

Zebra Crayfish (*Cherax peknyi*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, October 2011

Revised, September 2012, January 2018

Web Version, 5/20/2018



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1 Native Range and Status in the United States

Native Range

From Lukhaup and Herbert (2008):

“[...] the Fly River drainage, in the western province region of Papua New Guinea.”

From Faulkes (2015a):

“[...] its distribution has not been well described.”

Status in the United States

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

Faulkes (2015b) reports an attempted sale of *Cherax peknyi* on a North American online auction website in 2013.

The Florida Fish and Wildlife Conservation Commission has listed the crayfish *Cherax peknyi* as a prohibited species. Prohibited nonnative species “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” (FFWCC 2018).

From Washington Department of Fish & Wildlife (2018):

“(1) 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 quadricarinatus* [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 Faulkes (2015a):

“Since 2000, at least eight species or forms [of crayfish], mostly from the island of New Guinea, have been found in the pet trade before they were formally described scientifically [including] *Cherax peknyi* (Lukhaup & Herbert, 2008) [...]”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Crandall (2016):

“Classification: 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 peknyi* (Species)”

“Status: accepted.”

Size, Weight, and Age Range

From Lukhaup and Herbert (2008):

“Largest males examined reached 92mm total length; largest female 79mm total length.”

Environment

From Lukhaup and Herbert (2008):

“The crayfish were usually found in slow flowing, still water [...] Clarity of the water depends on the level of flooding and time. The Tamu River (near the West Papua border) is muddy during the flood season, becoming clear after the initial floods, and then becoming stagnant, with dark (tannin stained) water full of rotting leaves, and almost anaerobic ($DO < 1\text{mg/L}$) in the dry season. [...] Even when the water is very low in dissolved oxygen [the crayfish] live in all water depths and in their holes.”

“These modified creeks have moderate flow throughout the year, and are highly turbid (secchi 4mg/L . Water temperature in small streams around Kiunga gets as low as 18°C , and up to 29°C .”

“We did not collect crayfish in the swamps [...]”

Climate/Range

From Lukhaup and Herbert (2008):

“The crayfish were usually found [...] in parts of southern New Guinea with pronounced wet and dry seasonality.”

Distribution Outside the United States

Native

From Lukhaup and Herbert (2008):

“[...] the Fly River drainage, in the western province region of Papua New Guinea.”

From Faulkes (2015a):

“[...] its distribution has not been well described.”

Introduced

No introductions of this species have been reported. See “Human Uses”, below, for locations where the species has been reported in trade.

Means of Introduction Outside the United States

No introductions of this species have been reported.

Short Description

From Lukhaup and Herbert (2008):

“*Cherax peknyi* sp. nov. can be separated from all other Papua New Guinea species within the subgenus by the shape of the rostrum, and chelae, and in colouration [...]”

“Rostral teeth [...] 2”

“Chelae [...] dense setae on posterior part of cutting edges; fingers 3.3 x longer than broad”

“Carapace [...] smooth, 3–4 cervical spines present”

“Colouration. Body colour variable [...] The crayfish of the type series collected in Tamu creek [...] and High School creek are coloured (in life) as follows: chelae red to orange fading to pinkish white anteriorly; distal tip bluish grey. Legs (except for first pair) greenish grey with orange joints. Cephalic region greenish gray fading to a yellowish green laterally; dorsal thoracic region brown-orange fading to yellow laterally and becoming cream ventrolaterally. Pleon green with broad yellow bands. Telson green, becoming yellow to orange mesolaterally. Distal margin of tail-fan pale orange.”

Biology

From Lukhaup and Herbert (2008):

“The crayfish live under logs and in crevices and holes in submerged timber. They also live in burrows in the clay in the banks of the river. Even when the water is very low in dissolved oxygen they live in all water depths and in their holes. No berried females were collected in the dry season suggesting that breeding is in the wet season.”

“A few of the creeks in which they occur dry out completely, so they probably are able to survive in moist conditions for a couple of months, in burrows or moist logs.”

“No crayfish have been collected in the main Fly River channel which is heavily populated by *Macrobrachium rosenbergii*. In the streams *Cherax peknyi* was sympatric with *C. albertisii* and *C. quadricarinatus* [...]”

Human Uses

From Lukhaup and Herbert (2008):

“[Crayfish] are collected and eaten in all regions [in Papua New Guinea], particularly when the water level has receded during the dry season. [...] when we went collecting with [the local people], they caught several species including the undescribed *Cherax peknyi*.”

“The villagers traditionally collect these animals when the water levels are low during the dry season, as in most places the water flow is too fast in the wet season.”

“The pretty colour patterns of this crayfish, and the ease with which it can be transported, makes it of particular interest to the aquarium trade. Crayfish collected from wild populations are supplied by wholesalers to the European, Japanese and USA pet markets.”

Faulkes (2015a) summarized surveys of crayfish species in the pet trade and documented *C. peknyi* as present in the pet trade of the following countries: United States (Faulkes 2015b), Germany (Chucholl 2013), Greece (Papavlasopoulou et al. 2014), Czech Republic (Patoka et al. 2014, Patoka et al. 2015), Slovakia (Lipták and Vitázková 2015), and Turkey (Turkmen and Karadal 2012).

From Longshaw et al. (2012):

“[...] *Cherax peknyi* from Indonesia and Singapore were seized at the BIP [Border Inspection Post] at Manchester Airport [United Kingdom].”

From Patoka et al. (2014):

“Corresponding to trends abroad (Holdich et al. 2009), the most available [...] and popular ornamental species [in the Czech Republic] are *P. fallax* f. *virginalis*, *P. clarkii*, *C. quadricarinatus*, and *Cherax peknyi*.”

Diseases

From Longshaw et al. (2012):

“*Cherax peknyi* imported from Indonesia in August 2007 and from Singapore in September 2007 and April 2008 were seized at a port of entry [in the United Kingdom]. A multiplate *Psorospermium* sp. occurred in the gills, hepatopancreas and cuticular epithelium of 2 animals from Indonesia [...] and in the muscle of 1 *C. peknyi* from Singapore in September 2007 [...]. A bi-plate *Psorospermium* sp. occurred in the gills, gonadal tissues, stomach, hepatopancreas, muscle and cuticular epithelium of 75% of the studied crayfish from Indonesia [...], in 10 individuals from Singapore collected in September 2007 [...] and in the gills, hepatopancreas and gonads of 4 individuals seized in April 2008. The biplate form did not co-occur with the multiplate form in any host. Unidentified temnocephalids were noted in the gills of 10% of the *C. peknyi* seized from Indonesia; no pathology was noted, whilst a low level peritrichous ciliate infection was recorded on the gills of a single *C. peknyi* from Singapore seized in September 2007.”

Threat to Humans

No information available.

3 Impacts of Introductions

No introductions of this species have been reported.

Vodovsky et al. (2017) calculate a Freshwater Invertebrate Invasiveness Scoring Kit (FI-ISK) score of 4 and a FI-ISK category of “medium” for *C. peknyi* in the Lower Volga regions of the Russian Federation. Scores for the crayfish species evaluated ranged from 3 (lowest risk) to 32 (highest risk).

The Florida Fish and Wildlife Conservation Commission (FFWCC 2018) and the Washington Department of Fish and Wildlife (2018) have listed this species as a prohibited species.

4 Global Distribution

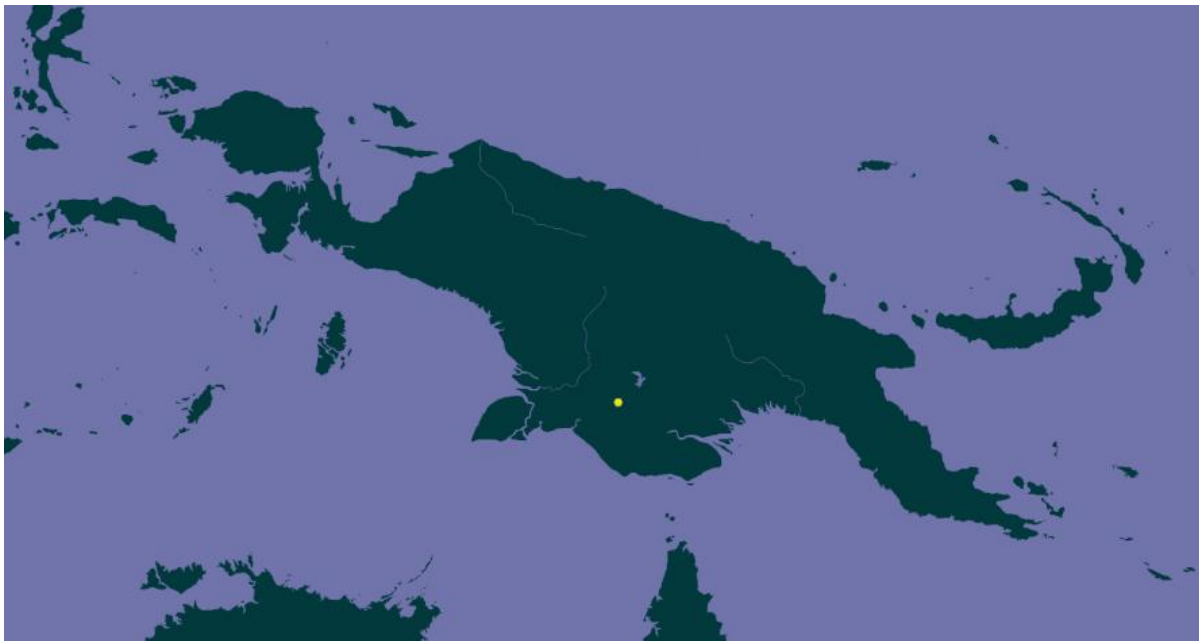


Figure 1. Known global established range of *Cherax peknyi*, in Papua New Guinea. Map from GBIF Secretariat (2017).

5 Distribution Within the United States

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

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for *Cherax peknyi* was low for most of the contiguous United States; only southeastern Florida showed a medium match. Climate 6 score indicated that the contiguous U.S. has a low climate match overall at 0.000. Scores of 0.005 and less are classified as low match.

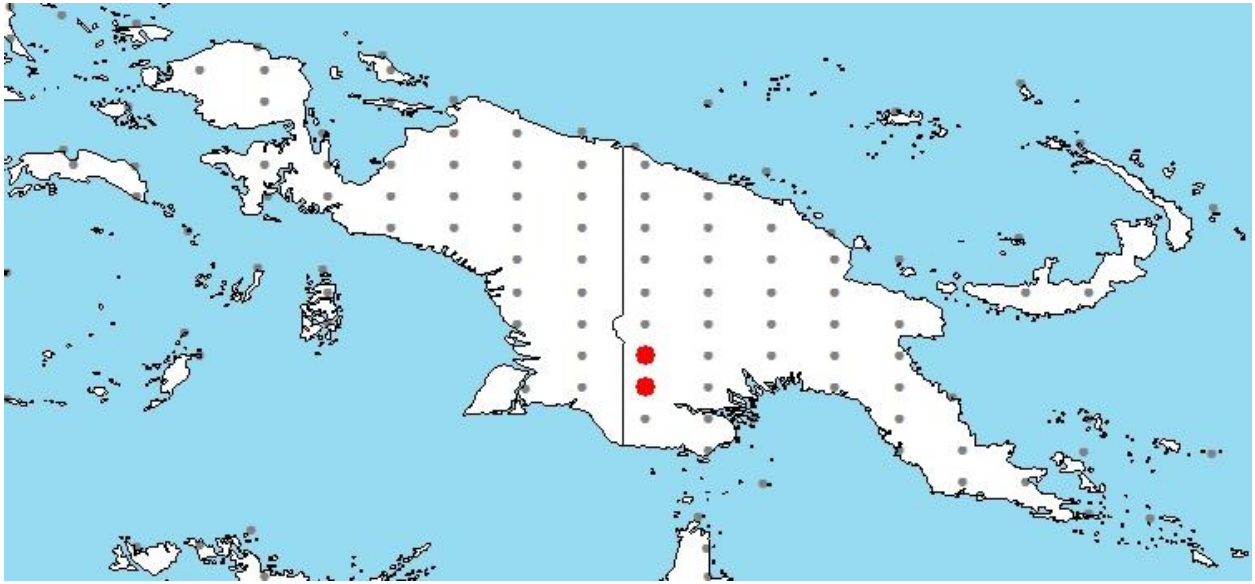


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in Papua New Guinea selected as source locations (red) and non-source locations (gray) for *Cherax peknyi* climate matching. Source locations from GBIF Secretariat (2017).

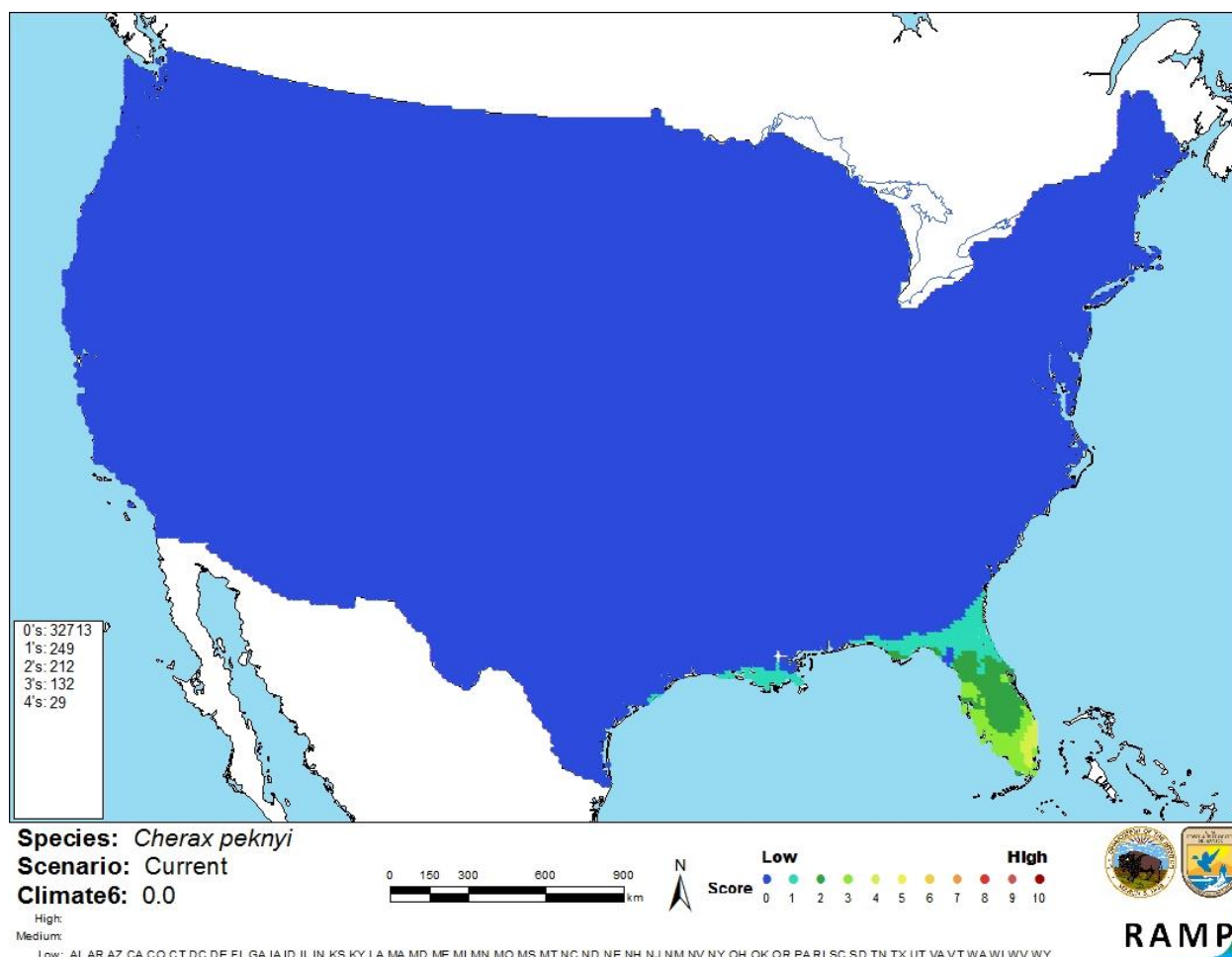


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Cherax peknyi* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

Information is available on the biology and ecology of *Cherax peknyi*, although much comes from a single journal article. The distribution of this species needs further study. Impacts of introduction are unknown because no introductions into natural habitats have been reported. Certainty of this assessment is low because of all that is still unknown about this species.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Cherax peknyi is a crayfish from Papua New Guinea. The species has an overall low climate match to the contiguous U.S. and has no history of introduction outside its native range. However, *C. peknyi* is one of the most common species in the pet trade in the Czech Republic and has been found in the pet trade in the United States as well. The States of Florida and Washington prohibit possession or trade of this species, along with other *Cherax* crayfish. The overall risk assessment 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.

- Crandall, K. A. 2016. *Cherax peknyi* Lukhaup & Herbert, 2008. In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=885568>. (January 2018).
- Faulkes, Z. 2015a. The global trade in crayfish as pets. *Crustacean Research* 44:75-92.
- Faulkes, Z. 2015b. Marmorkrebs (*Procambarus fallax* f. *virginalis*) are the most popular crayfish in the North American pet trade. *Knowledge and Management of Aquatic Ecosystems* 416:20.
- FFWCC (Florida Fish and Wildlife Conservation Commission). 2018. Prohibited species list. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. Available: <http://myfwc.com/wildlifehabitats/nonnatives/regulations/prohibited/>. (January 2018).
- GBIF Secretariat. 2017. *Cherax peknyi*. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/5789930>. (January 2018).
- Longshaw, M., K. S. Bateman, P. Stebbing, G. D. Stentiford, and F. A. Hockley. 2012. Disease risk associated with the importation and release of non-native crayfish species into mainland Britain. *Aquatic Biology* 16:1-15.
- Lukhaup, C., and B. Herbert. 2008. A new species of freshwater crayfish (Crustacea: Decapoda: Parastacidae) from the Fly River Drainage, Western Province, Papua New Guinea. *Memoirs of the Queensland Museum* 52:213–219.

- Patoka, J., L. Kalous, and O. Kopecký. 2014. Risk assessment of the crayfish pet trade based on data from the Czech Republic. *Biological Invasions* 16:2489-2494.
- Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- Vodovsky, N., J. Patoka, and A. Kouba. 2017. Ecosystem of Caspian Sea threatened by pet-traded non-indigenous crayfish. *Biological Invasions* 19:2207-2217.
- Washington Department of Fish & Wildlife. 2018. WAC 220-12-090 Classification - Nonnative aquatic animal species. Washington Department of Fish & Wildlife, Olympia, Washington. Available: <https://wdfw.wa.gov/ais/wac.html>. (January 2018).

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.

- Chucholl, C. 2013. Invaders for sale: trade and determinants of introduction of ornamental freshwater crayfish. *Biological Invasions* 15:125-141.
- Holdich, D. M., J. D. Reynolds, C. Souty-Grosset, and P. J. Sibley. 2009. A review of the ever increasing threat to European crayfish from non-indigenous crayfish species. *Knowledge and Management of Aquatic Ecosystems* 11:394-395.
- Lipták, B., and B. Vitázková. 2015. Beautiful, but also potentially invasive. *Ekológia (Bratislava)* 34:155-162.
- Papavlasopoulou, I., C. Perdikaris, L. Vardakas, and I. Paschos. 2014. Enemy at the gates: introduction potential of non-indigenous freshwater crayfish in Greece via the aquarium trade. *Central European Journal of Biology* 9:11-18.
- Patoka, J., L. Kalous, and O. Kopecký. 2015. Imports of ornamental crayfish: the first decade from the Czech Republic's perspective. *Knowledge and Management of Aquatic Ecosystems* 416:04.
- Turkmen, G., and O. Karadal. 2012. The survey of the imported freshwater Decapod species via the ornamental aquarium trade in Turkey. *Journal of Animal and Veterinary Advances* 11:2824-2827.