

The low number of released hogs makes any definitive conclusions impossible. That a panther did kill one of the hogs suggests that very large scale releases may increase the panther prey base. However, the biological consequences and economic costs of large releases of hogs in this area makes this a debatable management alternative. It is possible that environmental stresses may have compromised the health of collared hogs and made them more vulnerable to predators such as bears, bobcats, and alligators. The patterns of mortality revealed by this study demonstrate that predators other than panthers may be a considerable mortality factor when hogs are available in the study area.

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LITERATURE CITED

- LEIGHTY, R. G., M. B. MARCO, G. A. SWENSON, R. E. CALDWELL, J. R. HENDERSON, O. C. OLSON, AND G. C. WILLSON, JR. 1954. Soil survey (detailed reconnaissance) of Collier County, Florida. Gainesville, Florida: Florida Agric. Exp. Sta., Univ. of Florida.
- MAEHR, D. S. 1988. Florida panther movements, social organization, and habitat utilization. Tallahassee, Florida: E-1-12 Annu. Performance Rept., Florida Game and Fresh Water Fish Comm.
- ROELKE, M. E., E. R. JACOBSEN, G. V. KOLLIAS, AND D. J. FORRESTER. 1986. Florida panther health and reproduction. Tallahassee, Florida: E-1-10 Annu. Performance Rept., Florida Game and Fresh Water Fish Comm.
- SHAW, H. G. 1979. Mountain lion field guide. Phoenix, Arizona: Arizona Game and Fish Dept. Spec. Rep. no. 9.

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Least Bittern Nesting on Mangrove Keys in Florida Bay

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The Least Bittern (*Ixobrychus exilis*) is found throughout much of the western hemisphere (AOU 1983). It is usually associated with a variety of freshwater habitats and to a lesser extent, salt marshes (Palmer 1962). In southern Florida the Least Bittern is a common resident of the Everglades freshwater marshes, nesting primarily in sawgrass (*Mariscus jamaicensis*) and the cattail (*Typha* spp.) (Kushlan 1973). As an exception, Howell (1932) reported a Least Bittern nest in a mangrove at Indian Rocks, Pinellas County, in Florida. Most sightings of the Least Bittern in the Florida Keys have been during the fall or winter months (Bowman 1978), suggesting migrating or wintering birds. Summer sightings in the Keys were presumed to be non-breeders or the result of environmentally-induced dispersion (Robertson 1962). Robertson (1971) reported a Least Bittern on Big Crane Key in Florida Bay on 19 August 1971 and referred to an "elusive population that inhabits mangrove islands of Florida Bay." Here we report the first observations of Least Bittern nesting on mangrove keys in Florida Bay.

During the summers of 1985 and 1986 we observed Least Bitterns on Middle Butternut Key, in the northeast corner of Florida Bay (25° 4' 70" N, 80° 32' 02" W). On 29 May 1987 we flushed an adult Least Bittern from a small red mangrove (*Rhizophora mangle*) clump

on the edge of the central lagoon. A nest was in the center of the clump, 0.3 m above the water, containing three pale-blue eggs. The clump was 1.2 m tall and 1.5 m in diameter and at least 10 m from the nearest mangroves. The nest was made of coarse, woody twigs. We remained in the vicinity of the nest for 15 minutes. On 5 June the nest was revisited. The adult Least Bittern was perched near the nest and flushed when we were 15 m distant. The three eggs were intact, but felt cold. By 10 June, the nest was empty and the adult was not seen nearby.



Figure 1. Adult female Least Bittern brooding young in nest located in black mangroves on Bottle Key, Florida Bay.

On 12 June 1987 a second Least Bittern nest containing three eggs was found on Bottle Key about 4 km southwest of Middle Butternut Key. The nest was located 0.5 m above dry ground in a dense clump of saltwort (*Batis* spp.) growing in a dense stand of black mangroves (*Avicennia germinans*). The nest was made of small woody twigs and measured 27 cm in diameter and 9 cm deep. The eggs were similar in size with mean dimensions of 30.2 mm x 23.0 mm. These dimensions are comparable to those reported by Hancock and Kushlan (1984). On 22 June the nest contained two young and one egg. On 1 July two young were seen in the mangroves above the nest. The last egg did not hatch. On 15 July we flushed a juvenile Least Bittern about 15 m from the nest.

On 15 June 1988 a third nest was found on Bottle Key (Fig. 1). This nest was located in a tall black mangrove in the central lagoon. The nest was only 0.3 m above water 0.4 m in depth. This nest was built of larger sticks than previous nests and was much larger in overall size, especially depth (31 cm in diameter and 45 cm deep). The lower portions of the nest were under water. The contents were three eggs similar in size to the 1987 eggs. On 24 June the nest contained two young and one egg. By 5 July the water depth below the nest had risen to 0.57 m. Both young were able to fly short distances near the nest, but the unhatched egg was still in the now partially submerged nest. We saw adult Least Bitterns throughout the summer of 1988, but never resighted a juvenile.

Saline environments are not normally considered appropriate breeding habitat for the *exilis* subspecies of Least Bittern, although they may be used extensively during the winter. Mangrove swamps, however, are commonly used for nesting by a Mexican subspecies (*L. e. pullus*) and to a lesser extent by *L. e. erythromelas* populations of Trinidad (Hancock and Kushlan 1984). Beatty (1943) reported Least Bittern nesting in mangroves on St. Croix in the Caribbean. Least Bitterns have been observed nesting in *Avicennia* on offshore islands along the south Texas coast (R. T. Paul, pers. comm.). The regular, but infrequent, sightings of Least Bitterns during the summer in the Florida Keys suggest that breeding has occurred here for some time. Most keys in Florida Bay are within Everglades National Park and closed to the general public. Considering the inconspicuousness of the Least Bittern, it is not surprising that this breeding population had gone undetected.

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LITERATURE CITED

- AMERICAN ORNITHOLOGISTS' UNION. 1983. Check-list of North American birds. 6th ed. Lawrence, Kansas: Allen Press.
- BEATTY, H. A. 1943. Records and notes from St. Croix, Virgin Islands. *Auk* 60: 110-111.
- BOWMAN, M. C. 1978. Species index to Florida bird records in Audubon Field Notes and American Birds, volumes 1-30, 1947-1976. Fla. Ornithol. Soc., Spec. Publ. no. 1.
- HANCOCK, J., AND J. KUSHLAN. 1984. The heron handbook. New York: Harper and Row, Inc.
- HOWELL, A. H. 1932. Florida bird life. Tallahassee, Florida: Florida Dept. Fish and Game.
- KUSHLAN, J. A. 1973. Least Bittern nesting colonially. *Auk* 90: 685-686.
- PALMER, R. S. (ED.) 1962. Handbook of North American birds. Vol. 1. New Haven, Connecticut: Yale Univ. Press.

ROBERTSON, W. B., JR. 1962. Florida region. Audubon Field Notes 16: 468.

ROBERTSON, W. B., JR. 1971. Florida region. Amer. Birds. 25: 46.

PERIODICAL LITERATURE

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Florida Birds in the Periodical Literature

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This list contains 47 citations to recent (1987-1988) articles about Florida birds except those published in *Florida Field Naturalist* and the seasonal reports in *American Birds*. Authors are encouraged to send reprints of their articles to the compiler for inclusion in this annual feature.

- ANONYMOUS. 1988. Regional reports, pictorial highlights, winter 1987-1988. *Am. Birds* 42: 193.—Includes photo of Buff-bellied Hummingbird, 10 December 1987, Destin, by William E. Dowling.
- ATKINSON, C. T. 1988. Epizootology of *Haemoproteus melagridis* (Protozoa: Haemosporina) in Florida: potential vectors and prevalence in naturally infected *Culicoides* (Diptera: Ceratopoginidae). *J. Med. Entomol.* 25: 39-44.—As studied in Florida wild Turkeys.
- ATKINSON, C. T. 1988. Epizootology of *Haemoproteus melagridis* (Protozoa: Haemosporina) in Florida: seasonal transmission and vector abundance. *J. Med. Entomol.* 25: 45-51.
- BANCROFT, G. T., J. C. OGDEN, AND B. W. PATTY. 1988. Wading bird colony formation and turnover relative to rainfall in the Corkscrew Swamp area of Florida during 1982 through 1985. *Wilson Bull.* 100: 50-59.—Collier and Lee co.
- BEISSINGER, S. R. 1988. A faithful, fickle hawk. *Natural History* 97(1): 43-50.—Based on author's Snail Kite studies in southern Florida.
- BOHALL-WOOD, P. G., AND M. W. COLLOPY. 1988. Foraging behavior of southeastern American Kestrels in relation to habitat use. *Raptor Res. Rept.* 6: 58-65.—Alachua and Levy co.
- BREITWISCH, R. 1988. Sex differences in defense of eggs and nestlings by Northern Mockingbirds, *Mimus polyglottos*. *Anim. Behav.* 36: 62-72.—On Univ. Miami campus, Dade Co.
- BUCHANAN, J. B. 1988. North American Merlin populations: an analysis using Christmas Bird Count data. *Am. Birds* 42: 1178-1180.—Includes data from 5 Florida CBC; Coot Bay, Merritt Island NWR, Sarasota, St. Marks, and St. Petersburg.
- BURGER, J. 1988. Foraging behavior in gulls: differences in method, prey, and habitat. *Colon. Waterbirds* 11: 9-23.—Includes data on Herring and Laughing gulls in Florida.
- BUTLER, R. W. 1988. Population dynamics and migration routes of Tree Swallows, *Tachycineta bicolor*, in North America. *J. Field Ornithol.* 59: 395-402.—Some of 41 recoveries of banded birds were from Florida. A map indicates these birds banded in Ontario and along the Atlantic seaboard.
- CARL, R. A. 1987. Age-class variations in foraging techniques by Brown Pelicans. *Condor* 89: 525-533.—As studied at South Jetty Park, Port Canaveral, Brevard Co.