



RESEARCH ARTICLE

Uncovering the Calls of Data-Deficient Masked Owls Using Morphology and Environmental Gradients

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ABSTRACT

Aim: To test whether vocal characteristics of little-known and ‘lost’ owl species can be inferred from environmentally driven morphological and vocal correlations, using the Australian Masked Owl (*Tyto novaehollandiae*) as a model system.

Location: Australasia.

Taxon: Australian Masked Owl (*T. novaehollandiae* superspecies, Tytonidae).

Methods: We fit linear models to examine the relationship between environmental variables (latitude, temperature, elevation) and wing length for 196 Australian Masked Owl specimens. We also examined the relationship between these environmental variables and acoustic characteristics (call duration and mean dominant frequency) from 700 calls recorded via passive acoustic monitoring. These datasets were then integrated to predict vocalisations for the Papuo-Moluccan taxa *Tyto aurantia*, *Tyto manusi*, *Tyto sororcula* and *Tyto novaehollandiae calabyi*.

Results: Wing length of Australian Masked Owls was greater in females than in males ($R^2 = 0.480$, $p < 0.001$) and increased with cooler temperatures ($R^2 = 0.240$, $p < 0.001$) and higher latitudes ($R^2 = 0.211$, $p < 0.001$). Call duration decreased with decreasing latitude ($R^2 = 0.347$, $p = 0.013$) and temperature ($R^2 = 0.347$, $p = 0.036$). Mean dominant frequency increased at lower latitudes ($R^2 = 0.402$, $p < 0.001$) and warmer temperatures ($R^2 = 0.391$, $p < 0.001$) and decreased with elevation ($R^2 = 0.429$, $p = 0.032$).

Main Conclusions: Environmental factors influencing morphology correlate with vocal traits, enabling predictions for species lacking reference calls. By correlating small datasets of data-deficient species with larger datasets from better-known relatives, our approach provides insights into the expected vocalisations of ‘lost’ Papuo-Moluccan masked owls, challenges taxonomic boundaries, and offers a broadly applicable framework for biogeographic and taxonomic inference.

1 | Introduction

Conservation of ‘lost’ species is an increasing concern in biodiversity preservation efforts (Lindken et al. 2024; Martin

et al. 2023). Having been overlooked or forgotten for long periods, these species present significant challenges for conservationists as there is little or no knowledge to inform search efforts or conservation decisions (Long and Rodríguez 2022).

Overcoming these challenges requires such species to be ‘rediscovered’. However, the challenges associated with rediscovery can be exacerbated by limited opportunities and funding for searches, as well as ecological factors such as body size, behaviour and habitat preference, and the potential impacts of introduced organisms, overexploitation and habitat loss resulting from human activities (Lindken et al. 2024).

Significant shortfalls often exist in our ecological knowledge of rare species (Golding et al. 2024). However, new tools such as passive acoustic monitoring, camera traps and drones, are revolutionising the capture of important ecological information by allowing researchers to locate and monitor such species non-invasively and over extended periods (Lahoz-Monfort and Magrath 2021). For example, the ability to collect acoustic data autonomously in remote areas has provided a wealth of data on the presence, habitats and behaviour of some endangered species (Gros et al. 2023; Leseberg et al. 2022; Murphy et al. 2017), as well as leading to discoveries of new populations (Beirne et al. 2017; Dinata et al. 2008). However, the effectiveness of tools like passive acoustic monitoring devices can be limited by the availability of species-specific data, making proactive species-specific searches challenging when a species' vocalisation has not yet been determined (Webster et al. 2024). While technological advancements improve data collection and analysis, their success still requires the integration of species-specific knowledge and dedicated search efforts (Boersma et al. 2024; Lindsay et al. 2024).

The Australian Masked Owl complex or superspecies is a phylogenetic clade currently comprising 11 distinct taxa in four recognised, allopatric species: Moluccan Masked Owl (*Tyto sororcula*; three subspecies), Australian Masked Owl (*T. novaehollandiae*; five subspecies in Australia, one in New Guinea), Golden Masked Owl (*Tyto aurantia*; monotypic) and Manus Masked Owl (*Tyto manusi*; monotypic) (Gill et al. 2024; Jönsson et al. 2013; Uva et al. 2018). Six taxa within this group (*T. sororcula*, *T. aurantia*, *T. manusi* and *T. n. calabyi*), herein grouped as the Papuo-Moluccan masked owls, occur in the Moluccas, Bismarck Archipelago and Trans-Fly savannas of southern New Guinea (Mason 1983). These taxa are poorly known

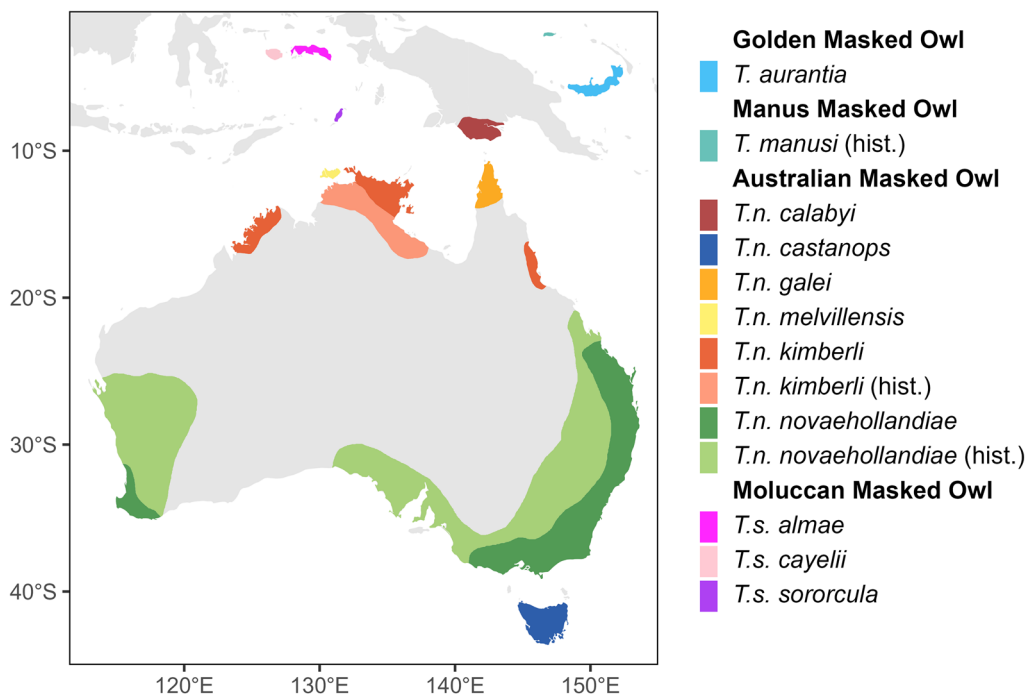


FIGURE 1 | Mapped distributions of members of the *Tyto novaehollandiae* species complex, adapted from museum skin localities. Polytypic taxa *T. novaehollandiae* and *Tyto sororcula* are abbreviated as *T. n.* and *T. s.*, respectively. Historical or vagrant ranges are labelled as 'hist.'

novaehollandiae (mid-west and mid-east to most of south Australia), *castanops* (Tasmania), *kimberli* (north Australia except north Cape York Peninsula), *galei* (north Cape York Peninsula) and *melvillensis* (Tiwi Islands). Outlying Papuo-Moluccan subspecies are *calabyi* (Trans-Fly region of south New Guinea) in *T. novaehollandiae*, nominate *sororcula* (Tanimbar), *cayelii* (Buru) and *almae* (Seram) in the Moluccan Masked Owl (*T. sororcula*), and two monotypic species: the Manus Masked Owl (*T. manusi*) in the Admiralty Islands and the Golden Masked Owl (*T. aurantia*) in New Britain, both in the Bismarck Archipelago (Figure 1).

2.2 | Morphometric Data

We obtained wing measurements from study skins of 9 of the 11 masked owl taxa (Table 1) (*T. novaehollandiae calabyi*: 3; *T. n. castanops*: 72; *T. n. galei*: 5; *T. n. kimberli*: 18; *T. n. melvillensis*: 7; *T. n. novaehollandiae*: 136; *T. aurantia*: 8; *T. manusi*: 3; *T. s. cayelii*: 1) held in eight ornithological collections (Australian Museum: 54; Australian National Wildlife Collection: 51; American Museum of Natural History: 41; Museums Victoria: 26; Natural History Museum, London: 26; Queensland Museum: 19; Western Australian Museum: 19; South Australian Museum: 16). Additionally, wing lengths for *T. sororcula cayelii* (2), *T. sororcula sororcula* (2) and *T. sororcula almae* (1) were sourced from Jönsson et al. (2013). Wing measurements, from shoulder to the tip of the longest primary in the flattened but not spread or extended wing, were considered a suitable proxy for body size, consistent with recent studies examining body size variation in birds (see e.g., Salewski and Watt 2017; Romano et al. 2021; Sebastianelli et al. 2022). The sex of each sample was recorded where available from specimen tags. For consistency, all morphological measurements were taken by a single recorder,

TABLE 1 | Wing lengths (mm) of the masked owl complex included in this study given as mean $\pm$ SD.

Taxon	Female	n	Male	n
<i>Tyto aurantia</i>	257.3 $\pm$ 17.0	3	232.8 $\pm$ 7.5	5
<i>Tyto manusi</i>	301	1	282.0 $\pm$ 8.5	2
<i>Tyto novaehollandiae</i>	340.8 $\pm$ 19.4	124	311.0 $\pm$ 12.5	110
<i>calabyi</i>	328	1	302.5 $\pm$ 0.7	2
<i>castanops</i>	363.0 $\pm$ 15.6	34	321.8 $\pm$ 7.5	35
<i>galei</i>	302.5 $\pm$ 0.7	2	282.7 $\pm$ 2.9	3
<i>kimberli</i>	320.0 $\pm$ 9.6	9	305.7 $\pm$ 8.0	6
<i>melvillensis</i>	304.3 $\pm$ 8.1	4	285.7 $\pm$ 7.5	3
<i>novaehollandiae</i> (south-east)	334.0 $\pm$ 9.1	59	308.3 $\pm$ 9.4	47
<i>novaehollandiae</i> (south-west)	346.1 $\pm$ 8.6	16	309.5 $\pm$ 11.0	13
<i>Tyto sororcula</i>	243.8 $\pm$ 13.8	4	248	1
<i>almae</i>	252	1	—	—
<i>cayelii</i>	256	1	248	1
<i>sororcula</i>	233.5 $\pm$ 12.0	2	—	—

except for the five samples sourced from Jönsson et al. (2013). Collection localities were sourced from the specimen tags and/or database records. Corresponding coordinates were generalised to the nearest 0.1° based on our best interpretation of the collection location. Samples lacking location data were excluded

from linear regression models. All morphological and location data are supplied in Appendix 1.

2.3 | Acoustic Data

We collated acoustic datasets from recent or ongoing research (2010–2024) of Australian Masked Owls at 33 sites across Australia (Figure 2). Recordings were obtained through passive acoustic monitoring (30 sites) except for the use of handheld recorders at three sites. Recordings were obtained year-round across sites, spanning all seasons. At the site level, deployments were time-limited, typically within a single season rather than sustained over multiple years. Sites were typically located within the core of an owl's home range in proximity to roosting or nesting areas. All recordings were made in .wav format, with sampling rates varying from 22,050 to 24,000 Hz.

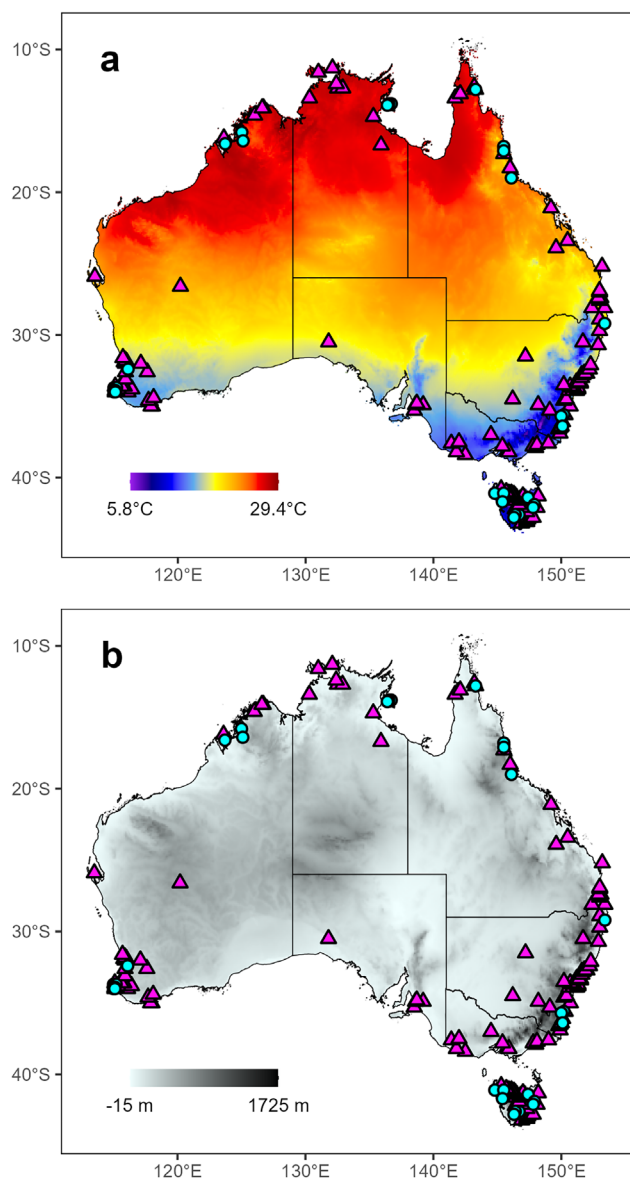


FIGURE 2 | Spatial distribution of specimens and recordings across environmental gradients. Collection localities for Australian Masked Owl museum skins (pink) and sound recordings (cyan) across Australia, shown in relation to (a) mean annual temperature and (b) elevation.

Audio files containing Australian Masked Owl vocalisations were opened in Audacity 2.4.2 software (Audacity Team, USA). A total of 700 *screech* (Todd, Kavanagh, Bell, and Munks 2018) calls were manually extracted from their parent files. We selected *screech* calls for this study, as they are functionally consistent across the species complex (Debus 1993) and easily measured relative to other known call types, for example, *chuckle* (Todd, Kavanagh, Bell, and Munks 2018). For consistency, all calls were normalised to -3 dB and re-sampled to 24,000 Hz (the typical sampling rate set on the recorders).

Screeches were determined to be adult vocalisations based on their structure. Juvenile begging screeches are typically phrases of repeated, raspy, relatively high-pitch notes that are easily differentiated from the typical screeches of adults (Todd, Kavanagh, Bell, and Munks 2018). Atypical adult screech types, including repeated, drawn-out calls given in a threatening context and low-pitched rasps repeated by nesting females were excluded from analyses (Debus 1993; Higgins 1999; Jönsson et al. 2013).

Spectral analysis of screech calls was conducted in R Studio using package *warbleR* (Araya-Salas and Smith-Vidaurre 2017) and the *autodetec* function. We manually inspected each *autodetec* result to confirm that the entirety of a call was captured and where needed, readjusted the *autodetec* threshold to ensure complete spectral capture.

We generated spectral measurements from each of the 700 screeches using the *specan* function in *warbleR*. Masked owl screeches are typically single notes of relatively constant frequency (Jönsson et al. 2013; Todd, Kavanagh, Bell, and Munks 2018). As such, we deemed call duration (in seconds) and mean dominant frequency (kHz) useful characteristics for further analysis. Error can sometimes arise through differing sampling protocols and recording devices (Araya-Salas et al. 2019). However, this may be negligible for our measurements because original sample rates were similar among recordings, metrics were generated consistently and significant biases would not be expected due to the relatively simple acoustic structure of the calls. All acoustic data are supplied in Appendix 2.

2.4 | Environmental Data

Mean annual temperature data for the Australian mainland between 1991 and 2020 were sourced from Bureau of Meteorology (2024). Elevational data were derived from the 3s SRTM Derived Digital Elevation Model (DEM) Version 1.0 (Gallant et al. 2009). Rasters were re-sampled to 0.1° in ArcGIS (Environmental Systems Research Institute Inc., Redlands, CA, USA). ArcGIS's interpolation function was applied to smooth location inaccuracies before raster pixel values were extracted from the corresponding locations of each specimen and call recording.

2.5 | Statistical Analysis

Using R (R Core Team 2025), we fitted linear regression models to analyse relationships between wing length and three predictor

environmental variables—latitude, temperature, elevation. We used standard linear models for morphological data since each specimen represented a unique individual. We calculated R^2 and p -values to determine predictors that best explained variation.

For vocal traits, we used mixed-effect linear regression models with call duration and mean dominant frequency as responses, and latitude, temperature and elevation as fixed effects. Recording location was included as a random effect to account for non-independence among calls recorded at the same site. These models were fitted using the lme4 package (Bates et al. 2015).

As Australian Masked Owls exhibit reverse sexual size dimorphism (Debus 1993), we explored whether calls could be clustered by sex to improve interpretation of acoustic datasets where sex is unknown. To examine this, we applied K -means clustering with $K=2$ to discriminate clusters that may represent sex within the vocal datasets for each Australian mainland subspecies and the Tasmanian *T. n. castanops*. We then evaluated clustering performance using silhouette widths, which quantify how well each call matches its assigned cluster compared to the nearest alternative cluster. Silhouette widths range from -1 to 1 . Following Kaufman and Rousseeuw (1990), we interpreted values ≥ 0.71 as indicating a strong structure, 0.51 – 0.70 a reasonable structure, 0.26 – 0.50 a weak or possibly artificial structure and ≤ 0.25 no substantial structure. We summarised clustering quality by calculating the mean silhouette width for each cluster and taxon.

2.6 | Predicting Calls for Papuo-Moluccan Masked Owls

We used latitude as the common predictor linking the morphometric and acoustic datasets. First, we modelled wing length as a function of latitude using our Australian morphometric data. As acoustic recordings were only available for Australian taxa, measured call data were limited to this subset of the species complex. We then applied this fitted model to the latitude values in our acoustic dataset to generate predicted wing lengths for each call recording location. Next, we modelled call duration and mean dominant frequency as functions of the predicted wing lengths. Finally, we applied these fitted relationships to measured wing lengths of Papuo-Moluccan masked owl museum specimens to predict their call characteristics. To evaluate predictive accuracy, we compared predicted and measured values for Australian taxa using Welch's two-sample t -tests in R, performed separately for call duration and mean dominant frequency.

3 | Results

3.1 | Assessment of Masked Owl Variation

Masked owl wing lengths differed between sexes for all taxa, females showing mean wing lengths 8 – 41 mm longer than males (Table 1). Tasmanian populations of *T. novaehollandiae* had the longest wing lengths of all masked owls and Tanimbar *T. sororcula* the shortest (Table 1). *T. aurantia* had wing lengths similar

to those of *T. sororcula*, whereas those of *T. manusi* were comparable to the wings of *T. novaehollandiae galei* from Cape York Peninsula (Table 1).

Within *T. novaehollandiae*, Tasmanian *T. n. castanops* had the longest wing lengths, and Cape York Peninsula *T. n. galei* and Tiwi Islands *T. n. melvillensis* had the shortest (Table 1). South-west Australian nominate *novaehollandiae* were generally larger than south-east populations (Table 1). New Guinean *T. n. calabyi* had wing lengths greater than *T. n. galei* from Cape York Peninsula and *T. n. melvillensis* of the Tiwi Islands but comparable to those of *T. n. kimberli* from the northern Australian mainland (excluding north Cape York Peninsula where it is replaced by *galei*) (Table 1).

The linear regression models incorporating wing length and environmental variables indicated that variation in wing length within Australian Masked Owls was best explained by sex ($R^2=0.480$, $p<0.001$) and, to a lesser extent, temperature ($R^2=0.240$, $p<0.001$) and latitude ($R^2=0.211$, $p<0.001$) (Table 2). Wing length was negatively correlated with both temperature and latitude (Figure 3). Conversely, wing length was positively correlated with elevation, albeit weakly ($R^2=0.032$, $p=0.015$) (Table 2, Figure 3).

Relative to the Marginal R^2 values, the inclusion of the random effect for recording site substantially improved the explanatory power of the models for call variables, highlighting site-specific variability as important in explaining call duration and mean dominant frequency (Table 2).

K -means clustering circumscribed two reasonably well-defined groups based on silhouette widths in both the duration and mean dominant frequency data for the Australian Masked Owls (Table 3). The better-sampled taxa (i.e., *T. n. kimberli*, *T. n. novaehollandiae* [south-east], *T. n. novaehollandiae* [south-west]) had the most stable clustering (Table 3). Clusters present within the data for these taxa may contribute bias towards the call duration and mean dominant frequency measurements in Table 3.

Similarly to variation in wing length, the duration of *T. novaehollandiae* screech calls varied between populations and subspecies (Table 4). The south-west Australian nominate *novaehollandiae* ($n=323$) typically produced longer calls than Tasmanian *castanops* ($n=24$) and south-east Australian nominate *novaehollandiae* ($n=95$) (Table 4). Although the sample size for the Cape York Peninsula *galei* was small, its calls ($n=12$) were significantly shorter than all other taxa (Table 4). Northern Australian *kimberli* produced calls intermediate in duration ($n=246$) between *galei* from Cape York Peninsula and the southern Australian mainland (*T. n. novaehollandiae*) (Table 4).

The mean dominant frequency of calls in Australian populations and subspecies mirrored intraspecific variation in call duration. South-west nominate *novaehollandiae* and Tasmanian *castanops* produced lower frequency calls than south-east nominate *novaehollandiae* and northern Australian *kimberli*, while Cape York Peninsula *galei* called at the highest pitch of all taxa (Table 4).

TABLE 2 | Linear model performance metrics for absolute wing length, call duration and mean dominant frequency. Conditional R^2 values and associated p include the random effect of call recording site.

Character	Model	Marginal R^2	p	Conditional R^2	p
Wing length	Sex	0.480	< 0.001		
	Temperature	0.240	< 0.001		
	Latitude	0.211	< 0.001		
	Elevation	0.032	0.015		
Call duration	Latitude	0.079	< 0.001	0.347	0.013
	Temperature	0.062	< 0.001	0.347	0.036
	Elevation	0.005	0.068	0.365	0.775
Call mean dominant frequency	Latitude	0.103	< 0.001	0.402	< 0.001
	Temperature	0.116	< 0.001	0.391	< 0.001
	Elevation	0.007	0.027	0.429	0.032

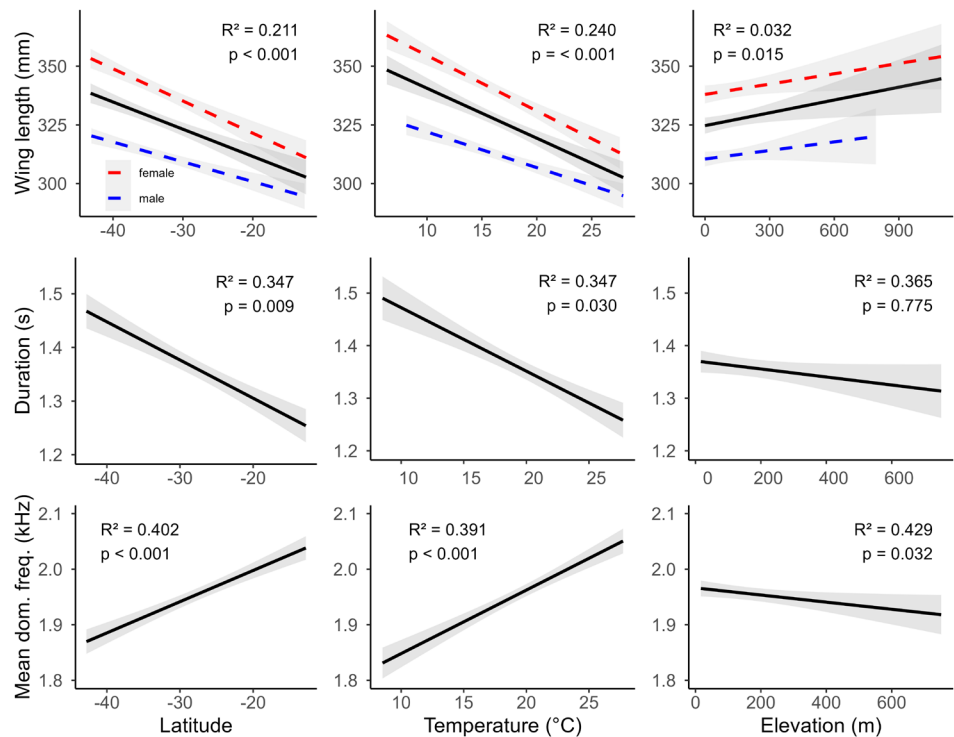


FIGURE 3 | Environmental correlates of morphology and vocal traits in masked owls. Linear regression models for wing length (mm), call duration (s) and mean dominant frequency (kHz) and environmental variables latitude, temperature (°C) and elevation (masl). Shaded areas represent 95% confidence intervals. R^2 and p -values refer to the main linear model represented by the solid black line in each plot.

3.2 | Predicting Calls for Papuo-Moluccan Masked Owls

The predicted values closely matched the measured values for most taxa, typically differing by <0.1 s in call duration and <0.1 kHz in mean dominant frequency (Table 4, Figure 4). Only in *T. n. kimberli* and *T. n. galei* were significant differences detected between the predicted and measured values for both duration and mean dominant frequency, although absolute deviations remained minor (≤ 0.11 s in duration, ≤ 0.13 kHz in frequency; Table 4).

The predicted call duration and mean dominant frequency values for taxa lacking measured values (Papuo-Moluccan masked owls, Tiwi Islands *T. n. melvillensis*) indicate that *T. n. calabyi*, *T. n. melvillensis* and *T. manusi* would be most similar to the measured values of *T. n. kimberli* and south-east nominate *T. n. novaehollandiae* (Table 4, Figure 4). Those of *T. sororcula* and *T. aurantia*, although comparable to the measured values for *T. n. galei*, were predicted to have the shortest call durations and highest mean dominant frequencies of all masked owls (Table 4, Figure 4).

TABLE 3 | Silhouette widths for *duration* and *mean dominant frequency* from *K*-means clustering (*K*=2).

Taxon	Call duration				Call mean dominant frequency			
	Cluster 1	<i>n</i>	Cluster 2	<i>n</i>	Cluster 1	<i>n</i>	Cluster 2	<i>n</i>
<i>Tyto novaehollandiae</i>	0.58	348	0.58	352	0.56	328	0.55	372
<i>castanops</i>	0.71	11	0.59	13	0.51	13	0.64	11
<i>galei</i>	0.58	4	0.54	8	0.45	9	0.45	3
<i>kimberli</i>	0.58	122	0.59	124	0.52	126	0.51	120
<i>novaehollandiae</i> (south-east)	0.61	62	0.54	33	0.62	52	0.64	43
<i>novaehollandiae</i> (south-west)	0.61	191	0.52	132	0.61	142	0.58	181

TABLE 4 | Measured (M) and wing-length—predicted (P) call duration and mean dominant frequency ($\pm$ SD) for all masked owls. Bolded *p*-values indicate significant differences.

Taxa with measured and predicted values	Duration (seconds)			Mean dominant frequency (kHz)			<i>n</i> ^M	<i>n</i> ^P
	Measured	Predicted	<i>p</i>	Measured	Predicted	<i>p</i>		
<i>Tyto novaehollandiae</i>								
<i>castanops</i>	1.38 $\pm$ 0.16	1.47 $\pm$ 0.10	0.014	1.85 $\pm$ 0.08	1.87 $\pm$ 0.08	0.321	24	71
<i>galei</i>	1.14 $\pm$ 0.07	1.25 $\pm$ 0.05	0.007	2.17 $\pm$ 0.09	2.04 $\pm$ 0.04	0.001	12	5
<i>kimberli</i>	1.28 $\pm$ 0.19	1.34 $\pm$ 0.05	0.001	2.00 $\pm$ 0.15	1.97 $\pm$ 0.04	0.021	246	18
<i>novaehollandiae</i> (south-east)	1.37 $\pm$ 0.20	1.39 $\pm$ 0.07	0.503	1.98 $\pm$ 0.15	1.93 $\pm$ 0.05	0.008	95	107
<i>novaehollandiae</i> (south-west)	1.42 $\pm$ 0.24	1.41 $\pm$ 0.09	0.685	1.91 $\pm$ 0.15	1.91 $\pm$ 0.07	0.990	323	30
Taxa with predicted values only								
<i>Tyto aurantia</i>	—	1.05 $\pm$ 0.07	—	—	2.20 $\pm$ 0.05	—	—	8
<i>Tyto manusi</i>	—	1.24 $\pm$ 0.05	—	—	2.05 $\pm$ 0.04	—	—	3
<i>Tyto novaehollandiae</i>								
<i>calabyi</i>	—	1.34 $\pm$ 0.06	—	—	1.97 $\pm$ 0.05	—	—	3
<i>melvillensis</i>	—	1.28 $\pm$ 0.05	—	—	2.02 $\pm$ 0.04	—	—	7
<i>Tyto sororcula</i>								
<i>almae</i>	—	1.09	—	—	2.17	—	—	1
<i>cayelii</i>	—	1.09 $\pm$ 0.02	—	—	2.17 $\pm$ 0.02	—	—	2
<i>sororcula</i>	—	1.01 $\pm$ 0.05	—	—	2.23 $\pm$ 0.04	—	—	2

4 | Discussion

We developed a novel approach to help address the global challenge of finding ‘lost’ and elusive, data-deficient species, in order to improve our understanding of their ecologies and their conservation as a basis for management (Lindken et al. 2024; Martin et al. 2023). Specifically, our analyses of the morphological and vocal characteristics of the Australian Masked Owl (*T. novaehollandiae*) provide insight into the possible characteristics of vocalisations of Papuo-Moluccan masked owls, including the ‘lost’ *T. manusi* of the Admiralty Islands. The Papuo-Moluccan masked owls are smaller than their Australian

relatives (Jönsson et al. 2013; Mason 1983; Roulin et al. 2018), suggesting these taxa have shorter and higher pitched calls than other members of the complex. We predict that New Britain's *T. aurantia* and Tanimbar Island's *T. s. sororcula*, which are the smallest in size (Jönsson et al. 2013; Roulin et al. 2018), have the shortest and highest pitched calls. However, given the genetic distance of *T. aurantia* (Jönsson et al. 2013; Uva et al. 2018) caution is needed when inferring its vocal characteristics from other taxa in the species complex.

The morphological and vocal variation we observed within Australian Masked Owl populations both support and enrich

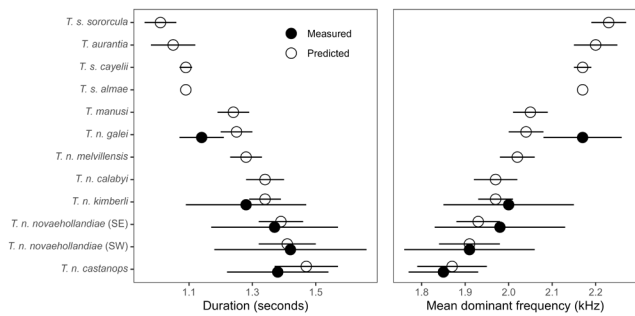


FIGURE 4 | Comparison of measured and predicted vocal traits across masked owl taxa. Measured call duration and mean dominant frequency are plotted alongside values predicted from wing length using linear models. Error bars indicate one standard deviation from the mean.

current taxonomic understanding of subspecies limits. The consistent differences in morphology and vocalisations between the northern Australian *T. n. kimberli* and *T. n. galei* lend support to their recognition as distinct subspecies. However, we found unexpected differences between the south-east and south-west Australian populations of nominate *novaehollandiae*. The south-west population is morphologically and vocally intermediate between Tasmanian *T. n. castanops* and the south-east population, suggesting the two *novaehollandiae* populations may differ from each other more than is currently recognised. Our findings indicate that a phylogenetic assessment incorporating samples from all populations is needed to clarify subspecies boundaries within the Australian Masked Owl.

Australian Masked Owls display reverse sexual dimorphism (Higgins 1999), and the females of *T. n. castanops* have been shown to produce lower frequency screech calls than those of the smaller males (Todd, Kavanagh, Bell, and Munks 2018). Therefore, the clusters identified in our vocal clustering analysis may reflect sex differences between males and females. The influence of *recording site* as a random effect in our models is consistent with this, as breeding pairs were present at some sites. While such clustering may help distinguish the sexes within pairs, it may be less reliable for identifying the sex of individual owls, or for owls from new locations (Todd, Kavanagh, Bell, and Munks 2018). Nevertheless, similar clustering methods have proven effective in sex identification among other owl species (Dale et al. 2022; Odom and Mennill 2010), indicating potential in its application to masked owl vocalisation research. Although reverse sexual dimorphism may affect vocal clustering, it is unlikely to impede accurate predictions for ‘lost’ or poorly known members of the species complex.

Our study helps address the lack of reference calls for Papuo-Moluccan masked owls, helping to resolve a major challenge for researchers attempting to detect and study these taxa. To date, research has been focused on a limited number of calls for *T. sororcula* (Jönsson et al. 2013). While these calls were considered similar in structure to those of *T. novaehollandiae*, the low-pitched calls attributed to *T. s. almae* were likely distress notes given during handling and may not represent typical screeches (Jönsson et al. 2013). Additionally, the contexts in which the *T. s. sororcula* and *T. s. cayellii* recordings analysed by Jönsson et al. (2013) are not reported, leaving open the possibility that playback or other

disturbances may have elicited atypical screeches. Due to these uncertainties, we are hesitant to compare recordings of *T. sororcula* directly to the passively emitted calls recorded during our study. Accordingly, we recommend that researchers conducting targeted surveys for Papuo-Moluccan masked owls consider our vocal predictions where reference calls are lacking.

A comparative study with other *Tyto* species could provide insights into the broader applicability of these methods, particularly with wing length correlating with latitude and elevation in most species (Romano et al. 2021). Specifically, the cosmopolitan and phenotypically diverse Barn Owl (*T. alba sensu lato*) species complex (Romano et al. 2019; Roulin et al. 2018) presents an opportunity to test our predictive models in new environmental contexts globally. Expanding the range of taxa and geographic coverage would further refine our understanding of how environmental factors influence the relationship between vocalisations and morphology across *Tyto* species.

Papuo-Moluccan masked owls present an illustrative example of how critical insights can be gained through focused analyses of closely related species. Despite the limitations imposed by small sample sizes, particularly for Papuo-Moluccan masked owls, our study also demonstrates the value of interrogating small datasets in advancing ecological knowledge. In the case of data-deficient species, where novel data collection is often daunting or otherwise impossible, such small datasets become instrumental for making ecological inferences and may ultimately guide future research and conservation efforts (Golding et al. 2024; Kindsvater et al. 2018). For example, for the Buff-breasted Button-quail (*Turnix olivii*), Coxen's Fig Parrot (*Cyclopsitta diophthalma coxeni*) and Slaty-mantled Goshawk (*Tachyspiza luteoschistacea*), Australo-Papuan taxa that are critically endangered, data-deficient and lack confirmed sound recordings (Bravo Sanchez et al. 2024; Davis et al. 2018; Webster et al. 2021), our approach may aid in their detection. An important next step will be validating our predictions for taxa lacking known calls. This could be achieved through expanded deployment of passive acoustic monitoring within the ranges of these species so as to collect reference calls, potentially combined with non-invasive genetic investigation (e.g., collecting moulted feathers) or photographing calling owls, to assign calls to individuals and sexes (Banhos et al. 2008; Boano et al. 2019; Mason and Bowie 2020). Such validation would strengthen confidence in our modelled predictions and further refine the approach for other elusive or data-deficient taxa.

Author Contributions

N.A.J., J.E.M.W., S.A.M. and N.P.L. conceived the study and developed the methodology. N.A.J., B.J.W., M.K.T., C.G., R.J.B., P.B., P.K. and C.D. collected acoustic data. R.S. collected morphometric data. N.A.J. analysed the data and model outputs. All authors contributed to drafting and/or critically revising the manuscript, approved the final version, and agree to be accountable for their contributions and for the integrity of the work.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data used in this paper are available through Dryad at <https://doi.org/10.5061/dryad.73n5tb390>.

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Appendix 1

Morphological and Associated Environmental Data

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto aurantia</i>	−5.8	150.1	M	237	—	—
<i>Tyto aurantia</i>	−5.7	150.6	M	231	—	—
<i>Tyto aurantia</i>	−4.2	152.2	M	232	—	—
<i>Tyto aurantia</i>	−4.2	151.8	M	242	—	—
<i>Tyto aurantia</i>	−5.1	151.9	F	270	—	—
<i>Tyto aurantia</i>	−5.7	150.6	M	222	—	—
<i>Tyto aurantia</i>	−5.7	150.6	F	264	—	—
<i>Tyto aurantia</i>	−5.7	150.6	F	238	—	—
<i>Tyto manusi</i>	−2.1	146.9	M	288	—	—
<i>Tyto manusi</i>	−2.1	146.9	M	276	—	—
<i>Tyto manusi</i>	−2.1	146.9	F	301	—	—
<i>Tyto novaehollandiae calabyi</i>	−9.1	143.2	M	302	—	—
<i>Tyto novaehollandiae calabyi</i>	−9.1	143.2	M	303	—	—
<i>Tyto novaehollandiae calabyi</i>	−9.1	142.0	F	328	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	320	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	314	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	318	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	362	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	367	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	349	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	346	—	—
<i>Tyto novaehollandiae castanops</i>	−43.2	146.9	F	367	9.4	214
<i>Tyto novaehollandiae castanops</i>	—	—	M	313	—	—
<i>Tyto novaehollandiae castanops</i>	−43.1	147.3	M	333	11.5	0
<i>Tyto novaehollandiae castanops</i>	−43.0	147.3	M	322	11.0	53
<i>Tyto novaehollandiae castanops</i>	—	—	F	375	—	—
<i>Tyto novaehollandiae castanops</i>	−43.0	147.3	F	350	11.0	53
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	F	354	10.9	190
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	M	330	10.9	190
<i>Tyto novaehollandiae castanops</i>	—	—	F	373	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	379	—	—
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	M	323	10.9	190
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	M	322	10.9	190
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	M	313	10.9	190
<i>Tyto novaehollandiae castanops</i>	−42.9	147.3	F	360	10.9	190
<i>Tyto novaehollandiae castanops</i>	−42.8	147.1	F	334	10.4	141
<i>Tyto novaehollandiae castanops</i>	—	—	M	316	—	—
<i>Tyto novaehollandiae castanops</i>	−42.8	147.6	F	365	12.5	0
<i>Tyto novaehollandiae castanops</i>	−42.8	147.8	F	363	11.9	189

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae castanops</i>	−42.4	147.3	F	365	10.1	424
<i>Tyto novaehollandiae castanops</i>	—	—	F	366	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	—	365	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	—	370	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	332	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	332	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	315	—	—
<i>Tyto novaehollandiae castanops</i>	−42.2	146.4	M	329	8.1	694
<i>Tyto novaehollandiae castanops</i>	—	—	F	406	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	F	376	—	—
<i>Tyto novaehollandiae castanops</i>	−42.2	146.4	F	343	8.1	694
<i>Tyto novaehollandiae castanops</i>	−42.1	148.1	F	356	12.7	0
<i>Tyto novaehollandiae castanops</i>	−42.1	147.4	M	313	10.8	235
<i>Tyto novaehollandiae castanops</i>	−41.9	146.7	F	387	6.3	1034
<i>Tyto novaehollandiae castanops</i>	−41.6	147.2	M	330	11.6	150
<i>Tyto novaehollandiae castanops</i>	−41.6	147.1	M	332	11.6	150
<i>Tyto novaehollandiae castanops</i>	−41.6	147.2	M	321	11.6	150
<i>Tyto novaehollandiae castanops</i>	−41.6	146.4	F	362	7.7	366
<i>Tyto novaehollandiae castanops</i>	−41.6	146.4	F	364	7.7	366
<i>Tyto novaehollandiae castanops</i>	−41.5	146.8	M	322	11.4	208
<i>Tyto novaehollandiae castanops</i>	−41.5	146.8	F	378	11.4	208
<i>Tyto novaehollandiae castanops</i>	−41.5	147.1	M	319	11.8	151
<i>Tyto novaehollandiae castanops</i>	−41.4	146.3	M	323	10.7	280
<i>Tyto novaehollandiae castanops</i>	−41.4	146.5	F	373	11.5	67
<i>Tyto novaehollandiae castanops</i>	−41.4	147.1	F	371	12.1	3
<i>Tyto novaehollandiae castanops</i>	−41.4	146.3	M	311	10.7	280
<i>Tyto novaehollandiae castanops</i>	−41.4	147.1	M	314	12.1	3
<i>Tyto novaehollandiae castanops</i>	−41.4	147.1	F	371	12.1	3
<i>Tyto novaehollandiae castanops</i>	−41.3	146.4	M	333	11.8	59
<i>Tyto novaehollandiae castanops</i>	−41.3	146.4	F	377	11.8	59
<i>Tyto novaehollandiae castanops</i>	−41.3	146.4	F	358	11.8	59
<i>Tyto novaehollandiae castanops</i>	−41.3	148.2	M	327	12.1	84
<i>Tyto novaehollandiae castanops</i>	−41.3	147.0	F	362	11.9	64
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	M	332	11.9	21
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	M	308	11.9	21
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	M	321	11.9	21
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	M	335	11.9	21
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	F	332	11.9	21
<i>Tyto novaehollandiae castanops</i>	−41.2	146.3	F	322	11.9	21
<i>Tyto novaehollandiae castanops</i>	—	—	M	315	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	M	320	—	—
<i>Tyto novaehollandiae castanops</i>	—	—	—	313	—	—

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae castanops</i>	−41.1	146.1	M	320	12.2	0
<i>Tyto novaehollandiae castanops</i>	−41.1	145.9	M	317	11.6	203
<i>Tyto novaehollandiae castanops</i>	—	—	F	332	—	—
<i>Tyto novaehollandiae galei</i>	—	—	M	286	—	—
<i>Tyto novaehollandiae castanops</i>	−41.0	145.7	M	319	11.8	24
<i>Tyto novaehollandiae castanops</i>	−40.8	145.3	F	357	12.9	0
<i>Tyto novaehollandiae galei</i>	−13.4	141.7	M	281	27.0	0
<i>Tyto novaehollandiae galei</i>	−13.1	142.1	F	303	26.7	30
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	F	302	25.3	32
<i>Tyto novaehollandiae galei</i>	−12.6	143.2	M	281	24.9	262
<i>Tyto novaehollandiae kimberli</i>	−18.3	146.0	M	311	22.9	375
<i>Tyto novaehollandiae kimberli</i>	−17.3	145.5	M	297	19.7	793
<i>Tyto novaehollandiae kimberli</i>	−16.7	135.9	F	300	26.6	72
<i>Tyto novaehollandiae kimberli</i>	−16.2	123.6	M	310	27.9	81
<i>Tyto novaehollandiae kimberli</i>	−14.7	135.3	F	315	27.0	1
<i>Tyto novaehollandiae kimberli</i>	−14.6	126.0	F	325	27.1	19
<i>Tyto novaehollandiae kimberli</i>	−14.1	126.7	M	305	27.7	22
<i>Tyto novaehollandiae kimberli</i>	—	—	—	303	—	—
<i>Tyto novaehollandiae kimberli</i>	−14.1	126.6	M	317	27.7	22
<i>Tyto novaehollandiae kimberli</i>	−13.4	130.3	M	294	27.0	2
<i>Tyto novaehollandiae kimberli</i>	−12.7	132.5	M	300	27.5	4
<i>Tyto novaehollandiae kimberli</i>	−12.7	132.5	F	323	27.5	4
<i>Tyto novaehollandiae kimberli</i>	−12.7	132.9	F	323	27.2	24
<i>Tyto novaehollandiae kimberli</i>	−12.7	132.9	F	318	27.2	24
<i>Tyto novaehollandiae kimberli</i>	−12.4	132.4	F	336	27.6	4
<i>Tyto novaehollandiae kimberli</i>	−11.3	132.1	F	318	27.4	14
<i>Tyto novaehollandiae kimberli</i>	−11.3	132.1	M	308	27.4	14
<i>Tyto novaehollandiae kimberli</i>	−11.3	132.1	F	322	27.4	14
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	F	298	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	F	315	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	M	293	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	M	286	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	F	306	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	M	278	27.0	62
<i>Tyto novaehollandiae melvillensis</i>	−11.6	131.0	F	298	27.0	62
<i>Tyto novaehollandiae novaehollandiae</i>	−38.4	142.5	F	330	14.2	7

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−38.4	142.5	F	347	14.2	7
<i>Tyto novaehollandiae novaehollandiae</i>	−38.4	142.5	M	297	14.2	7
<i>Tyto novaehollandiae novaehollandiae</i>	−38.2	141.8	F	341	13.8	9
<i>Tyto novaehollandiae novaehollandiae</i>	−38.2	145.9	F	320	13.5	133
<i>Tyto novaehollandiae novaehollandiae</i>	−37.9	148.0	M	322	14.4	4
<i>Tyto novaehollandiae novaehollandiae</i>	−37.9	148.0	F	335	14.4	4
<i>Tyto novaehollandiae novaehollandiae</i>	−37.9	148.0	F	327	14.4	4
<i>Tyto novaehollandiae novaehollandiae</i>	−37.8	147.8	F	345	14.5	14
<i>Tyto novaehollandiae novaehollandiae</i>	−37.8	147.8	F	334	14.5	25
<i>Tyto novaehollandiae novaehollandiae</i>	−37.8	145.4	M	322	13.8	215
<i>Tyto novaehollandiae novaehollandiae</i>	−37.7	148.1	M	303	14.3	161
<i>Tyto novaehollandiae novaehollandiae</i>	−37.6	149.0	M	333	13.7	432
<i>Tyto novaehollandiae novaehollandiae</i>	−37.6	141.4	M	311	13.9	41
<i>Tyto novaehollandiae novaehollandiae</i>	−37.6	141.4	F	343	13.9	41
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	306	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−37.5	142.0	F	340	13.1	209
<i>Tyto novaehollandiae novaehollandiae</i>	−37.0	144.5	M	323	13.8	275
<i>Tyto novaehollandiae novaehollandiae</i>	−36.9	149.9	F	324	14.8	0
<i>Tyto novaehollandiae novaehollandiae</i>	−36.6	149.8	F	332	13.9	202
<i>Tyto novaehollandiae novaehollandiae</i>	−36.5	149.9	F	325	14.4	282
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.0	F	336	14.8	55
<i>Tyto novaehollandiae novaehollandiae</i>	−36.1	150.1	F	320	16.0	61
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.3	M	289	16.1	76
<i>Tyto novaehollandiae novaehollandiae</i>	−35.3	149.1	F	343	12.6	557
<i>Tyto novaehollandiae novaehollandiae</i>	−35.3	138.5	F	343	15.4	62
<i>Tyto novaehollandiae novaehollandiae</i>	−35.0	118.0	F	367	15.5	8

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−35.0	150.7	F	332	16.9	1
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	307	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−35.0	117.9	M	326	15.6	29
<i>Tyto novaehollandiae novaehollandiae</i>	−35.0	117.9	F	347	15.6	29
<i>Tyto novaehollandiae novaehollandiae</i>	−35.0	117.9	F	346	15.6	29
<i>Tyto novaehollandiae novaehollandiae</i>	−34.9	148.2	F	324	15.0	314
<i>Tyto novaehollandiae novaehollandiae</i>	−34.9	138.6	M	300	16.4	56
<i>Tyto novaehollandiae novaehollandiae</i>	−34.9	139.2	F	332	15.3	134
<i>Tyto novaehollandiae novaehollandiae</i>	−34.8	138.7	M	302	16.3	166
<i>Tyto novaehollandiae novaehollandiae</i>	−34.6	150.2	F	329	13.0	715
<i>Tyto novaehollandiae novaehollandiae</i>	−34.6	117.7	F	342	15.1	240
<i>Tyto novaehollandiae novaehollandiae</i>	−34.5	146.2	F	338	16.3	130
<i>Tyto novaehollandiae novaehollandiae</i>	−34.5	150.4	F	338	13.0	670
<i>Tyto novaehollandiae novaehollandiae</i>	−34.4	118.1	M	317	15.1	272
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	F	337	16.6	82
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	116.1	F	343	15.0	253
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	151.1	M	310	17.6	10
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	151.2	F	336	17.8	17
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	151.2	F	342	17.8	17
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	150.6	F	338	16.2	190
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	151.1	F	339	17.6	10
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	150.9	F	335	17.0	51
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	M	312	16.5	108
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.2	F	354	16.3	126
<i>Tyto novaehollandiae novaehollandiae</i>	−33.8	151.3	M	306	17.7	2
<i>Tyto novaehollandiae novaehollandiae</i>	−33.8	115.5	F	345	15.9	175

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.8	116.4	M	310	15.1	270
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	151.1	M	303	16.9	179
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	151.3	F	327	17.5	3
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	151.0	F	327	16.8	136
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	150.9	F	338	16.9	54
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	150.7	M	310	16.2	11
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	115.5	M	310	16.7	12
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	115.1	M	310	16.9	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	115.1	F	350	16.9	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	115.8	M	304	16.3	92
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	278	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−33.6	115.6	M	316	16.6	36
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	310	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−33.5	150.2	F	332	12.2	903
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	306	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	312	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	317	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−33.4	151.5	M	300	17.7	0
<i>Tyto novaehollandiae novaehollandiae</i>	−33.3	151.2	M	318	16.5	285
<i>Tyto novaehollandiae novaehollandiae</i>	−33.3	151.5	M	300	17.8	0
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	330	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	332	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	349	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−33.3	151.4	F	339	17.4	25
<i>Tyto novaehollandiae novaehollandiae</i>	−33.3	151.4	M	305	17.4	25
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	M	322	—	—

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.1	115.9	F	342	16.9	46
<i>Tyto novaehollandiae novaehollandiae</i>	−33.0	151.5	M	295	17.5	53
<i>Tyto novaehollandiae novaehollandiae</i>	−33.0	151.6	F	324	17.7	0
<i>Tyto novaehollandiae novaehollandiae</i>	−32.8	151.7	M	301	17.7	0
<i>Tyto novaehollandiae novaehollandiae</i>	−32.8	151.6	F	322	17.6	55
<i>Tyto novaehollandiae novaehollandiae</i>	−32.7	152.0	M	296	17.8	0
<i>Tyto novaehollandiae novaehollandiae</i>	−32.7	151.8	M	311	17.7	28
<i>Tyto novaehollandiae novaehollandiae</i>	−32.7	151.9	F	335	17.7	14
<i>Tyto novaehollandiae novaehollandiae</i>	−32.7	152.0	F	341	17.8	0
<i>Tyto novaehollandiae novaehollandiae</i>	−32.6	117.6	M	312	16.6	279
<i>Tyto novaehollandiae novaehollandiae</i>	−32.6	115.9	F	352	17.8	18
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	—	315	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	152.2	M	293	17.8	3
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	152.2	M	315	17.8	3
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	152.2	F	329	17.8	3
<i>Tyto novaehollandiae novaehollandiae</i>	−32.1	152.3	M	305	18.1	33
<i>Tyto novaehollandiae novaehollandiae</i>	−32.0	117.1	F	340	17.0	257
<i>Tyto novaehollandiae novaehollandiae</i>	−32.0	115.9	F	327	18.6	18
<i>Tyto novaehollandiae novaehollandiae</i>	−31.9	115.8	M	307	18.7	3
<i>Tyto novaehollandiae novaehollandiae</i>	−31.9	116.0	F	352	18.4	8
<i>Tyto novaehollandiae novaehollandiae</i>	−31.8	115.9	M	314	18.5	48
<i>Tyto novaehollandiae novaehollandiae</i>	−31.6	115.7	F	348	18.6	30
<i>Tyto novaehollandiae novaehollandiae</i>	−31.5	147.2	M	322	18.8	169
<i>Tyto novaehollandiae novaehollandiae</i>	−30.7	152.9	F	336	18.7	12
<i>Tyto novaehollandiae novaehollandiae</i>	−30.5	151.7	F	356	13.3	1034
<i>Tyto novaehollandiae novaehollandiae</i>	−30.5	131.8	M	307	18.6	102

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−29.7	153.0	M	308	19.2	39
<i>Tyto novaehollandiae novaehollandiae</i>	−28.9	153.0	F	345	19.0	28
<i>Tyto novaehollandiae novaehollandiae</i>	−28.1	153.4	M	315	19.1	14
<i>Tyto novaehollandiae novaehollandiae</i>	−28.1	152.4	F	335	15.2	1098
<i>Tyto novaehollandiae novaehollandiae</i>	−27.6	153.0	F	330	20.1	32
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	M	316	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	M	322	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	—	330	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	F	335	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	F	345	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	363	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	M	313	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	F	326	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	F	338	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.5	153.0	F	322	20.2	38
<i>Tyto novaehollandiae novaehollandiae</i>	−27.4	153.1	M	293	20.7	2
<i>Tyto novaehollandiae novaehollandiae</i>	−27.4	152.9	F	320	19.2	94
<i>Tyto novaehollandiae novaehollandiae</i>	−27.0	153.0	F	330	20.4	21
<i>Tyto novaehollandiae novaehollandiae</i>	−27.0	153.0	M	310	20.4	21
<i>Tyto novaehollandiae novaehollandiae</i>	−27.0	153.0	M	311	20.4	21
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	325	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−27.0	153.0	F	322	20.4	21
<i>Tyto novaehollandiae novaehollandiae</i>	−26.9	153.0	M	302	20.0	33
<i>Tyto novaehollandiae novaehollandiae</i>	−26.9	153.0	F	322	20.0	33
<i>Tyto novaehollandiae novaehollandiae</i>	−26.6	120.2	M	307	21.9	514
<i>Tyto novaehollandiae novaehollandiae</i>	−25.9	113.5	F	346	22.0	12

Taxon	Latitude	Longitude	Sex	Wing length (mm)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−25.2	153.2	M	298	21.4	116
<i>Tyto novaehollandiae novaehollandiae</i>	−23.9	149.6	M	306	22.0	124
<i>Tyto novaehollandiae novaehollandiae</i>	−23.4	150.5	M	303	22.3	24
<i>Tyto novaehollandiae novaehollandiae</i>	—	—	F	342	—	—
<i>Tyto novaehollandiae novaehollandiae</i>	−21.1	149.2	M	312	22.6	0
<i>Tyto sororcula almae</i>	−3.0	129.6	F	252	—	—
<i>Tyto sororcula cayelii</i>	−3.7	126.4	M	248	—	—
<i>Tyto sororcula cayelii</i>	−3.4	127.1	F	256	—	—
<i>Tyto sororcula sororcula</i>	−8.0	131.3	F	242	—	—
<i>Tyto sororcula sororcula</i>	−7.1	131.8	F	225	—	—

Appendix 2

Acoustic and Associated Environmental Data

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.24	2.19	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.13	2.15	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.15	2.19	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.17	2.10	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.21	2.11	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.11	2.00	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.22	2.15	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.11	2.25	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.06	2.26	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.04	2.33	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.06	2.15	25.3	42
<i>Tyto novaehollandiae galei</i>	−12.8	143.3	1.13	2.20	25.3	42
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.54	2.05	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.53	2.16	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.48	2.03	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.21	2.10	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.44	2.07	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.26	2.16	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.26	2.14	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.54	1.99	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.43	2.05	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.44	2.04	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.48	2.04	26.0	31
<i>Tyto novaehollandiae kimberli</i>	−13.8	136.7	1.30	2.03	26.0	31

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.40	1.98	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.52	1.98	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.17	2.12	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.43	2.03	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.32	2.06	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.33	2.11	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.27	2.13	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.48	2.04	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.16	2.05	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.24	1.94	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.19	1.98	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	0.81	2.38	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.36	1.92	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.13	2.24	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.18	1.75	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.30	2.14	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.52	2.19	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.56	2.18	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.09	2.26	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.41	2.17	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.25	2.19	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.06	2.20	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.00	2.11	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.22	2.29	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.7	1.18	2.30	26.0	31
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.24	2.19	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.13	2.15	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.15	2.19	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.17	2.10	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.21	2.11	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.11	2.00	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.22	2.15	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.11	2.25	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.06	2.26	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.04	2.33	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.06	2.15	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.8	136.5	1.13	2.20	26.0	16
<i>Tyto novaehollandiae kimberli</i>	-13.9	136.4	1.16	2.08	26.1	17
<i>Tyto novaehollandiae kimberli</i>	-13.9	136.4	1.05	1.81	26.1	17
<i>Tyto novaehollandiae kimberli</i>	-13.9	136.4	1.21	2.05	26.1	17
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.30	1.90	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.36	1.91	26.6	242

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.43	1.96	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.38	1.93	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.38	1.93	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.37	1.72	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.41	1.95	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.11	2.03	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.16	2.09	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.50	1.61	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.45	1.66	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.50	1.95	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.66	1.94	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.43	1.81	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.40	2.03	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-15.8	125.0	1.43	1.95	26.6	242
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.30	2.17	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.04	2.28	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.41	1.97	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.64	2.36	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.34	1.91	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.42	1.78	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.41	1.89	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.24	1.76	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.36	1.80	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.39	1.84	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	0.96	2.25	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.15	2.19	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.23	1.93	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.32	1.84	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.33	1.96	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.4	125.1	1.08	2.27	26.9	210
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.35	2.31	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.01	2.11	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.52	2.31	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.14	2.15	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.36	2.06	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	0.94	1.95	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.50	2.16	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.22	2.07	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.31	2.00	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	0.93	2.00	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.51	2.08	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.52	2.13	27.7	74

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	0.82	2.11	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.53	2.16	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.50	2.28	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.12	2.08	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.48	2.00	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.36	1.99	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.41	2.04	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.18	2.09	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.00	2.16	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.39	2.02	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.61	2.17	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.51	2.33	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.31	2.08	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.58	2.14	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.40	2.05	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.38	2.05	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.10	1.99	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.20	2.23	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.55	2.35	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.06	2.15	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.14	2.13	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.56	2.19	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.11	2.01	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.18	2.05	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	0.88	1.96	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.50	2.27	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.44	2.00	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.15	1.95	27.7	74
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.19	1.98	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.22	1.93	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.22	2.05	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.28	1.85	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.32	1.89	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.26	1.96	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.28	2.00	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.31	1.86	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.25	1.93	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.33	1.87	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.32	1.97	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.33	1.83	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.32	1.90	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.25	1.89	27.7	111

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.30	1.94	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.22	1.86	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	0.97	1.80	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.09	2.04	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.22	1.98	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.31	1.84	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.30	1.84	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.17	1.92	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.24	1.92	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.12	1.88	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.17	1.98	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.26	1.99	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.21	2.01	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.03	1.87	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.6	123.7	1.25	1.80	27.7	111
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.17	2.11	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.19	1.82	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.06	1.99	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.24	1.95	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.31	1.82	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.51	1.89	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.48	1.89	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-16.8	145.5	1.22	2.01	21.6	432
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.02	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.11	2.07	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.16	1.96	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.22	2.06	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.95	1.90	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.95	1.75	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.25	1.91	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.20	1.83	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.21	1.88	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.15	1.88	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.36	1.97	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.80	2.05	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.04	1.94	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.06	1.96	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.77	1.99	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.05	1.97	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.99	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.12	1.93	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.13	1.79	21.4	573

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.06	2.01	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.20	1.91	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.01	1.96	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.12	2.14	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.06	2.02	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.24	2.04	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.45	1.95	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.23	1.94	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.84	1.91	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.18	1.68	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.91	1.90	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.44	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.34	1.98	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.04	1.98	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.27	2.12	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.43	1.91	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.21	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	0.89	2.02	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.12	2.02	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.16	1.95	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.29	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.13	2.08	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.25	2.10	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.29	1.98	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.40	2.04	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.33	1.97	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.32	2.03	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.24	2.05	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.36	2.07	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.32	2.00	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.39	2.02	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.45	2.09	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-17.1	145.5	1.43	2.02	21.4	573
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.44	1.69	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.59	1.64	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.31	2.03	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.57	1.82	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.59	1.98	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.44	1.99	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.59	2.02	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.60	2.02	20.1	751
<i>Tyto novaehollandiae kimberli</i>	-19.0	146.1	1.59	2.00	20.1	751

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.48	1.98	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.50	1.95	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.49	2.03	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.46	1.86	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.64	1.83	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.52	1.92	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.63	1.95	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.34	2.07	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.12	2.06	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.48	2.13	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.37	2.13	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.50	2.02	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.61	1.79	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.48	1.80	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.12	1.80	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.35	1.92	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.07	1.79	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.04	1.74	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.31	1.77	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.61	1.72	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.55	1.78	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.60	1.83	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.49	1.67	20.1	751
<i>Tyto novaehollandiae kimberli</i>	−19.0	146.1	1.02	1.82	20.1	751
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.25	2.03	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.38	1.96	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.29	1.94	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.26	1.79	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.14	1.92	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.56	2.01	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.38	1.87	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.67	1.84	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.66	1.84	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.74	1.80	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.78	1.79	18.9	57

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.41	2.27	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.77	2.22	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.32	2.20	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.29	2.26	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.64	2.16	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.50	2.10	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.52	2.06	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.75	2.19	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.65	2.15	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.61	2.11	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.79	2.12	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.59	2.15	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.52	2.18	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.21	2.27	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.44	2.30	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.55	2.16	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.45	2.16	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.47	1.75	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.25	1.85	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.35	1.77	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.19	1.84	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.13	1.94	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.25	1.78	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.38	1.76	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.38	1.79	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	-29.2	153.4	1.30	1.74	18.9	57

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.22	1.98	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.24	1.93	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.20	1.90	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.44	1.72	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.41	1.72	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−29.2	153.4	1.36	1.78	18.9	57
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.33	2.06	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.28	1.96	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.27	1.98	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.26	1.95	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.34	1.92	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.53	1.87	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.53	1.93	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.43	1.90	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.52	1.93	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.51	1.98	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.51	1.89	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.43	1.90	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.37	1.91	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.69	1.97	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.53	1.98	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.32	2.00	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.40	2.14	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.39	1.95	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.37	2.00	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.50	1.91	16.9	242

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.36	1.93	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.17	2.14	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−32.4	116.1	1.34	2.18	16.9	242
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.76	1.77	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.23	2.10	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.50	1.92	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.70	1.79	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.53	1.77	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.76	1.72	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.77	1.77	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.57	1.92	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.19	2.20	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.32	1.93	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.44	1.96	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.38	1.97	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.40	1.83	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.23	2.05	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.54	1.75	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.72	1.72	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.63	1.74	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.14	2.20	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.30	2.16	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.53	1.78	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.15	2.04	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.28	1.87	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.04	2.16	16.6	70

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.06	2.18	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.63	1.65	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.29	2.17	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.12	2.12	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.19	1.72	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.08	2.10	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.35	2.03	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.40	2.06	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.29	1.97	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.44	2.02	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.75	1.76	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.24	2.20	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.62	1.82	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.49	2.00	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.14	2.09	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.07	1.98	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.01	1.82	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.64	1.71	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.71	1.70	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.0	1.49	1.84	16.6	70
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.37	1.88	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.41	2.17	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.57	1.78	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.29	1.73	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.61	1.69	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.64	1.76	16.5	33

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.73	1.74	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.38	1.94	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.58	1.84	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	0.96	1.56	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.34	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.29	1.73	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.10	1.66	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.52	1.75	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	0.99	1.81	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.42	1.88	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.48	1.95	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.59	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	0.95	1.59	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	0.71	1.64	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.14	1.62	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.14	1.76	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.35	1.83	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.45	1.84	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.48	1.76	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.19	1.81	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.45	1.98	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.29	1.86	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.08	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.38	1.63	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.41	1.77	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.34	1.88	16.5	33

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.48	1.90	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.75	1.71	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.66	1.68	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.18	1.88	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.31	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.45	1.67	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.50	1.75	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.21	1.85	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.61	1.61	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	0.84	1.65	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.39	1.74	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.83	1.75	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.34	1.95	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.37	1.96	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.25	1.81	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.45	1.75	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.15	1.74	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.48	1.79	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.79	1.77	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.30	1.97	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.41	1.78	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.21	1.78	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.34	1.93	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.75	1.76	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.16	1.71	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.74	1.77	16.5	33

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.72	1.76	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.50	1.83	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.39	1.90	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.20	1.84	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.21	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.47	2.07	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.60	1.74	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.26	1.72	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.37	2.03	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.39	2.03	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.28	1.85	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.61	1.80	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.68	1.74	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.7	115.2	1.00	1.71	16.5	33
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.51	1.92	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.80	1.90	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.34	1.73	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.59	2.15	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.79	2.00	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.53	2.01	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.68	1.98	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.74	1.99	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.71	2.02	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.60	2.03	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.78	2.05	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.84	2.04	16.6	90

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.54	2.03	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.47	2.09	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.56	1.98	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.17	1.72	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.51	2.07	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.44	1.93	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.75	1.97	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.65	1.94	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.73	1.95	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.59	2.08	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.61	2.09	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.68	2.12	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.32	1.86	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.70	1.96	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.75	1.92	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.57	2.05	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.80	2.03	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.66	1.99	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.70	2.05	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.36	1.89	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.70	1.96	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.75	2.11	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.66	1.96	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.70	1.89	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.38	1.89	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.34	1.89	16.6	90

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.50	1.81	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.59	2.02	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.73	1.95	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.83	2.02	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.47	1.93	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.46	1.94	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.55	2.02	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.29	1.97	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.51	1.94	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.63	1.96	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.74	1.94	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.65	2.02	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.63	1.95	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.60	1.92	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.25	1.84	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.71	1.91	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	0.81	1.83	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.07	1.77	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.53	1.91	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.72	1.93	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.72	2.04	16.6	90
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.59	1.99	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.74	1.99	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.66	1.71	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.90	1.65	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.54	1.99	16.6	58

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.61	1.95	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.69	1.93	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.75	1.72	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.81	1.70	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.66	1.93	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.82	1.70	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.74	1.94	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.72	1.88	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.0	1.45	1.92	16.6	58
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.49	1.89	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.67	1.95	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.44	2.07	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.63	2.18	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.33	2.12	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.42	2.03	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.51	1.97	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.31	1.79	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.57	2.03	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.22	1.78	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.57	1.67	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.52	2.03	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.46	2.04	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.80	1.88	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.79	1.92	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.72	1.93	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.44	1.88	16.6	80

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−33.9	115.1	1.67	1.99	16.6	80
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.18	1.77	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.35	1.57	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.87	1.73	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.87	1.80	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.20	1.66	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.02	1.89	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.15	1.81	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.95	1.88	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.27	1.87	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.17	1.86	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.98	1.92	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.73	1.82	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.12	1.84	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.01	1.83	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.41	1.70	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.20	1.91	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.09	1.89	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.16	1.83	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.19	1.79	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.16	1.72	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.32	1.74	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.09	1.78	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.42	1.63	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.88	1.69	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.35	1.67	16.6	60

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.40	1.73	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.23	1.89	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.07	1.92	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.34	1.87	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.13	1.71	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.36	1.59	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.26	1.69	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.16	1.75	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.29	1.69	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.98	1.85	16.6	60
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.40	2.01	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.78	2.17	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.74	1.78	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.63	1.71	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.63	1.80	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.23	2.00	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.42	2.01	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.26	1.94	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.79	2.10	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.74	2.09	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.77	2.14	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.57	2.16	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.45	1.77	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.32	2.03	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.09	1.80	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	0.90	1.77	16.6	72

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.01	1.81	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.44	1.94	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.08	1.96	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.09	2.08	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.0	1.10	2.15	16.6	72
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.32	2.19	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.43	2.25	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	0.84	2.13	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.38	2.04	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.56	1.99	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.54	1.99	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.61	2.02	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.52	2.01	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.45	2.12	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.55	2.01	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.29	2.09	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.40	2.01	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.47	2.10	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.56	1.99	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	0.73	2.00	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.45	1.97	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.49	2.01	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.51	2.00	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.56	2.00	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.29	2.26	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.51	1.98	16.6	71

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.59	2.02	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.51	2.00	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.52	2.11	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.58	2.08	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.58	2.08	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.56	2.11	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.52	2.17	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.54	2.08	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.46	2.09	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.52	2.23	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.49	2.05	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.32	2.28	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.44	2.30	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.28	2.20	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.33	2.04	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.46	2.02	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−34.0	115.1	1.50	2.01	16.6	71
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.45	2.05	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.11	2.07	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.46	2.02	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.34	1.91	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.36	2.08	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.52	1.91	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.14	2.08	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.42	2.07	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.34	2.06	15.8	99

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.07	1.86	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.15	1.86	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.01	1.89	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.41	2.01	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.16	1.88	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.46	1.92	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.19	1.90	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.14	1.98	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.21	2.07	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.30	2.15	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.34	2.10	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.00	1.78	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.19	2.25	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.86	2.04	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.28	2.10	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.21	2.15	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.6	150.2	1.29	2.07	15.8	99
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.66	1.83	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.69	1.84	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.55	1.75	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.71	1.83	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.68	1.90	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−35.7	150.0	1.59	1.88	15.6	95
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.10	2.11	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.31	2.11	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.37	1.89	15.6	32

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.18	2.09	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.17	2.10	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.17	2.06	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.07	2.01	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.11	2.08	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.39	1.98	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.17	2.04	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.35	1.92	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.20	1.94	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.27	1.97	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.21	1.94	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.47	1.98	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.43	1.93	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.25	1.86	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.21	1.78	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.39	1.88	15.6	32
<i>Tyto novaehollandiae novaehollandiae</i>	−36.4	150.1	1.29	1.94	15.6	32
<i>Tyto novaehollandiae castanops</i>	−41.1	144.8	1.43	1.96	12.3	77
<i>Tyto novaehollandiae castanops</i>	−41.1	145.5	1.33	1.86	10.8	328
<i>Tyto novaehollandiae castanops</i>	−41.1	145.5	1.38	1.89	10.8	328
<i>Tyto novaehollandiae castanops</i>	−41.1	145.5	1.45	1.79	10.8	328
<i>Tyto novaehollandiae castanops</i>	−41.4	147.4	1.40	1.71	9.4	568
<i>Tyto novaehollandiae castanops</i>	−41.7	145.4	1.26	1.99	9.9	246
<i>Tyto novaehollandiae castanops</i>	−41.7	145.4	1.22	1.97	9.9	246
<i>Tyto novaehollandiae castanops</i>	−41.9	147.9	1.25	1.82	10.2	398
<i>Tyto novaehollandiae castanops</i>	−41.9	147.9	1.27	1.79	10.2	398
<i>Tyto novaehollandiae castanops</i>	−41.9	147.9	1.19	1.82	10.2	398
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.66	1.74	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.60	1.76	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.59	1.72	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.51	1.85	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.59	1.81	9.2	607

Taxon	Latitude	Longitude	Call duration (s)	Call mean dominant frequency (kHz)	Temperature (°C)	Elevation (masl)
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.53	1.79	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.1	147.8	1.53	1.86	9.2	607
<i>Tyto novaehollandiae castanops</i>	−42.6	146.7	1.44	1.91	8.7	363
<i>Tyto novaehollandiae castanops</i>	−42.6	146.7	1.22	1.85	8.7	363
<i>Tyto novaehollandiae castanops</i>	−42.6	146.7	1.11	1.74	8.7	363
<i>Tyto novaehollandiae castanops</i>	−42.6	146.7	1.25	1.93	8.7	363
<i>Tyto novaehollandiae castanops</i>	−42.6	146.7	1.15	1.89	8.7	363
<i>Tyto novaehollandiae castanops</i>	−42.6	146.4	1.49	1.87	8.8	452
<i>Tyto novaehollandiae castanops</i>	−42.8	146.3	1.32	1.97	8.5	548