

# Aerial Raptor Stick Nest Survey -- Spring 2013

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Active Bald Eagle nest on Kanuti National Wildlife Refuge, South Fork Koyukuk River

**Introduction.** A number of raptors that build stick nests use Kanuti National Wildlife Refuge each year. These birds include Bald Eagles (*Haliaeetus leucocephalus*), Sharp-shinned Hawks (*Accipiter striatus*), Harlan's Hawks (*Buteo jamaicensis harlani*), and Osprey (*Pandion haliaetus*). The Common Raven (*Corvus corax*) nests on the Refuge in trees, as well, and biologists often considered these corvids "ecological raptors" because they compete with true raptors for nest sites and food (Craighead and Craighead 1956). Northern Goshawks (*Accipiter gentilis*) usually nest in forest stands with old growth characteristics like large stems and closed canopies (Squires and Reynolds 1997). In the only study of Goshawks conducted in Interior Alaska, stands of large paper birch trees (*Betula papyrifera*) were the preferred nesting sites

(McGowan 1975). No accipiter nests have been found on Kanuti NWR, but recent surveys along some rivers on the Refuge have verified that territorial Northern Goshawks do occur there in low numbers (Craig and Spindler 2011, Craig et al. 2012). The Kanuti Refuge has a very active fire regime, in fact over 70% of the Refuge has burned since 1950. Because rivers can “armor” nearby vegetation communities against wildfire, the timber stands along many of the rivers on the Refuge are comprised of large, old trees.

Refuge personnel conducted an aerial survey for stick-nesting raptors on portions of Kanuti Refuge in fall 2011 that included several watercourses and patches of potential upland habitat (Craig and Dillard 2012). The objectives of the current survey were to:

- Resurvey the portions of the Refuge searched in fall 2012 by Craig and Dillard (2012), i.e. along the Refuge’s 5 major rivers: the South Fork and main Koyukuk Rivers, and the Jim, Kanuti, and Kanuti Kilolitna Rivers.
- Search for stick nests along Henshaw Creek – a major salmon spawning stream.
- Search for stick nests along Fish Creek.

**Methods.** We based the survey out of Bettles, Alaska. We used an American Champion Scout wheel-plane to conduct the survey and the work occurred over two days prior to leaf-out when there was complete snow cover (4-5 May). We spent a total of 16h and 22m searching for stick nests and ferrying to search locations (Table 1). Survey conditions were excellent; clear skies, and calm winds. During the survey, we searched for stick nests along the Kanuti, the South Fork Koyukuk, the Koyukuk Rivers, and Fish and Henshaw Creeks within the Refuge boundary. We also searched about 0.6 km upstream from the Refuge boundaries along these streams, assuming that any raptor nesting that close to the Refuge would also utilize the Refuge for foraging.

We used the plane’s GPS to navigate to the start of each surveyed watercourse segment, usually just upstream of its intersection with the Refuge Boundary. We then followed the stream until it either left the Refuge or joined another watercourse. We flew at approximately 500’ (152m) above ground level (AGL) and at about 75 mph (121 km/h) during the survey. The Pilot and observer searched for nest sites on opposite sides of the airplane. When we spotted a potential nest site, or nearby high quality nesting stands, we often circled to closely scrutinize the area (Fig. 1). On rivers with wide riparian zones, we made two or more passes, flying first one side and then the other, looking for nests wherever suitable habitat occurred. Conversely, we were able to survey smaller rivers with less riparian habitat in a single pass. Because of the plane’s speed, turning radius and funding limitations, we may have missed some suitable habit along rivers complicated by multiple sloughs, adjacent lakes, and frequent meanders. We spent a mean of 1.5 min./km surveying rivers during our study (Table 1). We expended more effort than the mean surveying the South Fork and main Koyukuk Rivers (2.5 and 2.1 min./km, respectively) because of the extensive riparian areas associated with these rivers and less time (0.4 – 1.7 min./km) surveying the streams with narrower riparian zones.

When we located a nest, the backseat observer recorded the observation/location on a paper survey form and the pilot entered a waypoint on the plane’s GPS. When we spotted a raptor, we searched nearby for nest sites, and conversely when we spotted an empty nest, we searched near it for attending birds. If no raptors were found near a nest, we attempted to determine the species

of raptor that made the nest based on stick and nest size, and nest placement. When the species that made a nest was indiscernible, we simply recorded it as an unidentified stick nest. Even though our primary objective was to search for raptor stick nests, we also recorded other notable wildlife species we spotted.

**Table 1. Flight time expended by watercourse during an aerial survey of raptor stick nests on Kanuti National Wildlife Refuge, Alaska. May, 2013**

Location	Flight Time		Approximate length (km) of river surveyed (min./km)
	Hours	Min.	
<b>South Fork Koyukuk and Jim Rivers</b>	2	55	70 (2.5)
<b>Kanuti River</b>	2	56	170 (0.4)
<b>Koyukuk River</b>	3	26	100 (2.1)
<b>Kanuti Kilolitna River</b>	0	45	30 (1.5)
<b>Henshaw Creek</b>	0	43	25 (1.7)
<b>Fish Creek</b>	0	59	70 (0.8)
<b>Total</b>	11	44	465 (1.5)

**Results and Discussion.** We conducted the survey at the end of a very late, cold spring. This weather was pervasive throughout interior Alaska and lead to an unusual bird migration (Peluso 2013). Snow cover on the Refuge was complete and the watercourses were ice-covered except for a few open leads. Probably because of the weather, the migration of many species into interior Alaska, including Kanuti Refuge was retarded in spring 2013.

Most of the nests we located were in deciduous trees. This probably does not reflect reality, but rather the difficulty in spotting nests located in conifers from an airplane, especially those that are built on “witches brooms”. Airplanes move too fast to conduct a thorough nesting survey where conifers are a nesting option. A more complete picture of nesting density, and nest substrate distribution, could be obtained by conducting the survey from a helicopter, although the cost of the survey would be prohibitive at current funding levels.

*Stick nests.* We visited 30 vacant stick nests during our survey (Table 2), some of which (14) were first located in the fall 2012 survey (Fig.1). Most (5) of these nests appeared to be old Northern Goshawk (NOGO) nests as they were smallish stick nests situated within the tree canopy and against the bole of the tree. All of these nests were located in large deciduous trees in unburned habitat near rivers. Two of the other stick nests were larger nests in more open settings and may have been old Harlan’s Hawk (HALH) nests, 3 appeared to be old Osprey (OSPR) nests (the nests were situated directly on the top of snapped off trees) and one was certainly an old Bald Eagle (BAEA) nest (Table 2). The genesis of the rest of the nests we found was equivocal.

*Occupied nests.* In spite of the late spring, we found adult Northern Goshawks, Bald Eagles and Common Ravens attending nests or incubating eggs during our survey (Table 2). We located more Common Raven (CORA) nests (3) that had attendant adults than the other species. While the number of nesting birds appears low, it should be remembered that the unusually late spring may have truncated bird migration and so reduced the number of nesting raptors on the Refuge in

2013. In concert with this hypothesis, we spotted very few birds of any kind on Kanuti Refuge during the survey; one swan, one Harlan’s Hawk, one Northern Hawk Owl and 4 Northern Goshawks. In particular, the lack of waterfowl, osprey and Harlan’s Hawks dramatically underscored the effects of the cold weather on bird migration.

*Other Wildlife Observations.* We observed many tracks of wolverine, otters and bears during the survey. We also saw one bear as it was emerging from its den, a wolf at a kill site and several places where beaver had dug through the ice near their lodges and were cutting nearby willows and sliding them back to the holes. This may be an indication that the volume of their caches was not adequate to meet their needs during the long cold winter of 2012-2013. Appendix 1 contains a list of all observations we made during the survey.

**Table 2. Locations of active nests of raptors and ravens, and vacant stick nests, found along watercourses during a survey of raptor stick nests on Kanuti National Wildlife Refuge, Alaska. May, 2013**

	South Fork Koyukuk/ Jim Rivers	Kanuti River	Koyukuk River	Kanuti Kilolitna River	Henshaw Creek	Fish Creek	Total
<b>BAEA nest</b>	1	1					2
<b>NOGO nest</b>			2				2
<b>CORA nest</b>		1	2				3
<b>Stick nest</b>	6	12	6	2	2	2	30

Climate change in the Arctic and sub-Arctic has resulted in an increase in temperature, and associated lengthened growing season (Chapin et al. 1995). This trend is expected to continue. Kanuti NWR is at the extreme northern range for nesting BAEA (Buehler 2000) and OSPR (Poole et al. 2002 ). It will be interesting to see if the nesting populations for these species change on Kanuti NWR in response to new environmental conditions in the years to come.

**Recommendations.** We suggest that this survey be repeated in at least spring 2014 in order to determine if the paucity of nesting raptors we detected, particularly BAEAs, NOGO and OSPR resulted from the unusual spring weather this year. The survey should be conducted following the same protocol and be conducted prior to leaf-out and snow melt, but after Bald Eagles and other raptors have arrived on territory.

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**Appendix 1. Observations made during an aerial survey of stick nests on Kanuti National Wildlife Refuge, Alaska, May 2013.**

<b>Observation</b>	2013 observation	Number	Discovery year	Comment	Y	X
<b>BAEA</b>	Animal	1	2013	Adult	66.2918	-151.12
<b>BAEA Nest</b>	Occupied	1	2012	Female incubating; found nest on 2012 float trip	66.6503	-151.5
<b>BAEA Nest</b>	Occupied	1	2012	Adult perched near nest.	66.298	-152.2
<b>Bear Den</b>	Animal	1	2013	Saw Bear	66.7336	-151.54
<b>Caribou</b>	Animal	34	2013		66.836	-151.78
<b>CORA</b>	Animal	2	2013	Flying	66.3078	-152.42
<b>CORA</b>	Animal	1	2013	Flying	66.004	-151.9
<b>CORA</b>	Animal	1	2013	Flying	66.5813	-151.75
<b>CORA</b>	Animal	1	2013	Flying	66.6543	-152.22
<b>CORA</b>	Animal	1	2013	Flying	66.7013	-151.37
<b>CORA</b>	Animal	1	2013	Flying	66.6714	-151.47
<b>CORA Nest</b>	Occupied	1	2013	1 egg	66.303	-152.52
<b>CORA Nest</b>	Occupied	1	2013	Possibly 1 egg. Spotted an osprey here in Fall 2012 but did not see a nest	66.3033	-152.52
<b>CORA Nest</b>	Occupied	2	2012	2 CORA at nest	66.5863	-152.03
<b>GHOW</b>	Animal	1	2013	Flying	66.1895	-151.83
<b>GHOW</b>	Animal	1	2013	Flying	66.8687	-151.67
<b>HALH</b>	Animal	1	2013	Perched	66.6206	-151.39
<b>NHOW</b>	Animal	1	2013	Perched	66.1725	-151.62
<b>NOGO</b>	Animal	1	2013	Flying	66.2164	-151.55
<b>NOGO</b>	Animal	1	2013	Flying	66.6051	-151.25
<b>NOGO Nest</b>	Occupied	1	2013	Female incubating	66.5569	-152.44
<b>NOGO Nest</b>	Occupied	1	2013	Female incubating	66.6325	-151.8

<b>Stick Nest</b>	Vacant	1	2012	Looks like active BAEA 2012	66.1692	-151.59
<b>Stick Nest</b>	Vacant	1	2012	Osprey-like	66.7789	-151.25
<b>Stick Nest</b>	Vacant	2	2013		66.7461	-151.36
<b>Stick Nest</b>	Vacant	3	2013	3 nests in grove	66.2905	-152.28
<b>Stick Nest</b>	Vacant	3	2013	Goshawk like	66.5565	-152.56
<b>Stick Nest</b>	Vacant	1	2012		66.6319	-151.51
<b>Stick Nest</b>	Vacant	1	2012		66.5798	-151.95
<b>Stick Nest</b>	Vacant	1	2012	Active Ospr nest in 2011 and 2012	66.2865	-152.15
<b>Stick Nest</b>	Vacant	1	2012		66.1426	-152.06
<b>Stick Nest</b>	Vacant	1	2013	Goshawk like; deep in a PIGL grove	66.8422	-151.72
<b>Stick Nest</b>	Vacant	1	2013		66.6673	-151.71
<b>Stick Nest</b>	Vacant	1	2013	Goshawk like	66.2269	-151.52
<b>Stick Nest</b>	Vacant	1	2013	Osprey like	66.6413	-152.21
<b>Stick Nest</b>	Vacant	1	2013	Very old	66.5727	-152.2
<b>Stick Nest</b>	Vacant	1	2013	HALH like	66.2251	-151.54
<b>Stick Nest</b>	Vacant	1	2012	Osprey like	66.1198	-152.01
<b>Stick Nest</b>	Vacant	1	2013		66.272	-152.11
<b>Stick Nest</b>	Vacant	1	2012	Was a CORA nest in 2012 on BBS route	66.3201	-152.84
<b>Stick Nest</b>	Vacant	1	2013		66.5376	-152.73
<b>Stick Nest</b>	Vacant	1	2013	HALH like	66.5645	-151.22
<b>Stick Nest</b>	Vacant	1	2013	Goshawk like	66.5931	-151.24
<b>Stick Nest</b>	Vacant	1	2012		66.6409	-151.49

<b>Stick Nest</b>	Vacant	1	2012		66.6134	-151.66
<b>Stick Nest</b>	Vacant	1	2012	Spotted an Osprey here in fall 2012	66.3033	-152.52
<b>Stick Nest</b>	Vacant	1	2012		66.53	-152.22
<b>Stick Nest</b>	Vacant	1	2012		66.1743	-151.61
<b>Stick Nest</b>	Vacant	1	2013		66.1318	-151.45
<b>Stick Nest</b>	Vacant	1	2012		66.7002	-151.38
<b>Stick Nest</b>	Vacant	2	2012		66.3068	-152.64
<b>Stick Nest</b>	Vacant	1	2012	Was a CORA in 2012 on BBS route	66.3028	-152.92
<b>Swan</b>	Animal	1	2013	On open lead in Kanuti R.	66.1862	-151.82
<b>Wolf</b>	Animal	1	2013	At kill site	66.7286	-152.32