

PROGRESS REPORT

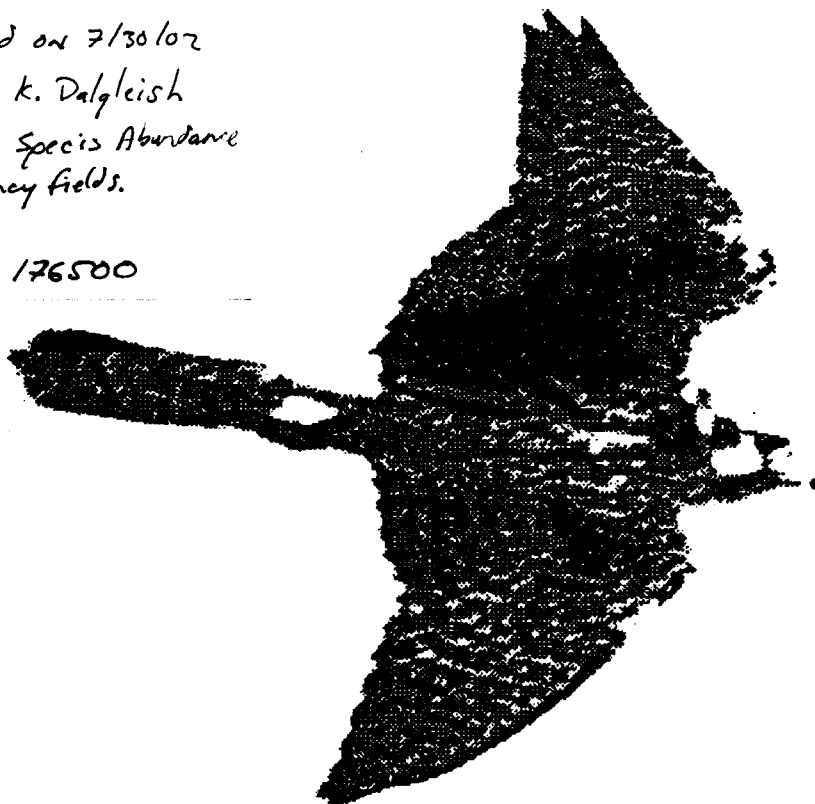
March, 1993

Avifauna and Climbing at Devils Tower National Monument
Results of 1992 Survey and Literature Search

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INTRODUCTION

Devils Tower is a 264 meter tall volcanic outcrop rising out of the relatively gentle relief of the Black Hills of northeastern Wyoming. It is attractive to cliff nesting birds in a region where large rock outcrops are rare.

Devils Tower National Monument (DTNM) was established 24 September, 1906 as the first National Monument. It was set aside because "...the 865 foot tall Tower is such an extraordinary example of the effect of erosion in the higher mountains as to be a natural wonder and an object of historic and great scientific interest."

The DTNM Resource Management Plan lists resource management objectives including protection "of the Tower by such means as will leave this outstanding resource unimpaired for future generations," identification and protection "of the natural resources and processes within the Monument," and compensation for "unnatural man caused disturbances to natural resources and processes" (NPS 1992).

Visitation to DTNM is 460,000 annually. Devils Tower is increasingly attractive to rock climbers. The spectacular outcrop and quality climbing granite make DTNM a destination for climbers. Climbing increased nearly 2500% from 1970 to 1990 when 5382 climbers registered to climb the Tower (NPS 1992).

National Park Service (NPS) staff at DTNM are concerned about the impacts increased climbing has on the Tower including impacts to vegetation and wildlife, especially birds (NPS 1992). Climbers have reported being attacked by raptors on the Tower and nesting prairie falcons (*Falco mexicanus*) may be so disturbed by climbers that they rarely fledge young. Devils Tower may have been used for nesting by the endangered peregrine falcon (*Falco peregrinus*) in the past and current climbing activity may discourage recolonization of the Tower by peregrines.

This Progress Report presents the results of 1992 field work. Field work and library work will also be conducted in 1993 and the results presented in a final report.

The objectives of the project were to: 1) determine what species of birds use DTNM for what purposes; 2) determine productivity of raptors using the Tower for nesting; 3) review NPS files and the literature and summarize information on historical use of DTNM by birds; 4) review and summarize the literature on disturbance of birds by climbers; and 5) recommend management options to minimize disturbance of birds by climbers.

STUDY AREA

DTNM is located in the Black Hills 53 km northeast of Moorecroft in northeastern Wyoming. It covers 545 hectares (1347 acres) ranging in elevation from a low of 1172 m (3850 ft) at the Belle Fourche River to 1560 m (5117 ft) at the top of the Tower. The lower elevations of DTNM have many small sedimentary outcrops, usually less than 10 m tall. The Tower rises 386 m above the river and 264 m above its boulder strewn base (NPS 1992). The Tower is elliptical with the long axis running SSW-NNE. At the top, the Tower measures approximately 145 m on the long axis by 70 m on the short axis (Driese and Roth, 1992). The flanks of the Tower slope away from the top at angles ranging from 4-12° (Effinger, 1934). The Belle Fourche is a small river with large flow rate fluctuations (e.g. from 41 cfs on 5 June to 104 cfs on 17 July to 5.9 cfs on September, 1991) due to upstream dam operations (pers. comm., Jane Gyhra).

The Missouri Buttes are a set of large igneous outcrops four km west-northwest of DTNM. They are not as tall or steep-sided as Devils Tower and they can easily be climbed. Although they are different than the Tower they provide similar nesting habitat for cliff nesting birds.

Dominant habitats of DTNM include coniferous forest and woodlands dominated by ponderosa pine (*Pinus ponderosa*) (62% of the area), prairie (29% of the area), and deciduous woodlands (5% of the area) dominated by *Fraxinus pennsylvanica*, *Populus* sp., and *Quercus macrocarpa* (1992 NPS and Jane Gyhra, pers. comm.). Much of the surrounding private and state lands are dominated by agricultural fields.

One hundred thirty species of birds have been recorded in DTNM (1992 NPS). Of those the turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), American kestrel (*Falco sparverius*), prairie and peregrine falcon (*F. mexicanus* and *F. peregrinus*), rock dove (*Columbia livia*), great horned owl (*Bubo virginianus*), white-throated swift (*Aeronautes saxatalis*), violet-green and cliff swallows (*Tachycineta thalassina* and *Hirundo pyrrhonota*), rock and canyon wrens (*Salpinctes obsoletus* and *Catherpes mexicanus*), and Townsend's solitaire (*Myadestes townsendii*), might be expected to nest or roost on Devils Tower.

METHODS

I surveyed DTNM on foot and from a vehicle on 6-10 May and 13-16 July, 1992. I spent 94 hours surveying over the 9 survey days. I surveyed during all day light hours (concentrating on early morning and late evening hours) and for a few hours in the evenings (for owls). I walked most of the trails in DTNM as well as areas with no trails and along the Belle Fourche River (Figure 1, last page of

report). I also spent seven hours on 9 April surveying the Missouri Buttes to compare the raptor and bird use of a rarely visited and climbed area to the heavily used National Monument. I walked to the base of each of the buttes and climbed to the top of the tallest northwestern-most butte.

I used 10X40 binoculars and a 30X77 spotting scope mounted on a tripod to make visual observations and a portable tape recorder and my own imitations to elicit responses from owls.

The weather was generally cool with good visibility. It rained for about 12 hours during my two visits.

RESULTS

Raptors and Other Birds Observed

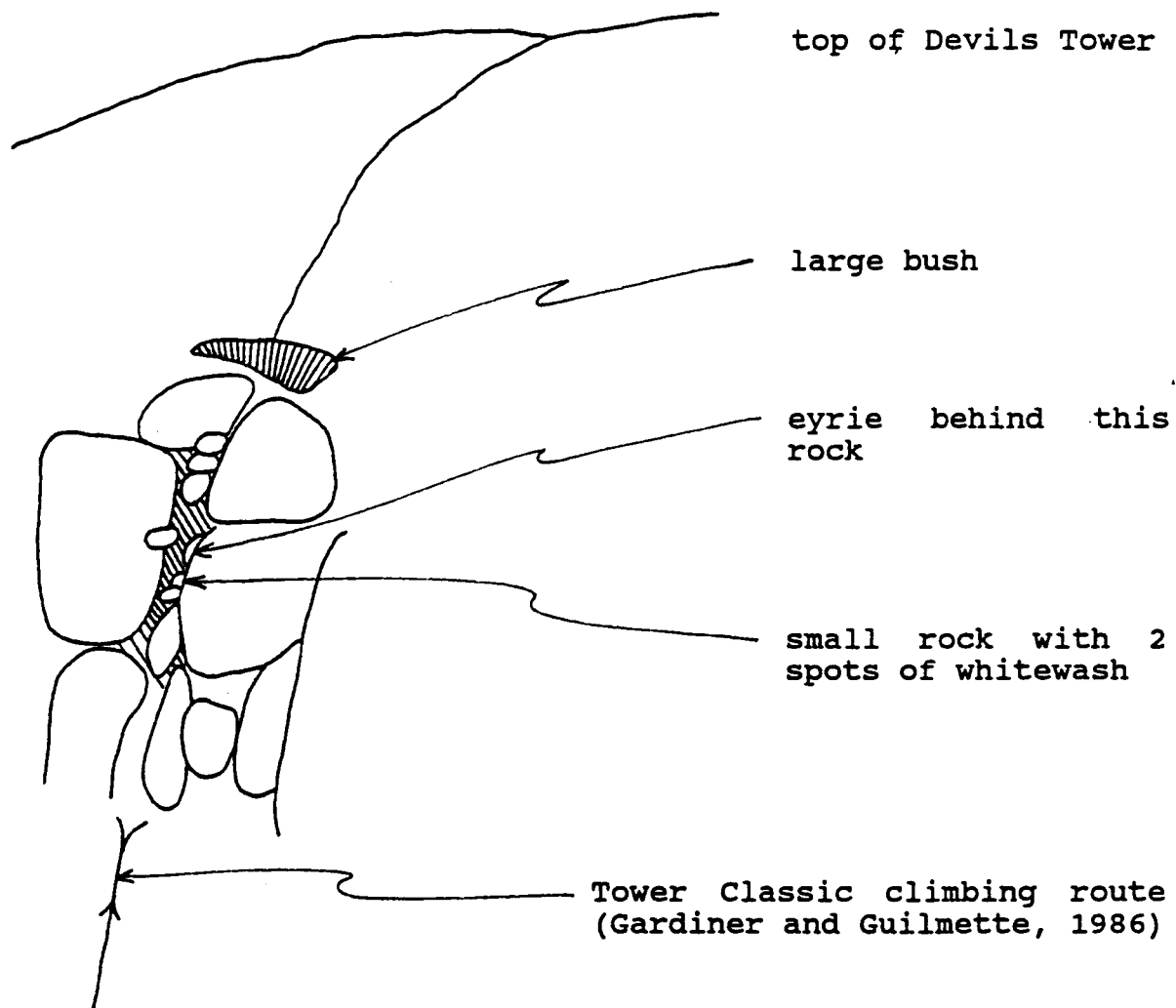
I observed 126 raptors of seven species in DTNM. On the Devils Tower itself, I located a breeding pair of prairie falcons. The falcons appeared (by their behavior) to be incubating eggs or brooding small chicks during early May in an eyrie near the top of the east face of Devils Tower (Figure 2). When I checked the eyrie again in July, the adults did not enter the eyrie (or any other potential eyrie) and it was obvious that the breeding attempt had failed.

I observed at least 99 turkey vultures using the Tower and boulders and ponderosa pines at the base of the Tower as overnight roosts. It is possible that one or more pairs of vultures nested in the boulder fields at the base of the Tower. The pines near the main visitor center parking lot and along a popular walking trail were the most heavily used roosts (Figure 1).

I observed white-throated swifts entering crevices on the Tower and assume that they were nesting. The violet-green swallows which were usually flying near the Tower were probably also nesting on the Tower. There was usually a flock of up to 15 rock doves on or near the Tower and they appeared to be nesting. I observed Townsend's solitaires on the Tower and I believe they probably nested on it or among the boulders at the base.

Although I saw no other raptors using the Tower, I located at least four breeding pairs of American kestrels, one breeding pair of northern goshawks (*Accipiter gentilis*), and one breeding pair of eastern screech owls (*Otus asio*) within the National Monument. I observed three red-tailed hawks, two Cooper's hawks (*Accipiter cooperii*), and at least one pair of great-horned owls which may have nested in DTNM. On 8 April I saw and heard an osprey (*Pandion haliaetus*) displaying just east of the northeast corner of DTNM. Although I thoroughly searched the cottonwoods of the riparian corridor for a nest, I did not find any other evidence of osprey breeding. [Ospreys successfully nested south of DTNM along Wyoming Route 14 and I observed an adult osprey building a nest north of

Figure 2. Prairie falcon eyrie location sketch, 1992, DTNM, Wyoming.



DTNM on a power pole (no young were produced and it may not have been a breeding attempt).]

I did not observe peregrine falcons or eagles of either species on the surveys although I saw a golden eagle of unknown age about 25 km south of DTNM along Wyoming Route 14 on 13 July.

Raptors Observed at the Missouri Buttes

At the Missouri Buttes I located a breeding pair of red-tailed hawks (incubating in a nest in a ponderosa pine) and a prairie falcon territory (an adult defended the cliff from the hawks). Another cliff nearby had a lone red-tailed hawk that may also have represented a breeding pair. Although Ray McCoy (caretaker for the past year and a half of the private ranch at the Missouri Buttes) said bald eagles nested on the buttes (pers. comm.), I saw no eagles or large stick nests that are typical of bald and golden eagle breeding territories. He may have been referring to red-tailed hawks and not eagles. I did not observe turkey vultures roosting on the buttes (but I was not at the buttes in the early morning or at dusk).

The Devils Tower area and the Missouri Buttes area are very similar in terms of avian habitat. There is less agricultural land around the buttes. The buttes do not provide as much exposed cliff face for nesting but they appear adequate for any raptors that might nest in the area. The buttes receive very little recreational use because they are on private land and they are not as inviting to rock climbers. Both areas had an occupied prairie falcon territory. The Missouri Buttes also had one or two red-tailed hawk breeding territories.

Raptor Records for Devils Tower

The earliest record I located of prairie falcons nesting on Devils Tower was in 1972 or 1973 when a pair nested low on the NW side of the Tower (Robert Oakleaf, pers. comm.). A search of DTNM files yielded records of prairie falcons on the Tower beginning in 1982 (Figure 3). In 1984 an immature was seen near a "nest" in July. In 1990 an immature was seen in August indicating they were probably successful in fledging at least one chick. In 1991 prairie falcons reportedly nested near the top of "El Matador" climbing route. Nearly a month later red-tailed hawks were reported nesting at the top of nearby "McCarthy's West Face" where young chicks were heard. Considering the earlier report of nesting falcons in nearly the same location, the lack of other climber reports of nesting hawks on the Tower, and the lack of stick nests on the Tower in 1992, I assume the report of red-tails was in error, and referred to prairie falcons.

Figure 3. Prairie falcon observations, DTNM, Wyoming.

Date	Location	Comments	Observer
05/30/82	W side Tower, 30-80 ft. above "two gray roofs"	closed "McCarthy West Face" climbing route	climbers
05/24/84	"One Way Sunset" climbing route		climbers
05/29/84	"New Wave" climbing route		climbers
07/03/84	"One Way Sunset" climbing route	2 climbers attacked	climbers
07/??/84	upper west face	closed upper west face to climbing, young chick seen in nest	fauna database
05/31/90	diagonal crack part of "Saber Climb" climbing route	falcon landed on ledge 2 times, a week before falcons seen mating	climbers
08/28/90	Tower	3 falcons seen including 1 immature	Martin Ziebell, NPS employee
02/??/91	Tower	prairie falcon observed	Rick Nolan
05/26/91	near the top of "El Matador" climbing route	prairie falcon nest reported	climber
06/20/91	"McCarthy's West Face" climbing route	2 climbers "warned off" by what they thought were red-tailed hawks, they could "hear baby chicks"	climber
01/??/92	DTNM	prairie falcon observed	Greg McDaniel

I did not observe peregrine falcons during my survey and currently there are no known peregrine breeding territories in eastern Wyoming or the western Dakotas. I could not locate any past reference to peregrine falcons nesting on Devils Tower but Dr. Jim Enderson is sure that peregrine falcons nested there before the widespread use of DDT (pers. comm.). Pettingill and Whitney (1965) list the peregrine as a rare summer resident of the Black Hills but their information is primarily from before the DDT-induced population lows of the 1960's, 70's and 80's. They list records of peregrines breeding in Dark Canyon in the southeastern Black Hills of South Dakota in 1948, 1956, and 1960.

Recently peregrine falcons have been reported in and near DTNM (Figure 4). None of the records indicate nesting nor are the observations well documented with observation details. The two best described observations, if valid, could represent migrant birds moving through the area. The 31 March, 1984 record is during spring migration for North American peregrines and the 8 October, 1983 record is during the fall migration.

Figure 4. Peregrine falcon observations, DTNM, Wyoming.

Date	Location	Comments	Observer
1980	just north of Tower on private ranch	2-3 birds	John Dorrance- rancher
1981	" " " "	" "	" "
1982	" " " "	" "	" "
03/31/83	southeast side of Tower	observer had experience with peregrines at the U. of MN Raptor Clinic--if a valid observation, the date does not rule out the possibility the birds were migrants	David Borgeson- visitor
10/08/83	northeast side of Tower	if a valid observation, the date does not rule out the possibility the bird was a migrant	Brad Lechman- visitor
07/24/84	northeast side of Tower	poor details on identification	Garth Spitler- Audubon Society member- visitor

Climbing at Devils Tower National Monument

Climbing use of DTNM began in 1937. Use was very low (0-3 climbing parties per year) until the mid-1950's when a steady increase began. By the mid-1980's more than 600 climbing parties per year were attempting to reach the summit (Figure 5). In 1974, DTNM began keeping records of non-summit climbers (Figure 6). Non-summit climbers increased from 88 climbers in 1974 to more than 4,000 in the late 1980's. Records for the 1990 and 1991 show a slight decrease in climbing for both summit and non-summit climbers.

In contrast to Devils Tower, Ray McCoy said that only 6 people climbed the highest Missouri Butte in 1991 (pers. comm.).

Figure 5. Annual numbers of summit climbers and climbing parties, 1937-1991, DTNM, Wyoming.

Year	Parties/ Year	Climbers/ Year	Year	Parties/ Year	Climbers/ Year
1937	1	3	1966	33	100
1938	1	2	1967	51	134
1939	0	0	1968	53	136
1940	0	0	1969	71	184
1941	2	10	1970	82	216
1942	0	0	1971	103	297
1943	0	0	1972	138	357
1944	0	0	1973	121	312
1945	0	0	1974	164	424
1946	1	2	1975	183	494
1947	1	2	1976	308	774
1948	2	18	1977	445	1098
1949	3	20	1978	657	1638
1950	1	2	1979	805	1969
1951	5	13	1980	701	1754
1952	7	19	1981	667	1624
1953	8	27	1982	428	1277
1954	12	42	1983	617	1621
1955	5	17	1984	629	1266
1956	53	158	1985	648	1591
1957	11	46	1986	618	1477
1958	42	143	1987	627	1569
1959	32	119	1988	671	1675
1960	42	104	1989	751	1879
1961	50	123	1990	682	1688
1962	55	128	1991	786	1694
1963	36	92			
1964	75	187			
1965	48	119			

Figure 6. Non-summit climbers and climbing parties, 1974-1982, DTNM, Wyoming.

Year	Non-summit Climbers	Year	Non-summit Climbers
1974	88	1983	1995
1975	117	1984	1870
1976	168	1985	2625
1977	183	1986	3301
1978	532	1987	3303
1979	659	1988	4334
1980	1053	1989	4283
1981	1700	1990	3694
1982	1753	1991	3727

Climbing Disturbance to Birds on Devils Tower

I did not observe climbers interacting with the raptors on Devils Tower. The roosting vultures I observed reacted to people walking beneath them by moving from lower perches to higher perches in the same tree, by moving to other nearby trees, and by becoming very alert. Usually only a few of the vultures changed perches but all became alert. I did not observe non-raptors interacting with people at DTNM.

Two of the records in DTNM files indicated that climbers disturbed nesting raptors. Two climbers were "attacked" by prairie falcons on 3 July, 1984 and two climbers were "warned off" by what were probably prairie falcons 20 July, 1991.

Literature Review--Effects of Climbers on Birds

The literature review is in progress and will be completed by the fall of 1993.

Other Birds Observed at Devils Tower National Monument

I observed 81 species of birds (not necessarily associated with the Tower) including two newly recorded species, a blackpoll warbler (*Dendroica striata*) on 7 May and a rose-breasted grosbeak (*Pheucticus ludovicianus*) on 6 May. The warbler was surely a migrant and the grosbeak may or may not have been a migrant (I made no attempt to relocate the grosbeak later in the season).

Copies of my field notes and a list of bird observations are attached (Appendices A and B, respectively) including details of observations for unusual species.

DISCUSSION

The birds I observed on and near Devils Tower are typical of the Black Hills judging by DTNM files and references on birds of the Black Hills (Pettingill and Whitney, 1965 and Peterson, 1990). My observations of other bird species using the outcrop are also typical of the Black Hills.

The Devils Tower outcrop is relatively small and, because raptors are territorial, probably can't support more than one pair of any species. Raptor territoriality extends to other species too, especially similar species, and the Tower probably can't support two pairs of ecologically or morphologically similar species (e.g. one pair of prairie falcons and one pair of peregrine falcons).

I don't believe that the recent records of peregrines at DTNM represent breeding pairs. Some of the records are poorly documented and probably represent observations of prairie falcons or other raptors. Several of the more credible records occur during peregrine migration periods and may represent migrant peregrines briefly utilizing the Tower during passage.

DTNM contains suitable habitat for peregrine falcons based on my observations of peregrines in Arizona, Alaska, Colorado, Utah, and Wyoming. Prey species would be exposed to the aerial attacks by peregrines along the flanks of the Tower, and above the meadows and agricultural lands in the area. The Belle Fourche River is close by and contributes to the habitat and avian diversity of the area. Potential peregrine falcon prey is abundant and includes: white-throated swift; violet-green, cliff, and barn swallows (*Hirundo rustica*); rock dove and mourning dove (*Zenaida macroura*) (I observed the prairie falcons attacking rock doves several times); common nighthawk (*Chordeiles minor*); northern flicker (*Colaptes auratus*); pinyon jay (*Gymnorhinus cyanocephalus*); American robin (*Turdus migratorius*); common grackle (*Quiscalus quiscula*); northern oriole (*Icterus galbula*); pine siskin (*Carduelis pinus*); American goldfinch (*C. tristis*); and chipping sparrow (*Spizella passerina*).

PRELIMINARY CONCLUSIONS

Climbers on Devils Tower do disturb nesting prairie falcons as indicated by climbers reporting being attacked by the birds. It is likely that climbers cause prairie falcons to fail to successfully fledge young from Devils Tower in some years. Appendix C. contains a discussion of potential climbing management alternatives to prevent or reduce impacts of climbers to nesting raptors at DTNM.

Currently there are no known nesting peregrines in eastern Wyoming

or Montana or in the western Dakotas. It is likely that peregrines are not nesting on the Tower because of the population decline caused by DDT. If the peregrine population continues to increase, it is only a matter of time until peregrines return to the Black Hills. When they do, climbing use of the Tower might prevent them from nesting. If they do begin nesting on the Tower, the site would be significant in terms of the regional peregrine population because peregrines and appropriate nest sites are so rare in the region.

Climbing and normal visitor use at DTNM disturbs turkey vultures (judging by vulture behavior) roosting on and near Devils Tower to some degree. People walking along the trails and the park road below the roosts flush a few of the vultures and all the vultures appear nervous at close human presence. The amount of disturbance by climbers and its negative effects are probably minimal because the birds seem habituated to people in the area.

The effects of climbers on other birds using the Tower is unknown. Probably there is some effect on all species using the Tower.

On a continent-wide and regional population basis the effect of climbing disturbance to the birds on the Tower is probably zero. On a local population basis there is probably little effect. On the scale of the National Monument itself, climbing probably prevents some raptor species and individuals from attempting to nest (golden eagles and possibly peregrine falcons) and others from successfully nesting.

While the Tower is not important to populations of prairie falcons, golden eagles, or any other raptors, it may be important to a visitors experience in DTNM to see raptors on the Tower or to know that they nest on it.

An exception to the general conclusion that the Tower is not important to regional raptor populations is for peregrine falcons. The Tower is one of the few large outcrops in the Black Hills and in the great plains that provides nesting habitat for peregrines. Should peregrines recolonize the plains, Devils Tower would be very important to the regional population.

RECOMMENDATIONS:

1. Develop a climbing management plan that considers the effects of rock climbers on nesting and roosting birds on the Tower. A spectrum of possible climbing management alternatives is attached (Appendix C).
2. Do not develop any additional facilities in the vicinity of the vulture roost.

3. Do not develop facilities (including hiking trails) in the vicinity (within 1/4 mile) of the goshawk nesting territory.
4. Continue to accurately document the climbing use of the Tower.
5. Monitor raptor nesting activity on the Tower. Determine whether prairie falcons (or other species) are occupying the Tower early in the season (April) and where they are nesting. Determine nesting success by weekly monitoring of the nest site using a spotting scope. Each week, observe the site until normal breeding activity is confirmed or for four hours. Determine reproductive success (and number of young fledged or nearly fledged) by observations at the estimated time of fledging (mid June through mid July).
6. Prevent disturbance to raptors by closing all climbing routes near a nest site as soon as it is located. Nearby (within ~100 m) climbing routes should be closed.
7. Regularly monitor (evening counts once a week) the number of vultures using the roost. Consider counting roosting vultures from within a vehicle to minimize disturbance to the birds.

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Personal Communications:

- Enderson, J.H. Professor, Colorado College, Colorado Springs, CO.
- Gyhra, J. Resource Management Specialist, Devils Tower NM. National Park Service.
- McCoy, R. Caretaker of private ranch surrounding the Missouri Buttes.
- Oakleaf, R. Wyoming State Raptor Biologist.

Appendix A. Field notes of Mike Britten, 6-10 May and 13-16 July, 1992, DTNM, Wyoming.

5/6/92 Devil's Tower NM, WY residence area: sev. cowbirds 1 N. Oriole ♂, song 1 Yellow Warbler, ♂, song 1 Rose-breasted Grosbeak, ♂ ~ 5 Black-capped Chickadee, several singing 1 Downy Woodpecker 1 probable Hairy Woodpecker 1 House Wren, song 1 Turkey Vulture, soaring near tower, apparently flushed ~ 15 pigeons 1 + Mourning Dove, song 15+ Rock Doves, asses w/ Tower 5+ Am. Robin Drive to V.C. and walk 1/4 way around Tower Trail - S side: 1 Blue-Tay Kill - near Park maintenance building, in heavy brush, appears to be accipiter kill 1 Cooper's Hawk, flew over low, same loc. (cont'd.)	5/6/92 (cont'd.) 1 Rufous-sided Towhee, same loc., ♂, song at Tower: many Am. Robins, some sing. " Yellow-rumped Warblers, song. Saw only 1, Audubons race. Its 2 white wing bars merged into a super wide single wing bar sev. Red-breasted Nuthatch 40+ White-throated Swift 1 Prairie Falcon, appeared small, perched high on SW part of tower, preened for 15-20 min., then dove off vertically and I lost it. 15+ Turkey Vulture, soaring off Tower. 5 of them were perched on the shoulder off boulders on the W side of Tower sev. Chipping Sparrows sev. Pine Siskins (cont'd.)
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5/6/92 (cont'd.) Devil's Tower res. area 1 Peer-will calling at 10:00-10:15P (many have called longer) There was possibly a second bird calling too. 5/7/92 Devil's Tower NM, WY res. area: 1 pine siskin on ground eating dandelion seeds from the stalk Tower Trail: 1 Solitary Vireo, song 1 Prairie Falcon, S. side high, flying Red Beds trail walk: Turkey Vulture roost - at beginning near park road where trail becomes 2 track "road" on large ponderosa (not good needle growth) w/ lots of white wash and several feathers at base. (cont'd.)	5/7/92 (cont'd.) 1 Blackpoll Warbler, ♂, foraging watched it catch & eat a large caterpillar I saw it well, noted its yellow-orange based beak and the greenish yellow in the wings (primaries) Also the yellow legs - they seemed very long. Solitary Vireo Yellow-rumped Warbler Townsend's Solitaire - watched a black-capped chickadee cleaning out a nest cavity in a dead Ponderosa. It was ~ 3 feet aq1, dbh ~ 1 1/2'. The hole was ~ 10" tall & 3" wide. The chickadee went down into it and came out w/ beakfuls of deadwood. Saw it make 10+ trips 1 + Piñon Jay, heard (cont'd.)
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- NPS. 1992. Devils Tower National Monument Resources Management Plan. National Park Service.
- Driese, K.L. and D.A. Roth. 1992. A description of the vascular flora and mammal fauna and the effects of human disturbance on the summit of Devils Tower. Final Report: Cooperative Agreement Number CA 1268-1-9009. Submitted to the National Park Service, Rocky Mountain Regional Office. Denver, CO.
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- Enderson, J.H. Professor, Colorado College, Colorado Springs, CO.
- Gyhra, J. Resource Management Specialist, Devils Tower NM. National Park Service.
- McCoy, R. Caretaker of private ranch surrounding the Missouri Buttes.
- Oakleaf, R. Wyoming State Raptor Biologist.

5/7/92 (cont'd.)

scanning Tower from main
park road, ~100 m W. of entrance
station:

2 Am Kestrel, ♂ + ♀, ♂ brings
an vole (or mouse) to ♀

1B + Turkey Vulture, soaring near
tower

1 Prairie Falcon, syanon. moult
~5 primary, perched on top (NE
"corner") but not completely on top.

It flew around tower sev. times,
chased a vulture, then soared
high, then glided SSE then into
a hunting stoop. Will mark on
map where stoop was.

sev. Pigeon Jays

10 min later: see apparently
same prairie soaring just S. of tower.
glides in lands on top. By the time
I get scope up to spot it's gone. In
a minute or so.

(cont'd.)

5/7/92 (cont'd.)

I see a prairie come out of
same area, fly to perch. Preens
for ~10 min, stretch, defecates flies
off around tower to W.

I believe (because the 2nd
bird was smaller & by behavior -
preening, etc.) I saw an irvula.
switch. I marked the spot & will
continue to watch it.

1 Red-tailed Hawk, ad. - very
light belly band but otherwise
appears typical. Soaring near
bridge, glides to SE & begins displays.

~5 Violet-green Swallows

1 Wood Duck, ♂ flying upriver
sev. M. Bluebird, ♂ + ♀

after dinner walk along River

1 Goshawk, ad. seemed huge.
Made 3 strong passes at a Mourning
Dove, beautiful! Missed. Flew to NW.
(I was close enough to hear its wings!)

5/7/92 (cont'd.)

1 Kestrel - attacked above Goshawk
after it landed for ~15 sec.

1 Prairie Falcon S. side Tower

2 N. Oriole, on near Bullocks ♂

1 Am Kestrel, ♂

4 Lark Sparrow

~3 Blue Jay

1 W. Tanager. sang

1 Canyon Wren

1 Poor-will WSW of Tower

2 prob. Clay-colored Sparrow

5/8/92 Devils Tower, WY early 9:45-
res. area to E side of
Monument along road

2 Poor-will

2 Rock Wren

1 Canyon Wren

1 Wood Duck - heard, sun, ♂

1 Great Blue Heron 2 ♂ + ♀

3 Wood Duck (besides above)

2 Say's Phoebe

5+ Pigeon Jay

(cont'd.)

5/8/92 (cont'd.)

Java Swallow

Blue Jay

Clay-colored Sparrow

Pine Siskin

6:30 spot ♂ Prairie sitting on Tower
near where I thought eyrie was

6:45 he flies, then I see ♀, has
following her around Tower counter-
clockwise. he comes out from behind
on S., flies to eyrie. In ~20 sec she
flies in also. They are both in eyrie
for ~60 sec, he flies out, perches
7:00 leave site

also noted:

2+ Yellow Warbler

1+ Killdeer

Admin. Building:

1 Warbling Vireo - sang

1 Black-headed Grosbeak, ♂ song

1 Rock Wren

(cont'd.)

5/8/92 (cont'd.)

at Bridge:

2 Prairie Falcons, low, being mobbed by Pinyon Jays, later see it come out of stoop over prairie dog town

walk, around Tower's S. slope:

10:00 + 12:30

* 4 Clay-colored Sparrow, well seen, brown rump, pale bills w/ dark on tip + top of upper mandible, crown w/ dark streaks but mostly brown w/ pale median streak. Heard 2-note buzzy song.

1 Yellow Warbler

11 Black-capped Chickadee

111 Rufous-sided Towhee

too many: 1 Chipping Sparrow

1 Mountain Bluebird

⑥ Violet-green Swallow

1 Canyon Wren

- pigeon kill - drainage near HQ

Horned Owl roost - small (12" + 4th)

pendulous, 7 feathers, 1 large pellet

111 Pine Siskin

5/8/92 (cont'd.)

111 Flicker

111 Yellow-rumped Warbler

11 Rock Wren

1 Brown-headed Cowbird

too many House Wren

White-throated Swift

Joyner Ridge area:

1 Wild Turkey, heard 2 gobble

1 Solitary Vireo

1 Hairy Woodpecker

6+ Gray Jay, 3+ fledglings, 2+ ad.

1 Kingfisher

1 Red-shafted Flicker - drinking

2 C. Crow

~10+ Lark Sparrow, 50+ g

1 Killdeer

2 Am. Kestrel, or fads 9

2 N. Rough-winged Swallow

- flushed an adult Cooper's Hawk

was eating an (ad or guess by long

tail feathers) Common Grackle

1 Osprey, calling + appeared

(cont'd.) to be displaying, shallow dives. (cont'd.)

5/8/92 (cont'd.)

2 Townsends Solitaire

1 Brown Creeper, very flat not

- while USAF jet circles tower, low tail # 38192 ~ 7:30 est. (checked one

clock later, time was ~ 6:40, then

same plane came back + made another turn around Tower again

later - photo

1 Kestrel - fly + perch Tower Ridge meadow

upper Devil's Tower Parking area: 10+ Turkey Vultures, roosting, same loc as 5/6. They are nervous when I am walking on the road looking at them. One flushed - because of ash I think.

1 Brown Creeper, song

2 Hairy Woodpecker

5/8/92 (cont'd.) Drive to Hulet:

1 Osprey w/ start of nest on wood crossbar between 2 utility poles. A complete nest is on next set of poles. 5.2 mi W. of Hulet on WY SR 24.

2 Turkey Vulture, ad and

2 Crows

- I saw the 4 in a tussle in a hay field. After ~ 15 sec one vulture "escaped" + flew 20' chased by the rest. The tussle continued. The crows seemed mostly to stand close but I didn't really see what was for sure. The aggressive vulture was biting the nape of the other. The first escaped again ~ 20' away chased by the rest. After ~ 2 min. it escaped again and made a hill w/ sparse trees/shrubs. A series of fights/chases ensued w/ the 1st trying to get away esp. by walking weakly uphill. Both were tired and getting slower. Once the 1st flew ~ 30' w/o the other chasing. It landed... (cont'd.)

5/8/92 (cont'd.)

... then walked uphill and around a tree - hiding. The 2nd flew after in ~ 20 sec. and almost flew past but saw it + "stooped" on it at ~ 10' a.g.l.

The entire chase/fight seq. lasted 20 min. There were also 12+ white-tailed deer near the hill that at first were afraid of the vulture but then appeared curious and followed them. The chase ended with the aggressor flying off ~ 1/2 mi. and landing in a cottonwood w/ a 3rd vulture. The 2nd vulture was in "healthy" plumage - no obvious damage while the 1st looked awful w/ lots of apparent feather damage.

After 15 min. of not seeing the 1st vulture on the hill I walked over and saw it - alive at least. It flushed and flew low ~ 50 yds.

5/9/92 Devil's Tower NM, walk on W side

- 6 Turkey Vultures, roosting in old barn
- 1 Black-backed Woodpecker
- 1 W. Wood Pewee
- 2 Red Crossbill
- 2 Lazuli Bunting
- 1 Brown Creeper, sang
- sev. Solitary Vireo
- + N. Goshawk, 2 at nest. The ♂

(I believe the ♂) was very aggressive. I heard calling before I was near the nest so I had an idea where it was. It's in a Ponderosa ~ 1 1/2' dbh + est 60' tall. It is against the main trunk 2/3 way up. The ♀(?) was on it. The ♂ attacked many times, the ♀ stayed on nest. When I finally found nest + saw adult on nest I left.

The ♂ had brown on breast + belly almost like a stain. When excited he seemed to dramatically puff under tail coverts.



5/9/92 Missouri Butte, WY

on route:

- Vesper Sparrow
- Am. Goldfinch
- 1 Western Kingbird
- 1 Osprey, same loc. as 5/8

tailless Butte:

- many White-throated Swifts, fly
- 1 Red-tailed Hawk, perch. on west-most Butte
- 1 Rock Wren
- 4+ Rock Dove, (also 2 on E. Butte)
- found broken grey arrow point on talus on N side - left there

walk between Buttes

- 2+ Gray Jay
- 1 Canyon Wren, E. Butte
- 1 Ovenbird, S of E. Butte, 4d was on a merry chase, finally got nice looks while singing
- hear wailing - large falcon, SW side of E. Butte
- 2 Red-tailed Hawks, nest... (cont'd.)

5/9/92 (cont'd.) (dbh ~ 16")

in a Ponderosa ~ 40' tall, nest 2/3 way up. Nest ~ 2' across 1 1/2' deep. 3 white eggs. Appears to be lined w/ juniper bark strips. Adults have very little as far as a belly band, scapulars and upperwing coverts very pale.

1 Prairie Falcon, attacks 1 of the Red-tails briefly then flies to Ponderosa on S. side of Butte. It appears large and has a full crop. Guess it to be a ♀.

- checked the W. side of the SW butte. No sign of an eagle nest as I was told by the ranch caretaker. However the weather is now rainy w/ clouds obscuring parts of Butte.

- checked the W. side of side of largest + N.-most Butte. No sign of a sticknest. No birds seen but it's bad weather and it's coming from the NW so I wouldn't expect a bird there. Decent places for a falcon eyrie though (cont'd.)

5/9/92 (cont'd.)

- found a palm-sized gray stone. Appears to be a scraper. found between the pond and gate where I parked

- talked w/ Ray - caretaker. Said when I asked if Bald or Golden Eagles nested there - Balds! (like him).

~ 5+ Tree Swallows w/ violet-green swallows and Barn Swallows over a small pond. Also perching in cattails in the bad weather.

5/9/92 Devil's Tower NM

28+ Vultures - roosting in 5+ trees near 1st road (map)

5/10/92 Devil's Tower NM

1 Red-tailed Hawk, near prairie dog town

sw. Clay-colored Sparrow - song

2 Canada Goose, over River

1 Prairie Falcon, perch near eye

5/10/92 near Cook Lake, WY

2 Yellow-bellied Sapsucker

1 Ovenbird

2 Broad-winged Hawk, ad. ~1.5

mi N. of jet SR A. 830 + SR 843

Watched 1 fly to top of broken Ponderosa. Called several times, "chip chip tsseeeeee". A second flew to same perch w/ small (about same length as overall hawk) snake in its beak.

The 1st flew off, the second called several times "chip tsseeeeee" then ate snake. The snake had a green belly. When it finished it flew to top of Ponderosa (live, above canopy) and called sev. times. Later (~1/2 hr) flush a Broad-wing while walking nearby, it appears to have prey. Calls twice.

S. of Cook Lake

2+ Ruby-crowned Kinglet

5/10/92 S. of Sheridan, WY

1 Golden Eagle - 1st of trip

6/13/92 Rio Grande NE, E of Wolf Cr. Pass (at Co. Columbine rest area)

2 Tree Swallow

1 Cliff Swallow

20+ Violet-green Sw.

6/13/92 sw mi N of Antero Res on SR 295 - South Park, CO

1 Mountain Plover

7/13/92 Devil's Tower NM, WY

1 Golden Eagle - 15 mi S of Devil's Tower Jet on WY SR 14.

3+ Eastern Screech Owl - in campground, 2 adults and at least 1 fledgling - flying well. Am. Robins were very aggressive towards the owls, esp. when they flew. Seen at dusk, much calling. With darkness they were quiet. (nearby full moon)

3 Osprey, 2 adult + 1 (or more) large nestling. (cont'd.)

7/13/92 (cont'd.)

... in the nest on the power pole on WY SR 14. Could only see the head of the nestling. 1 adult was perched on the nest edge, 1 on a water tower nearby.

7/14/91 Devil's Tower NM

2 Red-headed Wood - C.G. Bridge at Bella Fourche Ri.:

2 C. Yellowthroat

2+ Am. Kestrel, 1 ♂, 1 unk., sounded like a feeding of young or ♀

5+ E. Kingbird

2+ W. Kingbird

sev. House Wren

10+ C. Grackle

2+ Blue Jay

2 Cedar Wax.

1+ Red-eyed Vireo, singing.

near H.Q.

1 W. Tanager same loc. (cont'd.)

7/14/92 (cont'd.)

1 Prairie Falcon, E side of Tower, seen 2 times, brief wait once chasing pigeons.

3+ Red Crossbills

3+ Sol. Vireo, ad. feeding fledglings area of Goshawk nest.

1 Kestrel, to the S. agitated

2 (at least N. Goshawk fledglings tails still short, est. 2/3 grown) Near the nest found magpie and mourning dove prey remains. Also found a moulted #9 or 10 primary.

later:

1 Kestrel high going NW to SE moult #3 prim., esp on R wing

3+ Dark-eyed Junco (1 fledgling)

Goshawk nest - in a Ponder-

osa Pine, 35' up a 55' tree.

nest ~ 2' x 2' x 2' deep

one of the fledgling kak, kak,

kicked... as I approached, like an adult but high pitched

7/14/92 (cont'd.)

3+ N. Orioles, 1 ad. 1 fledgling, 1 unk. The adult took a couple of dives at the Goshawk chick. These orioles are in ponderosa forest. There is a small drainage (usually it would be dry) with a few small oaks.

Campground: song only

1 Indigo Bunting 1 unk bunting

3 Yellow Warblers (1 ad feeding a fledgling, 1 singing)

1 Downy Wood.

SW Eastern Kingbird

watching the Tower from the prairie dog meadow to the SE, 3:00-4:45 PM

15+ White-throated Swift

sev. Flickers (seen through out the day, all red-shafted)

22+ W. throat Swift (same as above group)

1 Lark Sparrow

4+ Pinyon Jay, 1 ad, 3+ fledg. near entrance

7/15/92 (cont'd.)

WNW side - from Jayner Ridge Trail park area 5:45-7:00 PM:

watched vultures come to roost - later counted them

V.C. parking lot

2 Prairie Falcons, 1 adult,

1 unk.

98 Turkey Vultures at the roost

They were there even during heavy rain & wind of a thunderstorm at ~ 9:15 P

1 Tiger Salamander

7/15/92 Devil's Tower NM

watching SE side from road

7:00A-10:15, mostly clear, breezy (2 Red-eyed Vireo, 1 in same loc. as yesterday, 1 in residence area. Both singing in oak groves)

1 Yellowthroat

1 Yellow-shafted Common Flicker

5+ Pinyon Jays, calling from SE (cont'd.)

7/15/92 (cont'd.)

B.S.S. saw a large falcon, high on the Tower, flew behind

en route to upper park area:

1 Rock Wren

2 Black-head Grosbeak

watching Tower from boulder field NW of Tower 11:00A-12:30P

Red Crossbills heard calling almost constantly

no falcons seen or heard

watching Tower from overflow parking at sewage pond 4:30P-8:00P

4:43 saw Prairie Falcon, unk age in front of Tower, glides S, lost to sight

1 Fledgling Cornbird - does not appear to be assoc. w/ a parent

5:06 2 Vultures arrive at roost - can't see them land but it looks like they went in. Perhaps 1st of evening

5:25 Falcon waiting - can't see it

5:40 moved to main parking area

7/15/92 (cont'd.)

19 Pigeons in a flock flying around Tower

6:25 P Prairie Falcon flying, lands on ledge $\frac{2}{3}$ up - NW side. Very yellow feet, apparent symmetrical moult #7 primary, very noticeable on R wing. Noticeable yellow cere. An adult, sex unk. Spends 3-5 min on ledge walking and poking around. Looking for cached food? Flies, see it 2-3 times going around to N. side

6:57 Same falcon fts flies from N to W side wailing/lands/preens

7:14 flies back to N side of Tower

8:13 Kestrel flies over park lot

8:14 - 8:25 hear wailing. See 1 then 2 prairie falcons on SSN face flying thru perching, wailing on and off for 3-5 min. It looks like they are looking (esp the ♂) for cached food.

Both are adults. One, the ♀ I think (difficult... (cont'd.)

7/15/92 (cont'd.)

... to see them both together because they are going in and out of view) is the falcon 1st seen at 6:25, same sym. moult #7 (or 8?) primary. No tail moult. The 2nd (more active) appears smaller - ♂. It has yellow feet, sym. moult at #6 primary. Also it is missing #2 or #3 right rectrices.

The ♀ flies to S face out of view after 5 min. The ♂ keeps flying in & out of view thru perching for another 5 min, then it flies out of view to S conclude watch at 8:40

91 Turkey Vultures in the roost near the parking area

owl calling 10:30-11:00 P

2 Great-horned owl - NW corner of NM

1 Poorwill - W side of NM

7/16/92 Devil's Tower NM, WY

6:20 - 7:50 A

walk from HQ up Park Rd

17 Western Wood Pewee IIII HT HT II

5 Solitary Vireo HT

4 Red-eyed Vireo II

10 Black-capped Chick. HT HT

6 House Wren HT I

1 E Kingbird I

4 Flicker IIII

1 W. Tanager I

4 Yellow Warbler IIII

2 Am. Robin II

2 Black-headed Grosbeak II

1 Cedar Waxwing I

1 Pine Siskin - I

3 Brown-headed Cowbird, fledgling following a passerine - chipping sparrow ? / lone cowbirds II

1 yellow-rumped W. I

2 Hairy Wood. II

3 Rufous-sided Towhee III

3 N. Oriole II (2 ad fled yng) III

2 Ovenbird II

2 Brown Creeper II

7/16/92 (cont'd.)

5 Chipping Sp. HT

3 White-breasted Nid. III

3 Am Robin III

1 Red Crossbill I

8:25 - 9:09 A walk along river from bridge upstream

2 Red-headed Wood. II

6 House Wren HT I

2 W. Wood Pewee II

1 Pine Siskin I

1 Piyoan Jay I

7 Am. Robin HT II

(5 Robins attacked an ad. ♂ Kestrel

2 Am. Kestrel 1 ad ♂, 1 unk

3 Yellow Warbler III

1 Great Blue Heron I

5 Common Grackle HT

10 E. Kingbird HT HT HT (family, 2 ad fledg)

1 Hairy Wood. I

1 Common Yellowthroat I

4 Mourning Dove III

7/16/92 (cont'd.)

1 Cedar Waxwing 1
1 Brown Thrasher 1
1 Black-headed Grosbeak 1
2 N. Oriole 11
3 Goldfinch 111
3 Lark Sparrow 111
3 Red Crossbill 111
1 Rough-winged Swallow 1
3 Violet-green Swallow 111
3 Cliff Swallow 111
2 Red-tailed Hawk 11 (1 ad,

1 unk, ~ 1 mi upstream

1 Hawk, near campground
1 Meadowlark 1

9:09 A - arrive campground. Did
not count birds in campground of
afterwards

Kestrel nest in G6 site A20. 7/26/92 Longmont CO.
in cottonwood, 40' up a 55' tree

E face hole at a broken off branch chattering, seen sev. adults had
~ 3' dbh, 3 newly fledged young, symm. molt in primaries
2 ♂♂, 1 ♀

(cont'd.) (7/16/92)

7/16/92 (cont'd.)

KDA Campground at entrance

8 Brewer's Blackbird

3 House Sparrow

7/17/92 Moorecroft WY

1 L. Shrike

1 road kill Badger

7/17/92 N. of Moorecroft WY

Osprey nest, ad on nest
w/ 3 large nestlings - soon to fledge

(checked the Osprey nest
that I had seen on 5/8/92 on
WY SR 24, 5.2 mi west of
Hulet. No adults seen nor
any signs of recent use)

7/26/92 Longmont CO.

7-10+ Chimney Swifts, heard

chattering, seen sev. adults had

symm. molt in primaries

Appendix B. Birds Observed at Devil's Tower National Monument,
6-10 May and 13-16 July, 1992.

Abundance estimates indicate the relative number of each species
observed in the proper habitat during visits.

Key to Symbols:

n nest or fledgling young observed

b breeding as indicated by singing or territorial behavior

species	abundance			
great blue heron.	rare			
Canada goose .	uncommon			
mallard .	uncommon			
wood duck b .	uncommon			
turkey vulture .	common			
Cooper's hawk .	uncommon			
northern goshawk n .	uncommon			
red-tailed hawk b .	uncommon			
American kestrel n .	common			
prairie falcon n .	uncommon			
osprey b? .	rare			
wild turkey .	uncommon			
killdeer .	uncommon			
rock dove n .	common			
mourning dove b .	common			
eastern screech owl n .	uncommon, observed	1	breeding	pair
great horned owl b +	common			
common nighthawk b .	common			
common poorwill b .	uncommon			
white-throated swift n .	abundant			
belted kingfisher .	uncommon			
red-headed woodpecker n .	common			
downy woodpecker b .	common			
hairy woodpecker b .	common			
northern flicker b .	abundant			

black-backed woodpecker.	rare
western wood pewee b +	abundant (along with the American robin, possibly the most abundant species at DTNM)
western kingbird b.	uncommon, 1 singing bird observed on eastern boundary
eastern kingbird n.	common
Say's phoebe b.	uncommon, 1 singing bird observed
tree swallow†	uncommon (probable migrants observed nearby)
violet-green swallow n.	common
cliff swallow n.	common
northern rough-winged swallow b.	uncommon
barn swallow b.	uncommon
gray jay n.	uncommon, 1 family group observed
blue jay.	common
pinyon jay n.	abundant
black-billed magpie.	uncommon
American crow.	uncommon
black-capped chickadee b.	abundant
red-breasted nuthatch b.	uncommon
white-breasted nuthatch b.	common
brown creeper b.	uncommon
rock wren b.	uncommon
canyon wren b.	uncommon
house wren n.	abundant
mountain bluebird b.	uncommon
Townsend's solitaire b.	uncommon
American robin b.	abundant (along with western wood pewee, possibly the most abundant bird in DTNM)
brown thrasher n†	uncommon, 1 family group observed
European starling.	uncommon
cedar waxwing.	uncommon
solitary vireo b.	common
warbling vireo b.	uncommon
red-eyed vireo b.	common, at least 4 singing males observed in one mourning
blackpoll warbler†	rare, 1 bird observed

yellow warbler b .	common
yellow-rumped warbler b .	abundant
ovenbird b .	uncommon
 western tanager b .	 uncommon
black-headed grosbeak b .	uncommon
rose-breasted grosbeak .	rare, 1 bird observed
lazuli bunting .	uncommon
indigo bunting b .	uncommon, 1 singing male observed
 rufous-sided towhee b .	 uncommon
chipping sparrow b .	abundant
clay-colored sparrow +	common migrant
vesper sparrow b .	uncommon
lark sparrow n .	common
dark-eyed junco b .	common
 red-winged blackbird n .	 uncommon
western meadowlark b .	common
Brewer's blackbird .	uncommon
common grackle b .	common
brown-headed cowbird n .	common
northern (bullock's) oriole n .	common
 red crossbill b +	 abundant
pine siskin b .	common
American goldfinch b .	common
 house sparrow n .	 uncommon

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Appendix C.

Climbing Management Alternatives

Climbing on Devils Tower does disturb nesting prairie falcons and may prevent recolonization of the Tower by peregrine falcons.

The NPS is mandated to protect nesting raptors by the Migratory Bird Treaty Act, NPS Management Policies, the Code of Federal Regulations, the Bald Eagle Protection Act (applies to bald and golden eagles), and the Endangered Species Act (for peregrine falcons). At the same time the NPS is mandated to provide for visitor enjoyment of DTNM by the NPS Organic Act.

With the goal of protecting nesting raptors on Devils Tower from disturbance by climbers (that would result failure to nest on the Tower, failure to successfully incubate and hatch eggs, or failure to successfully raise and fledge nestlings) and accommodating some level of climbing use of Devils Tower, I developed potential climbing management alternatives. The alternatives do not take into account any other factors (e.g. native American concerns). They are intended to cover a spectrum of management alternatives from no restriction to full restriction of climbing. After each alternative I discuss the potential effect on nesting raptors. It is important to recognize that whatever the climbing management alternative or combination of alternatives adopted, the effect on raptor populations will be local with the possible exception of the peregrine falcon (should they colonize the Tower). While the effects of climbing to populations of raptors and other bird populations may be small, the effect to the visitors' (including climbers) experience and perceptions may be significant.

Of the alternatives, I believe that A and B virtually eliminate human disturbance to raptors on the Tower. Alternative C would probably eliminate most human disturbance although a pair of raptors might choose a low nest in some years and be susceptible to climbing disturbance. Alternative D would eliminate most disturbance but requires effort by DTNM staff with some training or experience (depending on the experience of the observer, locating nest sites might take from 8-40 hours of observation time in April). Alternative E (continue current management) would cause raptors to continue to be disturbed and to fail to fledge young from the Tower in most years.

ALTERNATIVE A. Prohibit all climbing.

Restrict all climbing on the Tower.

Disturbance to prairie falcons would be virtually eliminated and they would have an excellent opportunity to fledge young from Devils Tower. Peregrine falcons might colonize the Tower in the near future and would probably colonize the Tower over the long-term (assuming the population of western peregrines continues to increase).

ALTERNATIVE B. Prohibit all climbing during the nesting season.

Restrict all climbing on the Tower from 1 March through 31 July.

Disturbance to prairie falcons would be virtually eliminated and they would have an excellent opportunity to fledge young from Devils Tower. Peregrine falcons might colonize the Tower in the near future and would probably colonize the Tower over the long-term (assuming the population of western peregrines continues to increase).

ALTERNATIVE C. Prohibit climbing on the Top 1/3 of the tower during the nesting season.

Restrict all climbing on the top 1/3 of the Tower from 1 March through 31 July. Allow climbing to the top of the Tower one or several routes that are in close proximity to each other. Restrict climbers at the summit to certain areas (near the middle and not directly above raptor nests).

Since the best nest sites appear to be on the upper 1/3 of the Tower and climbing well below nesting falcons is relatively benign, prairie falcons would have a good opportunity to fledge young from the Tower and peregrines might colonize the Tower.

ALTERNATIVE D. Restrict climbing within 100 meters of occupied raptor nests. (DTNM staff locate nest sites in April.)

Restrict all climbing in March and April until the DTNM staff have located all raptor nest sites on the Tower. (DTNM staff should locate nest sites using spotting scopes and binoculars during April. Excellent observation points are near the bridge over the Belle Fourche and the parking area near the Visitor Center.) Once located, restrict all climbing within 100 meters of occupied raptor nest sites. Restrict climbers from the top of the Tower directly above occupied nest sites. Monitor the outcome of all nesting attempts and modify the 100 meter restricted distance if necessary.

Prairie falcons would have a good opportunity to fledge young and peregrine falcons might colonize the Tower (assuming nest sites are

located and climbing near them is restricted).

ALTERNATIVE E. Continue current management--close climbing routes close to occupied raptor nests. Locate nest sites through climber reports.

Close climbing routes once a raptor nest site is reported by climbers.

Prairie falcons would have a poor opportunity to fledge young (depending on the nest site chosen) because of disturbance by climbers during critical stages of the breeding season. Disturbance would occur when climbers locate the nest site.

Figure 1. Survey routes and raptor locations, 6-10 May and 13-16 July, 1992, DTNM, Wyoming.

- KEY
- raptor
 - × raptor
 - wash
 - AMKE American kestrel
 - COHA Cooper's hawk
 - EASO eastern osprey
 - GHOW Great Horned Owl
 - NOGO northern owl
 - OSPR osprey
 - PRFA prairie falcon
 - RTHA red-tailed hawk



