

Great Barrier Island Bittern Survey

October 4th 2025



Report and data compiled by John Ogden
and Lotte McIntyre
on behalf of Oruawharo Medlands
Ecovision



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SUMMARY

- ° The results of the third annual October Bittern Census on Great Barrier Island / Aotea are reported and presented graphically.
- ° Twenty participants listened for Bittern booming for one hour after sunset on October 4th at sixteen locations on Aotea, mainly around Whangapoua Estuary or the Kaitoke catchment.
- ° Booming generally peaked 30 – 45 minutes after sunset.
- ° Booming was more frequent than at the same sites in 2024, but less than in 2023.
- ° Booming was heard at six locations around Whangapoua and one in the Kaitoke area (Police Station wetland).
- ° The Bittern Index, defined as the number of distinctly different booming (or observed) individual birds was six for the Whangapoua stations and one for the Kaitoke catchment stations.
- ° The results, taken with other data, suggest there are possibly two nesting pairs of Bittern in the Whangapoua system, and, with less evidence, possibly one in the Kaitoke/Police Station Swamp areas.
- ° It is conservatively concluded that there are likely to be between 6 and 10 adult Bittern on Aotea.
- ° Analysis of the OME database and previously published data indicates erratic (possibly biennial) breeding, with years of high booming activity often followed by quiet years in which bittern sightings increase, possibly due to dispersal of juveniles.
- ° Since Geary et al's report (2012) Bittern may have increased slightly around Whangapoua but appear to have declined in the Kaitoke Swamp.
- ° It is recommended that predators are controlled around the Whangapoua and Kaitoke Bittern habitat areas.
- ° With regard to Bittern food supplies, it is recommended that studies of the trophic structure of the wetlands be encouraged.
- ° The Annual Bittern census should continue in October, if possible on more than one night.
- ° An Addendum implies that the method of data recording while at the station (use of cell-phone app. or paper forms) requires more consideration.
- ° The booming data are present in detail in an Appendix.

INTRODUCTION

The Australasian bittern (Matuku-hurepo, *Botaurus poiciloptilus*) is considered 'Nationally Critical' and for this reason has been the subject of monitoring and other research in recent years. The Bittern Conservation Trust was formed in October 2023 [lovebittern.com/bittern-conservation-trust/]. The Oruawharo Medlands Ecovision (OME) monitoring was started as a community monitoring exercise in 2022, building on earlier work by Ogden and others since 2000 (Geary et al. 2012). The earlier monitoring provided good indications of the presence of bittern at various locations throughout Great Barrier Island/Aotea, but confounded population trends with increased monitoring effort. Establishing an index of population trends requires consistent monitoring at specific times and locations.

This report is the third in a series giving the results of the OME/DOC October bittern count on Great Barrier Island. The previous reports suggested a minimum *Bittern Index* (definitely separately heard boomers or observed individuals) of five in the Whangapoua area and two at Kaitoke to give a total of seven in 2023. In the 2024 October survey the Index declined to three at Whangapoua and one at Kaitoke.

In both years the indices were thought to underestimate the actual number of birds present in both areas as they were based mainly on hearing booming birds. It was thought that booming was only by males, so that the true population, including (hopefully) females and juveniles, was likely to be about twice the index figure. There may be a gender bias in bittern populations in New Zealand (Wendy Ambury *pers. comm.*) with possibly three males for every female. Until this is resolved, estimating population size from booming individuals is impossible, though an index based on distinct boomers (and sightings) may still be useful as a proxy for monitoring trends.

METHODS

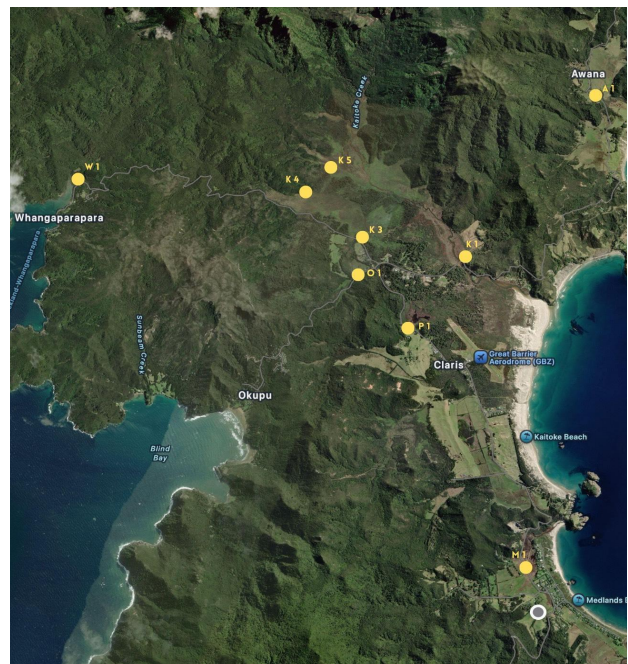
Two teams of observers were deployed, respectively North, around the Whangapoua Estuary, coordinated by Jo O'Reilly (Ecology Vision) and South, coordinated by Lotte McIntyre (OME) (Table 1, Maps 1 and 2). There were 7 observation (listening) stations in the north, coinciding with sites recorded in 2023 (Map 1). The stations were all > 500m apart (except W3 and W4 – c.400m). There were 9 listening stations in the south, six of them around Kaitoke swamp (including Police Station wetland) and three in more outlying positions where bitterns have been recorded since 2023 (Awana, Medlands/Oruawharo, Whangaparapara) (Map 2). Each station had one or two observers for one hour from sunset (7.24PM). Starting observations at sunset and listening for an hour followed protocol used by O'Donnell & Williams (2015), the Bittern Conservation Trust and results from previous years in OME Reports (Fig 1). Observers were asked to record the time of the start of each boom sequence, the number of booms in the sequence, and the direction and distance of the boomer on The Conservation Hub App or on a paper form. They also recorded any other relevant information (wind direction, strength, noise disturbance etc.). The 2025 survey was a trial for the use of the App. (see Addendum).

Table 1. Locations and participants 2025.

Site South (Kaitoke)	Latitude	Longitude	Observers
M1	36.266	175.487	David McIntyre
P1	36.241	175.456	John Ogden
O1	36.239	175.445	Frances McClure
K1	36.229	175.461	Nell and Dan Williams
K3	36.232	175.443	Kim Bannister
K4	36.228	175.433	Annamarie Clough
K5	36.223	175.435	Lotte McIntyre
W1	36.142	175.239	Sarah Matthew
A1	36.202	175.473	Steve Kendall
Site North (Whangapoua)			
W1a	36.119	175.409	Jo O'Reilly
W2	36.127	175.405	Lydia Green
W3	36.135	175.405	Beth and Thomas Daly
W4	36.135	175.400	Sarah Buckingham
W5	36.146	175.400	Aroha McGeady
W6	36.152	175.406	Sarah Dwyer
W7a	36.150	175.416	Jess Rutherford



Map 1. Whangapoua Estuary showing northern survey locations in 2025.



Map 2. Southern survey locations 2025.

RESULTS

The evening was cool, with little cloud cover (10-15%) and light to moderate wind from the west. It was dark as the moon was hidden by the hills to the south-east. Full-moon was not until October 6th, two days after the count.

Booming was recorded at six of the seven Whangapoua stations, but only one of the nine southern stations (P1: Police Station swamp). Excluding sites with zero booms, sequence detection ranged from a minimum of three at W7A to a maximum of 21 at W3 (Table2). The number of active sites reached six between 15 – 30 minutes after sunset and this number of sites (not always the same sites) were active until c. 60 minutes after sunset, when most booming apparently stopped.

Booming peaked between 31 and 45 minutes after sunset (Fig 1).

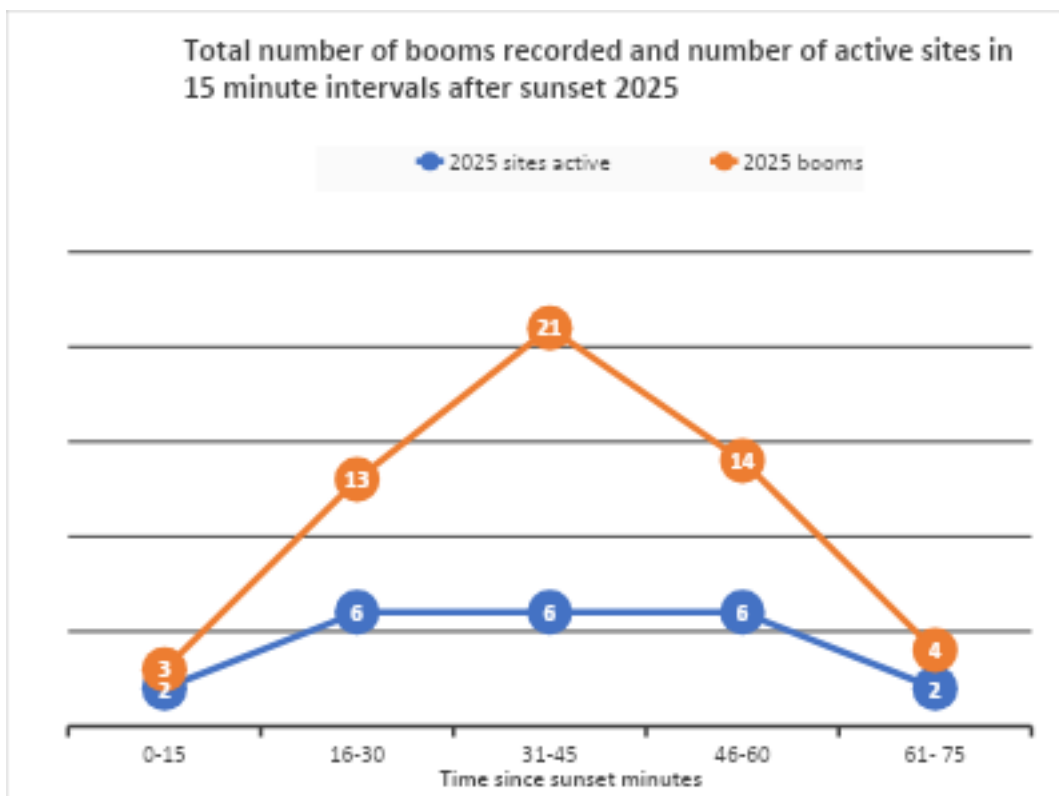


Fig 1. Site booming activity in 2025, all active sites combined. Derived from data in Appendix.

On the assumption that all observers hearing booms were hearing *different birds*, there would be six boomers around the Whangapoua Estuary. Making allowance for possibly hearing birds at one site booming from another (for example birds heard to the north of stations 5 and 6 could have been from W3) and for probably two boomers at each of W1A and W3, a cumulative minimum of 6 boomers at Whangapoua seems likely (Table 2).

All locations in the South, except P1 (Police Station), gave no indication of boomers on the survey night. The booms at P1 were very quiet, making them hard to count and position, although two birds might have been present.

Consequently in 2025 the total bittern index (definitely heard or seen distinct individuals) is 6 for Whangapoua and 7 overall.

Table 2 Number of boomers at sites around Whangapoua Estuary, October 2025

Station	Notes	No. of boomers at station	Cumulative index of boomers
W1A	Apparently 2 birds. Directions questioned	2	2
W2	Probably one bird, but direction (SW) questioned	1	3
W3	Probably 2 birds, E – SE	2	5
W4	No booms recorded	0	5
W5	One bird to N, likely one of those heard at W3	1	5
W6	Very distant to N or NE. Probably from W3	1	5
W7A	Three sequences only - SE	1	6

DISCUSSION

Bittern activity during the three October surveys (Fig 2, Table 3), suggests that bittern numbers were higher in 2025 than in the previous year (2024 Report) but below those recorded in 2023.

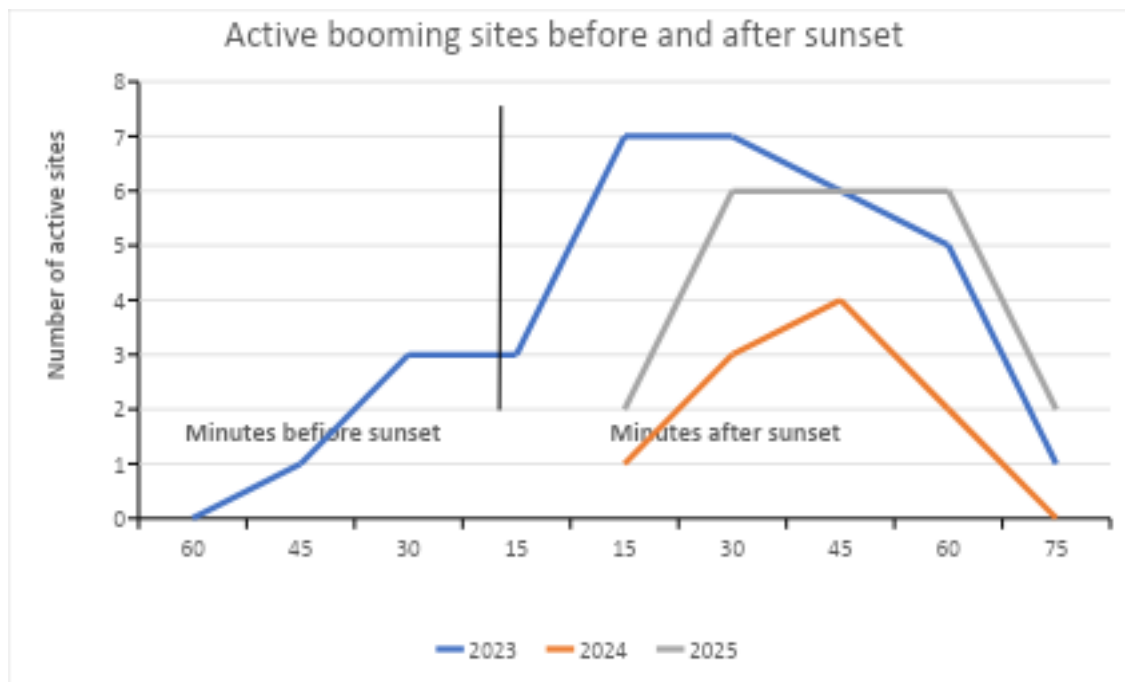


Fig 2. Bittern activity before and after sunset 2023 (blue) and 2024 (red) and 2025 (grey).

Table 3. Number of booming sequences recorded in October Surveys. The highlighted totals are those showing overall highest activity.

Station	2023	2024	2025	Total
North				
W1A	0	4	10	14
W2	10	0	4	14
W3	30	0	21	51
W4	4	3	0	7
W5	2	0	4	6
W6	7	0	5	12
W7A	17	12	3	32
South				
P1	22	10	8	40
K4	11	0	0	11
Total	103	29	55	187

The OME bittern database, recording all sightings or hearings of bittern reported to OME, has been maintained, though DOC participation was much reduced in 2025. The number of records each year since 2000 is shown in Fig 3. The positive trend indicated is not statistically meaningful and is more likely to be a reflection of reporting frequency rather than bittern abundance, but even that is useful if it indicates increased awareness generally within the community.

The results in Table 3 may indicate an oscillation between booming frequency in alternate years, and especially at W3. While this could also be a statistical artifact, if breeding has a tendency to be biennial, this could account for the annual fluctuations in bittern abundance reflected in the OME database (Fig. 3). Breeding years may be followed by dispersal of juveniles in the following year (when less breeding occurs). This is supported by the absence of Bittern sightings on Okiwi Station during peak booming months (October - November) and a concentration after breeding (April - July) reported for the period 2008 – 2013 by Geary et al. (2012). Figure seven in Geary et al. (2012) also suggests erratic breeding in the Kaitoke area, with peak booming years often followed by years in which few booms were recorded. For example, the high booming 2006 and 2007 years were followed by no booms in 2008. Observations of bitterns in locations some distance from the main nesting locations (Whangapoua and Kaitoke/Police Station Swamp) may be mainly dispersed juveniles.

The overall pattern of breeding during September – December followed by dispersal of fledged juveniles in late summer (February – April) is supported by the OME database (Fig 4). Bittern are presumably on established territories, quiet, secretive, and rarely seen, during the winter months.

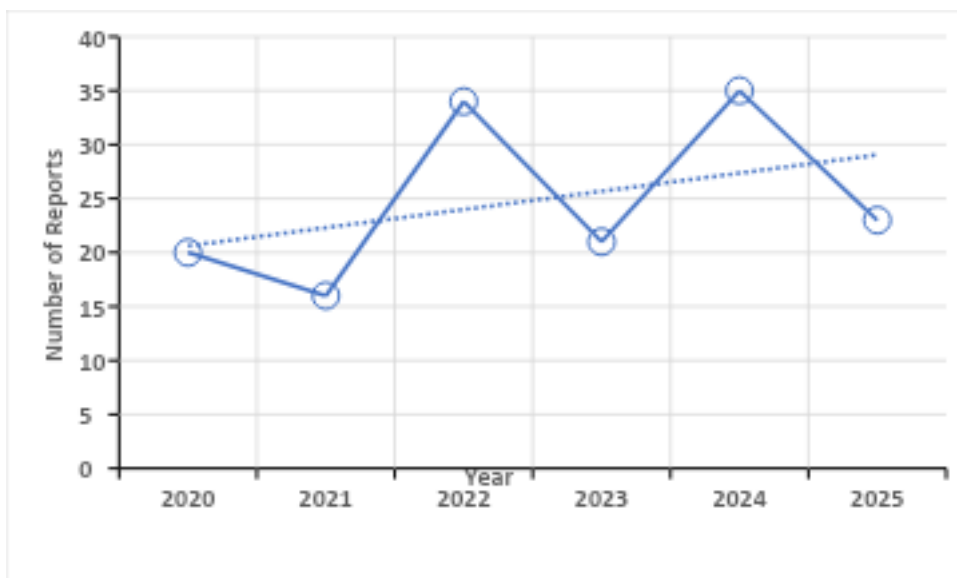


Fig 3. Reports of sightings and booming in OME data base 2020-2025. (**Excluding** sightings in the October Surveys described in this report).

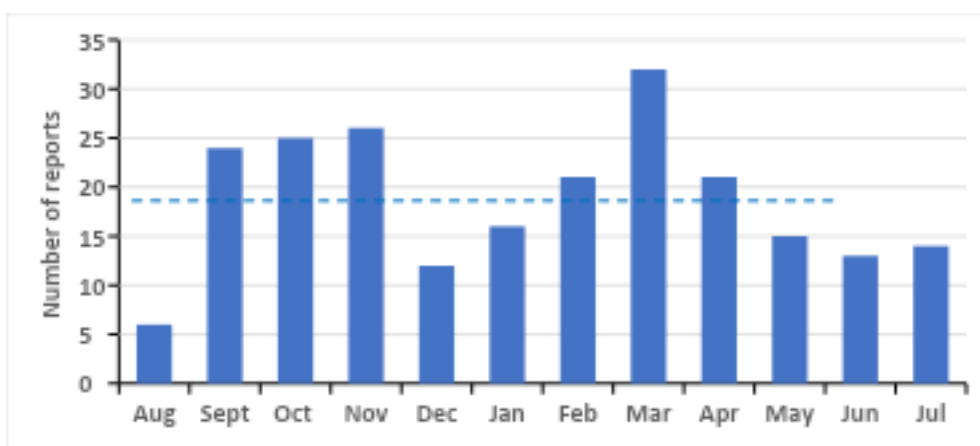


Fig 4. Analysis of 225 reports of bitterns (including sightings and boomings) from 2004 to 2025 in the OME database. The dashed line is the 'expected' or overall average value.

There are hints of persistent territoriality in the survey data. In both the 2023 and 2025 surveys the counters thought that two birds were present near W3. In September 2012, two birds were also recorded from this site (Geary, *et al.* 2012). In 2020 two birds were recorded in an acoustic survey of the eastern side of the estuary, of which at least one was near W3. Finally, in 2025 two bittern were pinpointed by drone thermal imaging close to W3 (Hugo Geddes, *pers. comm.*). Together, these observations provide evidence for a territorial pair in the north-western part of Whangapoua Estuary near W3.

A pair of bittern was seen and photographed close to 7A in the 2023 survey, and two birds have been seen together (and heard) again in the area between W7A and W6 in 2024 and 2025 (Gerald Endt *pers. comm.*). In 2024 the highest booming activity was at this station. A pair has been seen flying from this location, high, towards the north, suggesting that there is movement between locations, as also indicated by data in Geary *et al.* (2012). There may also be a separate pair in the far north of Whangapoua. Since 2020 pairs have been seen several times close to the Waikaro Block gate (W1A) by Scott Mabey and other observers, and four were seen together there in

August 2020 (Chris Giblin. *pers. comm.*). In the 2025 survey the W1A observers thought they heard two different birds in that location.

In the South, a 'pair' at P1, was first seen by S. Anderson in 2003 (Anderson, 2003 and *pers. comm.*), and since then booming has been recorded in most years from that swamp area by nearby residents. In each survey year there has been an indication of two birds by direction/distance differences of booms, although that evidence is weak. A single bird could be moving about. However, the frequent observations and hearings of birds in the area do suggest the site is occupied by a pair of bittern.

The absence of booming birds on the Kaitoke swamp in 2024 and 25, and a failure to pick up booming in acoustic recording devices along the adjacent Whangaparapara Road in September 2025 (Sue Moore, *pers. comm.*), was disappointing in view of earlier records from K4 (Geary et al. 2012 and 2023 count). A fledged juvenile was photographed on the Hot Springs track in January 2013. It is unlikely that there are no bittern pairs somewhere on this very large swamp system, breeding in some years, but high nest predation could have reduced numbers. Pigs have foraged in that part of the Kaitoke Swamp since at least 2000, when rats were also present, even in wet areas. Uncontrolled feral cats have been present on the wetland margins, though a network of feral cat traps along the hot springs track and roadside is now being managed by Auckland Council.

Consideration of the above data and anecdotal comments leads to the following conclusions:

- (1) there is likely to be at least two nesting pairs of bittern on the Whangapoua Estuary and at least one in the Kaitoke/Police Station Swamp systems;
- (2) It is quite possible that the former area actually has three nesting pairs and the latter has two;
- (3) thus, Aotea currently probably contains at least six adult bittern, and maybe ten.

While these conclusions are tentative, they are also conservative, as juvenile and unpaired birds are not adequately represented by the survey method.

Conclusions

The October 2025 bittern index overall for Aotea is estimated as seven. This is likely to underestimate the actual number of birds present.

Consideration of probable nesting territories suggests an overall total adult bittern population of six to ten birds, though this range is also conservative.

Comparison with earlier published observations and the OME data-base suggests a small overall increase since 2012, but this appears to have been mainly around the Whangapoua Estuary.

The Kaitoke Swamp bittern population may have declined since 2012, perhaps due to predation by introduced mammals.

The results again point to the importance of the Whangapoua Estuary and Okiwi area as the prime nesting area for bittern on Great Barrier Island.

Additional analyses suggest a biennial or erratic nesting regime, with good booming (nesting) years followed by quieter years in which juveniles disperse.

The public reports of bittern sightings and boomings, recorded in the OME data base, are valuable for conservation awareness and generating hypotheses, but the data are confounded in many ways so that trends derived from the database are necessarily tentative and suggestive only.

Recommendations.

More than one date (month) should be aimed for in future, but if only one is feasible, October is preferable (O'Donnell & Williams 2015); it is the most active month, and the one monitored previously. Three consecutive evenings would be ideal. Calm weather conditions are essential for getting boom direction correct and triangulating individual birds.

A study of the role of mammalian predators (pigs, cats, rats) as serious risks to the small Aotea bittern population should be encouraged. In the absence of this information predator control should be applied around Whangapoua Estuary and the Kaitoke Swamp area, as a precautionary measure. The role of shifts in bittern food resources also merits detailed study of trophic structure in the Aotea wetlands.

ACKNOWLEDGEMENTS

Oruawharo Medlands Ecovision wishes to thank all the participants listed in Table 1 and others who have contributed to the data-base. Thanks to Jo O'Reilly who, on behalf of Ecology Vision, helped coordinate the 2025 count and is taking on the annual Matuku Muster from 2026. Also, thanks to the staff of the Department of Conservation on Great Barrier Island for their cooperation in this project and to Sarah Dwyer for suggestions of improvements to our method. Finally, thanks to Wendy Ambury for generating enthusiasm for Bittern counting, for help with the Conservation Hub app and for advice on wetland habitat.

ADDENDUM – comments on the app and use of cell-phones in monitoring bittern (John Ogden).

Despite some prior practice with the app it was difficult to use it on a cell phone while concentrating on sounds with low audibility. I found it impossible to obtain direction and distance using the compass and map in the app without losing concentration, especially when calls were close together. It was much easier to use a standard (Silva) compass for bearings at the start of the session, and classify sound as 'near' 'far' or 'Intermediate'. (This system allowed confident definition of distinct individuals in 2023, using Chi squared analysis – see 2023 Report). Geary et al. (2012) found that having two people at a station introduced difficulties with local noise (talking!) and this was certainly the case in filling in the forms on the app. Geary et al. also presented evidence showing humans to be more reliable recorders than the acoustic recorders available at that time.

The app is not likely to be useful for volunteers using it only on one or two nights per year. Moreover, this trial suggested that directions and distances recorded in the App were often incorrect and had a spurious level of detail. Perhaps these difficulties would not occur with an experienced handler, but in our case a written form seems less likely to cause errors.

It also seems important to me that all the data are readily available to some members of the group so that a local report can be prepared. The Bittern Conservation Trust should probably concentrate on the larger overall picture.

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APPENDIX

Table 1. Raw data from sites where booming was heard 04/10/25

Note: Comments/notes column excluded. Sites with zero booming also excluded.

* Some distance and direction figures are thought to be inaccurate

Grey highlighting indicates possibly the same sequences heard from two locations.

station	time	between seq. min	time after 19.24	booms	distance *	direction*	Bird id. No.
P1	19:45		21	1	500	300	1
P1	20:00	5	26	1	500	300	1
P1	20:03	3	29	1	500	300	1
P1	20:05	2	31	5	500	300	1
P1	20:06	1	32	1	400	32	2
P1	20:15	9	41	3	400	32	2
P1	20:25	10	51	3	500	319	1
P1	20:30	5	56	4	500	300	1
MEDIANS		5	32	3	500		
W1a	19:49		25	3	200	300.91	1
W1a	19:57	8	33	3	200	300.91	1
W1a	19:58	1	34	5	200	5.95	2
W1a	20:00	2	36	3	100	5.95	2
W1a	20:01	1	37	5	100	5.95	2
W1a	20:03	2	39	4	100	5.95	2
W1a	20:06	3	42	3	100	5.95	2
W1a	20:08	2	44	4	100	5.95	2
W1a	20:17	9	53	3	100	5.95	2
W1a	20:18	1	54	4	100	5.95	2
MEDIANS		2	39	4	100		
W2	19:41		17	3	500	225	M1
W2	20:02	21	38	3	500	225	M1
W2	20:06	4	42	3	500	225	M1
W2	20:22	16	58	2	500	225	M1
MEDIANS		16	42	3	500		
W3	19:35		11	3	80	90	M1
W3	19:40	5	16	3	100	140	M2
W3	19:42	2	18	3	80	95	M1
W3	19:46	5	23	1	100	140	M2
W3	19:48	2	25	1	100	140	M2
W3	19:49	1	26	4	80	90	M1
W3	19:52	3	29	4	100	140	M2
W3	19:54	2	31	4	80	120	M1
W3	19:55	2	33	4	80	120	M1
W3	19:58	3	36	4	80	120	M1

W3	20:00	2	38	4	80	120	M1
W3	20:02	2	40	4	80	120	M1
W3	20:05	3	43	4	80	120	M1
W3	20:10	5	48	4	70	120	M1
W3	20:15	5	53	4	70	100	M1
W3	20:17	2	55	1	70	100	M1
W3	20:18	1	56	4	70	100	M1
W3	20:21	3	59	4	70	100	M1
W3	20:24	3	62	5	70	100	M1
W3	20:26	2	64	4	70	100	M1
W3	20:29	3	67	4	70	100	M1
MEDIANS		2.5	39	4	80		
W5	19:50		26	2	300	0	1
W5	19:59	9	35	2	300	0	1
W5	20:22	23	38	4	300	0	1
W5	20:33	33	49	2	200	0	1
MEDIANS		23	38	2	300		
W6	20:09		45	3	342	17.7	1
W6	20:13	4	49	3	342	17.7	1
W6	20:18	5	54	3	342	17.7	1
W6	20:22	4	58	2	288	11.57	1
W6	20:30	8	66	2	355	25.3	1
MEDIANS		4.5	56	2.5	342		
W7a	19:33		9	1	271	147.81	Bird 1
W7a	19:36	3	12	3	387	119.09	Bird 1
W7a	19:43	7	19	2	370	122.79	Bird 1
MEDIAN S		5	15.5	2.5	378		

Appendix Table 2. Median sequence characteristics for all active stations in 2025.

Station	Number of sequences	Median time between sequences (minutes)	Median no. of booms per sequence	No of separate birds booming
W1a	10	2	4	1 (possibly 2)
W2	4	16	3	1
W3	21	2.5	4	2
W5	4	23	2	1
W6	5	4.5	2.5	1
W7A	3	5	2.5	1(possibly 2)
P1	8	5	3	1(possibly 2)*

*All booms at P1 were very quiet and heard only by one of the two observers.