

best (Kendeigh 1961). Conversely, Lustick et al. (1982) and Mayer et al. (1982) showed that American Goldfinches (*Carduelis tristis*) may save 50% of their overnight energy requirement by roosting in suitable sites and by partial hypothermia. Roosting, alone, is not likely to account for the difference between energy reserves and expenditures.

Huddling is another potential means of conserving energy. Chaplin (1982) found that roosting pairs of Bushtits (*Psaltriparus minimus*; 5.5 g) used 21% less energy than individuals and that the saving was due to reduced activity and nocturnal huddling. Studying Goldcrests (*Regulus regulus*), Gavrilov (1972) found that individuals housed in pairs at 0°C reduced heat loss by 23% and trios reduced heat loss by 37%. These amounts are not sufficient to offset differences between reserves and energy demands, since reserves are less than 25% of the energy needed at normothermic body temperatures at relatively moderate mid-winter ambient temperatures. Hence, even with such large savings, it is unlikely that hypothermia could be avoided.

In summary, our data indicate a small fluctuation of daily lipid cycles in wintering Golden-crowned Kinglets. Reserves are inadequate for overnight energy demands at normothermic body temperatures.

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WHITE-FACED IBIS NESTING IN THE SOUTHERN SAN JOAQUIN VALLEY OF CALIFORNIA

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White-faced Ibis (*Plegadis chihi*) were last reported nesting in the southern San Joaquin Valley at Buena Vista Lake, Kern County, California, in 1922 (Lamb 1922). Grinnell et al. (1918) reported ibis as "a common summer visitant and breeder in the San Joaquin Valley." Booser and Sprunt (1980) reviewed the literature for the species and summarized its historical breeding distribution. The most recent published nesting record within the Central Valley was cited from a personal communication by Ryder (1967) that White-faced Ibis had "not nested in the Central Valley since 1954 or 1955." Voeks and English (1981) surveyed

White-faced Ibis distribution in the western states during 1979 and 1980. They did not mention the four pairs that nested in a small cattail (*Typha* sp.) marsh at Mendota Wildlife Management Area, Fresno County (northern San Joaquin Valley) in 1979. By 1983, that nesting population had increased to 24 pairs (Beam, pers. comm.).

On 8 June 1983, we visited South Wilbur Flood Area in southern Kings County to inventory colonial nesting waterbirds. This approximately 3,300-ha marsh is owned and managed by the J. G. Boswell Company for storage of excess irrigation and flood waters, and is located within the historic Tulare Lake bed. Dominant vegetation in the marsh included Baltic rush (*Juncus balticus*), summer tamarisk (*Tamarix pentandra*), cattail and hardstem bulrush (*Scirpus acutus*). We canoed through mixed colonies of Great Blue Herons (*Ardea herodias*), Double-crested Cormorants (*Phalacrocorax auritus*), Great Egrets (*Casmerodius albus*), Snowy Egrets (*Egretta thula*), Cattle Egrets (*Bubulcus ibis*), and Black-crowned Night-Herons (*Nycticorax nycticorax*) which were nesting in a flooded grove of summer tamarisk and Baltic rush. During the survey we found five White-faced Ibis nests which contained from one to four eggs, one nest with two half-grown young, and six nearly-fledged young at various locations in the colony. The nests were in Baltic rush and summer tamarisk about 20 to 50 cm above water, which was 65 cm deep. The ibis

nests were interspersed among Black-crowned Night-Heron nests. We tried to locate only a few nests to confirm nesting and to minimize disturbance to the colony, since young ibis may die if their parents are not present to shade them from the sun (Tyler 1933). We quickly paddled around the colony and counted 85 adults flushed from nesting cover. We also observed many small groups and several lone ibis feeding in the area, which increased our overall count to nearly 200 individuals.

On 15 June 1983, while monitoring an outbreak of avian botulism (*Clostridium botulinum*, type C), we returned in an airboat to the colony site. We observed 65 nearly-fledged young in the colony; we believe many young had fledged between our visits. On 21 June 1983, we revisited the area and discovered 13 additional nests in an area adjacent to the original colony. Their contents were much later in development than those in the original colony. One nest contained three eggs, two nests contained eggs and newly-hatched young, seven nests contained downy young, and three nests contained half-grown young. Based upon our observations, we estimated the total nesting population of White-faced Ibis in the area to be about 100 to 110 pairs.

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AN ARCHAEOLOGICAL RECORD FOR THE WHITE-FACED WHISTLING-DUCK (*DENDROCYGNA VIDUATA*) IN CENTRAL PANAMA

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Large, well-preserved bone samples have been recovered at several central-Panamanian archaeological sites (Cooke 1981, 1984b). At one site, Sitio Sierra (Fig. 1), over 400 bird bone elements have been found in middens, pit-fills and cemeteries (Cooke 1984a). In one refuse pile, which on ceramic evidence dates from before A.D. 500 and which lies directly over a circular structure dated to between 2015 ± 80 and 1975 ± 80 radiocarbon years (65 B.C. and 25 B.C.; Cooke 1979), RGC recovered the partial skeleton of an adult White-faced Whistling-Duck (*Dendrocygna viduata*). The bones were found close together and were excavated by hand trowelling. Twenty-two elements can be assigned confidently to a single individual, while a further 35 (mostly vertebrae and phalanges) probably belong to it. The frontal bone is intact and demonstrates the incomplete orbital ring, which is characteristic of adults of this species. (Subadults of *D. arborea*, *D. autumnalis* and *D. bicolor* may have incomplete eye-rings, but the unfused ends are thin and pointed, differing from

the thick ends in adult *D. viduata*. For details of post-cranial elements of *D. autumnalis*, *D. bicolor* and *D. viduata*, see Campbell 1979.)

Macrobotanical, pollen, phytolithic, faunal and human demographic evidence all point to extensive agricultural activities and deforestation in the vicinity of Sitio Sierra by the time of Christ. Organisms that prefer pond, marsh and river-edge habitats prevail in the archaeological bone samples (Cooke 1979, 1984a, b). Hence, it seems likely that the White-faced Whistling-Duck was taken locally. At the same site, and in similarly dated contexts, RGC recovered nine other elements of *Dendrocygna* from at least five different individuals. (A complete coracoid is probably from a second specimen of *D. viduata*.) Also identified were two individuals of the Muscovy Duck (*Cairina moschata*) and a single individual of the Lesser Scaup (*Aythya affinis*). Both *Cairina* and *Dendrocygna* could have been domesticated or kept in temporary captivity; several bones of young ducks that could not be identified to genus were found pressed into the compacted clay of house floors.

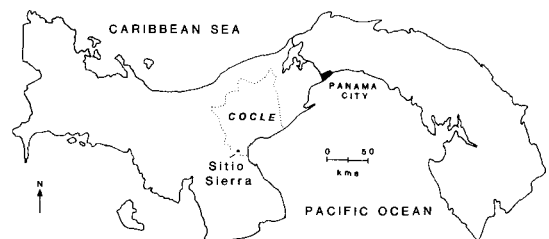


FIGURE 1. Map of Panama showing the location of Sitio Sierra and Coclé province.