

Ensuring successful habitat creation despite ecological experimental design constraints

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Abstract: With habitat loss and climate change the greatest threats for endangered species, the restoration or creation of compensatory habitat will be increasingly used for conservation. Achieving successful outcomes requires understanding, prior to implementation, habitat suitability and whether the target species will utilize and survive in the created habitat. Conducting statistically robust surveys and experimental field designs is crucial, with continuous monitoring essential in identifying potential issues. However, due to resource and time limitations, as well as logistical constraints, conducting quality ecological experimental designs is a complex endeavour. This study provides an example of how these complexities can be dealt with through using individual trial sites, long-term monitoring and statistical methodology that account for lack of replication. We used the endangered green and golden bell frog which has been the subject of the largest number of management plans of any amphibian in Australia. However, nearly all have failed to produce a self-sustaining population. A captive breeding and habitat creation project was implemented to improve their persistence and support a sustainable population in the landscape. This study aimed to identify whether past lack of success was due to the inability of created habitats to meet resource requirements or because of other ecological processes. A trial plot consisting of four permanent and six ephemeral waterbodies was constructed, with habitat suitability uncoupled from habitat selection by surrounding half of the site in a frog-proof fence to prevent dispersal and biotic interactions such as predation, competition, and disease. Monitoring of the site occurred on a weekly basis for three years and included visual encounter, auditory, dip-netting, and mark-recapture surveys, along with water and weather measurements. The results of the past three years will be presented along with implications of the common limitations on ecological experimental designs.