

Murray Crayfish - *Euastacus armatus*

February 2019, Primefact 1300, Second Edition
DPI Fisheries Threatened Species Unit

Introduction

The Murray Crayfish is an iconic freshwater crayfish that is endemic to the southern tributaries of the Murray-Darling Basin. It has the widest distribution of all the *Euastacus* crays, historically occurring in New South Wales, Victoria, South Australia and Victoria.

It is a true spiny crayfish with numerous large, sharp spines along its body. It is the second largest freshwater crayfish in the world, growing to over 2.5 kg in weight.

The NSW commercial harvest of Murray Crayfish ended in 1987. However, the species supports a popular recreational fishery in parts of the Murray and Murrumbidgee rivers.

The Murray Crayfish is listed as a vulnerable species in NSW. Heavy penalties apply for harming, possessing, buying or selling the species or for harming their habitat subject to the regulatory arrangements currently in place (see 'Fishing for Murray Crayfish in NSW' and 'Legal implications' sections below).



Figure 1: An adult Murray Crayfish, *Euastacus armatus* (Photo: D. Gilligan)

Description

The Murray Crayfish has a dark green to green-brown body and three rows of large white spines on each side of the tail. They are renowned for their bright white chelae (claws), which lighten in colour with age. Males generally have larger claws and females have broader abdomens.

Individuals can grow to more than 150 mm in carapace length; with the maximum documented size being 174 mm.

Like all crustaceans, Murray Crayfish grow sequentially through a series of moults. The frequency of moulting is size dependent, with juveniles moulting up to ten times in their first year, and only a single annual moult for individuals over 60 mm in carapace length.



Figure 2: A juvenile Murray Crayfish (Photo: V. Carracher)

Habitat and Ecology

Murray Crayfish can be found in a variety of habitats ranging from pasture-lands to sclerophyll forest. They prefer cool, flowing water that is well oxygenated.

The species is tolerant of water temperatures up to 27°C and moderate salinities, but are intolerant to low dissolved oxygen concentrations. They are most active between May to October when water temperatures are below 20°C and when the water warms in summer they tend to become less active.

They create burrows that vary in complexity, from deep burrows with multiple entrances to simple burrows under a rock or log.

The species is slow growing, with females taking up to 10 years to reach sexual maturity, and 4 years for males. They can live up to an estimated 28 years of age.

Murray Crayfish are opportunistic feeders, feeding mainly on decaying aquatic plant matter, dead fish and other animals. Cannibalism has also been reported within high-density populations.

Mating may be cued by a rapid decline in water temperature in May. Fecundity is size-dependent, with large mature females producing a maximum of 2,400 eggs.

Females incubate eggs under their abdomen for 20 weeks. Hatchlings remain in the mother's care for a further month before dispersing.



Figure 3: Murray Crayfish burrows exposed at low water (Photo: D. Gilligan)



Figure 4: A female Murray Crayfish carrying eggs on her abdomen (berried) (Photo: M. Antico)

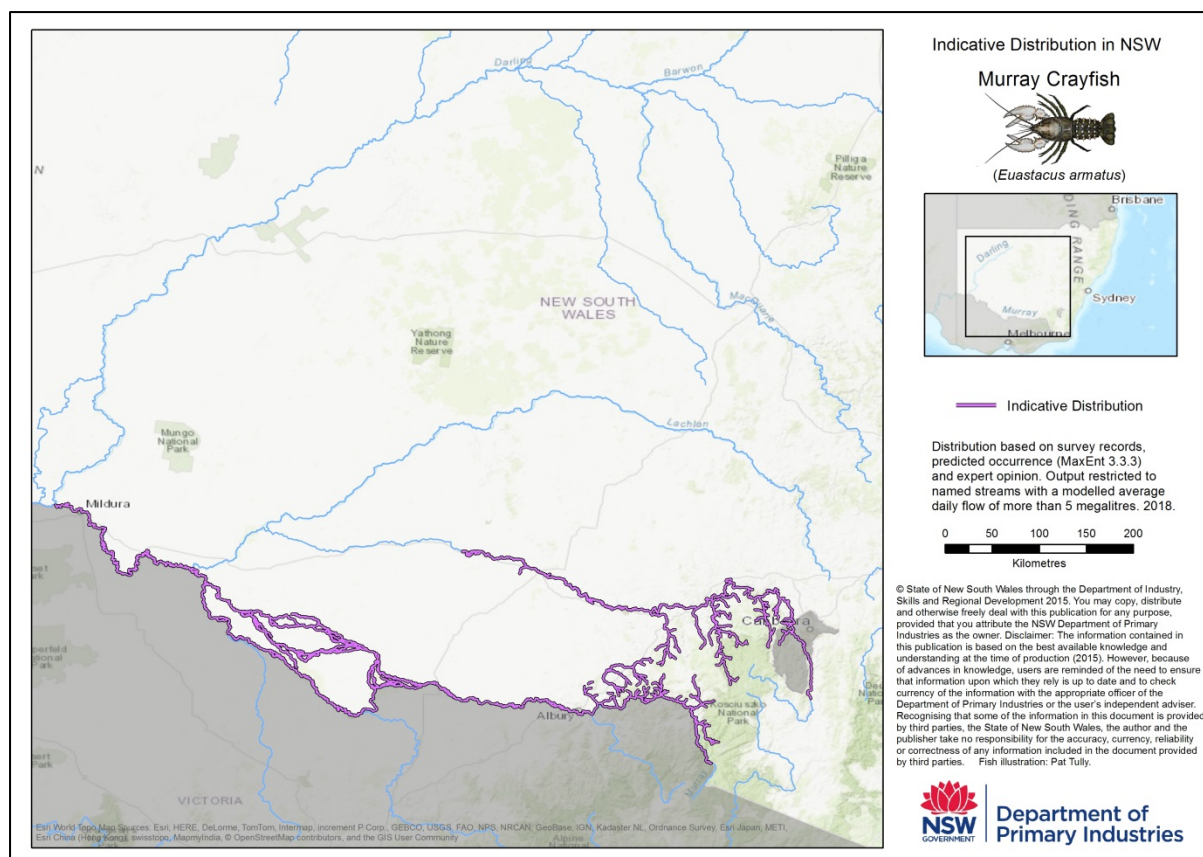


Figure 5: Indicative distribution of Murray Crayfish in NSW, based on survey records, predicted occurrence and expert opinion.

Why is the Murray Crayfish threatened?

A range of factors have contributed to the decline of Murray Crayfish in NSW. They include:

- Habitat modification from the construction of weirs have created extensive weir pools with altered bio-film composition and associated artificial lentic (still water) environments that are thought to be unsuitable for Murray Crayfish;
- Sedimentation that can fill deeper holes, smother snags and other cover, and bury clay banks required for burrowing;
- River regulation may result in reduced overall flows, alter water temperatures (thermal pollution), and may expose burrows and burrowing sites during reduced winter flows;
- Agricultural pesticides are thought to have been a significant factor in the historical decline of Murray Crayfish. Crayfish are sensitive to many commonly used pesticides and agrochemicals, and historical use of organochlorine pesticides such as DDT may have been particularly damaging;
- Historic commercial and current illegal fishing activities may have an impact on Murray Crayfish stocks although there is varying evidence as to the extent and significance of these impacts;

- Fishing can result in localised population depletion and biased sex ratios;
- Although fishing regulations prevent the taking of berried females, handling them could result in egg dislodgement;
- Juveniles and immature Murray Crayfish may be impacted by pest species from competition and predation;
- Murray Crayfish are generally intolerant of low dissolved oxygen concentrations such as those experienced in blackwater events after flooding, and extreme events have shown to severely deplete populations;
- Adult Murray Crayfish have very low dispersal abilities and occupy small home-ranges; exacerbating the effect of environmental or human impacts and limiting their ability to recolonise river reaches if populations are lost.



Figure 6: Snags are important habitat for Murray Crayfish (Photo: M. Antico)

Conservation and recovery actions

- Cooperative research partnerships have been developed to improve understanding of the biology, ecology and genetics of Murray Crayfish, and

the threatening processes affecting the species.

- Management partnerships are being developed to improve the management and mitigate the effect of threatening processes affecting the species.
- A translocation program is underway which involves the collection and movement of Murray Crayfish from an area where they are more abundant to an area where they have suffered severe declines. The ultimate goal is for the translocated Murray Crayfish to establish a self-sustaining population.
- Advisory materials are being regularly developed on the identification, conservation status and recreational fishing regulations that apply to Murray Crayfish.
- Regular compliance activities provide an active deterrent to illegal fishing activities and actions that damage the habitat of Murray Crayfish.
- Pest fish species impacts are being mitigated through management programs.
- Water quality is being improved through education on appropriate land management practices, conserving and restoring riparian vegetation and using effective erosion and sediment control measures.
- Any sightings of the species are encouraged to be reported to the DPI Threatened Species Sightings online form:
www.dpi.nsw.gov.au/fishing/species-protection/report-it

Fishing for Murray Crayfish in NSW

A Ministerial Order is in place authorising limited recreational fishing for Murray Crayfish in specified NSW waters subject to applicable regulatory controls. The controls have been developed to assist recovery of the species, while providing for limited recreational fishing within parts of the Murray and Murrumbidgee rivers. For full details, consult the [Fishing for Murray Crayfish in NSW](#) primefact.

The future for Murray Crayfish

During 2017/18, the Recreational Fishing (Freshwater) Trust Fund funded a recovery program that enabled the movement of over 400 Murray Crayfish from an area where they are more abundant to an area that had experienced significant population declines. Researchers have since detected some of those translocated individuals at the release site, signifying some promising results. However, Murray Crayfish are still listed as a vulnerable species in NSW, and recovery of the species relies on an ongoing concerted effort by government and the wider community.

Legal implications

It is illegal to catch and keep, buy, sell, possess or harm Murray Crayfish outside of the regulatory arrangements set out in the [Fishing for Murray Crayfish in NSW](#) primefact or without a specific permit, licence or other relevant approval. Significant penalties apply. For vulnerable species these penalties can include fines of

up to \$55,000 and up to one year in prison.

There can also be significant penalties for causing damage to the habitat of a threatened species without approval through such actions as dredging riverbeds, removing large woody debris and constructing barriers that block the free passage of fish.

The impact of developments or activities that require consent or approval (in accordance with the *Environmental Planning and Assessment Act 1979* and *Fisheries Management Act 1994*) must be assessed and considered by consent or determining authorities. Where such actions are likely to result in a significant impact on a threatened species or its habitat, a detailed species impact statement must be prepared.

Strategies that have been adopted for promoting the recovery of Murray Crayfish to a position of viability in nature are set out in a [Priorities Action Statement](#).



Figure 7: Murray Crayfish being released as part of a translocation program to help recover the species (Photo: M. Antico)

Biography and further reading

Fisheries Scientific Committee (2013) Final Determination: Murray Crayfish – *Euastacus armatus*.

Gilligan D., Rolls R., Merrick J., Lintermans M., Duncan P. and Kohen J. (2007) Scoping the knowledge requirements for Murray Crayfish (*Euastacus armatus*). NSW Department of Primary Industries – Fisheries Final Report Series No. 89. MDBC Project No. 05/1066.

McCarthy B., Zukowski S., Whiterod N., Vilizzi L., Beesley L. and King A. (2014) Hypoxic blackwater event severely impacts Murray crayfish (*Euastacus armatus*) populations in the Murray River, Australia. *Austral Ecology* doi:10.1111/aec.12109

McCormack R. (2012) A guide to Australia's spiny freshwater crayfish. CSIRO Publishing. Collingwood, Victoria.

NSW DPI (2013) Fishing for Murray Crayfish in NSW. Primefact 4 Edition 8.

Noble M.M., Fulton C.J. and Pittock J. (2018) Looking beyond fishing: Conservation of keystone freshwater species to support a diversity of socio-economic values. *Aquatic Conservation*, doi: 10.1002/aqc.2974

Todd C.R., Whiterod N., Raymond S.M.C., Zukowski S., Asmus M. and Todd M.J. (2018) Integrating fishing and conservation in a risk framework: A stochastic population model to guide the proactive management of a threatened freshwater crayfish. *Aquatic Conservation*, **28**(4): 954-968.

Whiterod N.S., Zukowski S., Asmus M., Gilligan D., and Miller A.D. (2017) Genetic

analyses reveal limited dispersal and recovery potential in the large freshwater crayfish *Euastacus armatus* from the southern Murray–Darling Basin. *Marine and Freshwater Research*, **68**: 213–225.

Zukowski, S., Watts, R., and Curtis, A. (2012) Linking biology to fishing regulations: Australia's Murray Crayfish (*Euastacus armatus*). *Ecological Management and Restoration*, **13**(2): 183-190.

Zukowski S., Whiterod N.S. and Watts R.J. (2013) Comparing Murray Crayfish (*Euastacus armatus*) population parameters between recreationally fished and non-fished areas. *Freshwater Crayfish*, **19**(2): 153-160.

For further information

See the NSW DPI website:

www.dpi.nsw.gov.au

Contact the NSW DPI Threatened Species Unit: PO Box 1305
CROWS NEST NSW 1585

Email:

fisheries.threatenedspecies@dpi.nsw.gov.au

© State of New South Wales through the Department of Industry, 2019. You may copy, distribute and otherwise freely deal with this publication for any purpose, provided that you attribute the NSW Department of Primary Industries as the owner.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (February 2019). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser. PUB13/74