———, ———, ———, AND R. HAWKINS. 1978. Multi-purpose radio transmitters for studying mortality, natality, and movements of Eastern Wild Turkeys. Proc. Int. Symp. on Biotelemetry 4:155–158. International Society on Biotelemetry, Garmisch-Partenkichen, West Germany.

SERMONS, W. O. AND D. W. SPEAKE. 1987. Production of second broods by Northern Bobwhites. Wilson Bull. 99:285–286.

SISSON, D. C., D. W. SPEAKE, J. L. LANDERS, AND J. L. BUCKNER. 1990. Effects of prescribed burning on Wild Turkey habitat preference and nest site selection in south Georgia. Proc. Natl. Wild Turkey Symp. 6:44–50.

SPEAKE, D. W. 1980. Predation on Wild Turkeys in Alabama. Proc. Natl. Wild Turkey Symp. 4:86–101.

———, R. METZLER, AND J. MCGLINCY. 1985. Mortality of Wild Turkey poults in northern Alabama. J. Wildl. Manage. 49:472–474.

WILLIAMS, L. E. 1966. Capturing turkeys with alpha-chloralose. J. Wildl. Manage. 30: 50–56.

———. 1981. The book of the Wild Turkey. Winchester Press, Tulsa, Oklahoma.

———, AND D. H. AUSTIN. 1988. Studies of the Wild Turkey in Florida. Univ. Presses of Florida, Gainesville, Florida.

———, ———, AND T. E. PEOPLES. 1976. The breeding potential of the Wild Turkey hen. Proc. Southeastern Assoc. Fish and Wildl. Agencies 32:303–308.

———, ———, AND ———. 1980. Turkey nesting success on a Florida study area. Proc. Natl. Wild Turkey Symp. 4:102–107.

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First nesting record for the Piping Plover in Oklahoma.—Piping Plovers (*Charadrius melodius*), endangered in the Great Lakes region and threatened throughout the rest of its range (U.S. Fish and Wildlife Service 1985), are known to nest in the northern Great Plains along the Loup, Missouri, Niobrara, and Platte rivers in Nebraska (U.S. Fish and Wildlife Serv. 1988). They often have been observed during both spring and fall migration at various sites in Kansas and Oklahoma but have never been known to nest in Kansas (Tordoff 1956, Johnston 1960, Thompson and Ely 1989).

During June and July 1986, a Piping Plover was seen at Optima Reservoir, located about 27 km east of Guymon, along the North Canadian (Beaver) River in Texas Co., Oklahoma (Fig. 1), but there was no indication of nesting.

On 17 June 1987, I found two adult Piping Plovers with four chicks along the west side of Optima Reservoir. The chicks were captured, measured, photographed (VIREO/VO6/7/001 thru VO6/7/004), and released. The adults were feigning injury. Neither was banded.

The Piping Plover chicks had been foraging along a sandy spit which projected into a shallow lagoon on the west side of the reservoir. A nest scrape of likely size, slightly larger and deeper than that made by Snowy Plovers (*C. alexandrinus*), but not as large as a Killdeer (*C. vociferous*) scrape, was discovered. The scrape was approximately 35 m from the water in loose sand and gravel. Snowy Plover chicks were seen farther north along the reservoir

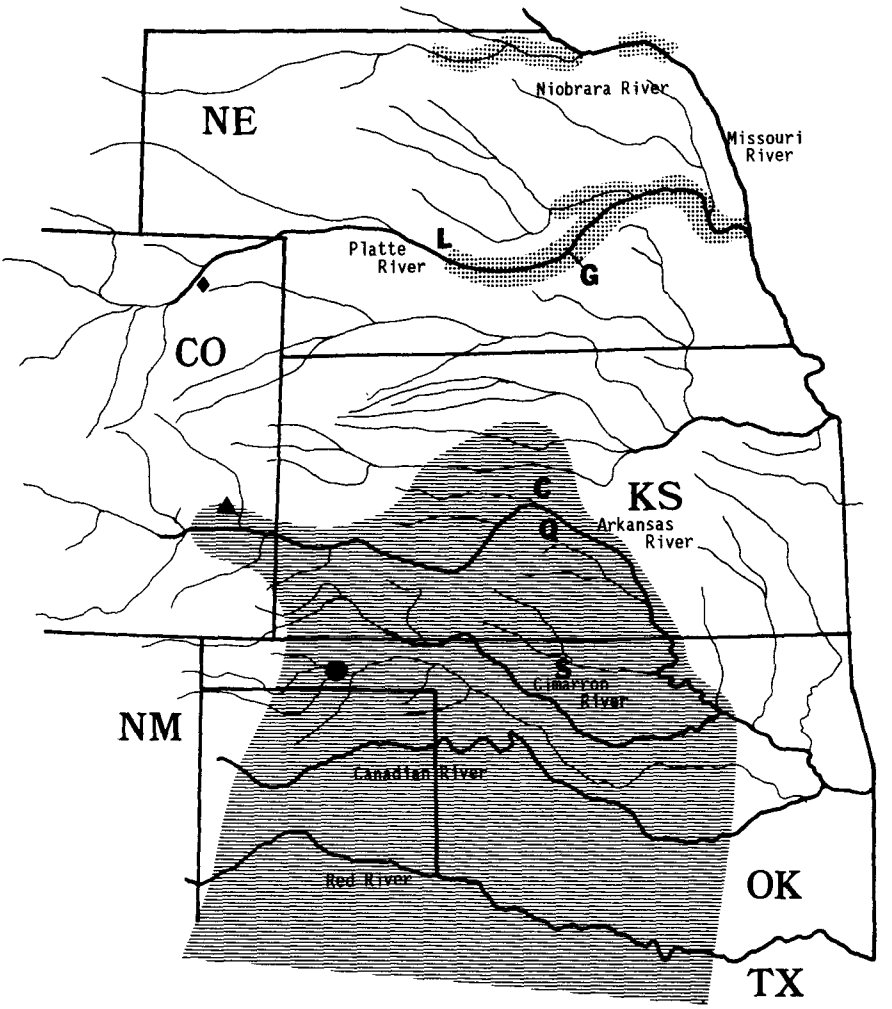

FIG. 1. Current breeding distribution of Piping Plovers in Nebraska (dots) and Snowy Plover (horizontal lines) in the southern Great Plains. Disjunct nesting records for Piping Plovers: Prewitt Reservoir (diamond), Nee Noshe Reservoir (triangle), Optima Reservoir (black circle). Other locations are Lexington (L), Grand Island (G), Cheyenne Bottoms WMA (C), Quivira NWR (Q), Salt Plains NWR (S). Piping Plover distribution from U.S. Fish and Wildlife (1988), Bailey and Niedrach (1965) and Kingery (1989); Snowy Plover distribution from A.O.U. (1983), Sutton (1967) and Boyd (1981).

shore, and an active Snowy Plover nest was found approximately 30 m north and closer to the water than the suspected Piping Plover scrape. On 26 June 1987, only one adult and two juveniles were located. I searched the west side of the reservoir on 7 July and did not find any adults or juveniles. I assumed that none of the juveniles fledged.

Comparing my measurements with those given by Cairns (1982) I estimated the juveniles to be approximately 8–10 days old. Based upon seven days for laying the clutch and 25–31 days for incubation (U.S. Fish and Wildlife Serv. 1988) I estimated the first egg was laid 2–9 May 1987.

During the summer of 1988, J. Shackford and others (pers. comm.) found three adult Piping Plovers and one active nest (25 June) at Optima Reservoir. This nest was inundated by heavy rains in early July and did not hatch. During the summer of 1988 and spring of 1989, water levels rose 4–5 feet higher than in 1987 and flooded all the favorable nesting habitat. No adults were seen during 1989 or 1990.

There is a single nest record for the Piping Plover along the South Platte River on 26 June 1949 at Prewitt Reservoir, Washington County, Colorado (Bailey and Niedrach 1965). More recently, there has been a sighting of a pair and four young on 28 June 1989 at Nee Noshe Reservoir, Kiowa County, Colorado (Kingery 1989). Other than these records, the closest current nesting record of Piping Plovers is along the Platte River between Lexington and Grand Island, Nebraska (U.S. Fish and Wildlife Service 1988) (Fig. 1). The nesting record at Optima Reservoir extends the known breeding range south of the Platte River by approximately 490 km.

This is the first record of Piping Plovers nesting sympatrically with Snowy Plovers (Fig. 1), but no interspecific interactions were observed. A possible reason that Piping Plovers have not nested in Kansas is that little nesting habitat is available. Major locations like Cheyenne Bottoms WMA and Quivira NWR, where Snowy Plovers nest in Kansas, are comprised of alkaline flats. Prindiville-Gaines and Ryan (1988) found that Piping Plovers favored sites with large amounts of sand and gravel. The nesting site at Optima Reservoir did consist of sand and gravel.

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LITERATURE CITED

AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-list of North American birds. 6th ed. A.O.U., Lawrence, Kansas.

BAILEY, A. M. AND R. J. NIEDRACH. 1965. The birds of Colorado, Vol. 1. Denver Museum of Nat. Hist.

BOYD, R. L. 1981. Distribution and abundance of Snowy Plovers in Kansas and Northern Oklahoma. Kansas Ornith. Soc. Bull. 3:25–28.

CAIRNS, W. E. 1982. Biology and behavior of breeding Piping Plovers. Wilson Bull. 94: 531–545.

JOHNSTON, R. F. 1960. Directory to the bird-life of Kansas. Univ. Kansas Mus. Nat. Hist. Misc. Publ. 23:1–69.

KINGERY, H. E. 1989. Mountain West Region. Am. Birds. 43:1347.

PRINDIVILLE-GAINES, E. AND M. R. RYAN. 1988. Piping Plover habitat use and reproductive success in North Dakota J. Wildl. Manage. 52:266–273.

SUTTON, G. M. 1967. Oklahoma birds. Univ. of Oklahoma Press, Norman, Oklahoma.
THOMPSON, M. C. AND C. ELY. 1989. Birds in Kansas, Vol. 1. Univ. Kansas Mus. Nat. Hist., Lawrence, Kansas.
TORDOFF, H. B. 1956. Checklist of the birds of Kansas. Univ. Kansas Publ. Mus. Nat. Hist. 8:307–359.
U.S. FISH AND WILDLIFE SERVICE. 1985. Endangered and threatened wildlife and plants: final rule. Fed. Register 50:50726–50734.
———. 1988. Great Lakes and Northern Great Plains Piping Plover Recovery Plan. U.S. Fish and Wildlife Service, Twin Cities, Minnesota.

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Dirt-storing behavior by White-breasted Nuthatches.—In April and May 1989 and in March 1990, a pair of White-breasted Nuthatches (*Sitta carolinensis*) nested in two artificial cavities constructed from a seasoned cherry (*Prunus serotina*) trunk in Asheville, Buncombe County, North Carolina (for descriptions of the nest-sites, see Duyck and McNair 1991). During the nest building, egg laying, incubation, and nestling periods, the male nuthatch carried, stored and smeared pellets of dirt 1 cm below the bottom of the cavity entrance, both inside and outside of the cavity, and on the bottom lip. Bill-sweeping behavior as described by Kilham (1968, 1971) and Bancroft (1987) was observed. The male stored, and later retrieved, dirt on limbs and in the fork of a dogwood tree (*Cornus florida*), 3 m from the nest cavity. As late as five days before fledging in 1989, the male continued to store and smear dirt at the cavity entrance and store other portions of it and new pellets in the dogwood tree. This behavior was photographed by Duyck. Pellets were usually loose in composition although sometimes molded, 0.3–0.6 cm in diameter, and were collected from the forest floor within 10 m of the nests. When stored, the dirt was not covered by any object. Late in the nestling period in 1989, we noticed a few pellets of dirt on the cavity floor.

At 13:55 h on 17 March 1987, a pair of White-breasted Nuthatches was observed carrying nest material into an abandoned Red-cockaded Woodpecker (*Picoides borealis*) cavity near Ocoee Lake, Polk County, Tennessee. At 14:05 h, 75 m from the nest-site, one of the pair (sex unknown) landed on a 1.2 m high mound of fairly dry, reddish clay soil. The nuthatch pecked at the soil a few times, flew off with a solid 2-cm diameter piece, landed in a Virginia pine (*Pinus virginianus*), and stored the piece of soil in a bark crevice 1.2 m above ground. Upon inspection, we determined that no food was stored in the same bark crevice, and the soil pellet was not covered by bark chips or other material. When crushed, it did not contain any apparent food items.

The diameters of the cavity entrance at both the artificial cavity in 1989 and the old woodpecker cavity were larger, in at least one dimension, than the 3–4 cm diameter favored by White-breasted Nuthatches (Tyler 1948, Evans and Conner 1979, Raphael and White 1984). Thus, these nuthatch pairs may have been susceptible to cavity usurpation by larger intruders. Many species of nuthatches modify the entrance to their nest cavities throughout the breeding cycle (Rand 1972, Collias and Collias 1984:14–15). Some use dirt to plaster the cavity entrance to keep intruders out, and others construct a nest cavity almost entirely of mud (op. cit.). The diameter of the cavity entrance of the White-breasted Nuthatch pair at Asheville was not reduced by the male's dirt-storing and smearing behavior. Thus, the behavior in this case did not function to prevent intruders from entering the cavity.

Using prescribed fire and herbicide to manage rank native warm season grass for northern bobwhite. The Journal of Wildlife Management, Vol. 79, Issue. 1, p. 69.Â Buckner, J. L. and Landers, J. L. 1979. Fire and disking effects on herbaceous food plants and seed supplies. J. Wildl.Â Effects of Conservation Reserve Program field age on avian relative abundance, diversity, and productivity. Wilson Bull. 108:760â€“770. Pyne, S. J. 1982. Sisson DC, Stribling HL, Speake DW (2000) Effects of supplemental feeding on home range size and survival of northern bobwhites in south Georgia. In: Brennan L, Palmer W, Burger LW Jr, Pruden T (eds) Quail IV: Proceedings of the Fourth National Quail Symposium, Tall Timbers Research Station, Tallahassee, FL, USA, pp 128â€“131Google Scholar. Sisson DC, Terhune TM, Stribling HL, Sholar JF, Mitchell SD (2009) Survival and causes of mortality for northern bobwhites in the southeastern USA.Â Terhune TM, Sisson DC, Mitchell S, Stribling HL (2009) Northern bobwhite demographic and population response following an intensive habitat modification to an agricultural landscape. Northern Bobwhite are much smaller than Ruffed Grouse and Wild Turkey. Northern Bobwhites are mottled-gray, brown, black, and white in color. Males are distinguished from females by their pure white throat and eye bands and females buff-colored.Â Female Montezuma Quail may resemble Northern Bobwhite, but has a head that appears helmeted rather than crested. Montezuma Quail lack strongly contrasting supercilium and throat and has a darker belly than Northern Bobwhite. Habitat In the High Plains and Northern Rolling plains the Northern Bobwhite inhabit mostly native rangeland, woodland, and brushland ecosystems in varying densities.