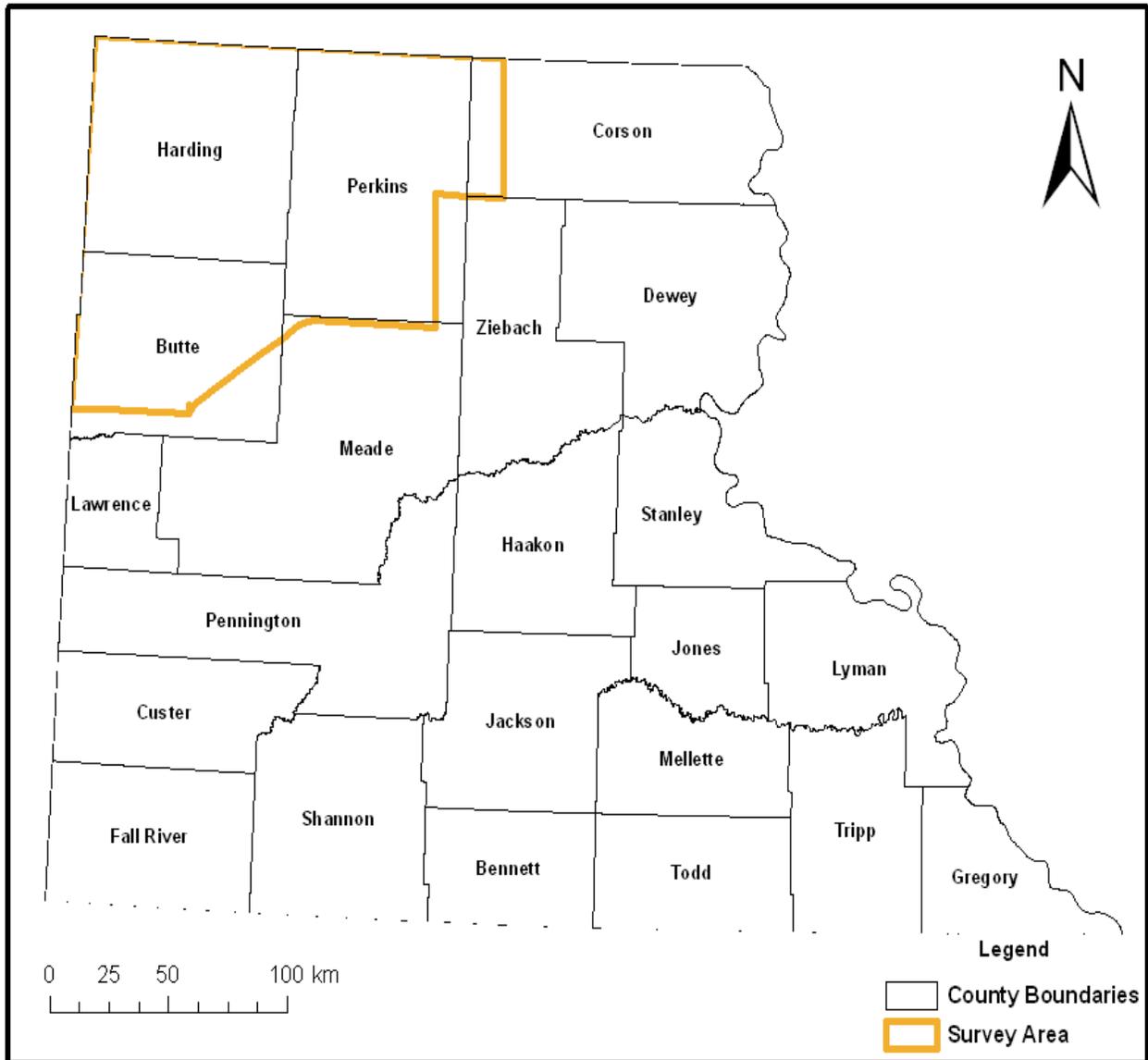


Figure 1. Aerial raptor survey area of northwestern South Dakota, 2011.

RESULTS

Bald Eagle

One bald eagle nest, previously documented by Knowles (2005) was located in a plains cottonwood tree and was again active in 2011 and subsequently fledged two eaglets (Appendix A, Table 2). In addition to status tables for each species, figures depicting active and fledged nest locations are found in Appendix A. Nest substrates and their associated abbreviations can be found in Appendix A, Table 1.

Ferruginous Hawk

Thirty-three previously documented ferruginous hawk nests were observed, ten were active in 2011, and an additional four new active nests were documented (Appendix A, Table 3). Knowles (2005) observed 19 active ferruginous hawk nests in 2005 compared to 14 observed in 2011 (Figure 2). Active nests observed in 2011 were located in plains cottonwoods, N=6, green ash (*Fraxinus pennsylvanica*), N=3, badlands knobs, N=3, scoria knobs, N=1, and an unidentified small tree, N=1. Fledging success was documented in 4 of the 14 active ferruginous hawk nests (28.5%). Average number of young fledged per successfully fledged nest was 2.50 ± 0.58 (SD) (Table 1).

Great Horned Owl

Thirteen great horned owl nests were previously documented, and upon visiting these nests six were active, one was inactive, and six were absent (Appendix A, Table 4). During this survey, five new active great horned owl nests were located, however due to early nesting of great horned owls; fledging success was not documented as our visits to active nests were conducted after all young would have fledged. Knowles (2005) documented 9 active great

horned owl nests in 2005 compared to eleven observed in 2011 (Figure 2). Active nests in 2011 were located in green ash, N=6 and plains cottonwoods, N=5.

Golden Eagle

One hundred twenty-one golden eagle nests were previously documented by Knowles (2005), in which 52 nests were active. Upon visiting each previously documented nest location twenty-six were active in 2011, and five new active nests were located (Figure 2). Active golden eagle nests were located on cliffs, N=20 and in plains cottonwoods, N=11 (Appendix A, Table 5). Fledging success was documented in 20 of the 31 active golden eagle nests (64.5%). Average number of eaglets fledged per successfully fledged nest was 1.45 ± 0.51 (SD).

Prairie Falcon

Knowles (2005) documented thirteen prairie falcon nests in 2005, and one additional nest was located during this survey. All previously documented nests were visited during this survey, of which six were determined to be active (Appendix A, Table 6). Fledging success was not documented, as young are extremely difficult to observe inside the cliff crevices and caves where nests are placed.

Red-tailed Hawk

Sixty-three red-tailed hawk nests were located within our defined survey area by Knowles (2005). Forty-five of these nests were active in 2005. Thirty active red-tailed hawk nests were observed during this survey, 15 of which were new (Appendix A, Table 7). Active nests observed in 2011 were located in plains cottonwoods, N=19, cliffs, N=8, and green ash, N=3. Fledging success was documented in 6 of the 30 active red-tailed hawk nests (20.0%). Average number of young fledged per successfully fledged nest was 1.83 ± 0.75 (SD).

Swainson's Hawk

Thirty-two Swainson's hawk nests were documented by Knowles (2005), and of these nests 18 were active in 2005. All previously documented Swainson's hawk nests were observed in 2011, of which, 10 were documented to be active, 12 were inactive, and 10 were absent. Three new active nests were also located (Appendix A, Table 8). Active nests observed in 2011 were located in plains cottonwoods, N=6, green ash, N=3, Siberian elm (*Ulmus pumila*) N=3, and willow (*Salix spp.*) N=1. Fledging success was documented in 4 of the 13 active Swainson's hawk nests (30.8%). Average number of young fledged per successfully fledged nest was 2.25 ± 0.50 (SD).

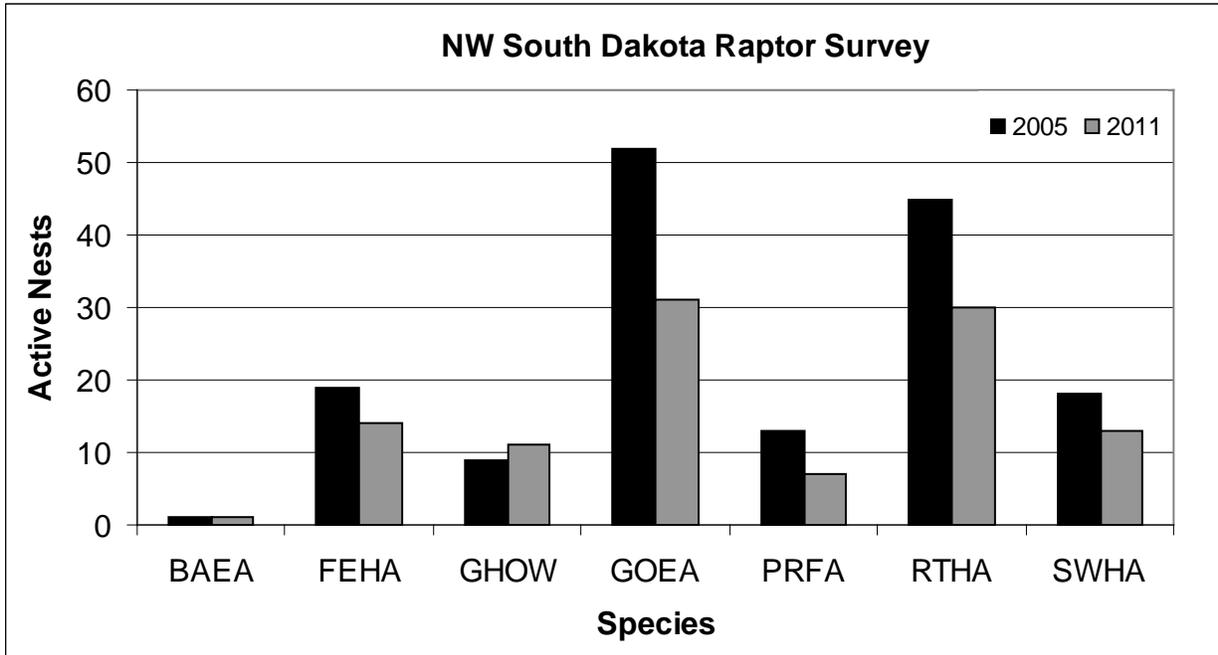


Figure 2. Active raptor nests observed during aerial surveys in northwestern South Dakota, 2005 and 2011. Raptor abbreviations, BAEA = bald eagle, FEHA = ferruginous hawk, GHOW = great horned owl, GOEA = golden eagle, PRFA = prairie falcon, RTHA = red-tailed hawk, SWHA = Swainson’s hawk.

Table 1. Average number of young fledged per successfully fledged nest \pm SD for raptors in northwest South Dakota, 2011.

	BAEA	FEHA	GHOW	GOEA	PRFA	RTHA	SWHA
N	1	4	-	20	-	6	4
Mean	2	2.50	-	1.45	-	1.83	2.25
\pm SD	-	0.58	-	0.51	-	0.75	0.50

Raptor abbreviations, BAEA = bald eagle, FEHA = ferruginous hawk, GHOW = great horned owl, GOEA = golden eagle, PRFA = prairie falcon, RTHA = red-tailed hawk, SWHA = Swainson’s hawk.

DISCUSSION

Active raptor nests observed during this survey were lower for nearly all species, compared to the survey conducted by Knowles (2005). The greatest decrease in active nests was in golden eagles, where 52 active nests were documented in 2005 and only 31 in 2011. Golden eagle nests will remain intact for several years, however of the 121 nests documented in 2005; 37 of these nests were absent in 2011. Nests that were absent in 2011 were likely the result of deterioration from winds, rain, and snowfall. In some cases it was evident that the nest had fallen due to cliff erosion on which the nest was placed. This was particularly evident in nests that were located on mud cliffs. One nest observed in extreme northwest Harding County was almost entirely eroded away when observed on 28 June. However, the one eaglet that was documented in the nest was perched several feet below at the rivers edge.

Golden eagle pairs will often have multiple nests within a localized area, although only one will be active during a given year. All major drainages and rock outcroppings that were flown in 2005 were flown in 2011. When flying drainages before leaf out golden eagle nests are easily located, however when flying rock outcropping, such as the Slim Buttes it is much more difficult to accurately document all nests. Therefore, the decrease in active golden eagle nests may be due to the relocation of nests within rock outcroppings that were not observed. Red-tailed hawk, prairie falcon, ferruginous, and Swainson's hawk active nests were also lower in 2011 compared to 2005. However, there were more (N=2) great horned owl nests documented in 2011 vs. 2005. One bald eagle nest that was previously documented in 2005 was again active in 2011, and no other active nests were documented.

Fledging success was documented in all species surveyed, except great horned owl and prairie falcon. Great horned owls initiate nests in Mid February and young fledge in May

(Tallman et al. 2002). Therefore, fledging success was not documented for great horned owls as the second flight survey of active nests was conducted in late June. Based on three of the nine active great horned owl nests where young were accurately counted during the May flights, brood size averaged 3.0. Prairie falcon nests were located in small crevices within cliffs; therefore fledging success was not documented due to the visual hindrance. In species where fledgling success was documented, it was apparent that fledgling success was higher for nests located in the northeast portion of the study area compared to the southwest. One possible explanation of this difference is the extreme weather events that tracked through the southwest portion of the study area during the nesting season. These events were likely the cause of downed nests, and may have been frequent and prolonged enough that adults were unable to remain on the nest during the incubation and/or brooding period, which would subsequently result in an unsuccessful nest. It is also likely that some nests may have fledged young prior to our second flight survey in late June. In addition, nests that failed early in the nesting season may have resulted in additional nesting attempts.

Future raptor survey efforts should be focused in southwest South Dakota as there is suitable nesting habitat, and numerous raptor nesting records have been documented in this area. However, many of these records are dated, and in order to continually track raptor populations in South Dakota, notably golden eagles, it would be essential to survey this area. Bald eagle nest locations and reproductive success is continually monitored throughout South Dakota. However, to accurately and efficiently document nesting bald eagle locations along primary river drainages of western South Dakota, survey flights are recommended in early spring before leaf out. These primary river drainages (White, Little White, Cheyenne, Belle Fourche, Moreau, Grand and Keya Paya), have not been flown for bald eagle monitoring since in 1998.

ACKNOWLEDGEMENTS

I would like to thank pilot Chad Cyrus of Big Sky Wildlife Consultants for his superb flying skills and ability to locate and identify raptor nests. I would also like to thank Chris Marsh and Chelsea West (South Dakota Department of Game, Fish and Parks), for the development of an ArcPad application that allowed me to easily locate previous raptor nest locations and record associated data during aerial flights.

Literature Cited

- Good, G.G. 1979. An inventory of raptor nesting in Harding County, South Dakota, 1977. Pittman-Robertson Project W-95-R-12, job No. 9-1. South Dakota Department of Game, Fish and Parks, Pierre, SD.
- Knowles, C.J. 2001. A raptor survey of the Grand River National Grassland, Perkins County, South Dakota. Unpublished report U.S. Forest Service, Bismarck, ND.
- Knowles, C.J. 2002. A raptor survey of the Grand River National Grassland, Perkins and Corson Counties, South Dakota. Unpublished report U.S. Forest Service, Bismarck, ND.
- Knowles, C.J. 2005. Results of an aerial survey for nesting golden eagles in northwestern South Dakota. Report prepared for South Dakota Department of Game, Fish and Parks, Pierre, SD.
- O'Brien, D. and M. Pulkrabek. 1974. An inventory of raptor nesting in Harding County, South Dakota, 1973. Pittman-Robertson Project W-95-R-7, job No. 9-1. South Dakota Department of Game, Fish and Parks, Pierre, SD.
- O'Brien, D. and J. Sharps. 1980. An inventory of nesting raptors in Harding County, South Dakota, 1980. South Dakota Department of Game, Fish and Parks, Pierre, SD.
- Pulkrabek, M. and D. O'Brien. 1974. An inventory of raptor nesting in Harding County, South Dakota, 1974. Pittman-Robertson Project W-95-R-8, job No. 9-1. South Dakota Department of Game, Fish and Parks, Pierre, SD.
- Pulkrabek, M. 1976. An inventory of raptor nesting in Harding County, South Dakota, 1975. Pittman-Robertson Project W-95-R-10, job No. 9-1. South Dakota Department of Game, Fish and Parks, Pierre, SD.
- Sharps, J. 1980. An inventory of raptor nesting in Harding County, South Dakota, 1978. Pittman-Robertson Project W-95-R-12, job No. 9-1. South Dakota Department of Game, Fish and Parks, Game Report 80-11, Pierre, SD.
- Tallman, D. A., D. L. Swanson, and J. S. Palmer. 2002. Birds of South Dakota. 3rd ed. Midstates/Quality Quick Print, Aberdeen, SD. 441 pp.

APPENDIX A.

Table 1. Substrates of raptor nest placement observed during an aerial raptor survey of northwest South Dakota, 2011.

Substrate	Abbreviation
Badlands Knob	BN
Badlands Pinnacle	BP
Cliff	Cliff
Green Ash	Ash
Hill Side	HS
Plains Cottonwood	CTNWD
Ponderosa Pine	Pine
Rock Pinnacle	RP
Rock Ridge	RR
Scoria Knob	SK
Siberian Elm	SE
Unidentified Small Tree	UST
Willow Tree spp.	Willow

Table 2. Bald eagle nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
BAEA01	N	ACT	2	CTNWD	BAEA

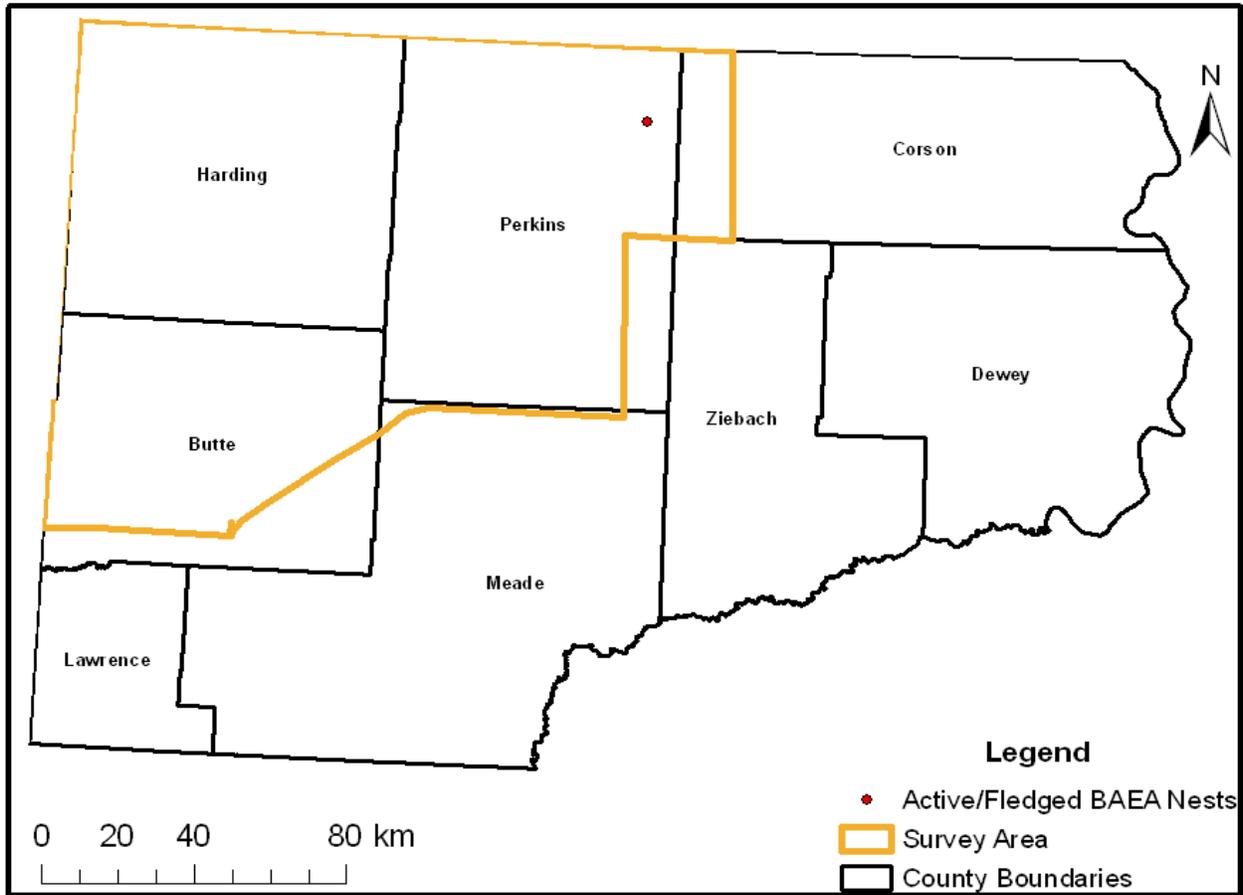


Figure 1. Active and fledged bald eagle nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 3. Ferruginous hawk nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
FEHA12	N	ACT	0	BK	FEHA
FEHA15	N	ACT	0	BK	FEHA
FEHA16	N	ACT	0	UST	FEHA
SWHA09	N	ACT	0	CTNWD	FEHA
FEHA20	N	ACT	0	CTNWD	FEHA
SWHA23	N	ACT	0	Ash	FEHA
FEHA22	N	ACT	0	BK	FEHA
FEHA25	N	ACT	0	CTNWD	FEHA
FEHA34	Y	ACT	0	Ash	FEHA
FEHA35	Y	ACT	0	SK	FEHA
FEHA36	Y	ACT	0	Ash	FEHA
FEHA39	Y	ACT	0	CTNWD	FEHA
GHOW02	N	ACT	0	CTNWD	FEHA
RTHA07	N	ACT	0	CTNWD	FEHA
FEHA01	N	INACT	0	CTNWD	NA
FEHA02	N	INACT	0	Ash	NA
FEHA04	N	INACT	0	SK	NA
FEHA07	N	INACT	0	CTNWD	NA
FEHA09	N	INACT	0	CTNWD	NA
FEHA10	N	INACT	0	CTNWD	NA
FEHA11	N	INACT	0	Willow	NA
FEHA17	N	INACT	0	CTNWD	NA
FEHA24	N	INACT	0	Ash	NA
FEHA27	N	INACT	0	HS	NA
FEHA28	N	INACT	0	HS	NA
FEHA29	N	INACT	0	UST	NA
FEHA31	N	INACT	0	UST	NA
FEHA03	N	Absent	0	Willow	NA
FEHA05	N	Absent	0	RP	NA
FEHA06	N	Absent	0	BP	NA
FEHA13	N	Absent	0	BK	NA
FEHA14	N	Absent	0	BK	NA
FEHA19	N	Absent	0	RR	NA
FEHA26	N	Absent	0	UST	NA
FEHA30	N	Absent	0	SE	NA
FEHA32	N	Absent	0	UST	NA
FEHA33	N	Absent	0	Ash	NA

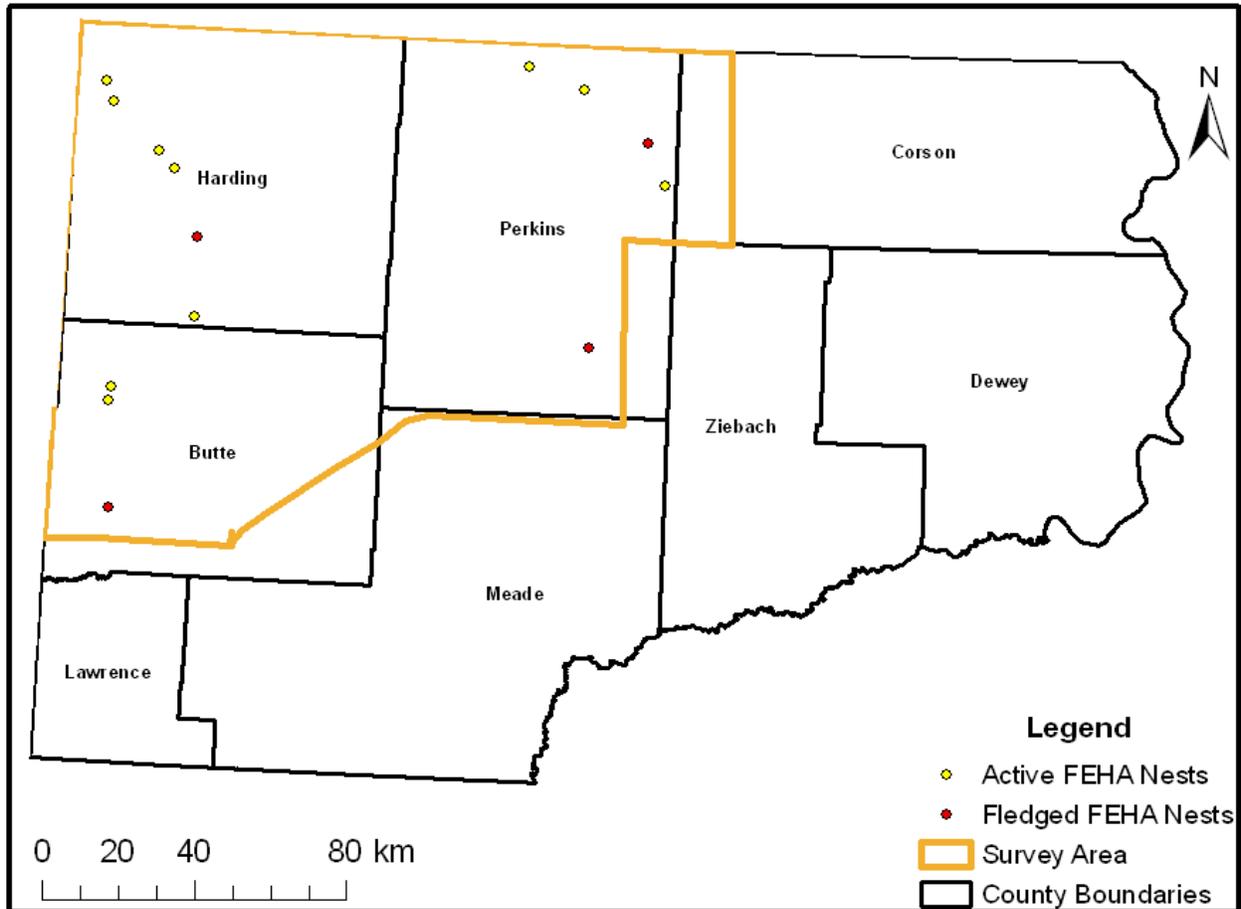


Figure 2. Active and fledged ferruginous nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 4. Great horned owl nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
GHOW03	N	ACT	3	CTNWD	GHOW
GHOW10	Y	ACT	0	Ash	GHOW
GHOW11	Y	ACT	3	Ash	GHOW
GHOW12	Y	ACT	3	Ash	GHOW
GHOW13	Y	ACT	0	CTNWD	GHOW
GHOW14	Y	ACT	0	CTNWD	GHOW
SWHA21	N	ACT	0	Ash	GHOW
RTHA10	N	ACT	0	Ash	GHOW
RTHA14	N	ACT	0	Ash	GHOW
RTHA36	N	ACT	0	CTNWD	GHOW
FEHA08	N	ACT	0	CTNWD	GHOW
GHOW01	N	INACT	0	CTNWD	NA
GHOW04	N	Absent	0	CTNWD	NA
GHOW05	N	Absent	0	BK	NA
GHOW06	N	Absent	0	CTNWD	NA
GHOW07	N	Absent	0	Ash	NA
GHOW08	N	Absent	0	Ash	NA
GHOW09	N	Absent	0	Ash	NA

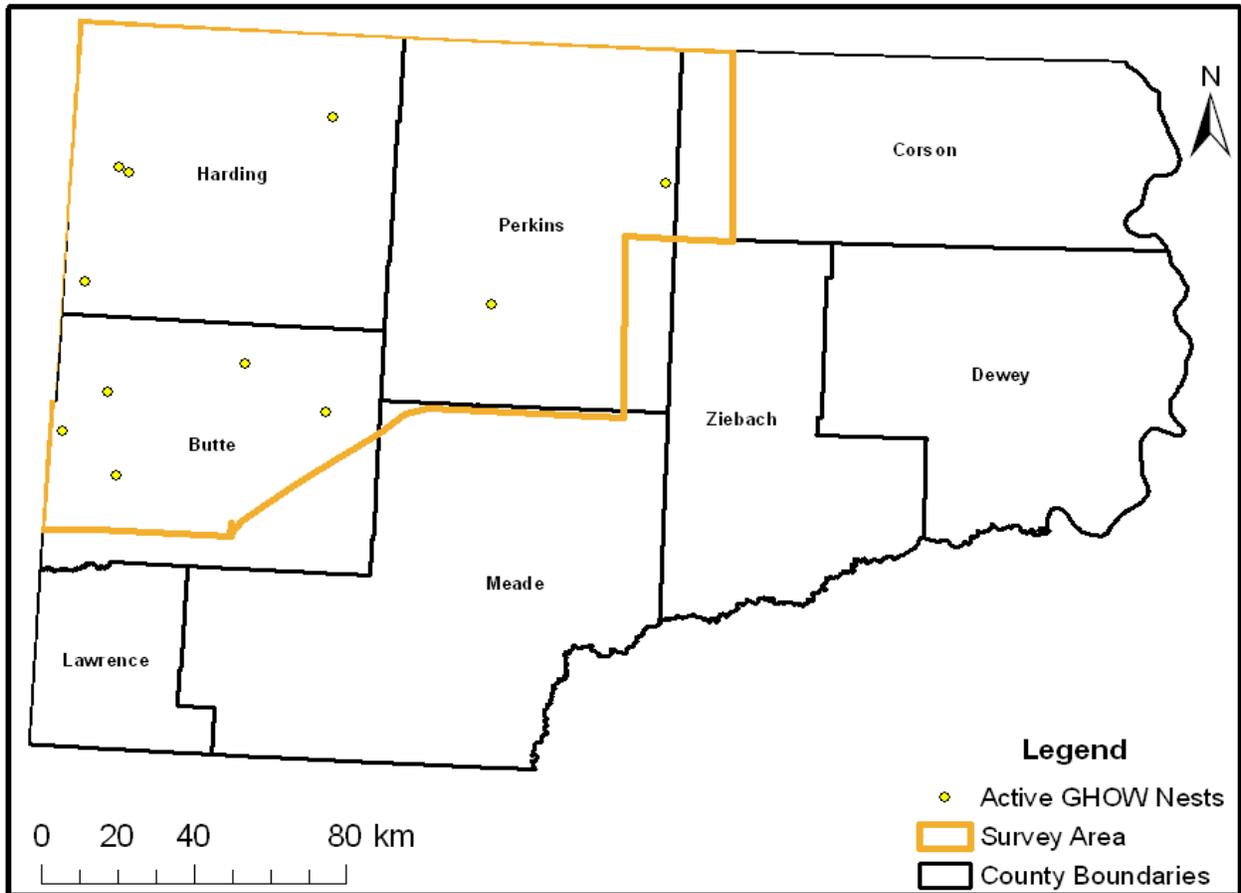


Figure 3. Active great horned owl nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 5. Golden eagle nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
GOEA01	N	ACT	1	Cliff	GOEA
GOEA100	N	ACT	2	Cliff	GOEA
GOEA101	N	ACT	1	Cliff	GOEA
GOEA105	N	ACT	2	CTNWD	GOEA
GOEA114	N	ACT	0	Cliff	GOEA
GOEA116	N	ACT	1	CTNWD	GOEA
GOEA117	N	ACT	2	CTNWD	GOEA
GOEA12	N	ACT	2	Cliff	GOEA
GOEA120	Y	ACT	2	Cliff	GOEA
GOEA121	Y	ACT	0	Cliff	GOEA
GOEA122	Y	ACT	0	Cliff	GOEA
GOEA129	Y	ACT	1	CTNWD	GOEA
GOEA130	Y	ACT	0	CTNWD	GOEA
GOEA18	N	ACT	1	Cliff	GOEA
GOEA25	N	ACT	2	Cliff	GOEA
GOEA43	N	ACT	1	Cliff	GOEA
GOEA48	N	ACT	0	Cliff	GOEA
GOEA49	N	ACT	2	CTNWD	GOEA
GOEA53	N	ACT	2	CTNWD	GOEA
GOEA54	N	ACT	2	CTNWD	GOEA
GOEA60	N	ACT	0	CTNWD	GOEA
GOEA64	N	ACT	1	Cliff	GOEA
GOEA70	N	ACT	0	Cliff	GOEA
GOEA71	N	ACT	0	Cliff	GOEA
GOEA76	N	ACT	0	Cliff	GOEA
GOEA81	N	ACT	0	Cliff	GOEA
GOEA88	N	ACT	0	Cliff	GOEA
GOEA92	N	ACT	0	Cliff	GOEA
GOEA94	N	ACT	0	Cliff	GOEA
GOEA97	N	ACT	1	CTNWD	GOEA
GOEA99	N	ACT	2	CTNWD	GOEA
GOEA03	N	INACT	0	CTNWD	NA
GOEA05	N	INACT	0	CTNWD	NA
GOEA06	N	INACT	0	Cliff	NA
GOEA07	N	INACT	0	Cliff	NA
GOEA09	N	INACT	0	Cliff	NA
GOEA10	N	INACT	0	Cliff	NA
GOEA11	N	INACT	0	Cliff	NA
GOEA13	N	INACT	0	Cliff	NA
GOEA14	N	INACT	0	Cliff	NA
GOEA15	N	INACT	0	Cliff	NA
GOEA16	N	INACT	0	Cliff	NA

GOEA17	N	INACT	0	Cliff	NA
GOEA20	N	INACT	0	Cliff	NA
GOEA21	N	INACT	0	Cliff	NA
GOEA23	N	INACT	0	Cliff	NA
GOEA24	N	INACT	2	Cliff	NA
GOEA28	N	INACT	0	Cliff	NA
GOEA31	N	INACT	0	Cliff	NA
GOEA35	N	INACT	0	Cliff	NA
GOEA36	N	INACT	0	Cliff	NA
GOEA37	N	INACT	0	Cliff	NA
GOEA38	N	INACT	0	Cliff	NA
GOEA40	N	INACT	0	Cliff	NA
GOEA50	N	INACT	0	Cliff	NA
GOEA58	N	INACT	0	CTNWD	NA
GOEA61	N	INACT	0	Cliff	NA
GOEA62	N	INACT	0	Cliff	NA
GOEA63	N	INACT	0	Cliff	NA
GOEA65	N	INACT	0	Cliff	NA
GOEA66	N	INACT	0	Cliff	NA
GOEA68	N	INACT	0	Cliff	NA
GOEA73	N	INACT	1	Cliff	NA
GOEA75	N	INACT	0	Cliff	NA
GOEA77	N	INACT	0	Cliff	NA
GOEA78	N	INACT	0	Cliff	NA
GOEA80	N	INACT	0	Cliff	NA
GOEA83	N	INACT	0	Cliff	NA
GOEA85	N	INACT	0	Cliff	NA
GOEA86	N	INACT	0	Cliff	NA
GOEA87	N	INACT	0	Cliff	NA
GOEA89	N	INACT	0	Cliff	NA
GOEA90	N	INACT	0	Cliff	NA
GOEA93	N	INACT	0	Cliff	NA
GOEA95	N	INACT	0	Cliff	NA
GOEA96	N	INACT	0	Cliff	NA
GOEA98	N	INACT	0	Cliff	NA
GOEA103	N	INACT	0	CTNWD	NA
GOEA104	N	INACT	0	Cliff	NA
GOEA108	N	INACT	0	CTNWD	NA
GOEA109	N	INACT	0	Cliff	NA
GOEA112	N	INACT	0	CTNWD	NA
GOEA113	N	INACT	0	CTNWD	NA
GOEA55	N	Absent	0	Cliff	NA
GOEA57	N	Absent	0	Cliff	NA
GOEA69	N	Absent	0	Cliff	NA
GOEA74	N	Absent	0	Cliff	NA
GOEA02	N	Absent	2	CTNWD	NA

GOEA04	N	Absent	0	CTNWD	NA
GOEA08	N	Absent	0	CTNWD	NA
GOEA22	N	Absent	0	Cliff	NA
GOEA26	N	Absent	0	Cliff	NA
GOEA27	N	Absent	0	Cliff	NA
GOEA29	N	Absent	0	Cliff	NA
GOEA30	N	Absent	0	Cliff	NA
GOEA32	N	Absent	0	Cliff	NA
GOEA33	N	Absent	0	Cliff	NA
GOEA34	N	Absent	0	Cliff	NA
GOEA39	N	Absent	0	Cliff	NA
GOEA41	N	Absent	2	Cliff	NA
GOEA42	N	Absent	0	CTNWD	NA
GOEA44	N	Absent	0	CTNWD	NA
GOEA45	N	Absent	1	CTNWD	NA
GOEA46	N	Absent	1	CTNWD	NA
GOEA47	N	Absent	0	Cliff	NA
GOEA51	N	Absent	1	Cliff	NA
GOEA52	N	Absent	0	CTNWD	NA
GOEA59	N	Absent	1	CTNWD	NA
GOEA67	N	Absent	0	Cliff	NA
GOEA72	N	Absent	0	Cliff	NA
GOEA82	N	Absent	0	Cliff	NA
GOEA84	N	Absent	0	Cliff	NA
GOEA91	N	Absent	0	Cliff	NA
GOEA102	N	Absent	0	Absent	NA
GOEA106	N	Absent	0	CTNWD	NA
GOEA107	N	Absent	0	Absent	NA
GOEA110	N	Absent	0	CTNWD	NA
GOEA111	N	Absent	0	CTNWD	NA
GOEA115	N	Absent	0	Ash	NA
GOEA118	N	Absent	0	CTNWD	NA

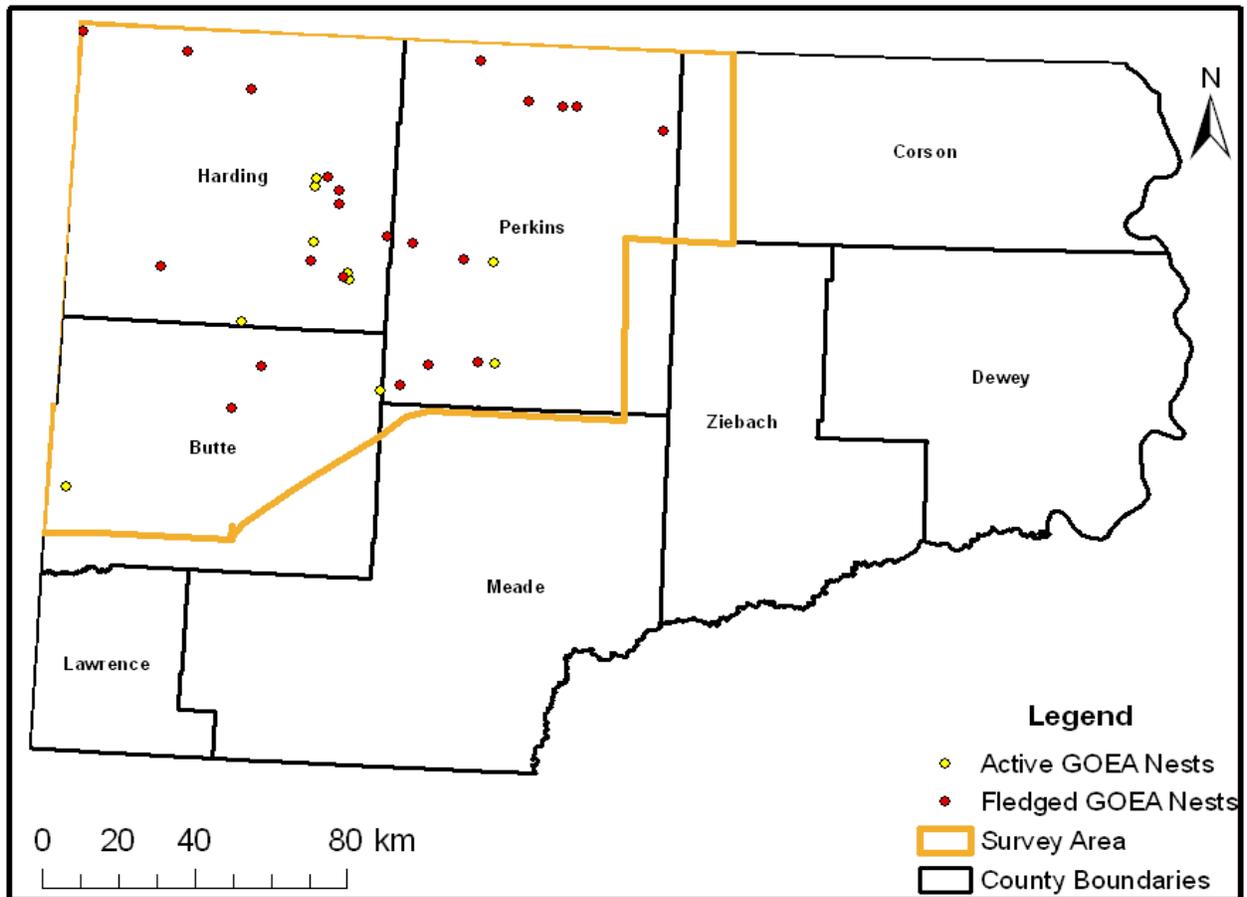


Figure 4. Active and fledged golden eagle nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 6. Prairie falcon nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
PRFA01	N	ACT	0	Cliff	PRFA
PRFA02	N	ACT	0	Cliff	PRFA
PRFA04	N	ACT	0	Cliff	PRFA
PRFA05	N	ACT	0	Cliff	PRFA
PRFA06	N	ACT	0	Cliff	PRFA
PRFA09	N	ACT	0	Cliff	PRFA
PRFA14	Y	ACT	0	Cliff	PRFA
PRFA08	N	INACT	0	Cliff	PRFA
PRFA12	N	INACT	0	Cliff	PRFA
PRFA03	N	UNDET	0	Cliff	PRFA
PRFA07	N	UNDET	0	Cliff	PRFA
PRFA10	N	UNDET	0	Cliff	PRFA
PRFA11	N	UNDET	0	Cliff	PRFA
PRFA13	N	UNDET	0	Cliff	PRFA

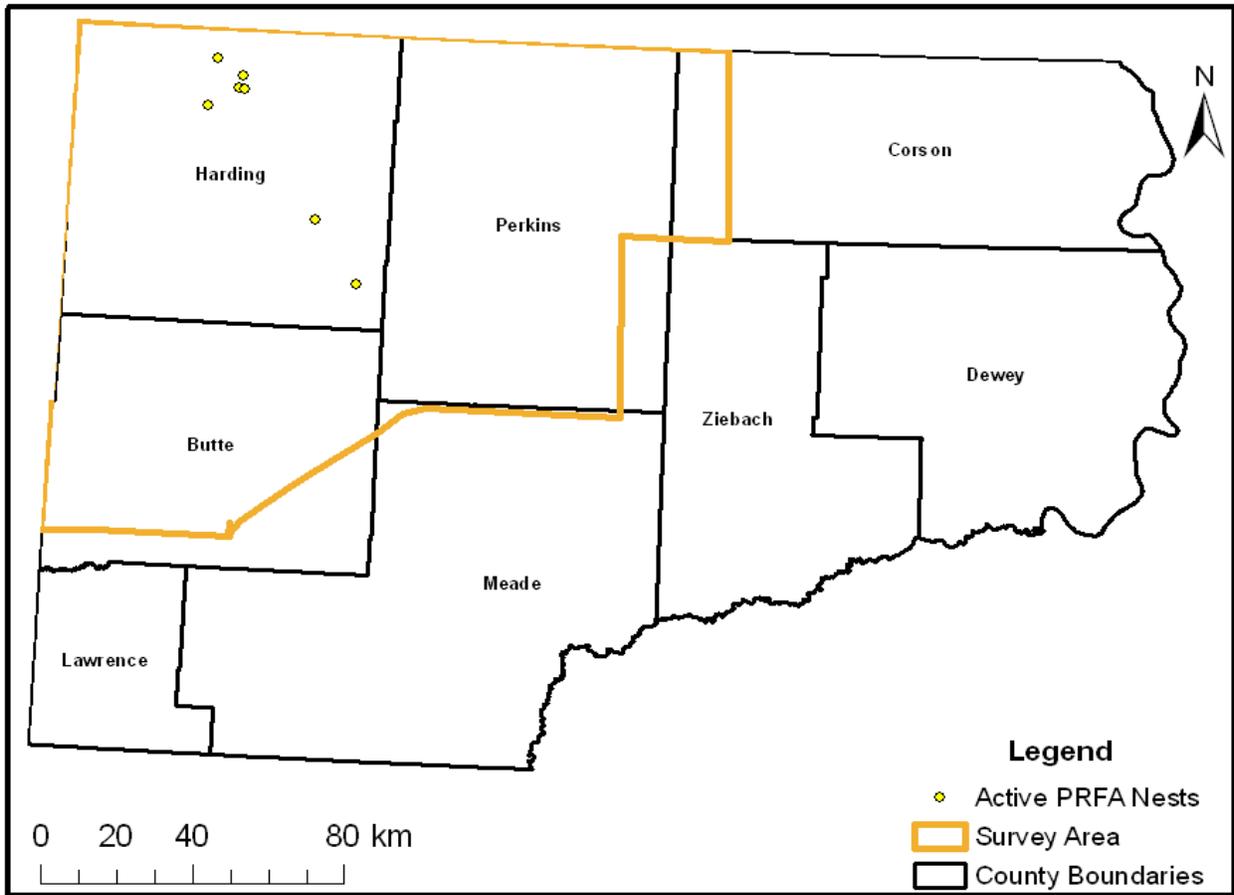


Figure 5. Active prairie falcon nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 7. Red-tailed hawk nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
RTHA04	N	ACT	0	CTNWD	RTHA
RTHA05	N	ACT	0	CTNWD	RTHA
RTHA06	N	ACT	0	CTNWD	RTHA
RTHA08	N	ACT	0	CTNWD	RTHA
RTHA19	N	ACT	0	CTNWD	RTHA
RTHA25	N	ACT	0	CTNWD	RTHA
RTHA30	N	ACT	0	CTNWD	RTHA
RTHA44	N	ACT	0	Cliff	RTHA
RTHA48	N	ACT	0	Cliff	RTHA
RTHA51	N	ACT	0	Cliff	RTHA
RTHA57	N	ACT	0	CTNWD	RTHA
RTHA64	Y	ACT	0	CTNWD	RTHA
RTHA65	Y	ACT	0	Cliff	RTHA
RTHA66	Y	ACT	0	Cliff	RTHA
RTHA67	Y	ACT	0	Cliff	RTHA
RTHA68	Y	ACT	0	Ash	RTHA
RTHA69	Y	ACT	0	CTNWD	RTHA
RTHA70	Y	ACT	0	CTNWD	RTHA
RTHA71	Y	ACT	0	CTNWD	RTHA
RTHA72	Y	ACT	0	CTNWD	RTHA
RTHA73	Y	ACT	0	CTNWD	RTHA
RTHA74	Y	ACT	0	CTNWD	RTHA
RTHA75	Y	ACT	2	CTNWD	RTHA
RTHA76	Y	ACT	0	CTNWD	RTHA
RTHA77	Y	ACT	0	CTNWD	RTHA
RTHA78	Y	ACT	0	CTNWD	RTHA
SWHA32	N	ACT	0	Ash	RTHA
FEHA23	N	ACT	0	Ash	RTHA
GOEA19	N	ACT	0	Cliff	RTHA
GOEA79	N	ACT	0	Cliff	RTHA
RTHA01	N	INACT	0	CTNWD	NA
RTHA09	N	INACT	0	Ash	NA
RTHA12	N	INACT	0	Ash	NA
RTHA15	N	INACT	0	Cliff	NA
RTHA16	N	INACT	0	Cliff	NA
RTHA17	N	INACT	0	Ash	NA
RTHA18	N	INACT	0	Ash	NA
RTHA20	N	INACT	0	CTNWD	NA
RTHA21	N	INACT	0	CTNWD	NA
RTHA38	N	INACT	0	CTNWD	NA
RTHA42	N	INACT	0	Cliff	NA
RTHA46	N	INACT	0	Cliff	NA

RTHA47	N	INACT	0	Cliff	NA
RTHA50	N	INACT	0	Cliff	NA
RTHA52	N	INACT	0	Cliff	NA
RTHA53	N	INACT	0	Cliff	NA
RTHA59	N	INACT	0	CTNWD	NA
RTHA60	N	INACT	0	Ash	NA
RTHA61	N	INACT	0	Ash	NA
RTHA62	N	INACT	0	Ash	NA
RTHA45	N	Absent	0	Cliff	NA
RTHA58	N	Absent	0	CTNWD	NA
RTHA02	N	Absent	0	CTNWD	NA
RTHA03	N	Absent	0	CTNWD	NA
RTHA11	N	Absent	0	CTNWD	NA
RTHA13	N	Absent	0	Pine	NA
RTHA22	N	Absent	0	CTNWD	NA
RTHA23	N	Absent	0	CTNWD	NA
RTHA24	N	Absent	0	CTNWD	NA
RTHA26	N	Absent	0	CTNWD	NA
RTHA27	N	Absent	0	CTNWD	NA
RTHA28	N	Absent	0	CTNWD	NA
RTHA29	N	Absent	0	Unid. Tree	NA
RTHA33	N	Absent	0	CTNWD	NA
RTHA34	N	Absent	0	CTNWD	NA
RTHA35	N	Absent	0	CTNWD	NA
RTHA37	N	Absent	0	CTNWD	NA
RTHA39	N	Absent	3	CTNWD	NA
RTHA40	N	Absent	0	CTNWD	NA
RTHA41	N	Absent	0	CTNWD	NA
RTHA43	N	Absent	0	CTNWD	NA
RTHA49	N	Absent	0	Cliff	NA
RTHA54	N	Absent	0	Ash	NA
RTHA55	N	Absent	0	CTNWD	NA
RTHA56	N	Absent	0	CTNWD	NA
RTHA63	N	Absent	0	CTNWD	NA

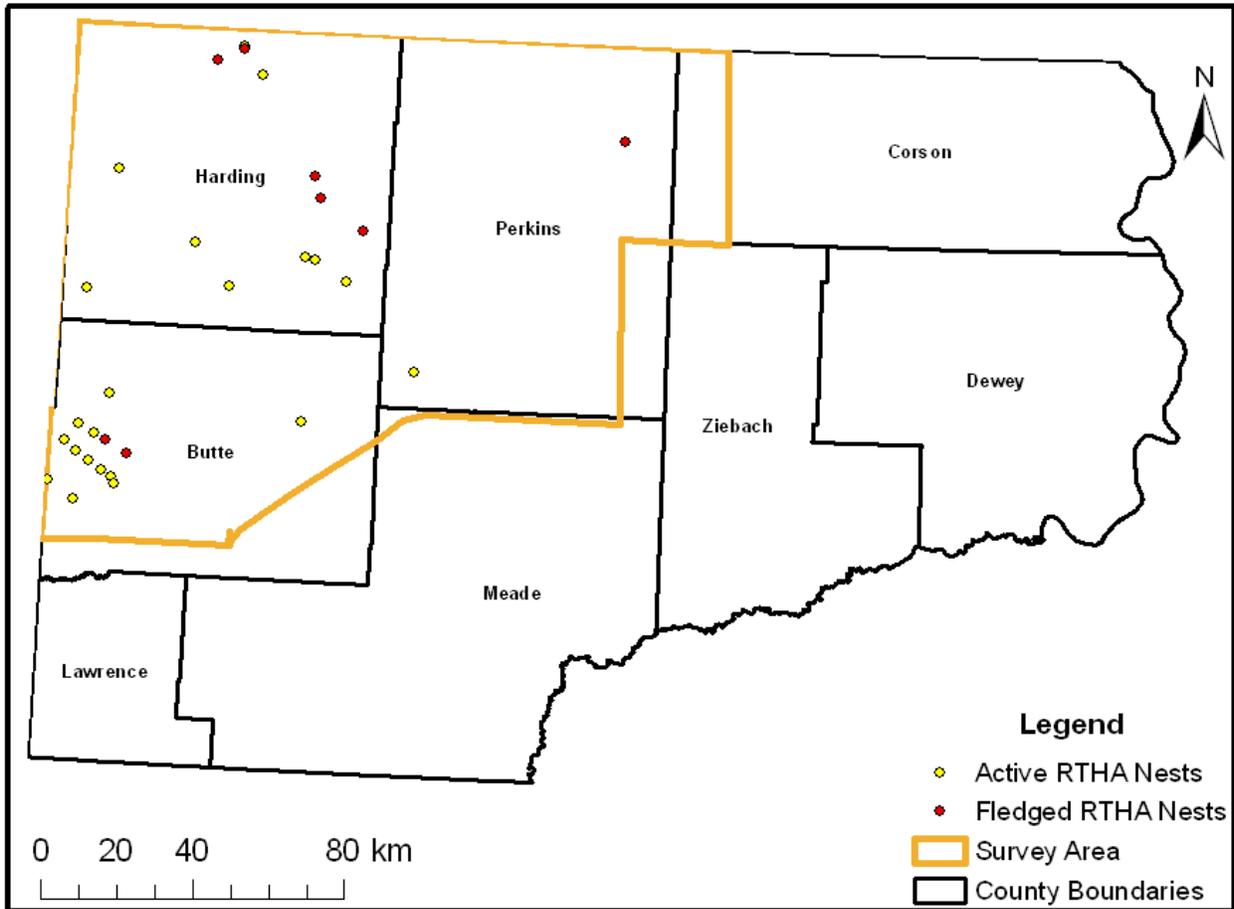


Figure 6. Active and fledged red-tailed hawk nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 8. Swainson's hawk nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
SWHA06	N	ACT	0	SE	SWHA
SWHA08	N	ACT	0	CTNWD	SWHA
FEHA21	N	ACT	0	SE	SWHA
SWHA12	N	ACT	0	CTNWD	SWHA
SWHA14	N	ACT	0	CTNWD	SWHA
SWHA27	N	ACT	0	Ash	SWHA
SWHA29	N	ACT	0	CTNWD	SWHA
SWHA33	Y	ACT	0	Ash	SWHA
SWHA34	Y	ACT	0	Ash	SWHA
SWHA35	Y	ACT	0	Willow	SWHA
FEHA18	N	ACT	0	SE	SWHA
RTHA31	N	ACT	0	CTNWD	SWHA
RTHA32	N	ACT	0	CTNWD	SWHA
SWHA02	N	INACT	0	CTNWD	NA
SWHA03	N	INACT	0	CTNWD	NA
SWHA05	N	INACT	0	CTNWD	NA
SWHA10	N	INACT	0	CTNWD	NA
SWHA11	N	INACT	0	Ash	NA
SWHA18	N	INACT	0	CTNWD	NA
SWHA19	N	INACT	0	CTNWD	NA
SWHA20	N	INACT	0	CTNWD	NA
SWHA22	N	INACT	0	Ash	NA
SWHA24	N	INACT	0	Ash	NA
SWHA26	N	INACT	0	CTNWD	CAGO
SWHA28	N	INACT	0	Ash	NA
SWHA01	N	Absent	0	CTNWD	NA
SWHA04	N	Absent	0	UST	NA
SWHA07	N	Absent	0	SE	NA
SWHA13	N	Absent	0	Willow	NA
SWHA15	N	Absent	0	Ash	NA
SWHA16	N	Absent	0	Willow	NA
SWHA17	N	Absent	0	CTNWD	NA
SWHA25	N	Absent	0	Ash	NA
SWHA30	N	Absent	0	CTNWD	NA
SWHA31	N	Absent	0	Ash	NA

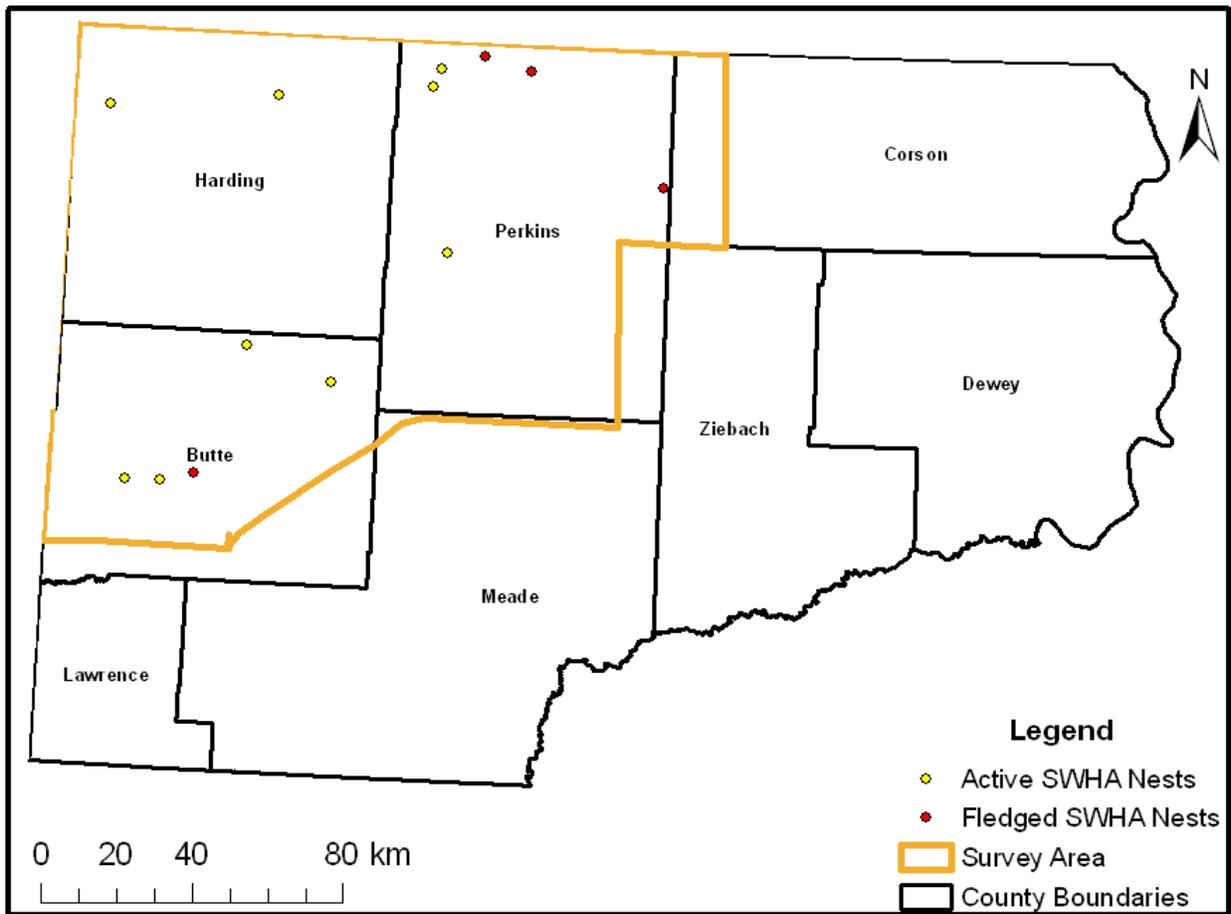


Figure 7. Active and fledged Swainson's hawk nests observed during an aerial survey of northwestern South Dakota, 2011.

Table 9. Unknown buteo nests observed during an aerial survey of northwestern South Dakota, 2011.

Nest ID	New	Status	Chicks	Substrate	Spp. Occ. Nest
UNKBUTEO01	Y	INACT	0	CTNWD	UNK
UNKBUTEO02	Y	INACT	0	Ash	UNK
UNKBUTEO03	Y	INACT	0	CTNWD	UNK
UNKBUTEO04	Y	INACT	0	Ash	UNK
UNKBUTEO05	Y	INACT	0	Ash	UNK
UNKBUTEO06	Y	INACT	0	Ash	UNK
UNKBUTEO07	Y	INACT	0	Ash	UNK
UNKBUTEO08	Y	INACT	0	Ash	UNK
UNKBUTEO09	Y	INACT	0	CTNWD	UNK
UNKBUTEO10	Y	INACT	0	CTNWD	UNK
UNKBUTEO11	Y	INACT	0	CTNWD	UNK
UNKBUTEO12	Y	INACT	0	CTNWD	UNK
UNKBUTEO13	Y	INACT	0	Unid. Tree	UNK
UNKBUTEO14	Y	INACT	0	CTNWD	UNK
UNKBUTEO15	Y	INACT	0	Ash	UNK
UNKBUTEO16	Y	INACT	0	Ash	UNK
UNKBUTEO17	Y	INACT	0	Ash	UNK
UNKBUTEO18	Y	INACT	0	Ash	UNK
UNKBUTEO19	Y	INACT	0	Ash	UNK
UNKBUTEO20	Y	INACT	0	Ash	UNK
UNKBUTEO21	Y	INACT	0	Ash	UNK
UNKBUTEO22	Y	INACT	0	Ash	UNK