

Presentation to Fingerboards Mineral Sands Project Inquiry and Advisory Committee.

Presentation time 20 May 2021, 13:15 to 13:25

Reference submission 167

Presenter Brendan Casey

Dear Advisory Committee, thank you for the opportunity to present to you. My presentation is framed by the context of my submission, number 167.

I am Brendan Casey and I am a Volunteer. I am not aligned with any group nor have I received any financial support, either as payments for the work I have done, expenses I have incurred or for acoustic research equipment that was and is being used.

On 08 December 2020 I submitted my research thesis for examination. My research was titled "Bioacoustic Monitoring of Frogs". The research was designed to investigate the efficacy of passive, automated acoustic monitoring as a method to determine the occupancy status of rare and cryptic frog species. One species I identified as a potential candidate for a species-specific monitoring program was the Giant Burrowing Frog *Heleioporus australiacus*. My experiment targeting the monitoring of *H. australiacus* used a stream transect of acoustic recorders operating on a pre-programmed recording schedule. The acoustic monitoring program commenced on August 2018 and ceased on May 2020. The monitoring sites were within the area around the south-east section on the Mitchell River National Park, approximately 8km distant (in a straight line) from the closest boundary of the proposed Fingerboards mineral sand mining area. After twenty months of monitoring across four sites and following 11 700 acoustic sampling events the call of *H. australiacus* was recorded from one location within three sound files. The calls were heard during the second week of May 2020. The call habitat was a degraded, ephemeral stream pond within cleared, grazing country.

Please refer to the Atlas of Living Australia occurrence record 'e0cfbdbe-2891-44ce-966a-bfd06fc560d5' for the details of this observation.

Having developed an interest in the ecology of *H. australiacus* in the area around my research, I reviewed the Environmental Effects Statement (EES) for the Fingerboards mineral sand mine proposal. I was interested in the method used to determine the occupancy status of this listed threatened species. Unfortunately, it appeared to me that almost no effort was made to investigate the occupancy of *H. australiacus* within the proposed mining area. Why a matter of national environmental significance (as defined by the EPBC Act) was not treated seriously by the proponent is a mystery to me. None of the listed threatened species identified in the EES were subject to any representative survey to determine their occupancy within the proposed area. The misleading account of threatened species as described within the EES is difficult to understand considering the biodiversity crisis this country is currently undergoing. Therefore, being in a position to address the lack of effort made by the proponent I was compelled to use my recently developed species-specific acoustic monitoring method to investigate the occupancy status of *H. australiacus* within the area proposed for the Fingerboards mine.

During early October 2020 and with the cooperation of landholders within the proposed mining area, two acoustic recorders were deployed to attempt to independently verify the occupancy status of *H. australiacus*. The first site was a farm dam situated along an ephemeral drainage line within cattle grazing country and adjacent to an undisturbed creek gully. The second site was a perched, spring-fed dam in an area currently being revegetated. During late January 2021 three more acoustic recorders were deployed. The third site was a relatively large farm dam within cropping and grazing country, the fourth site a spring-fed dam on country currently being revegetated and the fifth site a creek gully that held a series of semi-permanent pools surrounded by native, riparian vegetation. On 09 May 2021 a sixth recorder was deployed in close proximity to the first recorder deployed. The sixth recorder was carefully positioned to reduce any chance of 'signal interference caused by acoustic baffling', by using a cabled, external microphone suspended above the adjacent pool and well clear of the surrounding vegetation. All the monitoring sites were on private land and located close to the geographic centre of the proposed mine area. The recorders were programmed to record for

30-minutes at scheduled intervals. The monitoring program is ongoing, subject to the availability of the resources required to perform this type of complex *in-situ* frog monitoring.

The data cards within each recorder were periodically retrieved and the 30-minute acoustic data files created by each recording device were scanned for the target signal (the call notes of *H. australiacus*) using the latest version of two acoustic analysis software packages. The scanning for the target signals were based on filters designed during my research program.

The call of *H. australiacus* was detected within a single recording from one site, the date of recording being early April 2021, with the call group recorded between 03:15 and 03:27am. A total of 58 calls were measured using RavenPro acoustic analysis software, with the calls and call note characteristics being within the expected range for *H. australiacus*. For example, call notes were of the expected period (s) for the species, as were the inter-note silent intervals. The number of notes per call were consistent for the expected range for the species and the occurrence of a recorded call event was similar to that observed during the research period at the nearby site. The main variation of the expected call characteristics was for the note peak frequency, which was 100 to 150Hz higher in pitch than the expected range. The higher-than-expected peak frequency of the call notes may be explained as a response to acoustic interference from the sound of rain (it was raining during the call event). Frogs are known to demonstrate plasticity in individual call harmonics as a response to acoustic interference and peak frequency can shift to a higher pitch, as opposed to calling 'louder' in response to 'noise'.

To verify the species emitting the calls considered by me to be *H. australiacus*, samples of the calls were sent to the research scientist who has published the most peer-reviewed articles about the ecology of *H. australiacus*. The response was to recommend immediate sampling for the larvae of *H. australiacus* from the habitat at the monitoring site. The calls were also referred to the research scientist who observed *H. australiacus* from the adjacent Mitchell River NP and Mt. Alfred SF, and the response was if the calls were not from *H. australiacus*, that what species is it? Two Herpetologists with experience performing field work to detect rare and cryptic frog species were sent samples of the call and both responded with a similar comment, if the caller is not *Heleioporus sp.*, then what is it? A fifth authority was consulted

and they considered the caller was likely not a frog species, although they were unable to identify a species with a call even similar to the recorded calls. The call samples were also forwarded to experienced Ecologists and so far no species has been identified with a call vaguely similar to the calls in question. I have no doubt the call event I am investigating was made by *H. australiacus*, with the higher-than-expected peak frequency potentially explained as an environmental response to acoustic interference (the sound of rain falling).

Two other monitoring sites on the private land within the proposed mine area were found to contain calls that may have been emitted by *H. australiacus*, however I do not have the resources to further investigate this. Being considerate of the limited resources available to me (as a volunteer operating without support, except that being offered by the local landholders), I have focused my research and monitoring at one site, with the external, cabled microphone deployed to record potential target signals with reduced acoustic interference.

I recommend the Panel immediately suspend all works within the proposed mine area until the occurrence status of *H. australiacus* can be confirmed by independent experts. A minimum of two complete years of intensive and targeted acoustic monitoring will be required to collect enough data that may be considered as representative of the species known ecology. My acoustic monitoring program in the Fingerboards area is continuing (at the time of the Panel hearings) and will be for as long as possible.

I trust the Panel appreciates the effort made by me to independently verify the occurrence of an exceedingly rare and cryptic frog species within the proposed mine area. The timing of my Panel presentation does not align with the time required to fully prepare all the information I would have liked to present, however this is often the case when trying to collect time-sensitive data from animals that spend most of their existence hidden from human observations. Thank you for listening.

Your sincerely,

Brendan Casey

20 May 2021