Forest & Wood Products Australia

Project Flyer

DEVELOPING A METHOD TO SURVEY FOR GIANT FRESHWATER CRAYFISH using eDNA

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VNC457-1718
Sub-Report 3

DNA DETECTION FOR SPECIES PROTECTION

This tool was developed under sub-project 4 of the Forest & Wood Products Australia supported research project *Demonstrating Stewardship of the Environment and Ecologically Sustainable Forestry: Monitoring the Effectiveness of the Tasmanian Forest Practices Code for Biodiversity*, facilitated by the Forest Practices Authority.

THE SPECIES

The Giant Freshwater Crayfish or lutaralipina (*Astacopsis gouldi*) is the world's largest freshwater invertebrate.

Giant Freshwater Crayfish:

- can weigh up to 6kg and can live for up to 60 years.
- are endemic to Tasmania and their natural range is restricted to waterways in the north of the state.
- are typically found in well shaded streams that contain decaying logs and undercut banks.
- is a threatened species. The species is listed as vulnerable on both a state (*Threatened Species Protection Act 1995*) and federal level (*Environment Protection and Biodiversity Conservation Act 1999*).

Threats to the species include habitat loss, disturbance and/or sedimentation of waterways, illegal fishing and climate change.

THE PROBLEM

Protecting Giant Freshwater Crayfish requires reliable monitoring of populations to inform management decisions.

Due to their cryptic nature, detecting the Giant Freshwater Crayfish is time consuming and difficult.

To solve this problem a rapid, sensitive and cost-effective method needed to be developed to enable detection of Giant Freshwater Crayfish from water samples to allow for efficient monitoring and timely management interventions.

DNA DETECTION FOR SPECIES PROTECTION

THE SOLUTION

Environmental DNA (eDNA) is when samples of water, sediment, ice or air are collected from the environment and analysed for genetic material (DNA). eDNA is used to detect the presence or absence of species. eDNA monitoring is sensitive, non-invasive and cost efficient, and has been shown to be effective for crustacean surveillance, even at low densities.

Tissue samples from Giant Freshwater Crayfish were used to design a genetic assay specific to the species, which was tested for efficacy in a laboratory setting, followed by successful testing in freshwater streams in Tasmania where the Giant Freshwater Crayfish is known to occur.

Using this genetic assay Giant Freshwater Crayfish eDNA was successfully detected in all sites where the presence of the species had been previously confirmed.

Therefore the solution developed was an eDNA detection process that is rapid, sensitive and cost-effective for determining the presence of Giant Freshwater Crayfish in streams and waterbodies.

THE APPLICATIONS

Population monitoring is essential to help inform management decisions relating to the recovery of this threatened species.

This new eDNA technique for determining the presence or absence of Giant Freshwater Crayfish can be used to develop a population monitoring program, undertake formal occupancy modelling and update management tools.

Although it is not a requirement to complete the eDNA assessments as part of the forest practices planning process the outcome of this project presents an alternative option in the management toolbox.

More information:
Trujillo-Gonzalez, A. *et al.* Environmental DNA detection of the giant freshwater crayfish (*Astacopsis gouldi*). *Environmental DNA* **3,** 950-958 (2021).

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