

Project No.: 100008 - 4

Distribution and population sampling of one of Australia's most endangered freshwater crayfish species, the Fitzroy Falls Spiny Crayfish (*Euastacus dharawalus*)

Research Brief

Background

The Australian Crayfish Project has been finding and identifying freshwater crayfish species from across Australia. As part of this project sampling of freshwater crayfish was conducted around the Fitzroy Falls region of NSW. Within this aquatic ecosystem a rare and unique species of freshwater crayfish occurs. This species, *Euastacus dharawalus* is only found in this aquatic system above Fitzroy Falls. The Falls are at the northern end of Morton National Park and are formed where Yarrunga Creek pours 80 m over the escarpment. These Falls have acted as a barrier to the more aggressive and dominant crayfish species that live below the falls (e.g. *E. spinifer*) and *E. dharawalus* survives as a remnant population restricted only to the small, highland section of stream above the falls.

Unfortunately, an exotic species of crayfish (*Cherax destructor*) has become established at the site (Coughran et al. 2009). This species is a predatory, aggressive, highly fecund and fast growing species, biological traits that equip it to rapidly spread throughout this aquatic system. This species poses an imminent and growing threat to the survival of *E. dharawalus*, a much slower growing species with a comparatively poor reproductive biology. The problem may be compounded by the introduction of other recreational fishing species (i.e. Trout, Australian Bass and Carp) plus the growing recreational fishing effort for crayfish centered around the reservoir.

Due to these and other factors, a recent assessment identified *E. dharawalus* as satisfying IUCN criteria for listing as Critically Endangered (Coughran and Furse 2010, Furse and Coughran 2010a,b,c). *Euastacus dharawalus* is considered one of Australia's most threatened crayfish species. Urgent research is required into the life history of the species, population assessment and monitoring of both the imperilled Fitzroy Falls Spiny Crayfish and the introduced competitor, *Cherax destructor*.

This current project aims to gather such biological information, and builds on the information gathered in the three previous surveys conducted by AABio staff.

Method

The research project will involve an intensive survey of the whole aquatic system above Fitzroy Falls, to ascertain the current distribution and relative abundances of all species. This will require an intensive capture program across the entire water body and tributaries, over a 2 day period. We know from previous research by the Australian Crayfish Project (ACP) that this species is carnivorous and readily attracted to fish baits. The capture program would be conducted with baited traps that will easily and effectively capture both crayfish species. Crayfish will be captured, weighed, measured, and tallied. Native crayfish will be marked by clipping a uropod (Coughran 2006) and released back into the system, and exotic crayfish will

be removed from the system and humanely euthanized. The survey will be conducted at approximately 10 locations around the circumference of the reservoir, as well as several sites in Yarrunga and Wildes Meadow Creeks and other minor drainage gullies.

Transects of 3 traps placed 10 metres apart will be set at 10 locations along the shore of the reservoir, and three transects of 10 traps will be set below the reservoir in Yarrunga Creek. These are baited opera house traps, they will be laid in the morning and checked every 2 hours. Traps will be emptied and reset. They will be checked throughout the day and left out overnight and checked again in the morning. Duration of the project is 2 days and 1 night.

The broad sampling will provide a rudimentary picture of approximately where *Euastacus dharawalus* and *Cherax destructor* occur within the system, and an estimate of overall population densities.

Deliverables

The results of this research project will deliver:

- Preliminary distribution maps of the crayfish species within the aquatic system.
- Preliminary estimates of population size and relative abundances of *E. dharawalus* and *C. destructor* within the aquatic system.
- Biological and ecological information on aspects such as wounds and disease, ectosymbionts, reproductive biology and life history, habitat requirements, etc. The information ascertained on the biology and ecology of *Euastacus dharawalus* would be used to protect and conserve the species into the future.
- Creation of a database to manage the information gathered.
- Increase in the knowledge base on the species and its habitat and improved understanding of its requirements for survival.

The result of this project will be the completion of a scientific paper, planned for the Journal of Crustacean Biology's 'Conservation of Imperilled Crayfish' series (McCormack et al. in press), and tentatively titled:

Conservation of Imperilled Crayfish: The Fitzroy Falls Crayfish, *Euastacus dharawalus* Morgan 1997.

Robert B. McCormack^A & Jason Coughran^B,

^A Australian Crayfish Project, c/- Australian Aquatic Biological Pty Ltd, P.O. Box 3, Karuah, NSW, Australia, 2324 info@aabio.com.au

^B Environmental Futures Centre, Griffith School of Environment, Gold Coast Campus, Griffith University, Queensland, Australia, 4222. j.coughran@griffith.edu.au

Three surveys have been completed to date and those research results together with the new information gathered in this latest proposed project will be presented in this paper.

Research Team

Australian Aquatic Biological P/L (AABio) manages the Australian Crayfish Project. This project conducts aquatic research on all Australian freshwater crayfish species, locating and identifying species of freshwater crayfish across Australia. Research over the last 3 years

discovering new species, new distributions and anomalies has led to the establishment of this current project on *E. dharawalus*. Two of the research team members will co-ordinate this project:

- Robert B McCormack – Research Director, AABio. 25 years as Aquaculturalist and teacher. Author, his 7th book “The Freshwater Crayfish of NSW Australia” ISBN 978-0-9805144-1-4. President of the NSW Aquaculture Association. Serves on various statutory advisory committees. Research Associate, Carnegie Museum.
- Dr Jason Coughran - Adjunct Fellow, Griffith University. BAppSc(Hons) in Fisheries and Aquaculture Management, PhD in freshwater crayfish biology, ecology and taxonomy. Jason has over 10 years' research experience in freshwater biology, and has authored more than 20 peer-reviewed papers on the biology, ecology and taxonomy of Australian freshwater crayfish. He is currently engaged in a range of research projects as the Chief Ecologist and Taxonomist with the Australian Crayfish Project.

Australian Aquatic Biological P/L (AABio) currently has the permits from NSW DPI Fisheries & NSW Department of Environment and Climate Change to conduct research and will work closely with both towards the fruition of the project and to ensure that all permits required for this project are current.

For Further Information

Contact:

Robert B McCormack

Research Director

Australian Aquatic Biological Pty Limited

Phone/Fax: 02 49975160

Email: info@aabio.com.au

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