NRM SOUTH
NATURAL RESOURCE MANAGEMENT

Tasmanian Frog and Chytrid monitoring 2014:

Executive summary

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I. Executive summary

This summary is part of a larger report which outlines the methods, results and discussion focused on the research carried out in the Frog and Chytrid monitoring season in 2014:

- Chytrid fungus (*Batrachochytrium dendrobatidis* [Bd]) was first described in 1998 and is associated with frog population declines as well as frog population extinctions in Australia, Africa, Central, South, and North America. Anthropogenic processes have played a large role in the worldwide spread of Bd (Skerratt, Berger et al. 2007, Collins 2010), and the impact of chytridiomycosis on frogs is considered by some to be the most spectacular loss of vertebrate biodiversity due to disease in recorded history (Skerratt, Berger et al. 2007).
- In 2004 Bd was first detected in Tasmania (Obendorf and Dalton 2006), and is widespread across the state with the exception of the Tasmanian Wilderness World Heritage Area (TWWHA), where Bd has only recently begun to invade (Philips, Wilson et al. 2010, Cashins, Philips et al. 2013). Presently, the TWWHA makes up greater than 75% of the distribution of the endemic Tasmanian tree frog (*Litoria burrowsae*: Driessen and Mallick 2003). *L. burrowsae* has high susceptibility to Bd infection in laboratory trials (Voyles, Phillips et al. 2014), and climatic conditions are thought to be particularly favourable for Bd in the TWWHA (Murray, Rosauer et al. 2010).
- We report the results from three actions/components proposed in the Tasmanian Chytrid Management Plan (Philips et al. 2010): (i) a capture-mark-recapture study at two ponds, (ii) a remote sound recordings analysis across 36 ponds taken in 2013, and (iii) 2014 chytrid testing at Hartz Mountains and Birchs Inlet. We also review these actions and provide recommendations for ongoing implementation.
- A capture-mark-recapture study was used to determine survival and population growth in the Tasmanian tree frog (*Litoria burrowsae*) at two ponds, one at Lune River (chytrid positive from 2013) and the other at Melaleuca (chytrid negative). At both ponds, annual survival of males was very low, and was combined with a high degree of variation in frog abundance both within years (at Lune River) as well as across years (at both Lune River and Melaleuca). Survival analysis further indicated that frog movement (recruitment, immigration) is probably an important component of frog population dynamics at these sites; further study of frog movements across Tasmanian landscapes is needed to confirm these findings.
- Population growth from 2012 to 2013 was negative at Lune River, and then positive from 2013 to 2014 despite a change of status from chytrid negative to chytrid positive in 2013. At the chytrid-free site (Melaleuca), population was positive from 2012–13, then strongly negative from 2013–14. Frog population dynamics are often characterised as having a large degree of natural variation in abundance, and further longitudinal capture-mark-recapture study in additional future years would be needed to untangle any differences between chytrid impact on population growth and survival and naturally occurring population variation. Capture-mark-recapture studies could provide some of the strongest demonstrations of chytrid impacts on frogs in the TWWHA, but are also labour-intensive/costly.
- Remote sound recording units deployed in 2013 were used to assess frog population activity in 36 ponds across Tasmania's southwest. Brown tree frog *(Litoria ewingi*) were observed in every pond sampled, but call activity was much lower and variable for common froglet

(*Crinia signifera*), Tasmanian froglet (*Crinia tasmaniensis*), and Tasmanian tree frog. Seventeen ponds had no or very little Tasmanian tree frog calling activity, 18 ponds had no or very little common froglet calling activity, and 18 ponds had no or very little Tasmanian froglet call activity.

- Other sound data currently exist (2011 & 2012), and we present data on maximum call activities documented from previous years along with 2013 data in map form. For 2014, recordings exist but have yet to be coded. Preparing these other three years of acoustic data would allow for estimation of trends of call indices at ponds with and without chytrid.
- Further sound recordings should be taken in 2015, and sound analysis of previously collected data should be immediately performed. With the addition of the three available years of sound recordings, trends in call activity at ponds with chytrid versus those without may be discovered. Remote sound recordings appear to be the most cost-effective monitoring tool currently available.
- At Hartz Mountains chytrid was detected adjacent to the track past the bootwash station. Further incursion of chytrid at Birchs Inlet was observed as well. In both cases, understanding how to improve use of already existing bootwash stations, restricting public access to sensitive areas, and/or public education is recommended.
- Prevention, rather than managing the disease, is without a doubt the most powerful management tool currently available. Bootwash stations combined with an effective education program currently represent the best management tools available that can be used to prevent further chytrid movement into the TWWHA. Any actions that can be taken to deploy and manage more bootwash stations, along with actions designed to improve their use and associated education program, are likely the most powerful actions that could be taken to prevent the incursion of chytrid into the TWWHA.

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