

LITTLE BITTERN *Ixobrychus minutus* BREEDING AT BOOL LAGOON, 1984-1986

ROGER P. JAENSCH

SUMMARY

The author searched for nests of the Little Bittern at Bool Lagoon, South Australia, in January 1984, December 1985 and December 1986. Eleven nests were found at nine distinct sites in beds of reed and bulrush and in thickets or clumps of tea-trees. Active, recently active or new nests and adult birds were found each year, with maxima of six nests and four adults in any one year. An adult female was caught by hand on one occasion. These results and data of local ornithologists suggest that Little Bitterns occur and breed regularly at Bool Lagoon, perhaps in moderate numbers. Methods for finding Little Bitterns are discussed; use of these may reveal that this species is more widespread and abundant in South Australia than is currently thought.

INTRODUCTION

The Little Bittern *Ixobrychus minutus* has five subspecies: *minutus* in Europe, western Asia and Africa, *pavesii* in Africa, *podiceps* in Madagascar, *dubius* in Australia and southern New Guinea, and *novaezelandiae* (possibly extinct) in New Zealand (Hancock & Kushlan 1984). In Australia, it breeds in the south-west from north of Perth to east of Esperance, in the south-east from Bool Lagoon to northern New South Wales and in the north-west at Kununurra (pers. obs., Blakers *et al.* 1984, Parker *et al.* 1979, Jaensch 1988). Casual observations and regular counts suggest that it migrates northwards from southern Australia in autumn-winter, possibly to southern New Guinea (Blakers *et al.* 1984, Parker *et al.* 1979, Jaensch *et al.* 1988, Coates 1985).

In South Australia, the Little Bittern has been recorded in the South-East at Bool Lagoon, in the Murray Valley at Narrung, Punyelroo, Morgan and Moorook and at six other localities as far west as Streaky Bay (Parker *et al.* 1979). At Bool Lagoon, the only known breeding locality, it was first seen in 1930 and first found breeding in January 1931; there were many sightings and a number of nests found in the early 1930s but fewer records in the next 40 years (Glover 1976, Attiwill 1972). Mr S. Bourne found nests at Bool Lagoon in January 1981 (young recently fledged) and January 1982 (broken eggshell in nest, J. Bourne pers. comm.).

Surveys since 1983

On 6 January 1984 I was shown a nest of the Little Bittern at Bool Lagoon by M. Harper, B. Clark and J. Bourne (Nest A, details below). This inspired me to search for other nests in the vicinity later that day. I had experience at finding nests of Little Bitterns in south-western Australia and was interested in comparing the breeding strategies of this species in different parts of its range. Previous records of breeding at Bool Lagoon were from December and January, Parker *et al.* 1979) so I also searched for nests of Little Bitterns during visits to Bool Lagoon on 27-28 December, 1985, and 15-16 December 1986.

STUDY AREA AND METHODS

My searches at Bool Lagoon were confined to wetland between Big Hill and the Ranger's Office. Thickets and clusters of tea-tree *Melaleuca halimaturorum* within 30-100 m of the lagoon edge were investigated in 1984 and 1986; most of this vegetation became established naturally between spring 1968 and summer 1969 (J. Bourne pers. comm.), and was 2-5 m in height in 1984. Large beds of tall, dense reed *Phragmites australis* between Big Hill and a woodland of mature tea-tree, were searched in 1984 and 1985. These isolated beds were 50-200 m from shore and were dominated by living stems. Dense reedbeds between and within the tea-tree thickets were searched in 1984 and 1986. These near-shore beds contained many dead or old stems. Small beds of tall, dense bulrush *Typha* sp. near the woodland were searched in 1985.

Nests were sought by systematically searching sites that were similar to either that of Nest A or to those of sites at which I had found Little Bittern nests in south-western Australia. I did not expect to find nests with eggs over water that was less than 0.3 m deep. Whereas the thickets were searched extensively, fatigue and lack of time limited my searches of isolated beds of reed and bulrush to sampling of the most accessible areas.

Wetland conditions

In early January 1984, water extended to the edge of the main basin of Bool Lagoon, near the public access road. Most of the wetland vegetation in the study area was therefore inundated; water was generally 0.2–0.4 m deep in the tea-tree thickets and deeper in the isolated reedbeds. In late December 1985 the lagoon was shallow, with little or no water in the tea-tree thickets and associated reedbeds. In mid December 1986, the lagoon was slightly deeper than in January 1984, being just below “pool level”, and wading in the isolated reedbeds was difficult due to the waist-deep water.

RESULTS

Details of nests found in the three surveys are given in Table 1. The “status” of a nest was determined as follows: “active” if holding whole eggs or young, “recently active” if now not active but thought to have held eggs in the past six months, “new” if built recently but not yet laid in, or “old” if none of the above but probably active in a previous breeding season.

Four active nests, two recently active nests and one old nest were found in 1984. Two new nests and one old nest were found in 1985 and one recently active nest was found in 1986. Two of the active nests each held four eggs and the other two each held four young that were 7–9 days old. The young were partly covered with wispy orange-buff down. Nest H was at or near the site of Nest G and Nest K was at or near the site of Nest D. Therefore, the number of distinct nest sites found in the three surveys was nine. Five nests were in tea-tree, generally near reeds, three were in isolated reedbeds and one was in bulrush. Active or recently active nests were 35–470 m apart.

With one exception, nests were near or within beds of reed or bulrush. The distance from nest to open water varied from 0.5–5.0 m where nests were in tea-tree, to 15–20 m where nests were in isolated reedbeds. (Nests found in 1981–2 by S. Bourne were both in reeds, about 10 m from open water.) The height of vegetation at the nest site was, with one exception, 2.0–3.0 m. Active nests were 0.3–1.8 m above water that was 0.2–0.5 m deep. Material used in the nest structure was invariably available at the nest site. Old nests were tilted and therefore not usable without reconstruction.

In 1984, four adults, three of them males, were seen at nests or leaving the nest area. (Males were identified by their black backs.) Leaving birds made soft *kuk-kuk* calls but birds that were reluctant to leave gave sharp, loud *kak* calls and thrust neck and beak toward the observer from as close as 1.5 m. I have often observed this behaviour in Western Australia.

In 1985, two birds, presumably males, were heard calling in the early morning near Nest I. They gave the typical ‘advertising call’ of *I. m. dubius*, a deep, hoarse croak or barking sound of about 10 syllables, with syllables given every half-second (Hancock and Kushlan 1984, pers. obs.). Another male gave two brief advertising calls near Nest J after sunset.

A fourth bird was found while I was wading through the bulrush near Nest J, in mid morning on 28 December 1985. When first seen, it was motionless, about one metre from me in *Typha* that was 2.5 m high. I grasped the bird about its belly, whereupon after a short struggle I was able to take the bird ashore. With my father’s help, I examined and photographed it before allowing it to climb into a large tea-tree and fly away. It was identified as an adult female Little Bittern on consideration of the following characters.

Crown — black, surrounded by rufous (it is streaked in juveniles, all black in adult males).

Back — brown to red-brown with some feathers edged buff (the back is heavily streaked in juveniles, all black in adult males).

Primaries and secondaries (upperwing) — dark grey-brown with prominent rufous tips on inner four primaries and outer two secondaries (they are paler with rufous tips to most feathers in juveniles, and darker, almost black with few if any rufous tips in adult males).

Its iris was yellow, and its bill had a black ridge but was otherwise yellow with the inside of its mouth yellow and red. Its legs and feet were grey-green in front, yellow-green on rear, and its soles were yellow.

In 1986, two males gave advertising calls near the site of Nest C, at 0800 h and 1030 h. On the first occasion the birds were probably disturbed by my searching. On the second occasion, they promptly responded (twice) to my single imitation of the advertising call.

DISCUSSION

I possibly overlooked some Little Bittern nests in the tea-tree because some shrubs were not searched. Undoubtedly, I missed nests in the

TABLE 1. Details of nests of Little Bitterns at Bool Lagoon, 1984-6.

Nest code	Date seen by author	VEGETATION		NEST SITE					NEST			
		type	Height at nest (m)	Distance from nearest active nest (m)	Distance from open water (m)	Other vegetation at or near nest	Depth of water (m)	Height of nest above water (m)	Material	Contents	Status	Adults present
A	6/1/84	tea-tree thicket	3.0	350	0.5	—	0.2	1.8	fine twigs	4 young, oldest = 9 days	active	one male
B	6/1/84	tea-tree thicket	3.0?	350	2.5	reeds	0.3?	1.4	twigs, green tea-tree foliage	4 young, oldest = 7 days	active	one
C	6/1/84	single tea-tree	3.0	150	5.0	reeds	0.2	0.5	reed stems and leaves, bark	large pieces of eggshell	recently-active	one male
D	6/1/84	cluster of tea-trees	3.0	450	3.0	reeds and nettles	0.3	1.0	twigs, reed stems, green nettle pieces	large pieces of eggshell	recently-active	—
E	6/1/84	cluster of tea-trees	3.0?	470	3.0	reeds and nettles	0.3	1.0	twigs and reed stems	none, (nest tilted)	old	—
F	6/1/84	dense bed of reeds	2.3	35	15.0	—	0.5	0.3?	reed stems and leaves	4 eggs, lightly stained	active	—
G	6/1/84	dense bed of reeds	2.8	35	20.0	—	0.5	0.3	reed stems and leaves	4 eggs, clean	active	one male
H	27/12/85	dense bed of reeds	2.5	not applicable	20.0?	—	0.3	0.3	reed stems and leaves	non, (nest partly built)	new (un-used)	—
I	27/12/85	dense bed of reeds	3.0	not applicable	15.0	—	0.4	0.4	reed stems and leaves	none, (nest partly built)	new (un-used)	two males nearby
J	27/12/85	clumps of dense bulrush	2.0	not applicable	1.0	—	0.4	0.5	dry, cut pieces of bulrush stem	none, (nest tilted)	old	—
K	16/12/86	cluster of tea-trees	5.0	not applicable	5.0	reeds and nettles	0.4	0.8	reed stems and leaves, nettle pieces	2 broken eggs, yolk still wet	recently-active	—

reedbeds because reedbeds contain countless sites suitable for nests. Furthermore, few of the many beds of tall reeds or bulrush in the main lagoon and in adjoining Hack's Lagoon were searched. Therefore it is probable that the number of pairs of Little Bitterns breeding at Bool Lagoon in each of 1983-4, 1985-6 and 1986-7 was much higher than the number that I recorded.

Variable spacing of active nests has been noted elsewhere. In Western Australia I have seen nests only 5.0 m apart and this spacing is also mentioned for other populations by Hancock & Kushlan (1984); spacing of 30-100 m and a few hundred metres is more common (pers. obs., Jaensch 1988).

Many of the Little Bittern nests found at Bool Lagoon have been situated in tea-tree, generally with reeds or bulrush at or near the nest site. This situation is commonly used by Little Bitterns in south-western Australia (pers. obs.). Nests are probably more sheltered from strong wind in this situation than in isolated reedbeds. Nevertheless, survey results partly reflect the greater difficulty of searching for nests in large beds of reed or bulrush than in tea-tree. Recent work at Bool Lagoon and in Western Australia has demonstrated that Little Bitterns do nest in pure beds of tall reed or rush, even where tea-tree is also available.

Little Bitterns have long toes and are adept at clambering through dense reedbeds (pers. obs.). Therefore it is not surprising that they prefer to nest near reeds, even when nests are sited in tea-tree, because the reeds provide a great deal of shelter for adults and young. Adults may escape the nest area by clambering through but remaining in the reeds. Siting of nest over shallow water may enable adults to easily find food such as tadpoles (Jaensch 1984) close to the nest when young require it.

Some reedbeds at Bool Lagoon were used intensively by Starlings *Sturnus vulgaris* for roosting and were fouled by droppings. Nests H and I were found in this situation, but it is not known whether bitterns used those nests successfully.

Western Australian and overseas observations have shown that young Little Bitterns, which have well developed feet at an early age, may climb away from the nest 8-10 days after hatching, even if only for short periods (Jaensch 1984, Hancock & Kushlan 1984). Given that young at Bool

Lagoon in Nest A were known to have hatched on 28 December 1983 (J. Bourne pers. comm.) and that young in Nest B were of similar age, it is therefore likely that they were capable of leaving their nests at, or soon after, the time of my survey. Although this ability makes them less vulnerable to predators such as snakes while not confined to nests, these young would nevertheless face further dangers such as raptors, before they became able to fly (after four weeks, Hancock and Kushlan 1984).

Success of the other active nests found at Bool Lagoon in 1984-6 cannot be assessed due to lack of follow-up surveys. However, the failure of Nest K may be attributed to predation. The pattern of breakage suggested that the two eggs were probably broken by swamp-dwelling rats (J. Bourne pers. comm.) This type of predation has been noted at least twice in Western Australia (pers. obs.).

Nests D, E and K may have been used in different years by the same pair, because they were each more or less at the same site. Similarly, Nests G (or F) and H were possibly used by another pair. In Western Australia, I have noted use of the same nest, or a nest in the same vicinity, in different years. Repeated use of a nest may be indicated by presence of shell fragments deep in the nest lining or by a bulky nest structure. (A bulky nest may also be due to the use of less rigid nest material, e.g. *Typha* stems.)

Examination of the hand-held adult female, sightings of males at close range, and listening to advertising and alarm calls at Bool Lagoon enabled me to compare characters of the eastern and western populations of *I. m. dubius*. I found no differences in plumages of nestlings or adults, or in calls.

It should be noted that the captured bird's throat and chest were white with a blackish-brown double stripe from chin to lower chest and two faint, broader, rufous-buff stripes on either side. The side stripes are considered typical of adult females but not of adult males in European populations (Hancock & Kushlan 1984), whereas both sexes of *I. m. dubius* exhibit this character and some males are more heavily streaked than females (pers. obs.). The plumage of juveniles is extensively streaked with rich buff, each streak having a fine dark centre. First year birds may retain some dark-centred buff streaks on their

underparts when they moult from juvenile plumage (cf Hancock & Kushlan 1984).

On the basis of my surveys in 1984, 1985 and 1986, the status of the Little Bittern at Bool Lagoon in the 1980s may be described as "perhaps moderately common". This compares closely with the Bittern's status in the 1930s but differs from the "very rare" status attributed by Attiwill (1972) for the following 30 years (Parker *et al.* 1979). These differences may reflect either the survey methods of different observers or real fluctuations in abundance and breeding activity or both.

Before Bool Lagoon first was drained in 1912 it probably held a greater quantity of water than it has held in the 1980s (J. Bourne pers. comm.). The depth of water and extent of inundation were restored in 1965 when gates were installed on the Lagoon's outlet drain, converting the wetland to a ponding area for winter floodwater from the surrounding district. Changes in water management and vegetation in the 1960s therefore have enhanced the wetland as a conservation area for the Little Bittern. Nevertheless, drier years still occur when little water accumulates at Bool Lagoon, e.g. 1977-9.

In South Australia there are other large, regularly inundated areas of tea-tree with reeds or bulrush, or pure reed or bulrush: Mullins' Swamp (South-East), the Narrung, Loveday Bay, Finniss and Mosquito Point reedbeds (Lakes Alexandrina and Albert), and various wetlands of the Murray River such as Sunnyside Swamp. Surveys of these wetlands may reveal hitherto undetected populations and breeding activity of Little Bitterns. The following methods for finding Little Bitterns may be helpful:

- (1) *Listen* for advertising calls, around sunrise and sunset, before and during the breeding season (September to February). Birds may be induced to call by observers imitating the advertising call.
- (2) *Watch* reed or rush beds from high vantage points at sunrise and sunset, in the hope of seeing birds flying low, above the beds or across gaps between beds.
- (3) *Flush* birds by walking through tea-tree, reeds or rush with another observer watching from a clear vantage point. Adults or young may also be seen "frozen" in the classic "bittern posture" — neck and bill vertical.
- (4) *Search* for nests in suitable habitat. Discovery of old nests at least indicates use of the wetland by Little Bitterns and the nest platform is distinctive, being flattish rather than cup-shaped like crakes.

ACKNOWLEDGEMENTS

I thank J. Bourne and S. Bourne for use of their data and for commenting on the manuscript. I also thank the Bourne family and M. Harper (National Parks and Wildlife Service) for their assistance and hospitality during my visits to Bool Lagoon.

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4 Jalan 12/11, Petaling Jaya, Selangor, Malaysia.
 Received: 15 December 1988: accepted 1 August 1989