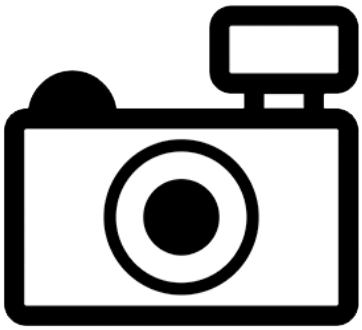
# Swamp Yabby (*Cherax rotundus*)

## Ecological Risk Screening Summary

**U.S. Fish and Wildlife Service, November 2011**
**Revised, September 2012 and April 2018**
**Web Version, 5/23/2018**



No Photo Available

# 1 Native Range and Status in the United States

## Native Range

From Coughran (2005):

"*Cherax rotundus*, as now recognised, is restricted to Victoria [Australia] (Austin et al., 2003)."

From Austin et al. (2003):

"Barmah State Forest, Victoria"

## Status in the United States

This species has not been reported as introduced or established in the United States.

The Florida Fish and Wildlife Conservation Commission has listed the crayfish *Cherax rotundus* as a prohibited species. Prohibited nonnative species (FFWCC 2018), "are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed or used for commercial activities."

From Washington Department of Fish and Wildlife (2018):

"Prohibited aquatic animal species. RCW 77.12.020

These species are considered by the commission to have a high risk of becoming an invasive species and may not be possessed, imported, purchased, sold, propagated, transported, or released into state waters except as provided in RCW 77.15.253. […] The following species are classified as prohibited animal species: […] Family Parastacidae: Crayfish: All genera except *Engaeus*, and except the species *Cherax quadricarninatus* [*sic*], *Cherax papuanus*, and *Cherax tenuimanus*."

## Means of Introduction into the United States

This species has not been reported as introduced or established in the United States.

## Remarks

From Austin et al. (2003):

"There has been much uncertainty over the identity and distribution of *C. rotundus* since its description by Clark (1941) from specimens collected near Severnlea in south-east Queensland, west of the Great Dividing Range (see Riek 1969). However, at least two attempts have failed to find this species at this location (Sokol 1988; Austin 1996) and Lawrence *et al.* (1998), citing Riek (personal communication), raised the possibility that museum labels had been mixed up. Thus the accuracy of the type location given by Clark (1941) for *C. rotundus* can be considered doubtful. Riek (1951) described specimens from near Newcastle in New South Wales as a new subspecies, *Cherax rotundus setosus*, but later placed this taxon in synonymy with *C. rotundus* (Riek 1969, p. 902). Sokol (1988) examined specimens of *C. rotundus* from near Newcastle and additional specimens collected in Victoria and concluded that *C. rotundus* was a valid species, but with an unusual, highly disjunct distribution. Austin (1996), in his allozyme study, found that specimens of *C. rotundus* collected from north of Newcastle, while diagnosable by fixed differences at four loci, otherwise showed a close genetic affinity to *C. destructor*. As a consequence, Austin (1996) suggested that *C. rotundus* could be treated as a subspecies of *C. destructor*, thus expanding the membership of the '*C. destructor*' complex."

"Finding *C. rotundus*, sampled from Barmah Forest in Victoria, to be genetically divergent from *C. destructor* and *C. setosus*, confirms that it is a valid species and that it is native to Victoria. This resolves the difficulties of Sokol (1988), who considered that *C. rotundus* from Victoria and the central New South Wales coast were conspecific and therefore, in order to account for this widely disjunct distribution, speculated that unlikely translocation events may have taken place."

**The reader should keep in mind that the taxonomy of *C. robustus* was not resolved until 2003, and confusion persists in the literature even after that date. Effort has been made to include information in this ERSS that pertains to the species as currently defined.**

# 2 Biology and Ecology

## Taxonomic Hierarchy and Taxonomic Standing

From WoRMS (2018):

"Biota > Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Eucarida (Superorder) > Decapoda (Order) > Pleocyemata (Suborder) > Astacidea (Infraorder) > Parastacoidea (Superfamily) > Parastacidae (Family) > *Cherax* (Genus) > *Cherax rotundus* (Species)"

"Status accepted"

## Size, Weight, and Age Range

From Department of Fisheries (2002):

"[…] reported maximum size of 107 mm and weight of 140 g (Clark, 1941) […]"

Austin et al. (2003) report that the specimens of *C. rotundus* that were used to establish accurate taxonomy of *C. rotundus* were morphologically consistent with the type specimen described by Clark (1941).

## Environment

From Edney et al. (2002):

"The Barmah State Forest site was a low dry floodplain with a small, slow-flowing creek at its centre. […] These crayfish were found in water that was 10-20 cm deep and they were caught late at night."

"The burrows at the Ovens River were on elevated land between billabongs. This land would be underwater only during flood events and is usually about two to three metres above the water level."

## Climate/Range

From Hale and Butcher (2011):

"

- Located in semi-arid climatic zone with hot dry summers and cold winters.
- Rainfall occurs year round, but is higher in winter months.
- On average evaporation exceeds rainfall.
- Rainfall is highly variable."

## Distribution Outside the United States

### Native

From Coughran (2005):

"*Cherax rotundus*, as now recognised, is restricted to Victoria [Australia] (Austin et al., 2003)."

From Austin et al. (2003):

"Barmah State Forest, Victoria"

### Introduced

No introductions of this species (as currently defined) have been reported.

## Means of Introduction Outside the United States

No introductions of this species (as currently defined) have been reported.

## Short Description

From Edney et al. (2002):

"Anecdotal evidence suggests a community awareness of a 'large black yabby with huge claws'."

"The species is easily recognised by its claws, which are very broad and have a paddle-like protrusion […]"

## Biology

From Edney et al. (2002):

"The Swamp Yabby does not occur in isolation. It coexists with the Common Yabby *C. destructor* throughout its entire range, and with the Murray River Crayfish *Euastacus armatus* throughout most of its range. It is sympatric with the burrowing species *Engaeus lyelli* and *Engaeus cymus* (Horwitz 1990), and with the genus *Geocharax* (Tyler *et al.* 1983)."

"From our observations, it seems that the Swamp Yabby is more aggressive than *C. destructor* and is likely to outcompete it in the wild. When divided by a barrier within the same aquarium, the Swamp Yabbies made extreme exertions to breech the barrier. When no barrier was provided, *C. destructor* were immediately attacked and swiftly killed unless they left the water via an emergent stick or rock. Swamp yabbies also exhibit strong intraspecific aggression."

"Only single specimens of Swamp Yabbies were found within each burrow, suggesting a non-colonial burrowing system."

"The Swamp Yabby constructs a burrow that is always connected to a permanent watercourse or to the water table […] Some entrances were freshly sealed with mud indicating the presence of

water within the burrow system. The Swamp Yabby appears to remain in its burrow for much of the time. The burrow covers more than one cubic metre and could be much larger underground. A surface chimney leads to a tunnel which descends for a short distance and then will branch or join a chamber."

"To date we have only collected males, and other workers have confirmed an extremely skewed sex ratio (Tarmo Raadik and Brian Woodbridge pers. comm.). The reasons for this are unknown. It is possible that there is some sexual habitat segregation, however current collecting techniques may somehow be biased towards finding males. Females may live in extremely deep burrows and remain non-emergent during small floods."

### Human Uses

No information available.

### Diseases

From Edney et al. (2002):

"Large numbers of temnocephalans were observed on all Swamp Yabbies collected. Some of these were sent to Lester Cannon of the Queensland Museum, who identified them as *Temnosewellia minor*, a species known to be common on *Cherax* in the Murray River catchment. Temnocephalans are turbellarian [*sic*] flatworms known to be symbiotic on freshwater crayfish throughout Australia (Cannon 1991)."

No OIE-reportable diseases have been documented for this species.

### Threat to Humans

From Edney et al. (2002):

"In 1936 farmers were complaining about losing cattle and horses in 'crab-hole country' near Benalla, Victoria (Clark 1936), and anecdotal evidence suggests that these complexes were always ploughed in for safety. Although the species responsible has never been identified, similar collapses have been reported due to extensive burrowing by *Engaeus* (Clark 1936). The Benalla area, however, is now known to be central to the Swamp Yabby distribution and it is possible that these 'crab' hole areas may have been the result of large aggregations of Swamp Yabby burrows."

## 3 Impacts of Introductions

No information available. No introductions of this species have been reported.

The Florida Fish and Wildlife Conservation Commission and the Washington Department of Fish and Wildlife have listed this species as a prohibited species.

# 4 Global Distribution

No occurrence map is available for *Cherax rotundus* with its current taxonomic definition as a species restricted to Victoria, Australia (GBIF Secretariat 2017).

From Coughran (2005):

"*Cherax rotundus*, as now recognised, is restricted to Victoria [Australia] (Austin et al., 2003)."

From Austin et al. (2003):

"Barmah State Forest, Victoria"

# 5 Distribution within the United States

This species has not been recorded in the U.S.

# 6 Climate Matching

## Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for *Cherax rotundus* was medium in central Texas and parts of California and the Interior West. The rest of the contiguous U.S. showed low climate match. Climate 6 score indicated that the contiguous U.S. is a low climate match overall for *C. rotundus*. Scores of 0.005 and below are classified as low match.

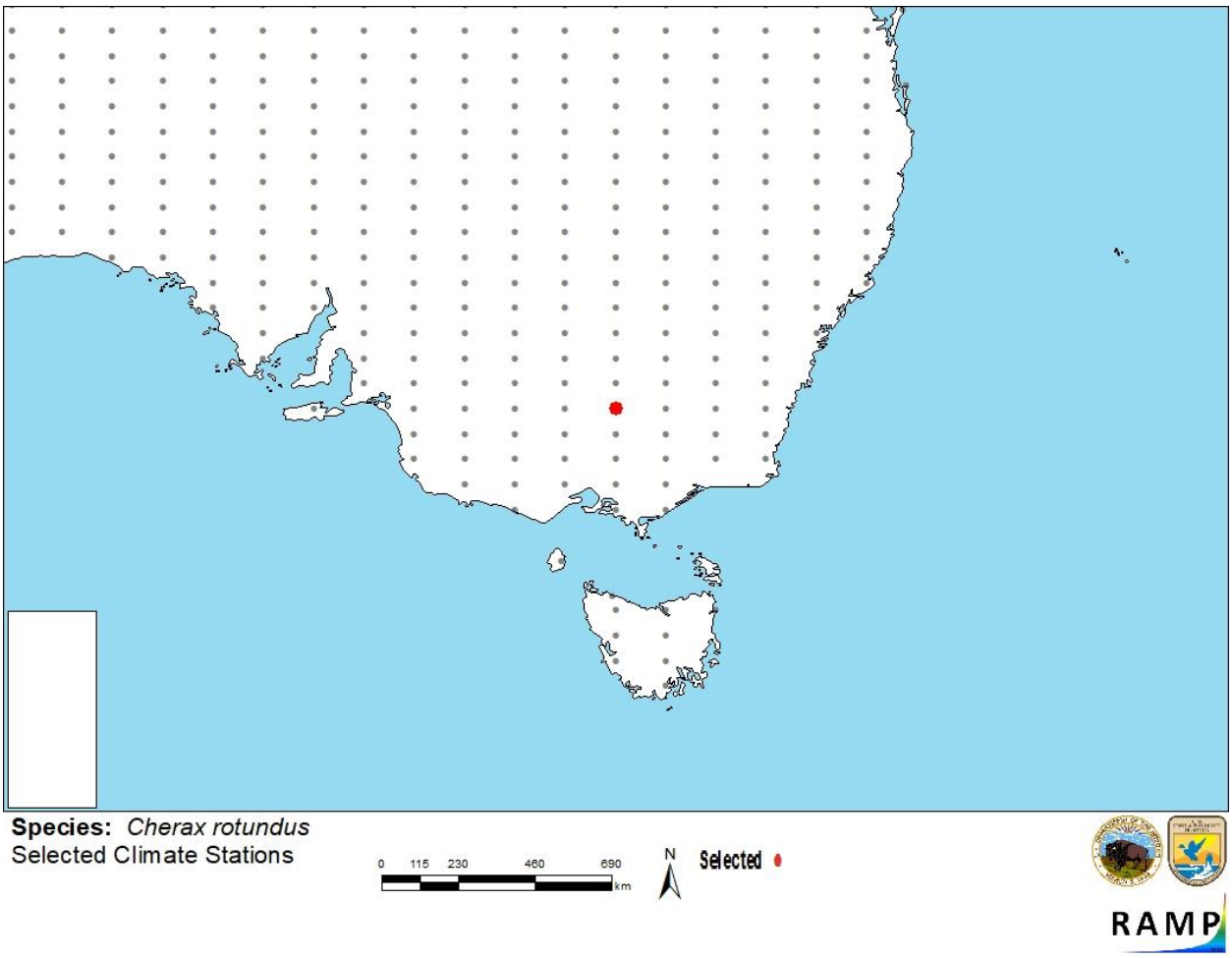



**Figure 2.** RAMP (Sanders et al. 2014) source map showing weather stations in southeastern Australia selected as source location (red) and non-source locations (gray) for *Cherax rotundus* climate matching. Source location from Austin et al. (2003).

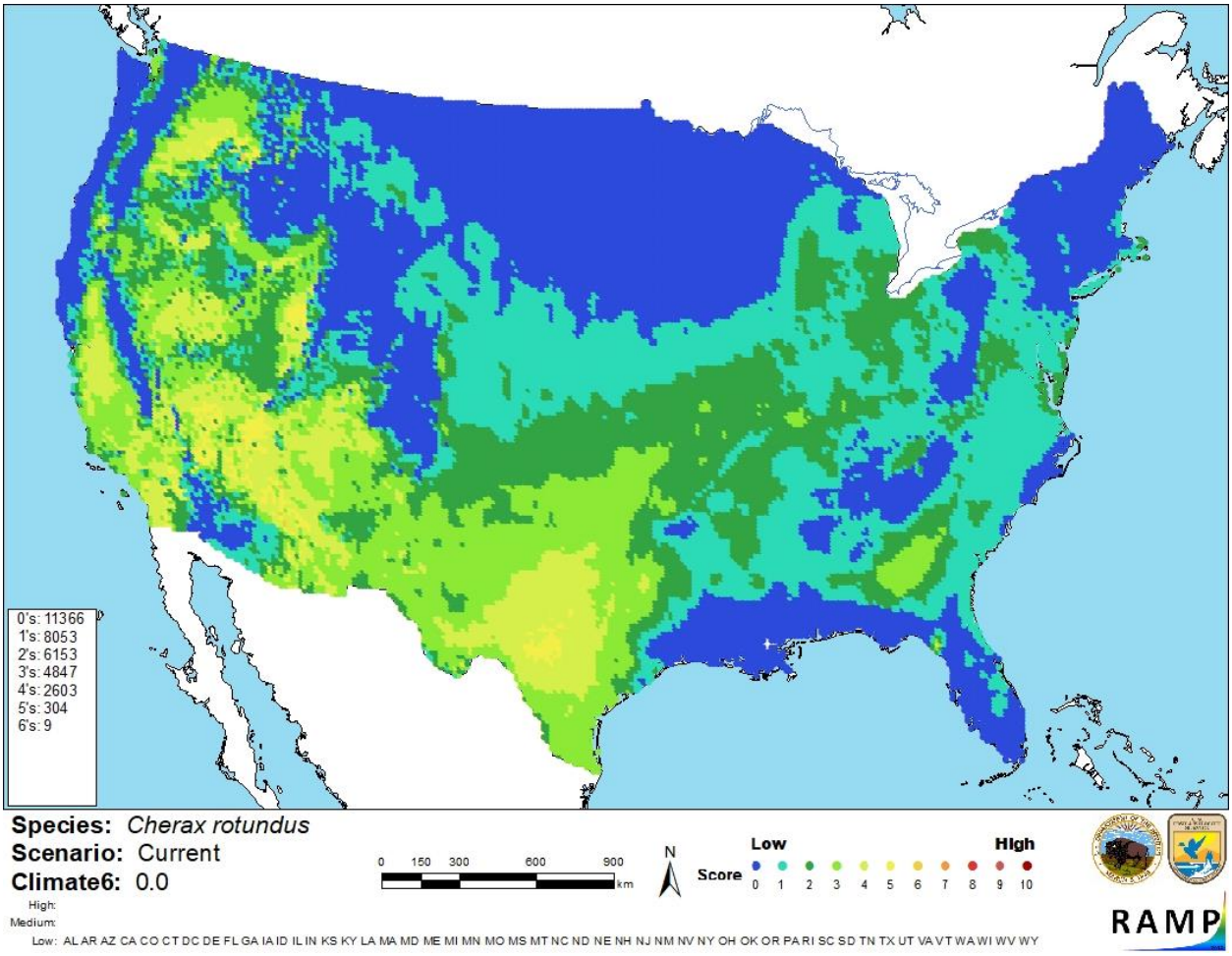



**Figure 3.** Map of RAMP (Sanders et al. 2014) climate matches for *Cherax rotundus* in the contiguous United States based on source locations reported by Austin et al. (2003). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

The "High", "Medium", and "Low" climate match categories are based on the following table:

| Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores) | Climate Match Category |
|---|---|
| 0.000≤X≤0.005 | Low |
| 0.005<X<0.103 | Medium |
| ≥0.103 | High |

# 7 Certainty of Assessment

There has been much uncertainty surrounding the taxonomy of *Cherax rotundus*, so it is difficult to tease apart the information in the literature on *C. rotundus*, as currently defined, versus other crayfish populations that were previously associated with the name and are now assigned to a different species. No introductions have been reported of *C. rotundus* from Victoria, Australia,

outside of that native range. Therefore, no information is available on impacts of introduction. For these reasons, the certainty of this assessment is low.

# 8 Risk Assessment

## Summary of Risk to the Contiguous United States

*Cherax rotundus* is a crayfish species native to northern Victoria, Australia. No introductions of this species have been reported, so potential impacts of introduction to the United States. However, one paper reports high intraspecific and interspecific aggression by this species. The States of Florida and Washington have judged the risk to be great enough to prohibit possession, transport, and trade of the species within the respective states. Climate match of *C. rotundus* to the contiguous United States was low, with medium matches occurring in parts of the West. Overall risk posed by *C. rotundus* to the contiguous U.S. is uncertain.

## Assessment Elements

- **History of Invasiveness: Uncertain**
- **Climate Match: Low**
- **Certainty of Assessment: Low**
- **Overall Risk Assessment Category: Uncertain**

# 9 References

**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.**


Austin, C. M., T. T. T. Nguyen, M. M. Meewan, and D. R. Jerry. 2003. The taxonomy and phylogeny of the '*Cherax destructor*' complex (Decapoda : Parastacidae) examined using mitochondrial 16S sequences. Australian Journal of Zoology 51:99-110.

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# 10 References Quoted But Not Accessed

**Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.**

Austin, C. M. 1996. Systematics of the freshwater crayfish genus *Cherax* Erichson (Decapoda: Parastacidae) in northern and eastern Australia: electrophoretic and morphological variation. Australian Journal of Zoology 44:259-296.

Cannon, L. R. G. 1991. Temnocephalan symbionts of the freshwater crayfish *Cherax quadricarinatus* from northern Australia. Hydrobiologia 227:341-347.

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Clark, E. 1941. New species of Australian freshwater and land crayfishes (Family Parastacidae). Memoirs of the National Museum of Victoria 12:31-40.

Horwitz, P. 1990. A taxonomic revision of species in the freshwater crayfish genus *Engaeus* Erichson (Decapoda: Parastacidae). Invertebrate Taxonomy 4:427-614.

Lawrence, C., N. M. Morrissy, J. Bellanger, and Y. W. Cheng. 1998. Enhancement of yabby production from Western Australian farm dams. Fisheries Western Australia Fisheries Research Report no. 112.

Riek, E. F. 1951. The freshwater crayfish (Family Parastacidae) of Queensland. With an appendix describing other Australian species. Records of the Australian Museum 22:368-388.

Riek, E. F. 1969. The Australian freshwater crayfish (Crustacea: Decapoda: Parastacidae). Australian Journal of Zoology 15:103-121.

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