SHORT COMMUNICATIONS

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GROUP HUNTING BY HARRIS' HAWKS IN TEXAS

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The degree of sociality appears to vary among Harris' hawk (*Parabuteo unicinctus*) populations in the United States, with group living being most frequent in the western part of the range. Mader (1975) found that 46% of Harris' hawk nests he studied were attended by trios and that groups varied in size from three to six hawks in Arizona. Dawson and Mannan (1989) reported a mean group size of 3.8 hawks per nest in Arizona, Bednarz (1987) found 2.8 hawks per nest in New Mexico, and groups of more than two hawks were rare at nests in Texas (Griffin 1976, Brannon 1980). However, the Texas population of Harris' hawks has not been studied in detail, and little is known of cooperative behaviors among Harris' hawks nesting there. Group hunting in Harris' hawks has been reported to occur in the deserts of Arizona (Mader 1975) and New Mexico (Bednarz 1987). This paper represents the first published accounts of group hunting behavior in Texas.

On 23 July 1994, at 2020 H, we observed an adult male and female Harris' hawk (we identified sex of hawks based on body size comparisons) perched on adjacent power poles approximately 60 m from each other along a highway in Pecos County, 1.6 km north of Ft. Stockton, Texas. The male initiated the hunt by flying high over the road, and was followed closely by the female. Four other adults (three males and one female), previously unseen, appeared from low perches on the east side of the road and followed the pair across the highway. The lead male hovered briefly and then made a shallow dive, dipping just above the ground cover at a desert cottontail (*Sylvilagus audubonii*). The first adult female dove steeply behind the male. Then the hawks executed a series of five or six steep dives apparently missing the rabbit. Five of the birds then landed on a single yucca (*Yucca* sp.). The sixth hawk perched in a nearby mesquite (*Prosopis juliflora*) about 6 m away. After 1–2 min, all six hawks chased the rabbit, until they were lost from view in a low spot in the landscape. No birds flew from this low area in 15 min of observation.

On 1 August 1994, at 0740 H, we again observed six adult Harris' hawks roosting on power poles at the same location described above. Two groups of two hawks were perched on neighboring poles, a fifth hawk was perched on an adjacent pole, and a sixth hawk (male) was perched eight poles away (about 480 m). The fifth hawk soon joined one of the perched pairs on a nearby pole. Then one Harris' hawk flew to the next pole in line. Immediately after it perched, another hawk flew toward it. As the approaching hawk drew near, the first hawk vacated its perch and flew to the next pole in line. The approaching hawk then landed on the recently vacated perch. All five hawks engaged in seven bouts of this "leap frog" behavior (Bednarz 1988a) as they moved from perch to perch, apparently group hunting. This method of hunting on the move, or the move-search hunting tactic is often used by Harris' hawks that are group hunting (Bednarz 1988a, Dawson 1988). The "leap frog" behavior was briefly interrupted two times when three Harris' hawks perched side by side. At 0746 H, all five birds began pursuing a cottontail and engaged in a series of stoops. One hawk captured the rabbit, and the others landed on the ground at the kill site.

We climbed a small hill to get a view of the kill site and inadvertently flushed four of the five hawks from the kill. One returned immediately to the kill while the remaining three perched on poles. Within about 5 min, these three chased another cottontail. After making five stoops, they perched together on a pole. Two of these hawks then landed at the site of the rabbit kill, and one adult male perched on a yucca under the power poles. At 0804 H, an adult female carried the hindquarters of the cottontail to the adult male perched on the yucca. The female dropped the hindquarters, and the male went down to it, presumably to feed.

TDC also observed group hunting by four Harris' hawks

on two occasions in Webb County, Texas, in the early 1980s in April or May. North and east of Laredo, an adult male Harris' hawk that was perched on a power pole executed a steep dive into the tall mesquite brush. Three other hawks (also perched on that pole) followed, diving in succession. Further observation was obscured by the vegetation. On a second occasion, two adult Harris' hawks perched on adjacent fence posts, while two more adults ran around a large prickly pear cactus (*Opuntia engelmannii*). The two perched hawks then joined the others in attempting to flush and ambush a prey animal in the prickly pear. The group eventually flew off without capturing anything.

The observations of cooperative hunting near Fort Stockton may not be particularly surprising—because group hunting is common in a nearby (approximately 225 km away) population in New Mexico (Bednarz 1988a). However, the observations in Webb County were distant (720 km) from the New Mexico populations. Nevertheless, it is likely that gene flow occurs between the Texas, New Mexico, and Arizona populations. Bednarz (1988b) found that based on morphology alone, *P. u. superior* and *P. u. harrisi* could not be easily differentiated, that skins of New Mexico Harris' hawks were morphologically intermediate, and that clinal variations exist between populations in the United States and Mexico. Because Harris' hawk populations do not appear to be geographically isolated in the United States, behavioral propensities for sociality possibly occur throughout.

Ecological factors may contribute to the incidence of group living and cooperative hunting. Dawson (1988) suggested that both the dense and thorny nature of the brush encourage group hunting in Arizona. These Harris' hawks live in a habitat characterized by a complex understory with an abundance of thorny cover available to prey animals. Groups are more successful than individuals when hunting in this terrain (Dawson 1988). Group hunting has also been proposed as a way for Harris' hawks to exploit large prey (e.g., jackrabbits, [*Lepus* spp.], Bednarz 1988a), and prey that is active only for a short period of time, dawn and dusk (e.g. cottontails, and woodrats, [*Neotoma* spp.], Bednarz and Ligon 1988, Faaborg and Bednarz 1990).

It is unusual for all Harris' hawks in a group to be adults (Dawson and Mannan 1989, 1991a), and it is particularly unusual for six adults to hunt together in the summer when exclusive territories are maintained (Dawson and Mannan 1991b). We do not know if this group of adults aggregated because of nest failure. No nest or juvenile birds could be seen in the vicinity. However, groups in New Mexico appear to compete with each other when hunting (J. Bednarz pers. comm.). Alternatively, the group observed in Pecos County could have been composed of nonbreeding adult floaters (wandering adults looking for breeding territories). Similar social aggregations are formed by resident hawks and transients in Arizona in the fall and winter during nonbreeding (Dawson and Mannan 1991b). In New Mexico, low prey years limit breeding in Harris' hawks; under these circumstances, some adult males remain with the parental group for up to 3 yr (J. Bednarz pers. comm.). It is certainly possible that the group of six adults we observed consisted of a breeding pair and four adult offspring.

The Texas population of Harris' hawks appears to consist primarily of pairs with no helpers (Griffin 1976, Brannon 1980). While cooperative breeding (more than two hawks per nest) may be rare in Texas, our observations suggest that cooperative hunting may be common when hawks are not actively nesting, a situation similar to that reported for New Mexico (Bednarz 1988a).

RESUMEN.—Caza cooperativa o grupal es realizada por poblaciones de *Parabuteo unicinctus* en Arizona y New Mexico. Observamos cuatro incidentes de caza grupal protagonizaddos por *P. unicinctus* en Texas, dos en el Condado de Webb (principios de los años ochenta) y dos en el Condado de Pecos (1994). El tamaño grupal varió de cuatro aves a grupos de seis adultos (cuatro machos y dos hembras). Es posible que el agrupamiento para la caza y como forma de vida pueda ser característico de algunos *P unicinctus*, a través del rango total de la especie.

[Traducción de Ivan Lazo]

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LITERATURE CITED

BEDNARZ, J.C. 1987. Pair and group reproductive success, polyandry, and cooperative breeding in the Harris' Hawk. *Auk* 104:393–404.

———. 1988a. Cooperative hunting in Harris' hawks (*Parabuteo unicinctus*). *Science* 239:1525–1527.

———. 1988b. Harris' hawk subspecies: is *superior* larger or different than *harrisi*? Pages 294–300 *in* R.L. Glinski, B. Giron Pendleton, M.B. Ross, M.N. LeFranc, B.A. Millsap and S.W. Hoffman [EDS.], Proceedings of the southwest raptor management symposium and workshop. Natl. Wildl. Fed. Sci. Tech. Ser. 11, Washington, DC U.S.A.

——— AND J.D. LIGON. 1988. A study of the ecological bases of cooperative breeding in the Harris' hawk. *Ecology* 69:1176–1187.

BRANNON, J.D. 1980. The reproductive ecology of a Texas Harris' hawk (*Parabuteo unicinctus harrisi*) population. M.S. thesis, Univ. Texas, Austin, TX U.S.A.

DAWSON, J.W. 1988. The cooperative breeding system of the Harris' hawk in Arizona. M.S. thesis, Univ. Arizona, Tucson, AZ U.S.A.

——— AND R.W. MANNAN. 1989. A comparison of two

methods of estimating breeding group size in Harris' hawks. *Auk* 106:480–483.

——— AND ———. 1991a. Dominance hierarchies and helper contributions in Harris' hawks. *Auk* 108:649–660.

——— AND ———. 1991b. The role of territoriality in the social organization of Harris' hawks. *Auk* 108: 661–672.

FAABORG, J. AND J.C. BEDNARZ. 1990. Galápagos and Harris' hawks: divergent causes of sociality in two raptors. Pages 357–383 *in* P.B. Stacey and W.D. Koenig [EDS.], Cooperative breeding in birds: long-term studies of ecology and behavior. Cambridge Univ. Press, Cambridge, U.K.

GRIFFIN, C.R. 1976. A preliminary comparison of Texas and Arizona Harris' hawk (*Parabuteo unicinctus*) populations. *Raptor Res.* 10:50–54.

MADER, W.J. 1975. Biology of the Harris' hawk in southern Arizona. *Living Bird* 14:59–85.

SANDERS, R.R. AND W.J. GABRIEL. 1985. Soil survey of Webb County, Texas. Natl. Coop. Soil Surv., U S Gov. Print. Office, Washington, DC U.S.A.

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ACCIPITERS PREY ON NESTLING BIRDS IN JAPAN

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The diet of *Accipiter* spp. has been investigated in various localities (e.g., Brown and Amadon 1968, Opdam et al. 1977, Kenward 1982, Goszczynski and Pilatowski 1986, Petty 1989, Hirano and Kimiziwa 1992, Ueta 1992). In Japan the northern goshawk (*Accipiter gentilis*) preys on medium- to small-sized birds (Yamashina 1941, Ishizawa and Chiba 1967). The Japanese lesser sparrowhawk (*A. gularis*) exclusively hunts small birds such as tree sparrows and great tits (*Parus major*) during the breeding season (Hirano and Kimizawa 1992, Ueta 1992). In addition, hawks adjust their own fledgling periods to the season that prey bird species fledge (Newton 1986, Ueta 1993). Some previous reports that hawks hunt nestlings have been published (Opdam et al. 1977, Newton 1986), but these authors only observed prey delivered to hawk nests. Therefore, they did not observe the hunting technique used to capture nestlings. In this paper, we present observations on nestling hunting by northern goshawks and Japanese lesser sparrowhawks.

Northern Goshawk. A northern goshawk preying on a nestling bull-headed shrike (*Lanius bucephalus*) was recorded on videotape in western Hokkaido, northern Japan. The nest was being videotaped as a part of a study on shrike ecology, and was positioned among vines (*Vitis coignetiae*) about 1.2 m above ground. The four 14-d-old nestlings were recorded on videotape starting at 0800 H, 21 June 1992. The adult shrikes frequently brought prey to their nest, but during their absence the nestlings were often exposed to predators. Nest attack and subsequent behavior of the hawk and shrikes were as follows: At 1648 H the male shrike brought prey to the nest and left carrying a fecal sac. At 1649 H the goshawk approached the nest while parents gave alarm calls nearby. At 1650 H the hawk grasped one nestling and flew away with it. At 1652 H one nestling left the nest. The other two nestlings also left the nest at 1655 H and 1657 H, respectively. At 1700 H the parents again gave alarm calls. A few moments later the hawk came back and searched the vacant nest for a few minutes. The hawk remained in the vicinity and might have been searching for the rest of the nestlings for several minutes and then left the observation site. Even though