APPENDIX 4-J

RAPTOR SURVEY

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RAPTOR SURVEYS ALONG THE PROPOSED BROOKS EAST CORRIDOR, AMBLER MINING DISTRICT ACCESS PROJECT, ALASKA, 2013

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October 2013

INTRODUCTION

The Alaska Industrial Development and Export Authority (AIDEA) is evaluating the potential to construct an industrial access road approximately 200 miles long from the Dalton Highway to the Ambler Mining District in the upper Kobuk (referred to as the Brooks East Corridor). Numerous environmental and engineering studies were initiated as early as 2009 by the Alaska Department of Transportation and Public Facilities (DOT&PF), including reconnaissance level and more specific field studies (e.g., distribution of anadromous fish).

In 2013, DOWL HKM also contracted ABR, Inc.—Environmental Research & Services (ABR) to conduct raptor surveys to assess use of the Brooks East Corridor survey area by birds of prey, particularly focusing on large raptors that nest either on cliffs or in trees. The goal of this effort was to locate and determine the status of raptor nests within 2 miles of the proposed Brooks East Corridor centerline. The surveys focused on raptor species with special protection or conservation status, that show nest-site fidelity or re-use of established or "traditional" nests, and that potentially are sensitivity to disturbance. Bald and Golden eagles were included because they are afforded special protection under the Bald and Golden Eagle Protection Act (16 USC, Section 668). The American Peregrine Falcon (*Falco peregrinus anatum)*, whose range includes the study area (White 1968), was delisted as an endangered species in 1999 (64 FR 46542) but was included because there is continued agency interest in their populations (USFWS 2002). Nests of other raptors (e.g., Osprey, Red-tailed Hawk, Rough-legged Hawk, Great Horned Owl, and Gyrfalcon) and Common Ravens, all of which are protected by the Migratory Bird Treaty Act and traditional in their use of nest sites, were also focal species for the 2013 surveys.

As many as 18 species of raptors (Eagles, hawks, falcons, osprey, and owls) use the region (Table 1; Schempf 1989; Swanson 1992; NPS, undated). Many of these species probably breed along the proposed Brooks East Corridor, but their breeding status and nest distribution is poorly known for most of the study area. Although the study area has not been searched extensively for nesting raptors, exceptions include portions of the TAPS corridor including the Koyukuk and Jim rivers (White et al. 1977; Roseneau and Bente 1979; Craig and Hamfler 2003; J. Herriges, BLM, personal communication) and segments of the Kobuk and Alatna rivers (Swanson 1991; Melanie

Flamme, NPS, personal communication). Some nest sites found during these previous surveys were relocated within the Brooks East Corridor study area during our surveys in 2013.

This report presents results from the 2013 raptor surveys, which focused on the large tree- and cliff-nesting raptors (birds of prey) occurring in the Brooks East Corridor study area.

STUDY AREA

The Brooks East Corridor crosses a number of ecological regions of Alaska including Interior forested lowlands and uplands, Interior uplands, and the southern slopes of the Brooks Range (Gallant et al. 1995; Figure 1). Extensive stands of boreal forest cover most of the eastern half of the study area (Figure 2a), while more open tundra and riparian woodlands predominate west of Beaver Creek (Figure 2b). Large trees suitable for tree-nesting raptors occur in riparian areas along most drainages in the area including tributaries of the Koyukuk, Alatna, Kobuk, Reed, Beaver, Mauneluk, Kogoluktuk, Shungnak, and Ambler rivers. Suitable woodlands also occur around larger lakes in the region and in well-drained upland areas. Cliffs are scattered and generally limited to occasional outcrops in alpine areas, in a few distinct mountainous areas (Heart Mountain, Helpmejack Hills; Figure 3a), and along short sections of canyons on the main rivers and upland canyons (Figure 3b). The study area included cliff and woodland habitats primarily within ~2 miles of the proposed corridor centerlines.

METHODS

We conducted 2 helicopter surveys in 2013 along the proposed Brooks East Corridor to determine the distribution and occupancy of tree- and cliff-nesting raptors (June) and their nesting success and productivity (July). Standard survey procedure included flying toward potential cliff and forested areas, when the aircraft was ~0.5 mi (0.8 km) from the most suitable habitats. Slow ~10–40 mi/h (~15–60 km/h) passes were made within ~100–150 ft (~30–50 m) from a cliff or prospective tree nest to determine status. Habitats were approached as directly as possible to minimize the impact of surprise on nesting birds. Survey aircraft moved away quickly from sites that were occupied and where birds were incubating eggs or brooding tiny young.

During both surveys, 2 observers were seated on the same side of the aircraft for observations and data collection. Study area maps (1:40,000 scale) with centerlines and 2 mile

buffers delineated on them were carried in the field as hard copies and designated on GPS units. During the second survey, known nest sites also were delineated on study area maps and hand held GPS units. When a nest was discovered or when a known nest was approached, surveyors attempted to determine and record nest status: *unoccupied* (no pair or aggressive adults observed); *occupied* (at least a pair of adults or aggressive adult or proof of nesting); *successful* (young present); *failed* (abandoned eggs, inactive since first visit in June); or *unknown* (no clear information to determine final outcome of nest by July visit). Nests where adults were still brooding nestlings were assigned unknown status because survival of young to fledging could not be assumed. The aircraft slowed or hovered if nestlings were present; nestlings then were counted and aged (e.g., approximate age in weeks). We used image stabilizing binoculars to improve our view, while remaining at a safe distance from active nests. In addition to searching for nest sites, observers searched for other signs that raptors were using a suitable nesting habitat or territory, including the presence of other stick nests, nesting ledges, “whitewash” deposits (feces), and defensive adult raptors. Multiple passes sometimes were required to determine occupancy and to evaluate potential for raptor nesting, particularly if cliffs were large or complex. Because Common Ravens build many nests that are subsequently used by raptors, their nests were also located and mapped.

We recorded the coordinates of each nest site using an onboard GPS receiver while hovering over unoccupied nests or within 25–50 m of nests with defensive or incubating adults. Additional habitat and nest description data included species use, cliff height, aspect, and nest condition (good, fair [leaning, aged], poor [collapsing], or remnant only). If a specific species could not be assigned with certainty to any particular inactive nest, the nest was identified as unknown species. When conditions allowed, photographs of all nests were taken, including distant and close-up shots. After the survey, waypoints of new nests were transferred to a GIS database for summary by species, location in relation to the corridor centerline, and nest status.

RESULTS AND DISCUSSION

DISTRIBUTION, ABUNDANCE, AND PRODUCTIVITY

Fifty-one raptor and Common Raven nests or breeding territories were recorded within ~3.5 miles of the Brooks East Corridor centerlines (Table 2, Figure 4, Appendix A), including 3 cliff sites where the behavior of an adult Peregrine Falcon suggested an occupied territory but no nest was located. Thirty-two nests and nesting sites (63%) were located on cliffs or steep bluffs, while the remaining 19 were in trees, primarily spruce trees (95%). More than three quarters of nests and nesting sites (76%) were associated with lacustrine or riparian habitats; the remaining nests and nesting sites were located in isolated, off-river rock outcrops and mountainous cliffs. Nests ranged from 0.31 to 5.82 km from the Brooks East Corridor centerline (mean = 2.2 ± 1.5 km; Appendix A), but the majority of nests (75%) were within 2 miles of the centerline.

The majority of nests and nesting sites (73%) were unoccupied during either June or July surveys. Fourteen nests and nesting sites were occupied by 1 of the 4 species recorded: Peregrine Falcons (7), Osprey (4), Bald Eagle (2), and Common Raven (1). Interestingly, all Golden Eagle nests were unoccupied and conditions of Golden Eagle nests suggested none had been occupied in at least the past few years. In addition, only a single Golden Eagle (adult) was observed along the proposed Brooks East Corridor during 2013 surveys.

PEREGRINE FALCON

Peregrine Falcons were the most common breeding raptor recorded in the study area and were observed at 10 cliff areas (Figure 5, Appendix 1), including 7 pairs and 3 single adults. Two sites were within 1 mile (1.6 km) of Brooks East Corridor centerlines (mean = 2.5 ± 1.6 km). Peregrines were also observed hunting in areas without cliffs (e.g., along the Kogolukluk River) but they probably were not nesting in these areas. Cliffs used for nesting typically were located along drainages, the primary nesting habitat for Peregrine Falcons in Alaska (Cade 1960), but 3 observations were off-river or in mountainous areas (Figure 2). One of these nests was located on a large lake in the Beaver Creek watershed. Records of Peregrine Falcons nesting at lakes are rare for interior Alaska (Ritchie et al. 2004).

Although 7 pairs of Peregrine Falcons occupied cliffs in 2013, only 2 pairs (28%) were successful and produced a total of 3 young (1.5 young/successful pair). An incubating adult Peregrine Falcon also was observed at a third nest in mid-July; although it may have been brooding tiny young, this late date suggests a limited probability for successful fledging and the nest was listed here as unknown. At the 4 remaining cliffs where a Peregrine Falcon was observed incubating during June, all had failed: 2 nest scrapes were found empty and 2 contained abandoned eggs during July.

Although most of the sites with Peregrine Falcons had no history of use, at least 2 sites: PE01 and PE05 have some history of use (Jim Herriges, BLM personal communication; B. Ritchie, ABR, unpublished notes). There are additional records of peregrines nesting on tributaries of the Koyukuk and on the mainstem Koyukuk River in the eastern portion of the study area (Craig and Hamfler 2003). Historic records of nesting Peregrine Falcons are limited west of the Koyukuk (Irving 1960, Dean and Chesemore 1974), with only one nest previously identified in the upper Kobuk (Swanson 1991).

OSPREY

Ospreys were the second most common raptor nesting in the study area with 9 nests recorded, including 4 occupied nests. Three of the occupied nests were successful and produced young that were ~1 week old during the mid-July survey (Figure 4, Appendix A). Nest fate of a fourth nest could not be determined because an adult was still incubating on 13 July. Nests were most common in the western half of the study area; the eastern-most nest occurred on the Alatna River. All nests were in spruce trees on the larger drainages in the study area. No nests were found on lake shorelines. Four nests were within 1 mi (1.6 m) of the Brooks East Corridor centerlines (mean =2.1 ± 1.6 km).

Ospreys have been described as wide-spread and increasing their range through central Alaska, with scattered smaller populations north to the extent of tree-line in the Kobuk and western Alaska regions (Poole et al. 2002). Ospreys have been described as common in the Kobuk area with some breeding records (Grinnell1900, Irving 1960; Swanson 1992). Recent surveys on the Kobuk identified nests in and adjacent to the Brooks East Corridor study area (Swanson 1992; M. LeFlamme, NPS, personal communication). Some locations appeared to be

the same territories and possibly the same nest sites as our 2013 nest locations (Swanson 1992; M. LeFlamme, NPS, unpublished data).

GOLDEN EAGLE

We observed only 1 adult Golden Eagle during our surveys in June and July 2013 in the Ambler Study area, although unoccupied nests of this species were well distributed and relatively abundant in cliff habitats (Figure 4, Appendix A). Eleven Golden Eagle nests were recorded at 7 cliffs, but 2 of these only had nest remnants suggesting no recent use. The other 5 nests were in fair to good condition but did not show any evidence of use in 2013 (e.g., new grass, branches, whitewash, prey, feathers). Four nests were within 1 mi (1.6 m) of the Brooks East Corridor centerlines (mean =2.6 ± 1.6 km).

The study area is well within the breeding range of Golden Eagles in northern Alaska, but suitable habitat and prey resources probably increase to the north in the Brooks Range (Kochert et al. 2000). For example, no nests were recorded in the Schwatka Mountains in the southwestern Brooks Range (Dean and Chesemore 1974), but nests have been recorded the Brooks Range on the upper Koyukuk and Alatna rivers to the north (Roseneau and Bente 1979, Swanson 1992, Craig and Hamfler 2003).

BALD EAGLE

Four nests attributed to Bald Eagles were located in the Brooks East Corridor. Bald Eagles occupied 3 of these nests in 2013 (Figure 4, Appendix A). Two nests (Jim River and Alatna River) were occupied during June surveys and one nest was successful (1 young). A pair of Bald Eagles also was recorded at a third nest (not located during June surveys) on the upper Kogoluktuk River (nest fate unknown). The fourth nest possibly constructed by Bald Eagles was unoccupied and located on Beaver Creek. Only one nest was within 1 mi (1.6 m) of the Brooks East Corridor centerlines (mean = 2.3 ± 2.4 km).

The Brooks East Corridor probably is near the northern extent of Bald Eagle nesting in interior Alaska (Buehler 2000, Ritchie and Ambrose 1996). Two historic nests are known for the general study area: a nest has been recorded on Jim River (Jim Herriges, BLM, personal communication; probably the same as nest BE04 found during our surveys in 2013) and a second

nest has been recorded on the Kobuk River near the mouth of the Pah River outside of our study area (Swanson 1992; M. LeFlamme, NPS, personal communication).

OTHER RAPTORS

No other nests found in the study area in June and July 2013 could be assigned definitively to a specific raptor species. Eleven nests in the unknown category could have been constructed or used by any of the species noted above or by other raptor species, such as Red-tailed Hawk, Rough-legged Hawk, and Great Horned Owl (Figure 4).

No Gyrfalcons or their ledges or well-used perches were identified during our surveys. Only a few Gyrfalcon nests have been recorded on the south slope of the Brooks Range (Swem et al. 1994) and these generally have been in more rugged mountainous areas of the Brooks Range. Gyrfalcons similarly were not recorded during previous surveys of the Alatna and Kobuk drainages (Dean and Chesemore 1974; Swanson 1992; M. LeFlamme, NPS, unpublished data), but they probably are rare, resident breeders in the region (e.g., Irving 1960).

A single Merlin was recorded on an alder covered bluff on the Mauneluk River and its defensive behaviors suggested an occupied nest site. The species is probably an uncommon breeder in the study area (Bee 1958, Irving 1960, Dean and Chesemore 1974).

Three additional large raptor species each were observed 1–3 times during our surveys: Red-tailed Hawks, Rough-legged Hawks, and Northern Harriers. No large owls (Great Horned Owls, Great Grey Owls, or Short-eared Owls) or accipiters (Northern Goshawks or Sharp-shinned Hawks) were observed.

COMMON RAVEN

At least 6 Common Raven nests were recorded in the Brooks East Corridor study area (Figure 5, Appendix A). Only one of these nests was determined to have been occupied and successful in 2013 (5 young), although this nest had collapsed by the time surveys were conducted in July. Another 4 stick nests were classified as unknown origin although they may have been constructed or used by ravens in the past. One raven nest was within 1 mi (1.6 m) of the Brooks East Corridor centerlines (mean =2.3 ± 1.7 km).

Common Ravens are regularly recorded during surveys in the region, but their breeding status is rare or uncommon (Dean and Chesemore 1974, Irving 1960). Nests have been recorded on the Koyukuk, Alatna, and Kobuk rivers (Swanson 1992; J. Herriges, BLM, personal communication; M. LeFlamme, NPS, unpublished data).

SPRING CONDITIONS AND POSSIBLE INFLUENCE ON RAPTOR NESTING

Spring was unusually late or delayed over most of interior and northern Alaska in 2013. Characteristics of this late spring included delayed ice break-up on rivers and lakes, late snow cover, and late arrival dates of many bird species including raptors. All of these factors may have influenced nest occupancy and nest distribution particularly for non-resident species. Many common non-resident species such as Red-tailed Hawks apparently did not nest or nested late in some regions (B. McCaffery, USFWS, pers. comm.). Only one pair and two single birds were observed during all of our surveys. If potential prey items (i.e., other birds) arrived late, conditions for nest initiation for some species (Peregrine Falcons) also may have been compromised. Nest initiation was late and success was very low for Peregrine Falcons at other study areas in northern and interior Alaska (Ritchie, unpubl. data, S. Ambrose, pers. comm.).

In addition, low prey numbers (e.g., hares) may have compounded the effects of a delayed spring for other species such as Great Horned Owls and Golden Eagles. No occupied nests of these two species were recorded in the study area during 2013 and, anecdotally, noticeable sign of hares was not recorded at any helicopter landing locations within the study area. A lack of prey may also have limited Golden Eagle occupancy and productivity at other interior Alaska study areas (C. McIntyre, NPS, pers. comm.; J. Shook, ABR, pers. comm.).

HABITAT ASSESSMENT

As noted in a letter report following June surveys (R. Ritchie, ABR, to J. Christianson, DOWL, 21 June 2013), suitable habitats for the primary cliff-nesting species (Golden Eagle and Peregrine Falcon) are scattered throughout the study area. Most cliff areas are in the foothills of the mountain ranges in the area and >2 miles from the Brooks East Corridor centerline. Exceptions include small canyons on Ryan Creek and Jim Creek, bluffs along the Hogatza and upper Kobuk rivers, and cliffs on Heart Mountain and Deadman Mountain and in the Helpmejack Hills.

The most suitable riparian stands used by the primary tree-nesting species (Bald Eagle and Osprey) occur along all the major drainages (e.g., Alatna, Reed, Kogoluktuk, Jim, Koyukuk, Shungnak, and Mauneluk rivers and Beaver Creek). Most lakes in the Brooks East Corridor study area had limited stands of trees on their shorelines, but some trees were large enough for either Bald Eagle or Osprey nests.

In addition to larger riparian cliffs, Peregrine Falcons are capable of using small cliffs on main rivers and small, incised canyons on tributaries of these rivers, and larger, off-river, mountain cliff sites. In the study area, one off-river site is located on a cliff fronting a large lake, notable because lake-nest sites are rare in interior Alaska (Ritchie et al. 2004).

NEST AVOIDANCE RECOMMENDATIONS

On 25 June, in an effort to reduce impacts of other project-related field surveys on nesting raptors, ABR provided DOWLHKM with the locations of all occupied and unknown status nest sites located during June 2013 surveys. In addition, ABR provided a list of recommended guidelines or suggested precautions near these nests (Appendix B) to reduce impacts to nesting birds, reduce potential for collisions between aircraft and defensive birds, and to satisfy restrictions inherent in some federal regulations (e.g., Bald and Golden Eagle Protection Act). Following nest fate surveys in July, ABR updated the nest location data to include only those nests still occupied or newly discovered and occupied. This information was transferred to DOWLHKM on 25 July 2013.

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Table 1. Status of raptor species expected in the Brooks East Corridor, Brooks Range, Alaska.[1]

Common Name	Species Name	Status[2]
Northern Goshawk	*Accipiter gentilis*	RB
Sharp-shinned Hawk	*Accipiter striatus*	MB
Northern Harrier	*Circus cyaneus*	MB
Rough-legged Hawk	*Buteo lagopus*	MB
Red-tailed Hawk	*Buteo jamaicensis*	MB
Golden Eagle	*Aquila chrysaetos*	MB
Bald Eagle	*Haliaeetus leucocephalis*	MB
Osprey	*Pandion haliaetus*	MB
Gyrfalcon	*Falco rusticolus*	RB
Peregrine Falcon	*Falco peregrinus*	MB
Merlin	*Falco columbarius*	MB
American Kestrel	*Falco sparverius*	MB
Great Horned Owl	*Bubo virginianus*	RB
Short-eared Owl	*Asio flammeus*	MB
Snowy Owl	*Bubo scandiacus*	V
Great Gray Owl	*Strix nebulosa*	RB
Northern Hawk Owl	*Surnia ulula*	RB
Boreal Owl	*Aegolius funereus*	RB

[1] Sources: Schempf 1989, Swanson 1992, www.nps.gov
[2] RB = resident, breeding; MB = migrant, breeding; V = visitor

Table 2. The number, species, and status of raptor and Common Raven nests found within ~2 miles of the Brooks East Corridor centerline, Dalton Highway to Ambler, Alaska, June and July 2013.

Species	No. Nests	Unoccupied Nests	Occupied Nests (% Successful)	Successful Nests	Unknown Nest Fate[2]
Peregrine Falcon	10[1]	3[1]	7 (29)	2	1
Osprey	9	5	4 (5)	3	1
Golden Eagle	11	11	0	0	0
Bald Eagle	4	2	2 (50)	1	1
Common Raven	6	5	1 (100)	1	0
Unknown	11	11	0	0	0
Total	51	37	14 (50)	7	3

[1] Includes cliffs where adults were observed, but no nests were recorded.
[2] Locations where young could not be recorded (adult brooding or covering eggs/young closely) or only a pair was present in July. All of these nesting locations were first identified during July survey.

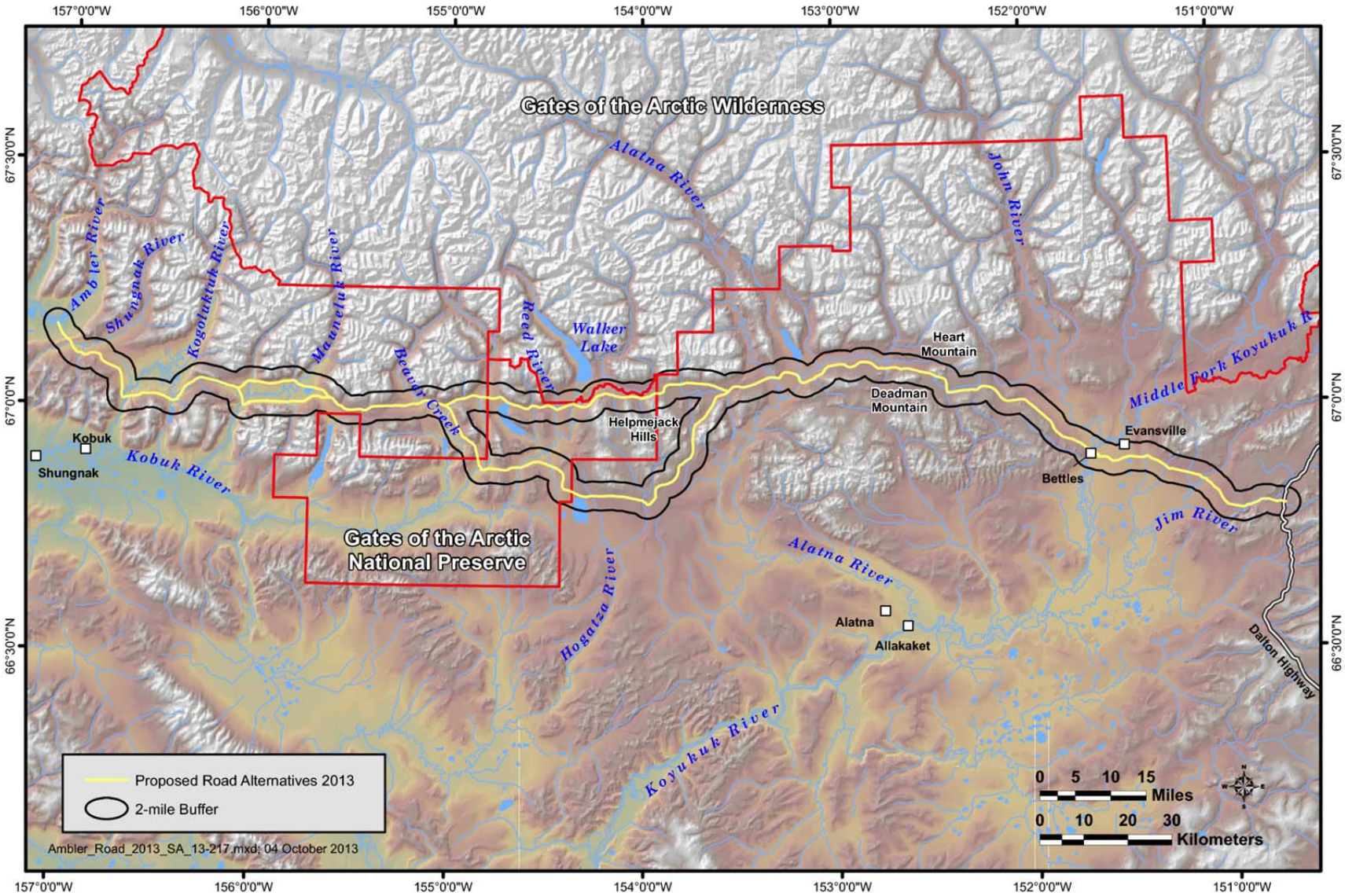

Figure 1. Study area for raptors along the Brook East Corridor, Alaska, June and July 2013.

a

b

Figure 2. a) Beaver Creek valley showing typical woodland habitat in the eastern two thirds of the Brooks East Corridor, Alaska; b) Mauneluk River showing more open riparian forest-tundra cover in western third of the Brooks East Corridor, Alaska.

a

b

Figure 3. a) Off-river cliff habitat in Heart Mountain area, Brooks East Corridor, Alaska; b) Cliff habitat in small canyon, Ryan Creek, Kogoluktuk River area, Brooks East Corridor, Alaska.

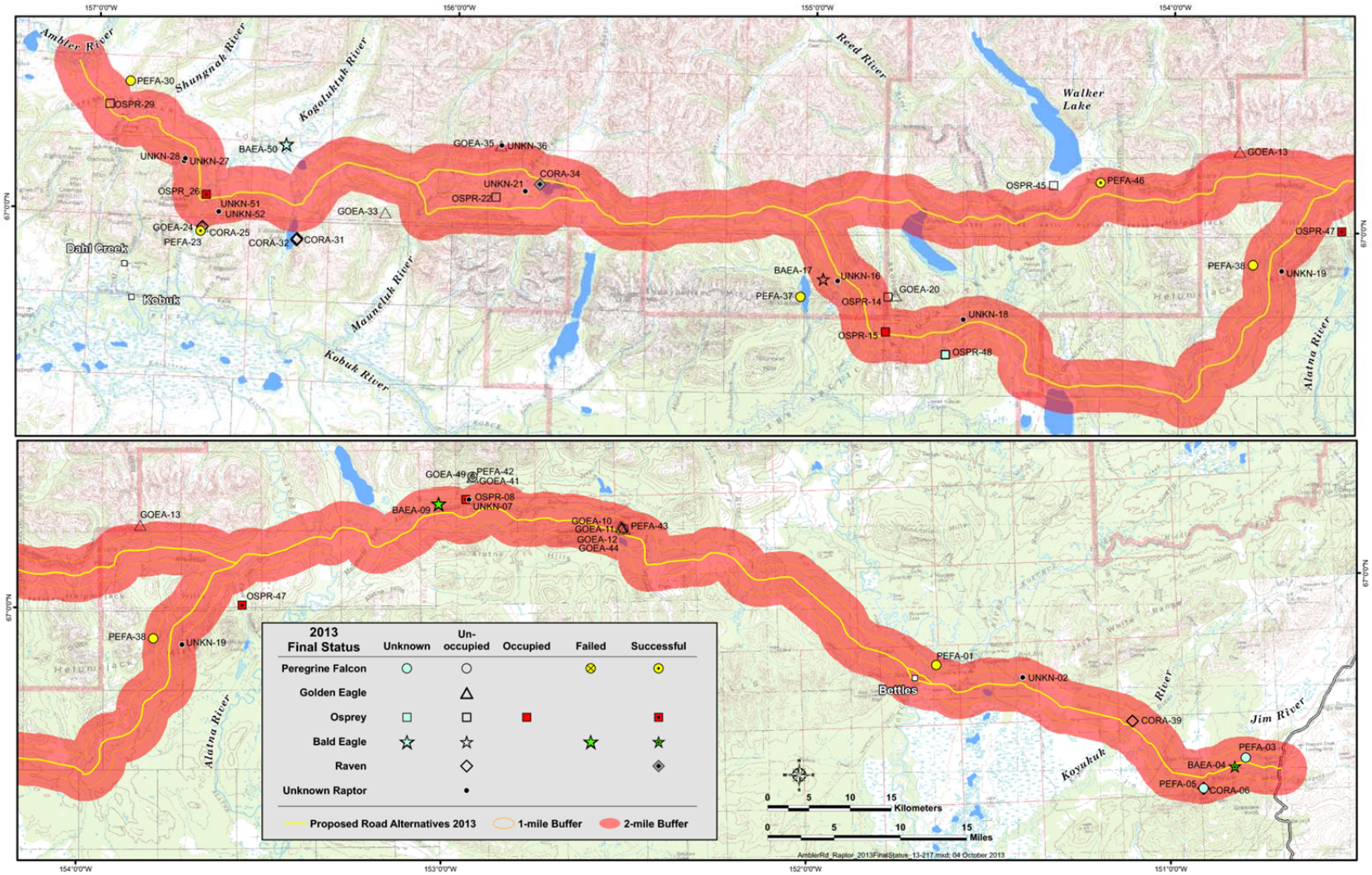

Figure 4. The distribution, species, and final status of raptor nests along the Brook East Corridor, Alaska, June and July 2013.

Appendix A. Status and location of raptor nests, Brooks East Corridor, Alaska, June and July 2013.

Nest ID	ABR Nest ID	Species[1]	Visit 1	Visit 2	Latitude	Longitude	Distance to Road (m)	Nest Substrate	Nest Status[2]	Comments (success/productivity)
PEFA-01	AR001PEFA	PEFA	6-Jun-13	11-Jul-13	N66 55.213	W151 37.334	2026	cliff	F	Nest under juniper, top of gravel; eggs mud on July visit
UNKN-02	AR001UNKN	XRAP	6-Jun-13	11-Jul-13	N66 54.189	W151 23.129	695	spruce	UO	stick nest on dead spruce over small creek; maybe CORA
PEFA-03	AR002PEFA	PEFA	6-Jun-13	11-Jul-13	N66 48.306	W150 46.890	594	cliff	UO	may be lone bird; fair cliffs; not observed in July
BAEA-04	AR001BAEA	BAEA	6-Jun-13	11-Jul-13	N66 47.778	W150 48.763	305	poplar	S	nest in poplar tree on Jim River; 1 young
PEFA-05	AR003PEFA	PEFA	6-Jun-13	11-Jul-13	N66 46.443	W150 54.059	1331	cliff	Unk	Adult sitting tight just below recent burn midway on cliff; looks to be brooding
CORA-06	AR001CORA	CORA	6-Jun-13	11-Jul-13	N66 46.443	W150 54.059	1331	cliff	UO	Good OH, lots of whitewash
UNKN-07	AR002UNKN	XRAP	7-Jun-13	11-Jul-13	N67 06.847	W152 54.306	1763	spruce	UO	Witches broom platform; defensive RTHA pair within 200 meters.
OSPR-08	AR001OSPR	OSPR	7-Jun-13	11-Jul-13	N67 06.860	W152 54.850	2036	spruce	S	spruce tree; 2 young (<1 wk) on July visit
BAEA-09	AR002BAEA	BAEA	7-Jun-13	11-Jul-13	N67 06.589	W152 59.404	1124	spruce	F	nest in spruce; no adults in July
GOEA-10	AR001GOEA	GOEA	7-Jun-13	12-Jul-13	N67 04.883	W152 29.158	653	cliff	UO	leaning but solid
GOEA-11	AR002GOEA	GOEA	7-Jun-13	12-Jul-13	N67 04.888	W152 28.904	756	cliff	UO	good site with overhead protection
GOEA-12	AR003GOEA	GOEA	7-Jun-13	12-Jul-13	N67 04.794	W152 28.939	594	cliff	UO	old, but good site with overhang
GOEA-13	AR004GOEA	GOEA	7-Jun-13	12-Jul-13	N67 05.377	W153 49.218	3032	cliff	UO	old, but good condition
OSPR-14	AR002OSPR	OSPR	8-Jun-13	13-Jul-13	N66 55.785	W154 47.565	3065	spruce	UO	poor condition
OSPR-15	AR003OSPR	OSPR	8-Jun-13	13-Jul-13	N66 53.509	W154 47.943	330	spruce	O	unoccupied in June; incubating bird in July
UNKN-16	AR003UNKN	XRAP	8-Jun-13	13-Jul-13	N66 56.783	W154 55.968	729	cliff	UO	White wash; maybe old CORA; poor condition
BAEA-17	AR003BAEA	BAEA	8-Jun-13	13-Jul-13	N66 56.911	W154 58.395	1847	spruce	UO	Fresh or last year's grass
UNKN-18	AR004UNKN	XRAP	8-Jun-13	13-Jul-13	N66 54.353	W154 35.086	625	spruce	UO	maybe old BAEA or OSPR
UNKN-19	AR005UNKN	XRAP	8-Jun-13	13-Jul-13	N66 57.546	W153 42.326	1461	cliff	UO	maybe old GOEA platform
GOEA-20	AR005GOEA	GOEA	9-Jun-13	13-Jul-13	N66 55.871	W154 46.333	3968	cliff	UO	nest in fair condition
UNKN-21	AR006UNKN	XRAP	9-Jun-13	13-Jul-13	N67 02.229	W155 48.147	1876	spruce	UO	possible OSPR nest; fair condition
OSPR-22	AR004OSPR	OSPR	9-Jun-13	13-Jul-13	N67 01.790	W155 53.011	1305	spruce	UO	fresh green grass: possibly BAEA as well
PEFA-23	AR004PEFA	PEFA	9-Jun-13	13-Jul-13	N66 58.925	W156 41.893	3741	cliff	S	Good ledge with overhang and at least 1 young
GOEA-24	AR006GOEA	GOEA	9-Jun-13	13-Jul-13	N66 59.208	W156 41.593	3226	cliff	UO	just soil 'scar' remnant left of nest

Appendix A. Continued.

Nest ID	ABR Nest ID	Species[1]	Visit 1	Visit 2	Latitude	Longitude	Distance to Road (m)	Nest Substrate	Nest Status[2]	Comments (success/productivity)
CORA-25	AR002CORA	CORA	9-Jun-13	13-Jul-13	N66 59.216	W156 41.609	3210	cliff	UO	CORA nest above GOEA
OSPR-26	AR005OSPR	OSPR	9-Jun-13	13-Jul-13	N67 01.319	W156 41.189	540	spruce	S	nest in spruce; attacked aircraft at 300 m
UNKN-27	AR007UNKN	XRAP	9-Jun-13	13-Jul-13	N67 03.440	W156 45.076	1741	cliff	UO	cliff nest: maybe RLHA nest?
UNKN-28	AR008UNKN	XRAP	9-Jun-13	13-Jul-13	N67 03.616	W156 44.896	1551	cliff	UO	cliff nest; RLHA flying nearby
OSPR-29	AR006OSPR	OSPR	9-Jun-13	13-Jul-13	N67 06.997	W156 57.824	363	spruce	UO	spruce nest
PEFA-30	AR005PEFA	PEFA	9-Jun-13	13-Jul-13	N67 08.529	W156 54.541	3675	cliff	F	pair present in July, but failed nest with 2 eggs
CORA-31	AR003CORA	CORA	10-Jun-13	14-Jul-13	N66 58.668	W156 25.826	4015	cliff	UO	2 nests within meters; good condition
CORA-32	AR004CORA	CORA	10-Jun-13	14-Jul-13	N66 58.578	W156 25.904	4177	cliff	UO	see above
GOEA-33	AR007GOEA	GOEA	10-Jun-13	14-Jul-13	N67 00.567	W156 11.347	4496	cliff	UO	nest remnant; good cliff
CORA-34	AR005CORA	CORA	10-Jun-13	13-Jul-13	N67 02.716	W155 45.766	517	spruce	S	successful with 5 young in June; collapsed in July
GOEA-35	AR008GOEA	GOEA	10-Jun-13	13-Jul-13	N67 05.179	W155 52.345	3015	cliff	UO	fair condition but partially collapsing
UNKN-36	AR009UNKN	XRAP	10-Jun-13	13-Jul-13	N67 05.174	W155 52.267	3001	cliff	UO	CORA or GOEA?? Proximal to GOEA 35
PEFA-37	AR006PEFA	PEFA	11-Jun-13	13-Jul-13	N66 55.715	W155 02.084	5283	cliff	F	incubating bird in June; abandoned in July
PEFA-38	AR007PEFA	PEFA	11-Jun-13	13-Jul-13	N66 57.958	W153 47.078	2092	cliff	F	incubating bird in June; abandoned in July
CORA-39	AR006CORA	CORA	not located	11-Jul-13	N66 51.043	W151 05.291	531	spruce	UO	spruce nest on Koyukuk east bank; missed in June
GOEA-41	AR009GOEA	GOEA	not located	11-Jul-13	N67 08.277	W152 53.601	3934	cliff	UO	area not searched in June; 2 nests
GOEA-49	AR010GOEA	GOEA	not located	11-Jul-13	N67 08.333	W152 53.666	4047	cliff	UO	area not searched in June; 2 nests
PEFA-42	AR008PEFA	PEFA	not located	11-Jul-13	N67 08.333	W152 53.666	4047	cliff	UO	area not searched in June; single bird showing affinity to good cliff
PEFA-43	AR009PEFA	PEFA	not located	12-Jul-13	N67 04.723	W152 28.632	580	cliff	UO	no birds observed in June; July single only; good habitat
GOEA-44	AR011GOEA	GOEA	not located	12-Jul-13	N67 04.703	W152 28.534	576	cliff	UO	additional nest on Heart Mountain. (near GOEA 10-12)
OSPR-45	AR007OSPR	OSPR	not located	12-Jul-13	N67 03.160	W154 20.258	3461	spruce	UO	in spruce; 100 m from water; poor condition; missed in June
PEFA-46	AR010PEFA	PEFA	not located	12-Jul-13	N67 03.347	W154 12.401	1404	cliff	S	ledge in canyon, missed in June; 1 young, 3 wks old in July
OSPR-47	AR008OSPR	OSPR	not located	13-Jul-13	N67 00.119	W153 32.323	4749	spruce	S	area not searched in June; spruce nest; 2 young < 1 wk; adults attacked helicopter

Appendix A. Continued.

Nest ID	ABR Nest ID	Species[1]	Visit 1	Visit 2	Latitude	Longitude	Distance to Road (m)	Nest Substrate	Nest Status[2]	Comments (success/productivity)
OSPR-48	AR009OSPR	OSPR	not located	13-Jul-13	N66 52.065	W154 38.016	2690	spruce	Unk	missed in June; pair of ospreys nearby in July
BAEA-50	AR004BAEA	BAEA	not located	14-Jul-13	N67 04.794	W156 28.165	5815	spruce	Unk	area not searched in June; pair off river 200 m
UNKN-51	AR010UNKN	XRAP	not located	14-Jul-13	N67 00.226	W156 38.986	1732	cliff	UO	stick nest in proximity to UNKN 52; pair of Peregrines recorded nearby in June
UNKN-52	AR011UNKN	XRAP	not located	14-Jul-13	N67 00.226	W156 38.986	1732	cliff	UO	stick nest in proximity to UNKN 51; pair of Peregrines recorded nearby in June

[1] Species Codes: PEFA = Peregrine Falcon, GOEA = Golden Eagle, BAEA = Bald Eagle, OSPR = Osprey, CORA = Common Raven, XRAP = Unknown Raptor.

[2] Nest Status (final determination of status): S = successful; UO = unoccupied during both surveys, F = failed, Unk = unknown status (e.g., located on July survey).

Appendix B. Interim guidelines to avoid disturbance to nesting raptors (birds of prey) along the Brooks East Corridor.

APPENDIX B. INTERIM GUIDELINES TO AVOID DISTURBANCE TO NESTING RAPTORS (BIRDS OF PREY) ALONG THE BROODS EAST CORRIDOR

Ground, boat, and aircraft survey support are essential for engineering work and environmental studies in the Ambler road corridors. Disturbance associated with these human activities can negatively affect raptor nest occupancy and success, however. Further, Bald and Golden eagles are protected by the Bald and Golden Eagle Protection Act (16 USC § 668) that prohibits the take of any Bald Eagle or Golden Eagle, where *take* is defined as including "molest or disturb" eagles. (*Disturb* means to agitate or bother to a degree that causes, or is likely to cause, injury to an eagle, a decrease in its productivity, or nest abandonment.) The federal Airborne Hunting Act (16 USC § 742j–l) and accompanying regulations (50 CFR Part 19) also prohibit harassment of wildlife by aircraft. Harassment includes activities that 'disturb, worry, molest, concentrate, harry, chase, drive, herd, or torment animals'. Potential penalties, including fines, can be substantial.

Therefore, safe and practical guidelines are valuable to reduce potential impacts to raptors while accommodating field activities. The following interim guidelines provide a general code of conduct and specific recommendations for pilots and their passengers and ground crews near occupied or historic raptor nests and potential raptor habitat. Locations of occupied nest sites in 2013 will be provided by DOWL. Field personnel need to adhere to these guidelines, recognizing that some exceptions will be necessary during approved wildlife surveys. **These guidelines do not supersede established protocols developed to protect human life and safety**.

GUIDELINES

Numerous species of raptors nest in the Brooks East Corridor study area. Cliff-nesting raptors include Golden Eagles and Peregrine Falcons. Tree-nesting species include Bald Eagles, Ospreys, Northern Goshawks, and Red-tailed Hawks.

- Precautions should be exercised from now (June) through 31 August near cliff and woodland habitats where raptor nests are occupied.
- Avoid low-level (<500 ft above nest height) and/or close flights (>1,000 ft lateral distance) near occupied nests. Occasional flights may be necessary in these areas, but routine flights should occur as far away as are practical, to avoid repeated disturbance.
- Approach nests and potential habitat along a visible path. Do not approach cliff nests from behind, which increases the chances for severe responses of incubating birds (e.g., surprised departure from nests and potential injury to eggs or young).
- Do not land aircraft on the brink or top of cliffs or river bluffs with historic or occupied raptor nests. If landings must occur, land and take off >1,000 ft away and restrict the amount of time on the ground at these sites.
- Generally, people on the ground cause some of the most severe disturbance to raptors (e.g., missed feedings, attracting predators, expose egg and young, adults and young abandoning nests). Leave nesting areas if an occupied nest is discovered or when disturbance is obvious. Camp >1,000 ft from occupied and historic sites. If raptors are disturbed (e.g., adults screaming, diving at people or aircraft), move away from the site quickly. Activities above nests often are more disturbing than activities below.

Please report any evidence of raptors nesting (e.g., stick nests, vocal nestlings) to Bob Ritchie (britchie@abrinc.com). ABR Inc.—Environmental Research & Services, P.O. Box 80410, Fairbanks, AK 99709. 907-455-6777.

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