Bighorn Canyon Recreation Area Peregrine Falcon Survey

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Abstract

The rapid decline of Peregrine Falcon (*Falco peregrinus*) populations began in the United States in the 1950s. In 1980, one of the last known Montana Peregrine Falcon territories was located at Gray Wolf Lake. By 1981, this nest was no longer active, and no one observed wild peregrines nesting within the state until 1984. Following the release of over 500 Peregrine Falcons by the Peregrine Fund, the number of known active Peregrine territories increased to 13 in 1994 and 71 in 2007.

Continued monitoring of Peregrine Falcon populations will provide us with an understanding of the species' recovery process. In the summers of 2008 & 2009, we conducted a survey of the Bighorn River between Horseshoe Bend and the Yellowtail Dam. The objective was to locate and document active territories (areas occupied by two nesting adults) of Peregrine Falcons. In 2012, we conducted a follow-up survey here to evaluate the reproductive success. We found twelve of the fourteen known territories occupied, with an average of 2.5 young/active territory. This is higher than the 2.1 average found across the state as a whole in 2012. Additionally, we recorded the location of one Prairie Falcon nest (*Falco mexicanus*).

The complex system of cliffs over the Big Horn Reservoir, combined with an abundance of prey species, makes it prime Peregrine Falcon habitat. We believe an intensive survey of nearby drainages would show additional active territories. The extensive stretches of large cliff faces at Devils Canyon, Black Canyon, and Big Bull Elk Creek should be a priority for future work.

ACKNOWLEDGMENTS

We thank Cassity Bromley for organizing and implementing the survey. The Bighorn Canyon National Recreation Area provided funding, logistic support, and equipment. Erick Greene (Division of Biological Science of the University of Montana) also helped with project development. Additionally, National Park Service employees assisted in the field with the Peregrine Falcon fledge counts. Cover photo is by Barbara Jaquith.

INTRODUCTION

From 18 June to 13 July of 2012, we conducted intensive Peregrine Falcon surveys of the Bighorn Canyon National Recreation Area. Our effort was part of the larger, state-wide survey performed by the Montana Peregrine Institute. This information will help our understanding of the specie's recovery in Montana.

The rapid decline of Peregrine Falcon populations began in the United States in the 1950s. in 1980, one of the last known Montana Peregrine Falcon eyries was located at Gray Wolf Lake (Sumner, 1985). By 1981, this nest was no longer active, and no one reported wild peregrines nesting within the state until 1984.The Peregrine Fund released over 500 Peregrine Falcons at 26 different hack sites in Montana between 1981 and 1998. As of 1994, the Montana Peregrine Falcon Working Group had documented 13 known active Peregrine Falcon territories. By 1998, that number grew to 18. In response to similar successes across the country, the Peregrine Falcon was removed from the endangered species list on August 20th, 1999. Further intensive Montana Peregrine Falcon surveys, beginning in 1999, increased that tally to 27 territories in 1999, 29 in 2000, 37territories in both 2001 and 2002, and 40 territories in 2003 (Sumner & Rogers, 2003). By 2011, the number of active territories increased to 94 (Sumner & Shreading, 2011). This figure represents an increase of 81active territories over the pre-survey number of 13 in 1994.

The Bighorn Canyon National Recreation Area (BICA) transects the borders of central Wyoming and Montana (Figure 1.). The complex system of cliffs over the Big Horn Reservoir, combined with an abundance of prey species, makes it prime Peregrine Falcon habitat. Our survey focused on the Bighorn River between Horseshoe Bend and the Yellowtail Dam. The objective was to locate and document active territories (areas occupied by two adults attempting to nest) of Peregrine Falcons.

METHODS

Using standard survey techniques described by Rogers and Sumner (2000), Sumner and Rogers (1999, 2001, 2003), Sumner (1985), and the Montana Peregrine Falcon Working Group, we logged over 160 observation hours (Table 1). Cliffs were observed with 10X42

binoculars and a 15x-60x variable power spotting scope. We surveyed extensive segments of cliff faces by stopping and observing for approximately one hour every 200-400 meters. We returned to sites of activity to determine if a nest was present, and if so, to count the number of young on the nesting ledge.

We recorded the longitude and latitude of active territories of Peregrine Falcon and confederate raptor species with a Garmin global positioning system (G.P.S.) receiver. These G.P.S. units have an accuracy of ± 100 meters. G.P.S. readings designate points directly below or on the top of active nesting areas. Accordingly, we listed the G.P.S. units in tables and used Google Earth software to generate figures.

We located three territories after the young had fledged, so we could not identify the nesting ledge. In these instances, we used the location where young and adults were most active and the presence of mutes below ledges and perches to identify the probable nesting cliff.

RESULTS

We surveyed fourteen known Peregrine territories and found twelve (87%) occupied. We found an average number of young fledged of 2.50 for the ten territories, where we were able to get counts of young (Table 2). Additionally, we observed two Peregrine Falcons at two locations away from known active territories (Table 3).

Whereas our survey showed many active Peregrine Falcon territories along the Bighorn Lake, we failed to detect any activity across a large area surrounding Barry's Island. We suspect that we may have missed nesting pairs there. The northern portion of the study area contained a higher concentration of Peregrine territories, most likely because there were larger and more cliff faces there. A summary of the physical characteristics of nesting cliffs can be found in Table 4, whereas the specific locations and photos of nesting cliffs are shown in Appendix A. The majority of nesting cliffs were over 100 meters tall. We observed no preference for cliff exposure.

While many other raptors were seen, our focus was on Peregrine Falcons. In 2012 we located one Prairie Falcon territory approximately ½ mile downstream of the mouth of Frozen Leg Canyon (45.303823°, -107.998122° WSG 84), where two young fledged .

Discussion

The Bighorn Canyon Recreation Area contains some of the best Peregrine Falcon habitat in the state of Montana. The continuous networks of cliffs over the reservoir provide ideal nesting and hunting conditions. In 2012, we found higher productivity (2.50 average young per active territory) in the Bighorn Canyon National Recreation Area than the average 2.1 young per active territory in Montana (Sumner et al (2012), In prep) , and much higher than the 2005-2009 average of 1.8 young per territory recorded for the Rocky Mountain/Great Plains region (Enderson et al., 2011). This year's average was also higher than that measured in the Bighorn studies (Shreading & Sumner) in 2008 (2.09) and 2009 (2.1).

Due to limitations in cost, personnel, and time, a more thorough search of the surrounding area was not possible. We believe a survey of large, tributary drainages would result in the discovery of more active territories. The extensive stretches of large cliff faces of Porcupine Creek, Black Canyon, and Big Bull Elk Creek should be searched.

Three of our observations were made after the young had already fledged. In these instances, our count of young should be viewed as a minimum count, as it is impossible to ensure no others were present. In the case of Devil's Canyon, the nesting ledge was obscured from view from the canyon rim and surface of the reservoir. Additionally, we could not identify the exact nesting ledges at Dead Indian and Eye of the Eagle territories.

We recommend future efforts should coordinate with the United States Fish and Wildlife Service and the Montana State surveys in 2015 before undergoing ten-year survey intervals. Such cooperation will provide a more thorough estimate of the area's Peregrine Falcon population and document its viability.

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Figure 1. Bighorn Canyon study area.

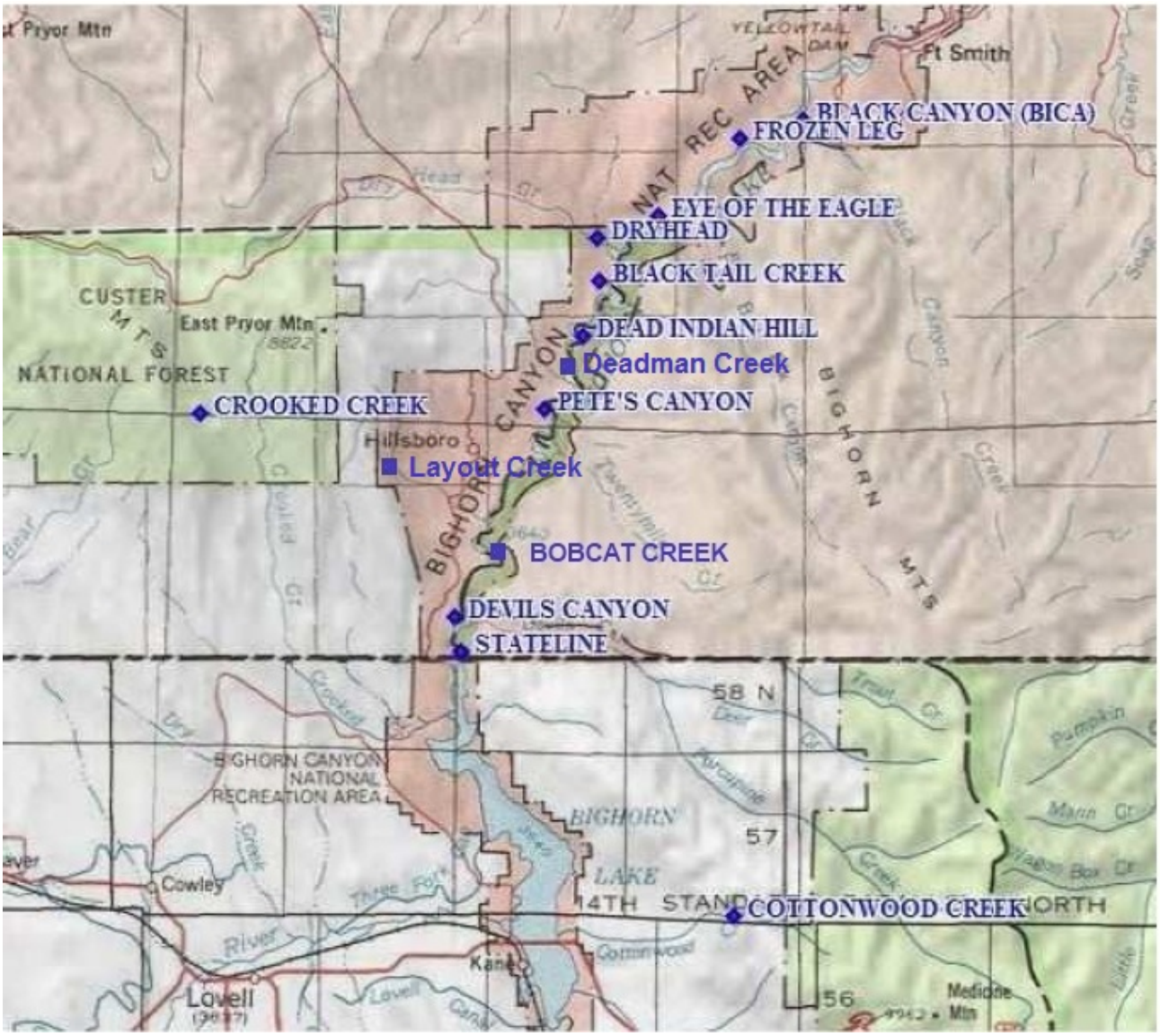


Table 1. Summary of Survey Effort during the Big Horn Canyon study (2012)

Date	Survey Hours	People Hours	Habitat Checked
18-Jun	2.5	2.5	Devil's Canyon
19-Jun	6	6	Devil's Canyon, Pryor Mountains
20-Jun	7.5	7.5	Medicine Creek, Deadman Creek, Barry's Landing
21-Jun	1.5	1.5	Crooked Creek
22-Jun	7.25	7.25	Barry's Landing to Devil's Canyon, Devil's Canyon, Stateline
23-Jun	3.5	3.5	Bighorn Lake, John Blue Road
24-Jun	6.5	6.5	Cottonwood Creek, Barry's Landing to Dayboard 40, Bobcat Creek
25-Jun	7.25	7.25	Barry's Landing-Deadman Creek, Blacktail Creek, Dead Indian Hill
26-Jun	6.75	6.75	Bobcat Creek, Barry's Landing to Dayboard 40
27-Jun	9	9	Dead Indian Hill, Dead Indian Hill to Pete's Canyon, Pete's Canyon
28-Jun	7	7	Blacktail Creek to Dryhead Creek, Dryhead Creek
29-Jun	6.75	6.75	Dayboard 43-Dayboard 44, Dayboard 52-Horsheshoe Bend, Horseshoe Bend
30-Jun	6.5	6.5	Devil's Canyon, Dayboard 41-Barry's Landing, Medicine Creek
1-Jul	4.75	4.75	Cottonwood Creek
2-Jul	9	9	Black Canyon
3-Jul	4	4	Bighorn Lake
4-Jul	9.25	9.25	Frozen Leg, Eye of the Eagle, Dryhead Canyon
5-Jul	6.75	6.75	StatelineHorseshoe Bend, Devil's Canyon, Dayboard 40-Barry's Landing
6-Jul	6.5	6.5	Dryhead Canyon, Blacktail Creek-Dead Indian Hill, Dead Indian Hill-Pete's Landing, Crooked Creek
7-Jul	5.5	5.5	Black Canyon, Black Canyon-Dayboard 4
8-Jul	3.5	3..5	Medicine Creek, Barry's Landing
9-Jul	9.5	9.5	Barry's Landing-Pete's Canyon, Pete's Canyon-Dead Indian Hill, Dead Indian Hill
10-Jul	6.25	6.25	South Narrows, Horseshoe Bend, Horseshoe Bend-Barry's Landing
11-Jul	7.25	12.25	Layout Creek, Devil's Canyon
12-Jul	9.5	9.5	Eye of the Eagle, Black Canyon-Box Canyon, Dam-Dayboard 4
13-Jul	2	2	Cottonwood Creek
Total	**161.75**	**163.25**	

Table 2. Occupany and productivity of active Peregrine Falcon territories in the Bighorn Canyon study area (2012).

Territory Name	Date(s) checked	Observer(s)	Adults obs.	Young Fledged
Blacktail Creek	25-Jun	Shreading	2	3
Bobcat Creek	Numerous	Shreading	2	1
Crooked Creek	21-Jun	Shreading	2	3
Black Canyon (BICA)	Numerous	Shreading	0	NRD*
Dead Indian Hill	27-Jun	Shreading	2	2
Deadman Creek	26-Jun	Shreading	0	NRD
Devil's Canyon	Numerous	Shreading	2	2
Dryhead Canyon	6-Jul	Shreading	2	3
Eye of the Eagle	4-Jul	Shreading	2	3
Frozen Leg	4-Jul	Shreading	2	2
Cottonwood Creek	Numerous	Shreading	2	NRD
Layout Creek	11-Jul	Hall- Parks-Shreading	2	NRD
Pete's Canyon	Numerous	Shreading	2	3
State Line	22-Jun	Shreading	2	3
		Known Territories	14	
		Active Territories	12	
		Percent Occupied	85.7%	
		Territories used for fledge count	10	
		Total Young	25	
		Young/Active Territory	2.5	

Table 3. Sightings of Peregrine Falcons in areas away from active territories (2012).

Date	Location	Age	Sex	Activity
7/08/2012	Barry's Landing	Adult	Unknown	Circled high above before flying north
7/12/2012	Frozen Leg Picnic Area	Adult	Unknown	Flew up into canyon on private land

Table 4. Physical characteristics of Peregrine Falcon nesting cliffs in the Bighorn Canyon (2012).

	Cliff Coordinates*		Cliff	Eyrie Height
Cliff Name	Latitude	Longitude	Height (m)**	(m)***
Black Canyon (BHRA)	45.27570°	107.99872°	100	60
Black Tail Creek	45.19168°	108.14838°	150	130
Bobcat Creek	45.05442°	108.22904°	160	75
Cottonwood Creek	44.87105	108.04602	245	N/A
Crooked Creek	45.12422°	108.44289°	50	25
Dead Indian Hill	45.16317°	108.15562°	130	N/A
Deadman Creek	45.14373	108.17504	45	N/A
Devil's Canyon	45.02997°	108.24861°	175	70
Dryhead Canyon	45.20937°	108.13582°	145	75
Eye of the Eagle	45.22545°	108.10912°	290	N/A
Frozen Leg	45.26636°	108.05008°	190	100
Layout Creek	45.08098°	108.29365°	220	N/A
Pete's Canyon	45.12855°	108.18527°	115	50
State Line	45.00191°	108.24395°	185	175

*Decimal Degrees WSG 84

**Height of actual cliff face measured from highest point on cliff.

*** Sites where eyrie was not located marked N/A.

Appendix A

Photographs and Locations of active Peregrine Falcon territories in the Bighorn Canyon National Recreation Area (2012)

Plate Number	Territory Name
1	Blacktail Creek
2	Black Canyon (BICA)
3	Bobcat Creek
4	Cottonwood Creek
5	Crooked Creek
6	Dead Indian Hill
7	Deadman Creek
8	Devil's Canyon
9	Dryhead Canyon
10	Eye of the Eagle
11	Frozen Leg
12	Layout Creek
13	Pete's Canyon
14	State Line

Plate 1. Black Canyon Peregrine Falcon Territory.

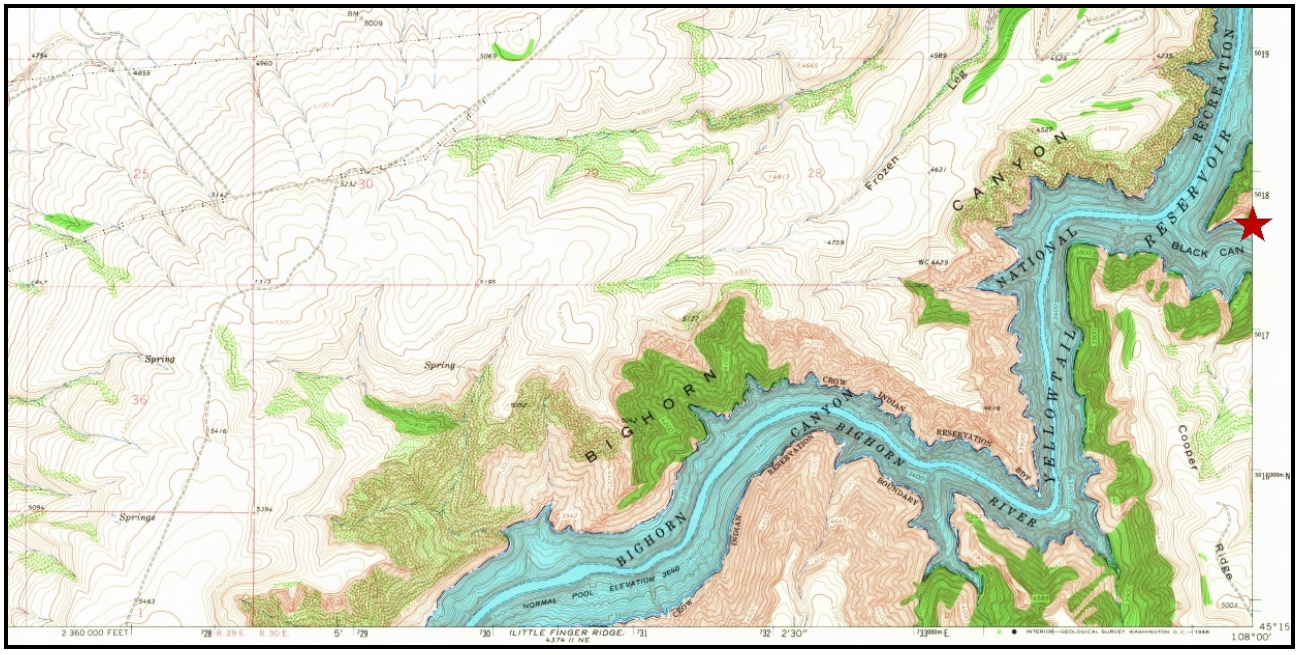
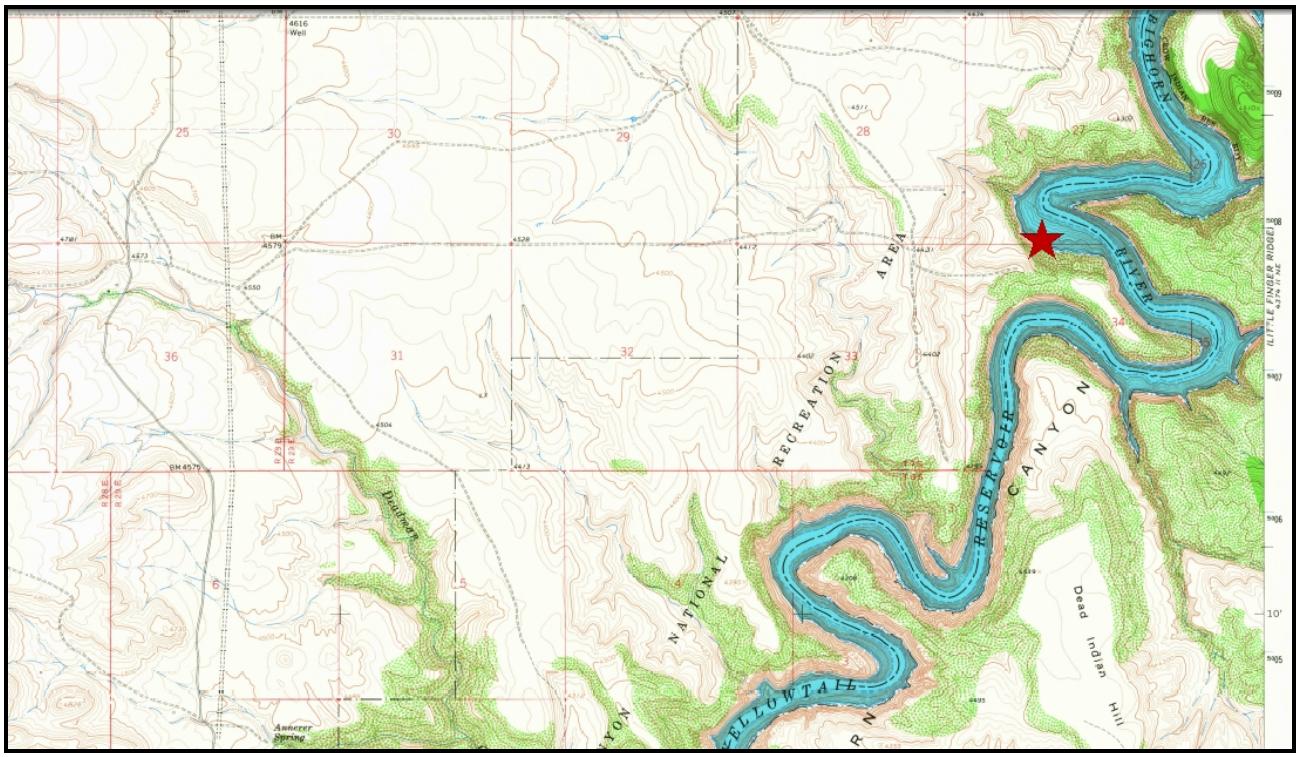


Plate 2. Blacktail Creek Peregrine Falcon Territory.



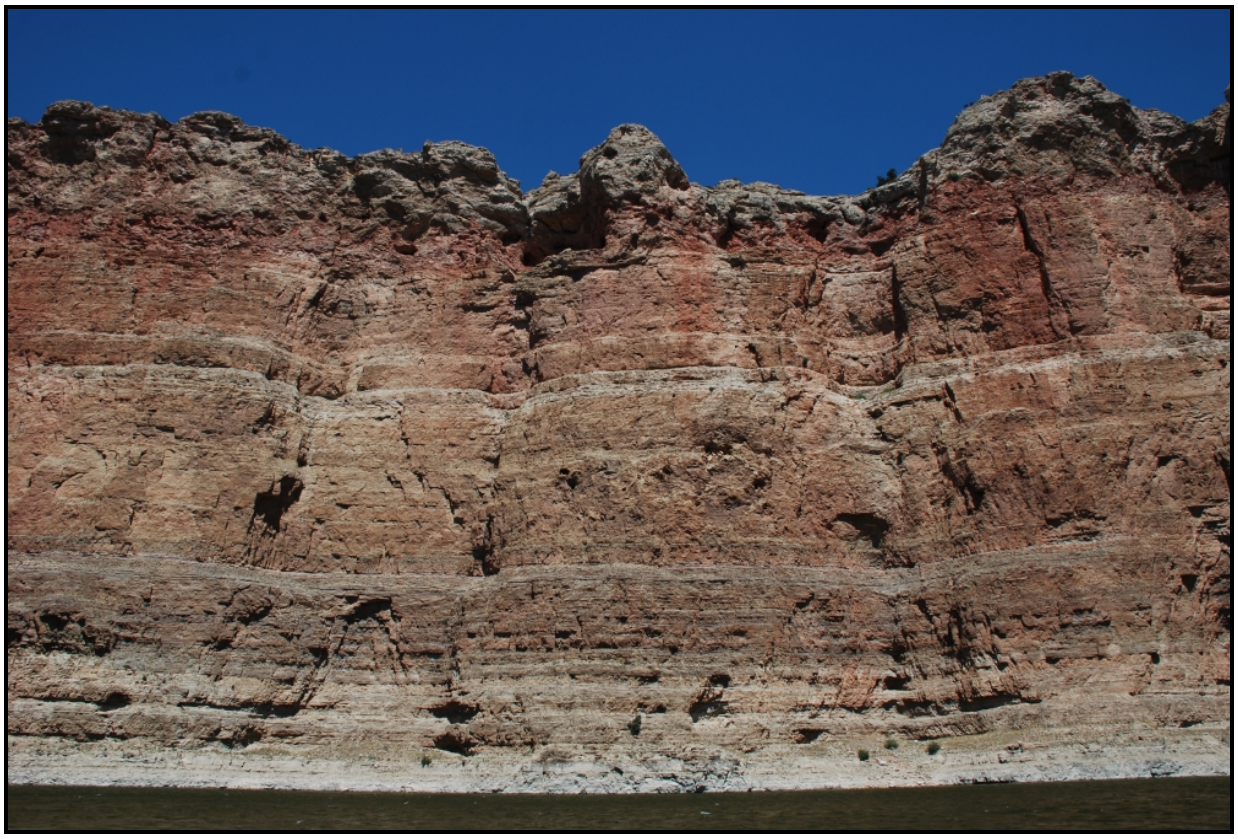


Plate 3. Bobcat Creek Peregrine Falcon Territory.

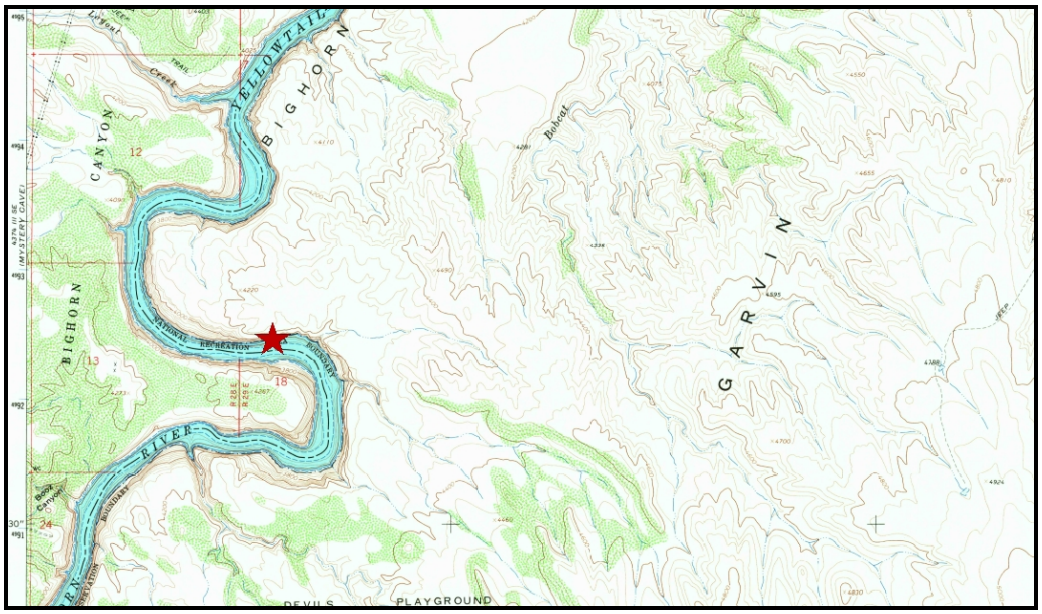


Plate 4. Cottonwood Creek Peregrine Falcon Territory.

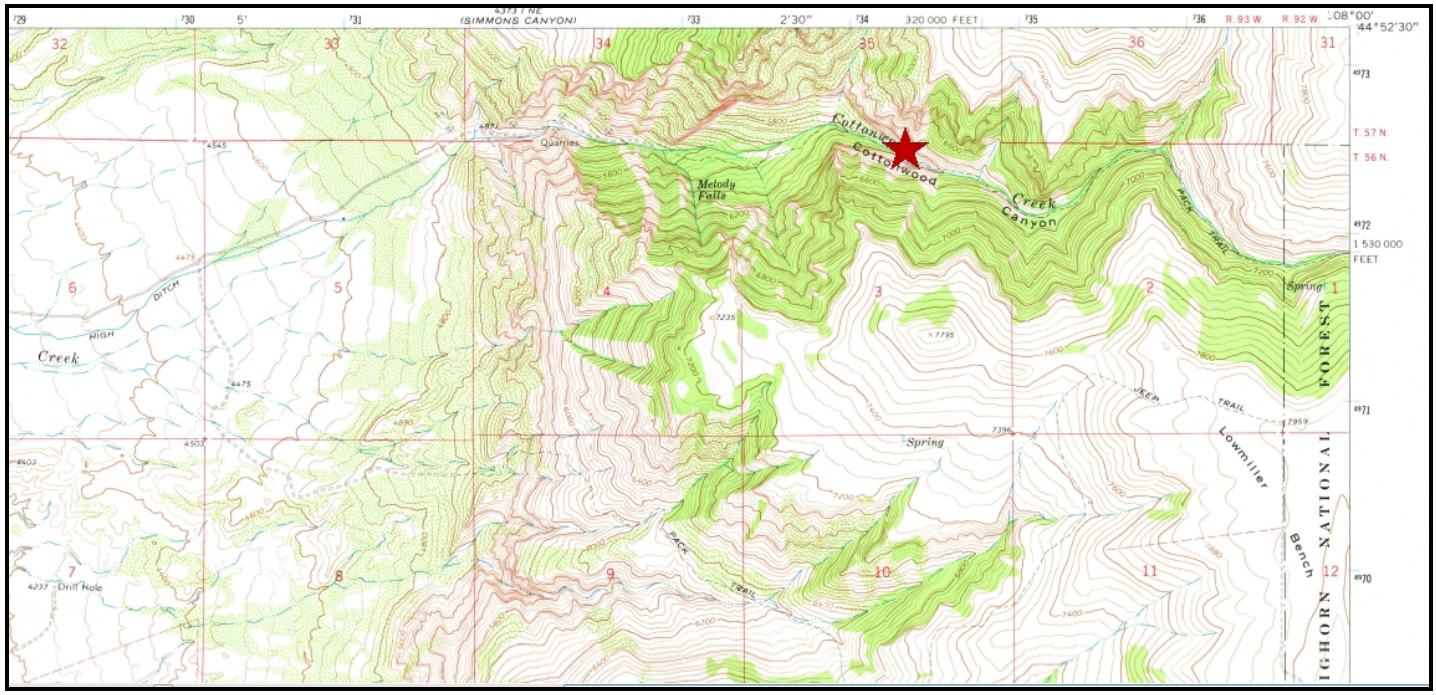


Plate 5. Crooked Creek Peregrine Falcon Territory.

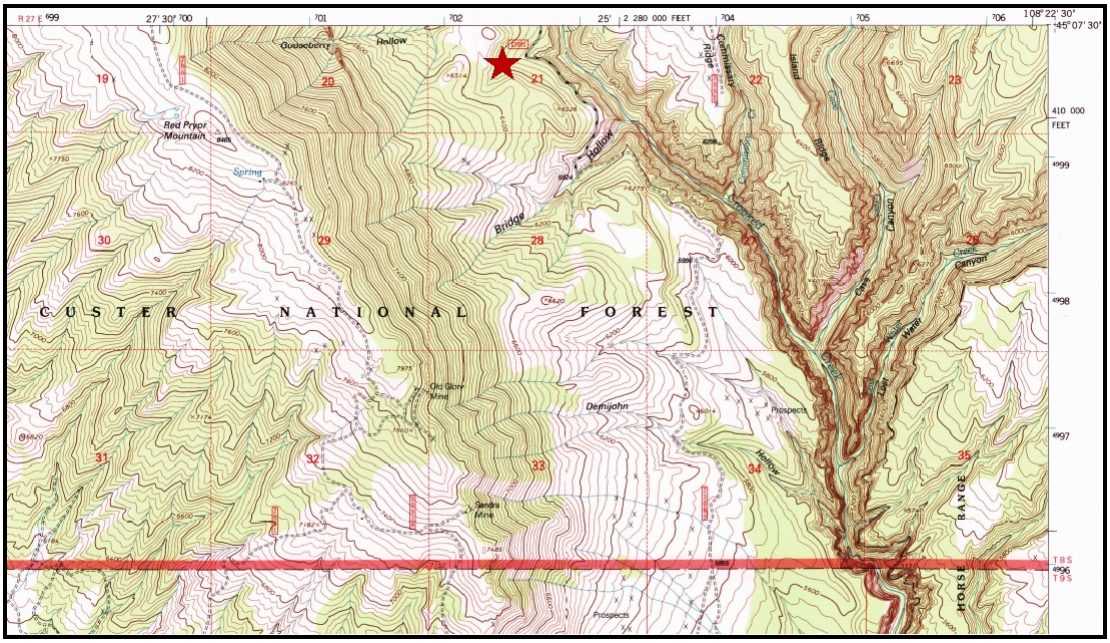
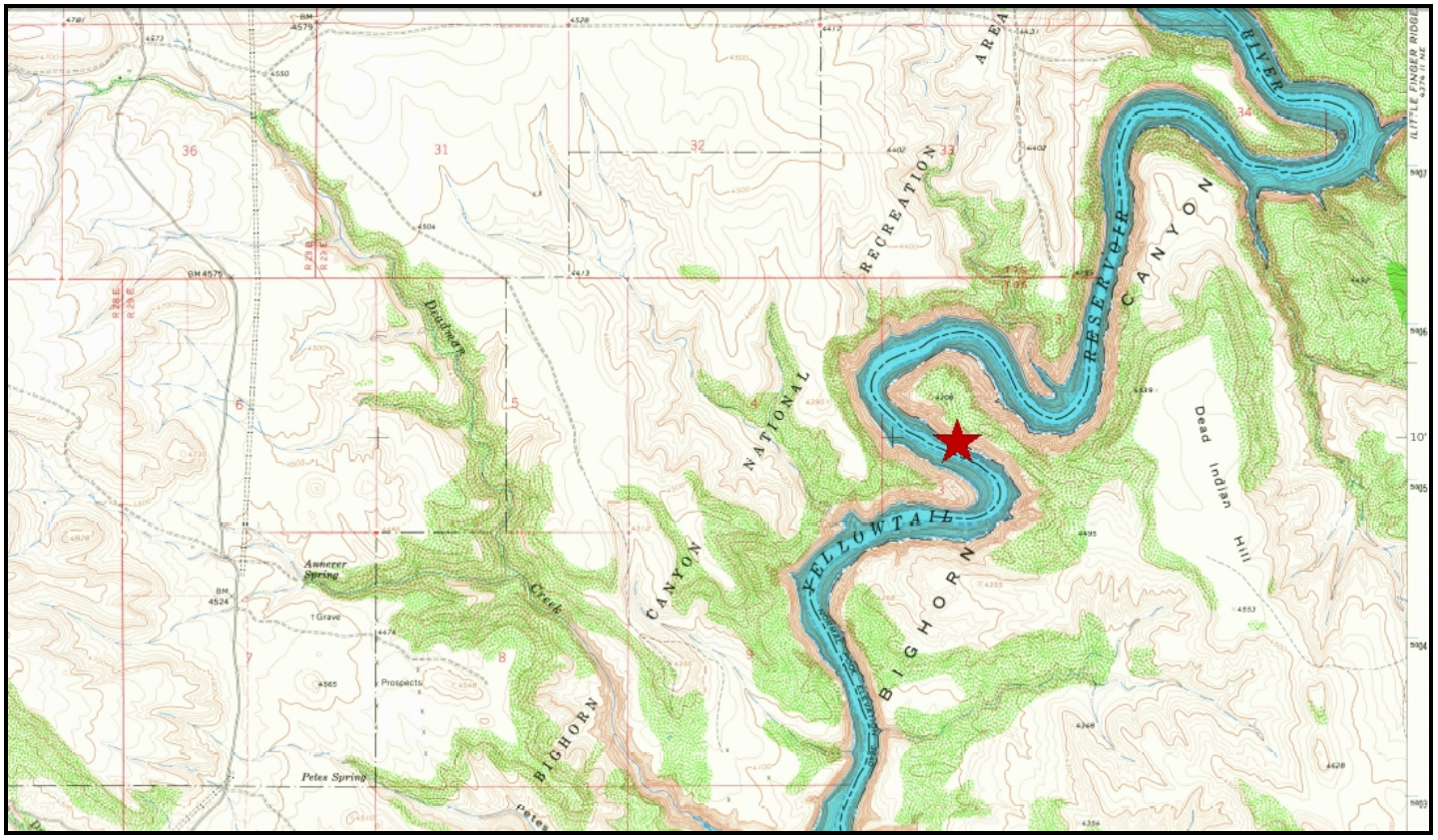


Plate 6. Dead Indian Hill Peregrine Falcon Territory.



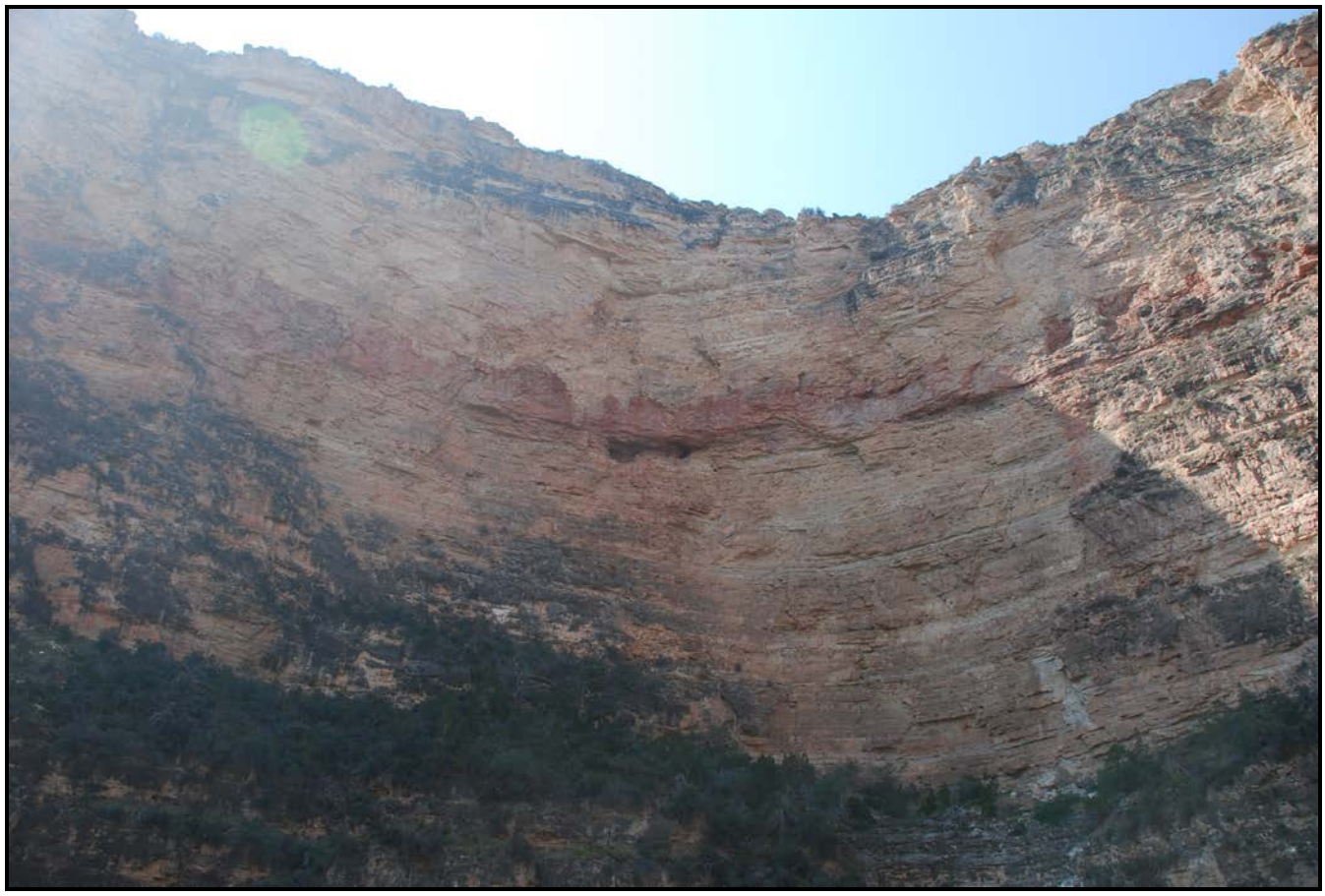


Plate 7. Deadman Creek Peregrine Falcon Territory.

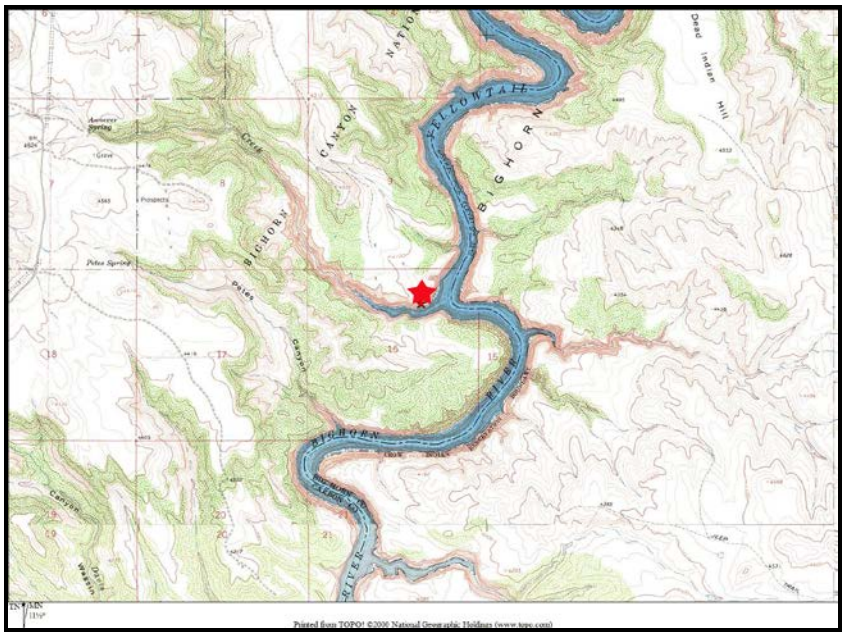


Plate 8. Devil's Canyon Peregrine Falcon Territory.

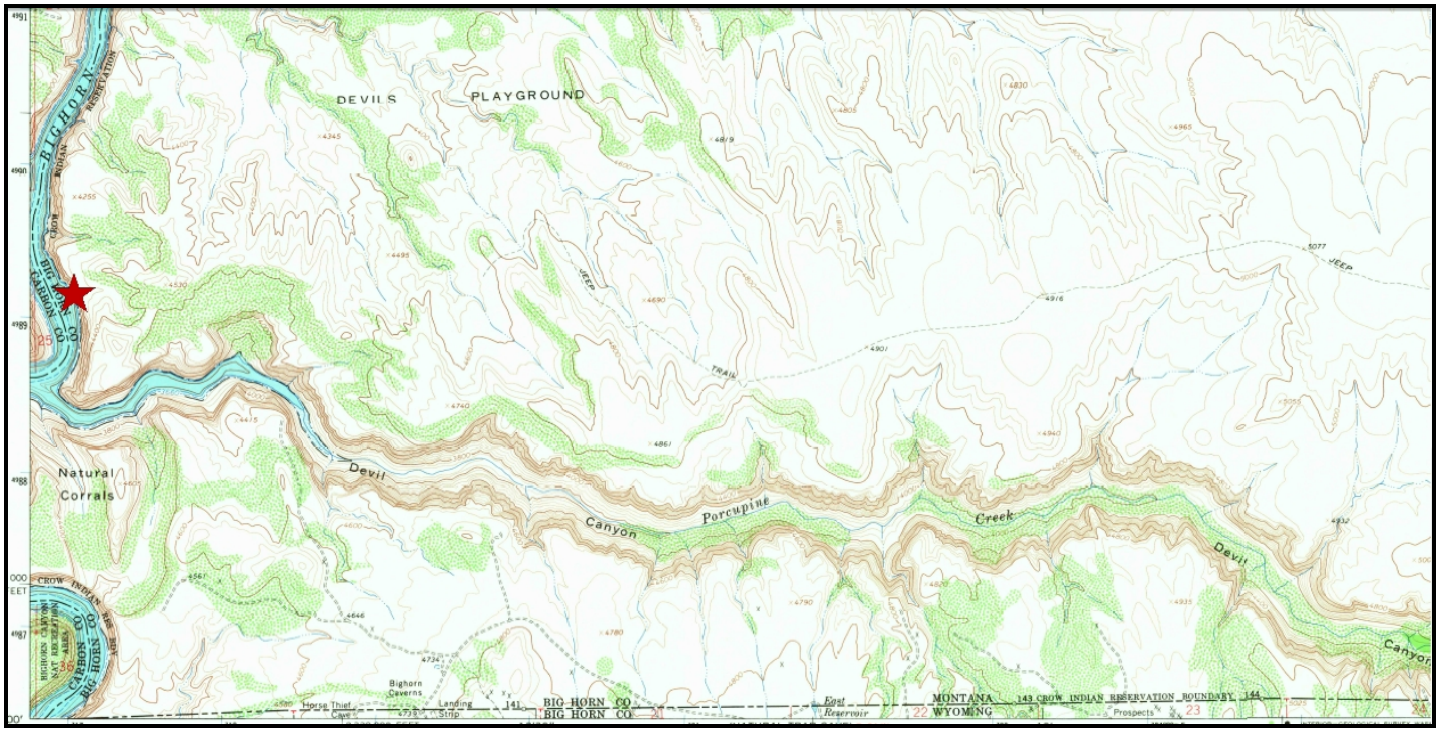


Plate 9. Dryhead Canyon Peregrine Falcon Territory.

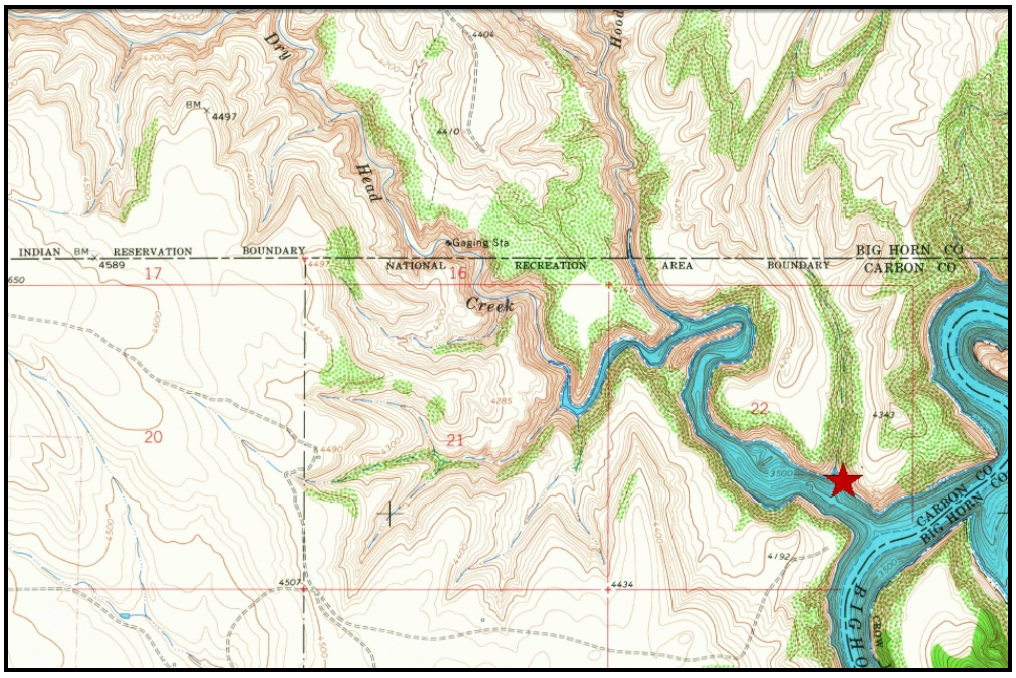


Plate 10. Eye of the Eagle Peregrine Falcon Territory.

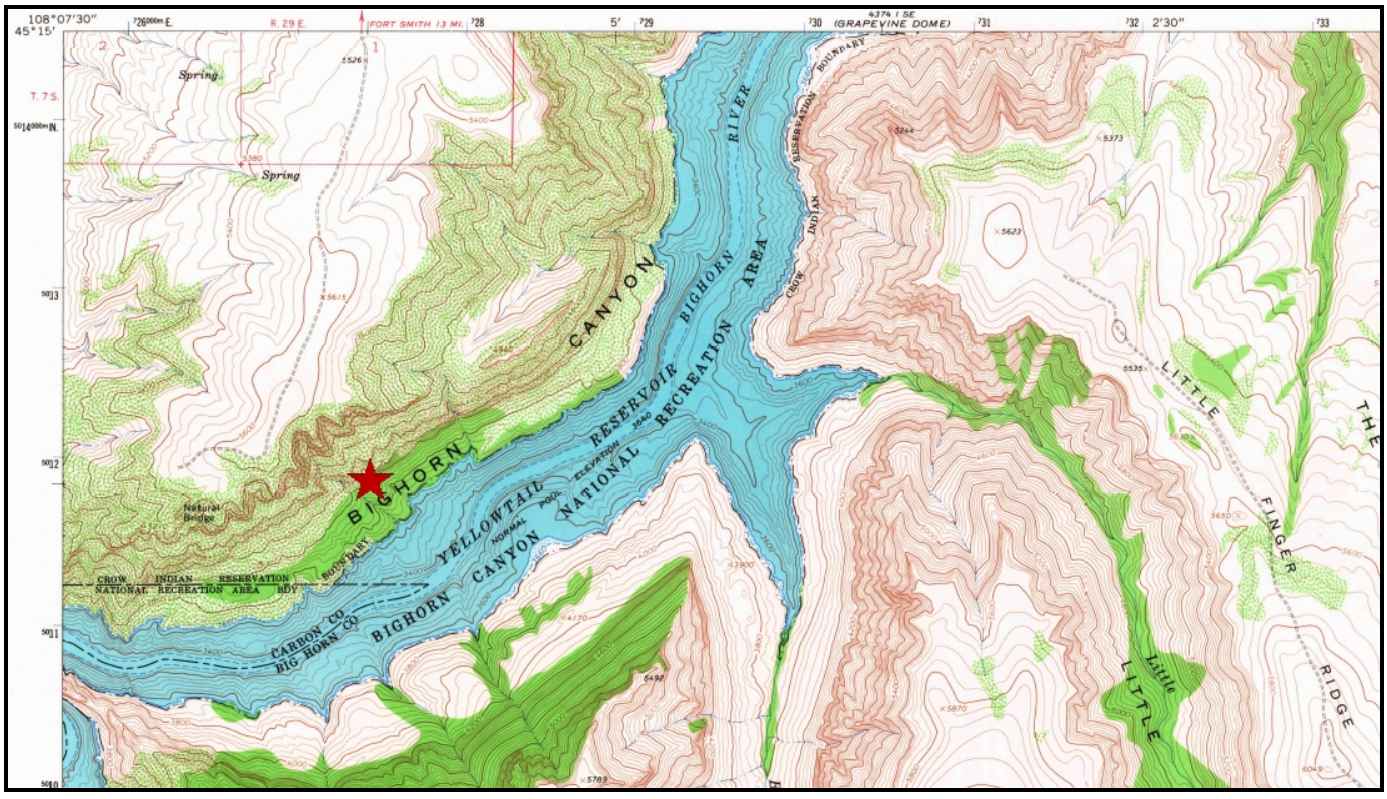
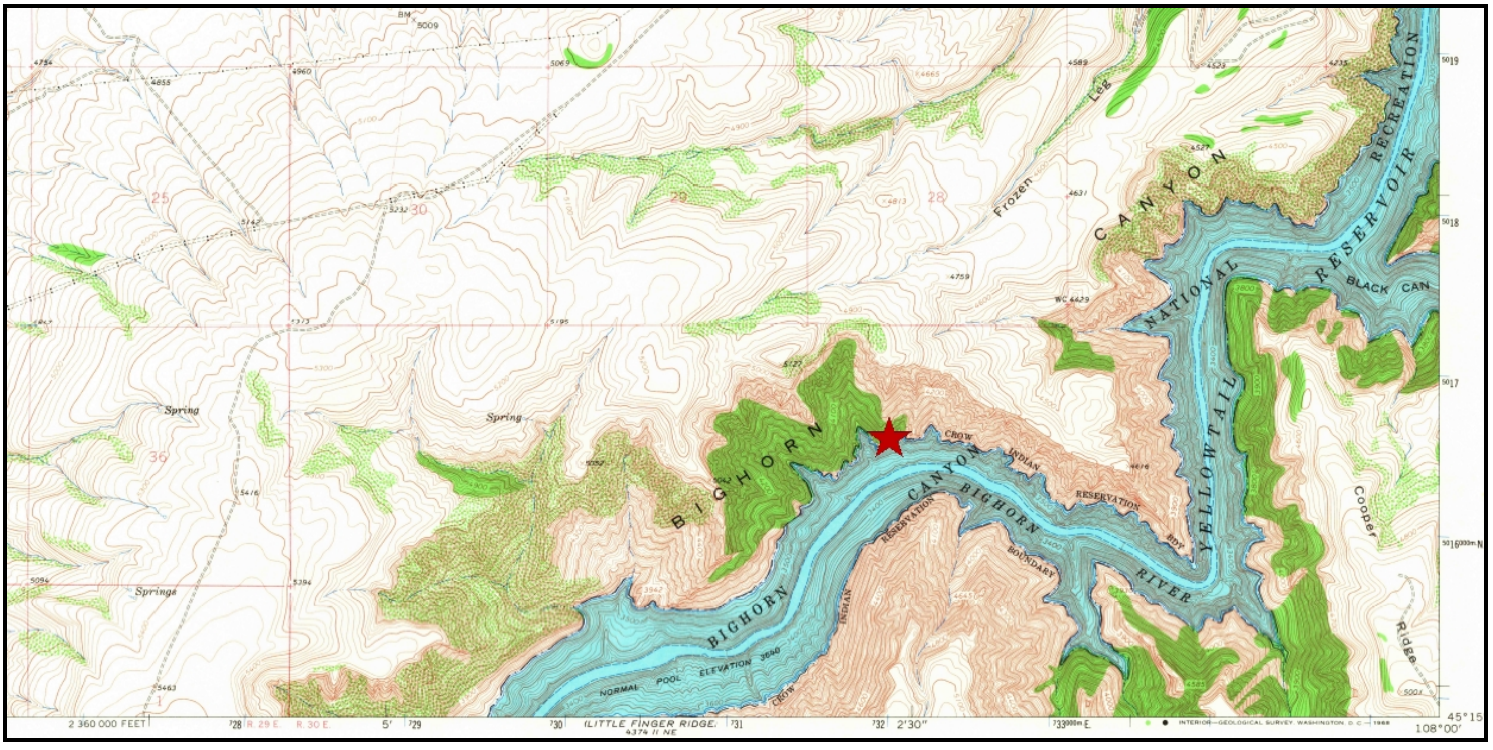


Plate 11: Frozen Leg Peregrine Falcon Territory.



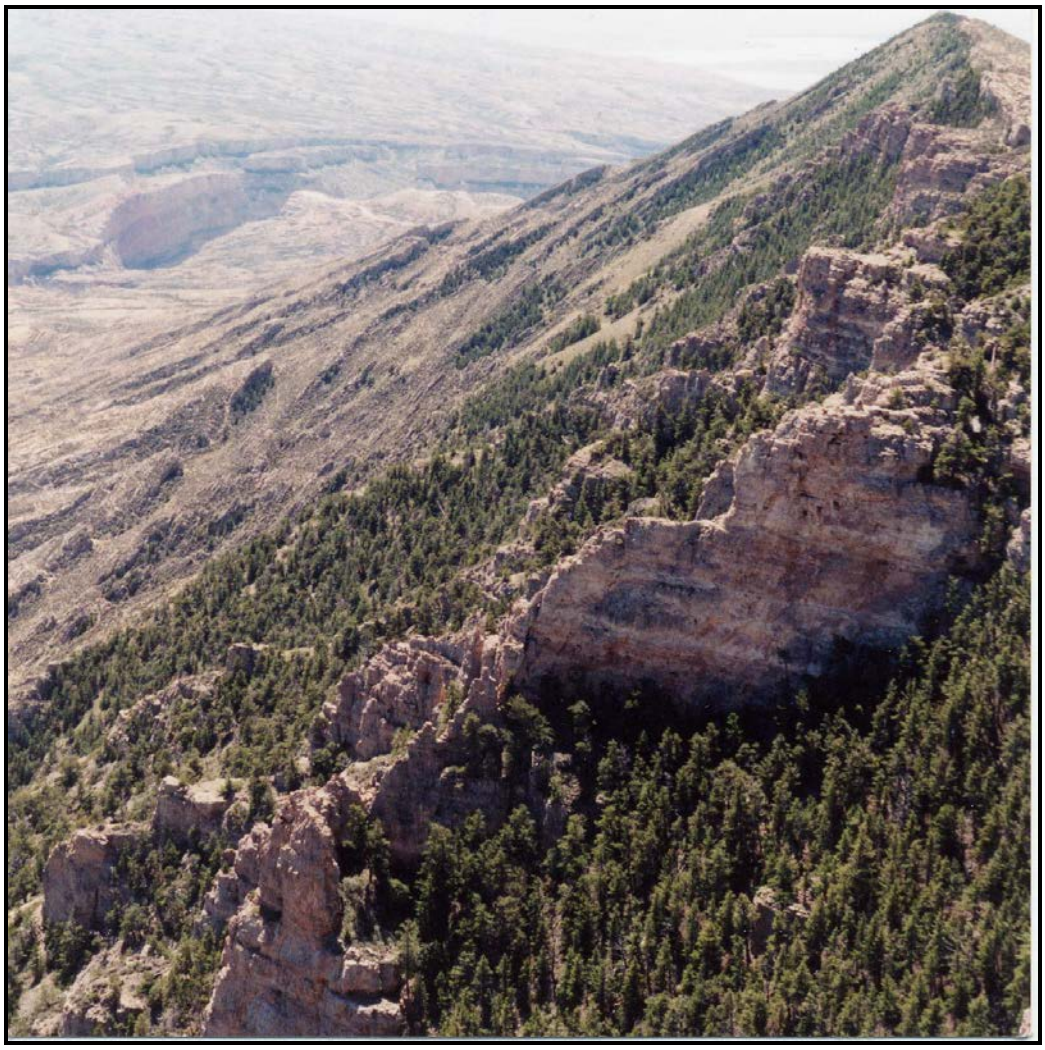


Plate 12. Layout Creek Peregrine Falcon Territory.

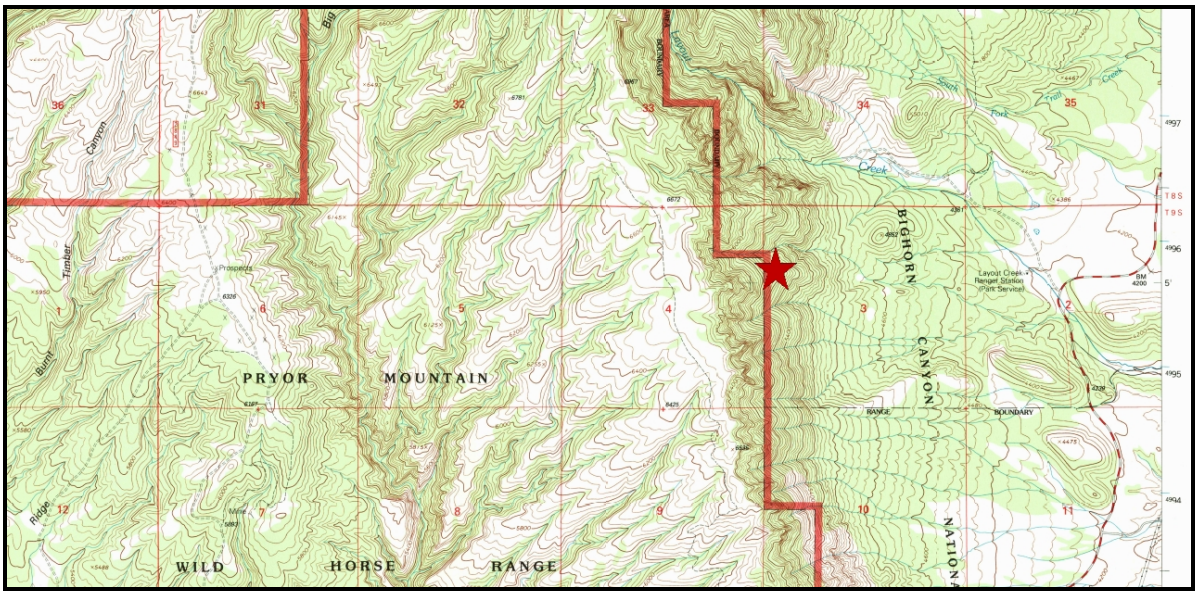


Plate 13. Pete's Canyon Peregrine Falcon Territory.

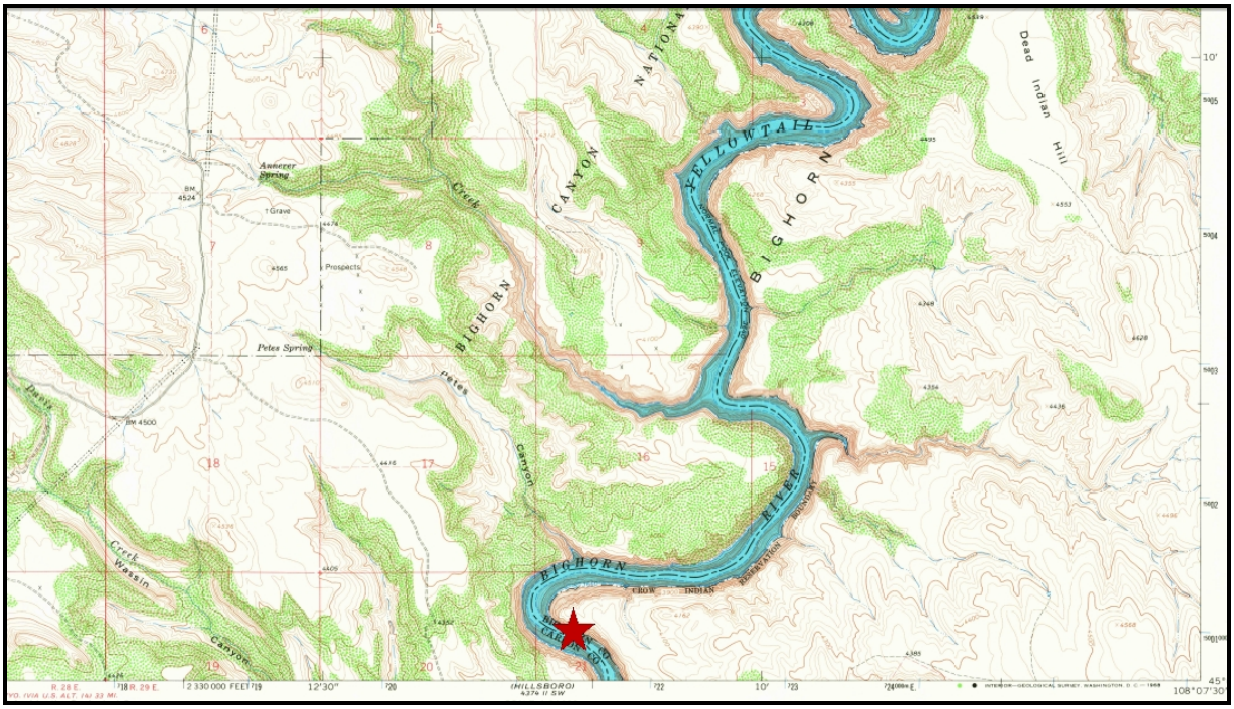


Plate 14. State Line Peregrine Falcon Territory.