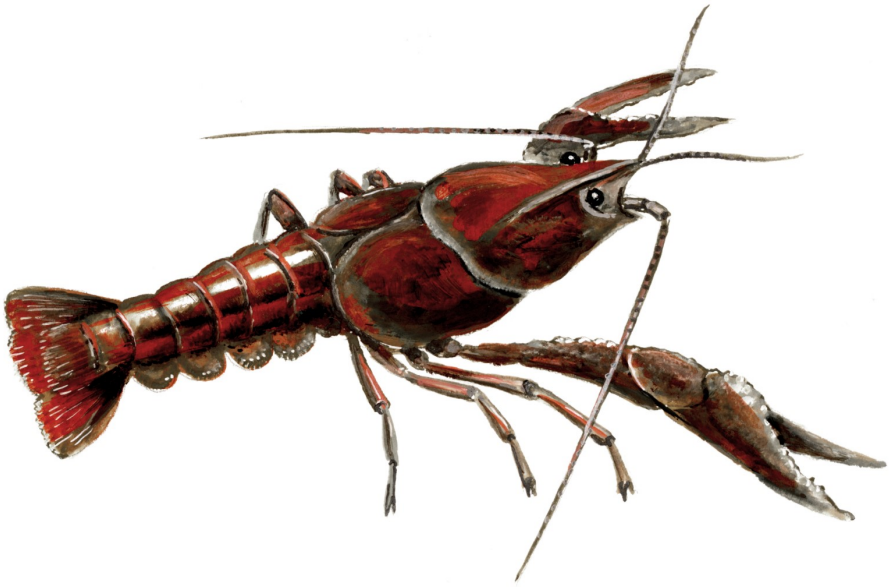
Monterey Bay Aquarium
Seafood Watch

Environmental sustainability assessment of wild-caught Red swamp crayfish (*Procambarus clarkii*) and White river crayfish (*Procambarus zonangulus*) from Louisiana caught using traps.



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Species:	Red swamp crayfish (*Procambarus clarkii*) and White river crayfish (*Procambarus zonangulus*)
Location:	Louisiana: Atchafalaya Basin
Gear:	Traps
Type:	Wild Caught
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Assessed using Seafood Watch Fisheries Standard v4

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About the Monterey Bay Aquarium Seafood Watch Program

The mission of the Monterey Bay Aquarium is to inspire conservation of the ocean and enable a future where the ocean flourishes and people thrive in a just and equitable world. To do this, the Aquarium is focused on creating extraordinary experiences that inspire awe and wonder, championing science-based solutions, and connecting people across the planet to protect and restore the ocean. We know that healthy ocean ecosystems are critical to enabling life on Earth to exist, and that our very survival depends on them. As such, our conservation objectives are to mobilize climate action, improve the sustainability of global fisheries and aquaculture, reduce sources of plastic pollution, and restore and protect ocean wildlife and ecosystems.

The aquarium is focused on improving the sustainability of fisheries and aquaculture given the role seafood plays in providing essential nutrition for 3 billion people globally, and in supporting hundreds of millions of livelihoods. Approximately 180 million metric tons of wild and farmed seafood is harvested each year (excluding seaweeds). Unfortunately, not all current harvest practices are sustainable and poorly managed fisheries and aquaculture pose the greatest immediate threat to the health of the ocean and the economic survival and food security of billions of people.

The Seafood Watch program was started 25 years ago as a small exhibit in the Monterey Bay Aquarium highlighting better fishing practices and grew into one of the leading sources of information on seafood sustainability, harnessing the power of consumer choice to mobilize change. The program's comprehensive open-source information and public outreach raises awareness about global sustainability issues, identifies areas for improvement, recognizes and rewards best practices and empowers individuals and businesses to make informed decisions when purchasing seafood.

We define sustainable seafood as seafood from sources, whether fished or farmed, that can maintain or increase production without jeopardizing the structure and function of affected ecosystems, minimize harmful environmental impacts, assure good and fair working conditions, and support livelihoods and economic benefits throughout the entire supply chain. As one aspect of this vision, Seafood Watch has developed trusted, rigorous standards for assessing the environmental impacts of fishing and aquaculture practices worldwide. Built on a solid foundation of science and collaboration, our standards reflect our guiding principles for defining environmental sustainability in seafood.

Seafood Watch Ratings

The Seafood Watch Standard for Fisheries is used to produce assessments for wild-capture fisheries resulting in a Seafood Watch rating of green, yellow, or red. Seafood Watch uses the assessment criteria to determine a final numerical score as well as numerical subscores and colors for each criterion. These scores are translated to a final Seafood Watch color rating according to the methodology described in the table below. The table also describes how Seafood Watch defines each of these categories. The narrative descriptions of each Seafood Watch rating, and the guiding principles listed below, compose the framework on which the criteria are based.

Green	Final Score >3.2, and either criterion 1 or criterion 3 (or both) is green, and no red criteria, and no critical scores	Wild-caught and farm-raised seafood rated green are environmentally sustainable, well managed and caught or farmed in ways that cause little or no harm to habitats or other wildlife. These operations align with all of our guiding principles.
Yellow	Final score >2.2, and no more than one red criterion, and no critical scores, and does not meet the criteria for green (above)	Wild-caught and farm-raised seafood rated yellow cannot be considered fully environmentally sustainable at this time. They align with most of our guiding principles, but there is either one conservation concern needing substantial improvement, or there is significant uncertainty associated with the impacts of the fishery or aquaculture operations.
Red	Final Score ≤2.2, or two or more red criteria, or one or more critical scores.	Wild-caught and farm-raised seafood rated red are caught or farmed in ways that have a high risk of causing significant harm to the environment. They do not align with our guiding principles and are considered environmentally unsustainable due to either a critical conservation concern, or multiple areas where improvement is needed.

Disclaimer: All Seafood Watch fishery assessments are reviewed for accuracy by external experts in ecology, fisheries science, and aquaculture. Scientific review does not constitute an endorsement of the Seafood Watch program or its ratings on the part of the reviewing scientists. Seafood Watch is solely responsible for the conclusions reached in this assessment.

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Guiding Principles

Monterey Bay Aquarium defines sustainable seafood as seafood from sources, whether fished or farmed, that can maintain or increase production without jeopardizing the structure and function of affected ecosystems, minimize harmful environmental impacts, assure good and fair working conditions, and support livelihoods and economic benefits throughout the entire supply chain.

As one aspect of this vision, Seafood Watch has developed trusted, rigorous standards for assessing the environmental impacts of fishing and aquaculture practices worldwide. Environmentally sustainable wild capture fisheries:

1. **Follow the principles of ecosystem-based fisheries management**

   The fishery is managed to ensure the integrity of the entire ecosystem, rather than solely focusing on maintenance of single species stock productivity. To the extent allowed by the current state of the science, ecological interactions affected by the fishery are understood and protected, and the structure and function of the ecosystem is maintained.

2. **Ensure all affected stocks[1] are healthy and abundant**

   Abundance, size, sex, age and genetic structure of the main species affected by the fishery (not limited to target species) is maintained at levels that do not impair recruitment or long-term productivity of the stocks or fulfillment of their role in the ecosystem and food web.

   Abundance of the main species affected by the fishery should be at, above, or fluctuating around levels that allow for the long-term production of maximum sustainable yield. Higher abundances are necessary in the case of forage species, in order to allow the species to fulfill its ecological role.

3. **Fish all affected stocks at sustainable levels**

   Fishing mortality for the main species affected by the fishery should be appropriate given current abundance and inherent resilience to fishing while accounting for scientific uncertainty, management uncertainty, and non-fishery impacts such as habitat degradation.

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[1]"Affected" stocks include all stocks affected by the fishery, no matter whether target or bycatch, or whether they are ultimately retained or discarded.

The cumulative fishing mortality experienced by affected species must be at or below the level that produces maximum sustainable yield for single-species fisheries on typical species that are at target levels.

Fishing mortality may need to be lower than the level that produces maximum sustainable yield in certain cases such as forage species, multispecies fisheries, highly vulnerable species, or fisheries with high uncertainty.

For species that are depleted below target levels, fishing mortality must be at or below a level that allows the species to recover to its target abundance.

4. **Minimize bycatch**

   Seafood Watch defines bycatch as all fisheries-related mortality or injury other than the retained catch. Examples include discards, endangered or threatened species catch, pre-catch mortality and ghost fishing. All discards, including those released alive, are considered bycatch unless there is valid scientific evidence of high post-release survival and there is no documented evidence of negative impacts at the population level.

   The fishery optimizes the utilization of marine and freshwater resources by minimizing post-harvest loss and by efficiently using marine and freshwater resources as bait.

5. **Have no more than a negligible impact on any threatened, endangered or protected species**

   The fishery avoids catch of any threatened, endangered or protected (ETP) species. If any ETP species are inadvertently caught, the fishery ensures and can demonstrate that it has no more than a negligible impact on these populations.

6. **Are managed to sustain the long-term productivity of all affected species**

   Management should be appropriate for the inherent resilience of affected marine and freshwater life and should incorporate data sufficient to assess the affected species and manage fishing mortality to ensure little risk of depletion. Measures should be implemented and enforced to ensure that fishery mortality does not threaten the long term productivity or ecological role of any species in the future.

   The management strategy has a high chance of preventing declines in stock productivity by taking into account the level of uncertainty, other impacts on the stock, and the potential for increased pressure in the future.

   The management strategy effectively prevents negative population impacts on bycatch species, particularly species of concern.

7. **Avoid negative impacts on the structure, function or associated biota of aquatic habitats where fishing occurs**

The fishery does not adversely affect the physical structure of the seafloor or associated biological communities.

If high-impact gears (e.g. trawls, dredges) are used, vulnerable seafloor habitats (e.g. corals, seamounts) are not fished, and potential damage to the seafloor is mitigated through substantial spatial protection, gear modifications and/or other highly effective methods.

8. **Maintain the trophic role of all aquatic life**

   All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web, as informed by the best available science.

9. **Do not result in harmful ecological changes such as reduction of dependent predator populations, trophic cascades, or phase shifts**

   Fishing activities must not result in harmful changes such as depletion of dependent predators, trophic cascades, or phase shifts.

   This may require fishing certain species (e.g., forage species) well below maximum sustainable yield and maintaining populations of these species well above the biomass that produces maximum sustainable yield.

10. **Ensure that any enhancement activities and fishing activities on enhanced stocks do not negatively affect the diversity, abundance, productivity, or genetic integrity of wild stocks**

    Any enhancement activities are conducted at levels that do not negatively affect wild stocks by reducing diversity, abundance or genetic integrity.

    Management of fisheries targeting enhanced stocks ensures that there are no negative impacts on the wild stocks, in line with the guiding principles described above, as a result of the fisheries.

    Enhancement activities do not negatively affect the ecosystem through density dependent competition or any other means, as informed by the best available science.

Final Ratings

Ratings Details	C 1 Target Species	C 2 Other Species	C 3 Management	C 4 Habitat	Rating
Red swamp crayfish United States - Louisiana - Atchafalaya Basin - Traps - 5,041 mt	2.644	2.644	2.000	3.464	Yellow (2.638)
White river crayfish United States - Louisiana - Atchafalaya Basin - Traps	2.644	2.644	2.000	3.464	Yellow (2.638)

Abbreviations

Table 1

Abbreviation	Description
LDWF	Louisiana Department of Wildlife and Fisheries

Summary

Wild-caught red swamp crayfish (*Procambarus clarkii*) is found worldwide in freshwater swamps, marshes, and slow-flowing rivers. Southern white river crayfish (*Procambarus zonangulus*) is found in similar habitats, though it has a smaller distribution. Both species have portions of their native ranges in Louisiana and are cultural and culinary icons. Wild-caught crayfish are harvested in the Atchafalaya Basin in Louisiana, United States using baited coated-wire mesh traps that rest on the substrate.

The abundance and fishing levels of both red swamp crayfish and southern white river crayfish in the Atchafalaya Basin are unknown, because no population assessments have been conducted. Abundance of these crayfish species appears to be sensitive to environmental variation, particularly the flood regime and water levels in the rivers and swamps in which they live. The species are considered moderately vulnerable to fishing pressure. Some small fishes could be caught in the traps used in this fishery; however, it is likely that bycatch is low and most of the nontarget catch is released unharmed.

This fishery is managed by the Louisiana Department of Wildlife and Fisheries, but few management regulations have been put in place and there is a substantial lack of data collection and analysis beyond collecting landings through trip tickets. The fishery is small and is considered to have highly effective enforcement and stakeholder inclusion measures in place, as well as minimal impacts on the habitat and ecosystem.

Wild-caught red swamp crayfish (*Procambarus clarkii*) and southern white river crayfish (*Procambarus zonangulus*) harvested by traps in the Atchafalaya Basin in Louisiana, United States are rated yellow, driven by moderate concerns surrounding the stock status and fishing mortality of both species, moderate concerns surrounding the impacts on unknown finfish species, moderately effective management, and insufficient data collection and analysis. There are minimal concerns surrounding the impacts to the habitat and ecosystem.

Introduction

Scope of the analysis and ensuing rating

This report covers ratings for wild-caught red swamp crayfish (*Procambarus clarkii*) and southern white river crayfish (*Procambarus zonangulus*) harvested by traps in the waters of the U.S. Western Central Atlantic and the Atchafalaya Basin in Louisiana, United States.

Species Overview

Crayfish species are found worldwide in freshwater swamps, marshes, and slow-flowing rivers (Crandall 2010) (Global Trust Certification 2011) (Saad et al. 2015). Red swamp crayfish's native range in the United States consists of the Gulf coastal plain from the Florida panhandle to Mexico and the southern Mississippi River drainage to Illinois (Nagy et al. 2024). The native range of southern white river crayfish is considered to be the Gulf Coastal Plain of Texas and Louisiana, extending into portions of southern Arkansas (Walls 2009). Louisiana's commercial crayfish fishery is concentrated in the Atchafalaya Basin, a freshwater system connected to the Mississippi River, and it is the region of focus for this assessment. Wild-caught crayfish are harvested using baited coated-wire mesh traps that rest on the substrate. There are 39 species of freshwater crayfish species in Louisiana, but commercial catch almost entirely comprises two species: red swamp crayfish and southern white river crayfish (Romaire 2016).

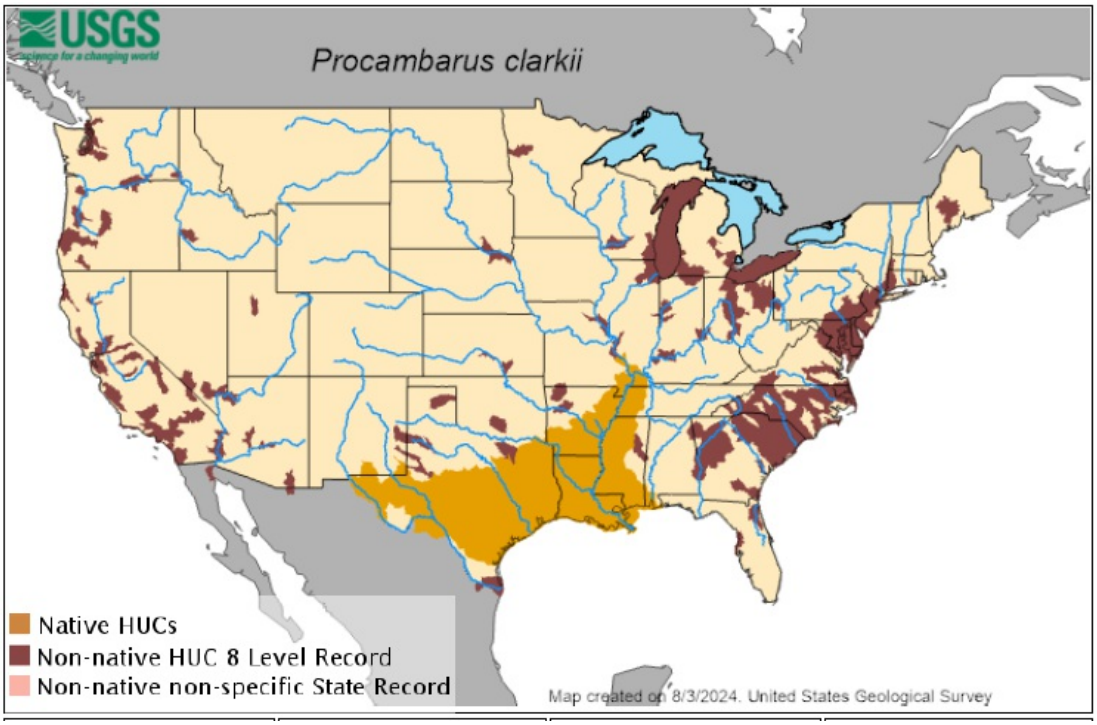


Figure 1: U.S. distribution of red swamp crayfish with native and nonnative areas identified [from (USGS 2024)].

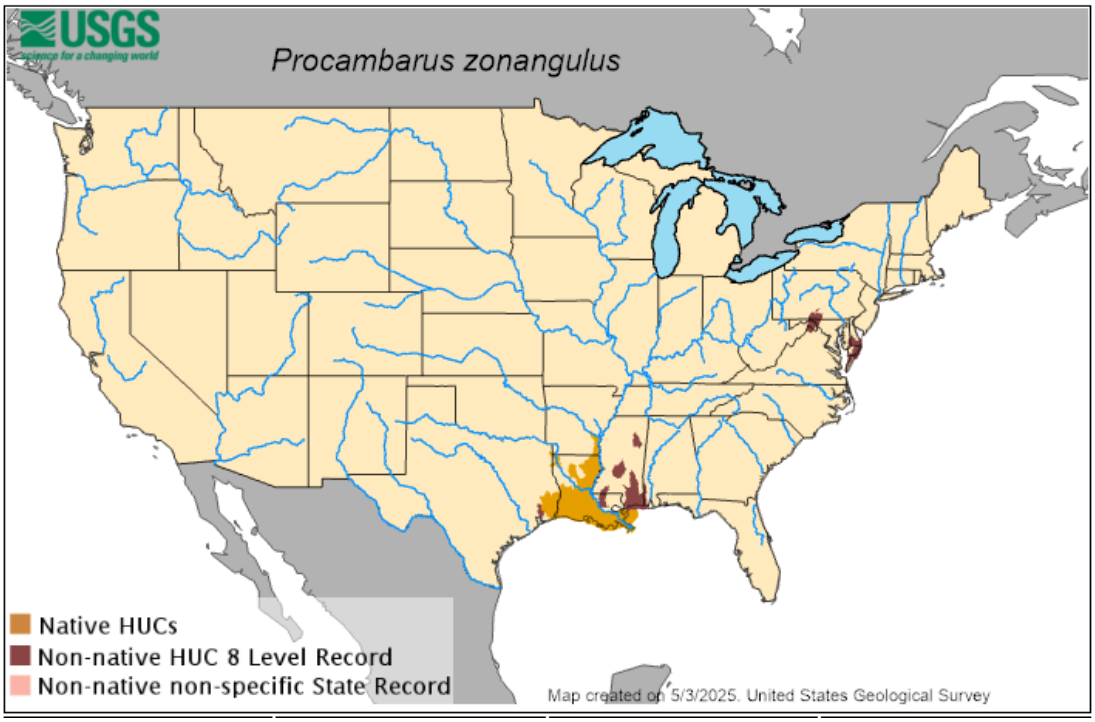


Figure 2: U.S. distribution of southern white river crayfish with native and nonnative areas identified [from (USGS 2024b)].

Red swamp crayfish (*Procambarus clarkii*)

The adult red swap crayfish ranges in length from 2.2 to 4.7 inches and may attain weights in excess of 50 grams in 3 to 5 months (Nagy et al. 2024). It is a nocturnal animal with little migration, emerging from burrows at night to forage, primarily feeding on plants and/or detritus as an adult (Nagy et al. 2024). But during some periods of its life, particularly the breeding season, it has a "wandering phase" (Global Trust Certification 2011). Environmental conditions (temperature and wet/dry periods) affect reproduction and growth rates (Romaire et al. 2004) (McClain et al. 2007) (Alford and Walker 2013) (Global Trust Certification 2011). A 4-in female can produce as many as 500 eggs, while a smaller female produces around 100 eggs (Nagy et al. 2024). The life cycle is relatively short, with sexual maturity occurring in as few as 2 months (Huner and Barr 1991). In the wild, individuals typically live 12–18 months, though individuals in laboratory conditions have been observed living up to 4 years (Huner and Barr 1991; Taylor and Schuster 2004).

Southern white river crayfish (*Procambarus zonangulus*)

The species was initially described in the literature as *Procambarus acutus*, which has since been recognized as a species group that contains at least three subspecies, including *P. zonangulus* (Hobbs and Hobbs 1990; Taylor and Schuster 2004). Life history characteristics

for southern white river crayfish are difficult to ascertain because of changes in the taxonomic designation and the paucity of life history data for crayfish species in general (Moore et al. 2013).

Southern white river crayfish prefers rivers, creeks, and springs (Romaire 2016). Its life cycle timing is shifted somewhat compared to red swamp crayfish, with birth, growth, and spawning occurring slightly later in the year (Albaugh 1973; Huner and Barr 1991). Individuals hatch in late winter and early spring, with nearly all individuals reaching sexual maturity at 6–12 months (Albaugh 1973). The maximum lifespan is not known, but it is likely similar to that of other *Procambarus* species (Barnett et al. 2017; Huner and Barr 1991; Taylor and Schuster 2004).

Southern white river crayfish is known to grow larger than red swamp crayfish, reaching a maximum size of 5.1 in (Huner and Barr 1991; Taylor and Schuster 2004). Size plays an important role in inter- and intraspecies competition because larger individuals are typically able to outcompete smaller individuals (Huner and Barr 1991).

Production Statistics

Landings data for red swamp crayfish and southern white river crayfish are reported together as "crayfish," and it is not possible to separate the production data for each species. The annual harvest of wild-caught crayfish in Louisiana has ranged from 13 MT in 1950 to 22,522 MT in 1993, and it remained under 9,070 MT since 1999 through the early 2010s (NMFS 2025). The wild-caught fishery has averaged around 11% of Louisiana's crayfish production in the past, with the remainder coming from aquaculture operations. From 2019 to 2023, annual landings of wild-caught crayfish in Louisiana have averaged approximately 4,400 MT, with just over 5,000 MT landed in 2023 (NMFS 2025).

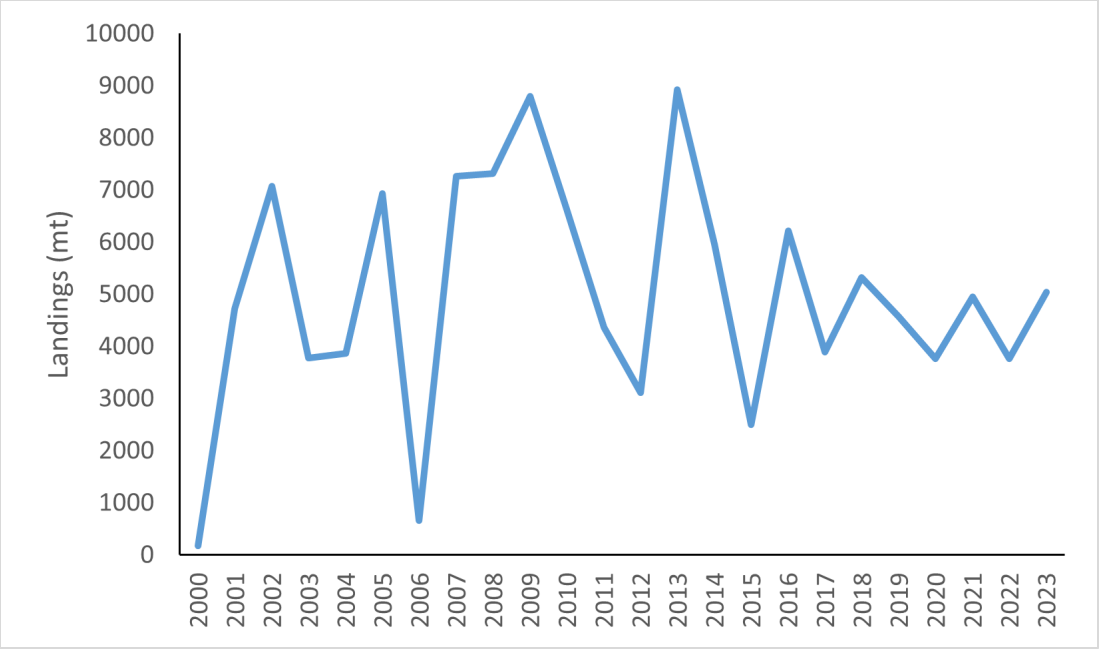


Figure 3: Annual nonconfidential landings of wild-caught crayfish in Louisiana using traps from 2000 to 2023 [data from (NMFS 2025)].

Importance to the US/North American market

Wild-caught and aquaculture crayfish from Louisiana accounts for 95% of the domestic crayfish sold in the United States (Romaire et al. 2005) (Gillespie et al. 2012; McClain 2016; Lutz 2022). Aquaculture production has been expanding since the late 1990s and is the main production form (McClain 2016; Lutz 2022). Louisiana crayfish aquaculture produced ≈77,000 MT in 2020, while wild crayfish landings were 3,764 MT in the same year (Lutz 2022; NMFS 2025). Other states known for producing crayfish include California and Oregon (NMFS 2013). The amount of crayfish imported to the United States has ranged from 2,300 MT to 9,200 MT annually since 2010, with China (2023: 3,768 MT), Egypt (2023: 112 MT), Spain (2023: 97 MT), and Japan (2023: 76 MT) as the primary sources (NOAA 2024). The amount of crayfish exported from the United States has ranged from 4 MT to 345 MT annually since 2010, with Vietnam as the primary recipient (2023: 68 MT) (NOAA 2024).

Common and market names

Both red swamp crayfish and southern white river crayfish are also commonly referred to simply as crayfish or crawfish (FDA 2024).

Primary product forms

Crayfish is marketed in the U.S. mainly as live product, with the highest demand in the Southeast. Small markets exist for whole fresh cooked, frozen tail-only meat, frozen cooked tail meat, and bait (McClain and Romaire 2004) (Romaire et al. 2005) (McClain et al. 2007) (Gillespie et al. 2012). The frozen tail-only market is reserved for small crayfish during the peak

season (April–May) and is largely dominated by imports from China (Romaire et al. 2005) (McClain et al. 2007) (Gillespie et al. 2012).

Production volume notes

From 2019 to 2023, annual landings of wild-caught crayfish in Louisiana have averaged approximately 4,400 MT, with just over 5,000 MT landed in 2023 (LDWF 2024, unpublished data). These values include landings for both red swamp crayfish and southern white river crayfish, because it is not possible to separate the production data for each species.

Summary

Wild-caught red swamp crayfish (*Procambarus clarkii*) and southern white river crayfish (*Procambarus zonangulus*) harvested by traps in the Atchafalaya Basin in Louisiana, United States are rated yellow, driven by moderate concerns surrounding the stock status and fishing mortality of both species, moderate concerns surrounding the impacts on unknown finfish species, moderately effective management, and insufficient data collection and analysis. There are minimal concerns surrounding the impacts to the habitat and ecosystem.

Assessments

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Standard for Fisheries, available at www.seafoodwatch.org. The specific standard used is referenced on the title page of all Seafood Watch assessments.

Criterion 1: Impacts on the Species Under Assessment

This criterion evaluates the impact of fishing mortality on the species, given its current abundance. When abundance is unknown, abundance is scored based on the species' inherent vulnerability, which is calculated using a Productivity-Susceptibility Analysis. The final Criterion 1 score is determined by taking the geometric mean of the abundance and fishing mortality scores. The Criterion 1 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Factor 1.3 (Fishing Mortality) is Critical.

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level*

Criterion 1 Summary

Red swamp crayfish			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
United States - Louisiana - Atchafalaya Basin - Traps - 5,041 mt	2.330 Moderate Concern	3.000 Moderate Concern	**Yellow (2.644)**

White river crayfish			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
United States - Louisiana - Atchafalaya Basin - Traps	2.330 Moderate Concern	3.000 Moderate Concern	**Yellow (2.644)**

Criterion 1 Assessment

Scoring Guidelines

Factor 1.1 - Abundance

Goal: Stock abundance and size structure of native species is maintained at a level that does not impair recruitment or productivity.

- *5 (Very Low Concern) — Strong evidence exists that the population is above an appropriate target abundance level (given the species' ecological role), or near virgin biomass.*
- *3.67 (Low Concern) — Population may be below target abundance level, but is at least 75% of the target level, OR data-limited assessments suggest population is healthy and species is not highly vulnerable.*
- *2.33 (Moderate Concern) — Population is not overfished but may be below 75% of the target abundance level, OR abundance is unknown and the species is not highly vulnerable.*
- *1 (High Concern) — Population is considered overfished/depleted, a species of concern, threatened or endangered, OR abundance is unknown and species is highly vulnerable.*

Factor 1.2 - Fishing Mortality

Goal: Fishing mortality is appropriate for current state of the stock.

- *5 (Low Concern) — Probable (>50%) that fishing mortality from all sources is at or below a sustainable level, given the species ecological role, OR fishery does not target species and fishing mortality is low enough to not adversely affect its population.*
- *3 (Moderate Concern) — Fishing mortality is fluctuating around sustainable levels, OR fishing mortality relative to a sustainable level is uncertain.*

- *1 (High Concern) – Probable that fishing mortality from all source is above a sustainable level.*

Red swamp crayfish *(Procambarus clarkii)*

1.1 Abundance

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

The abundance of red swamp crayfish in the Atchafalaya Basin of Louisiana is unknown because population assessments and abundance surveys have not been conducted. Red swamp crayfish populations are highly sensitive to environmental parameters, particularly water levels in the rivers and swamps where they dwell. Water levels have a direct impact on landings, because crayfish will burrow when water levels are too low, whereas fishing areas may become more difficult to access when water levels are too high (LDWF 2024, pers comm). During warm months, low oxygen (hypoxic) conditions can occur in the water, causing stress, burrowing, or death, which can result in lower catches (McClain and Romaire 2004; McClain et al. 2007; Global Trust Certification 2011; Bonvillain et al. 2012; Alford and Walker 2013). A productivity-susceptibility analysis (PSA) was conducted, which resulted in a score of 2.865 and medium vulnerability. Because there are no stock data available and the PSA score indicates medium vulnerability, abundance is considered a "moderate concern."

Supplementary Information

Productivity-Susceptibility Analysis (PSA):

Table 2

Productivity Attribute	Ranking	Score	Reference
Average age at maturity	< 5 years	1	(Nagy et al. 2024)
Average maximum age	< 10 years	1	(Nagy et al. 2024)
Fecundity	100 to 20,000 eggs per year	2	(Nagy et al. 2024)
Reproductive strategy	Demersal egg layer or brooder	2	(Nagy et al. 2024)
Density dependence	Compensatory dynamics at low population size demonstrated or likely	1	(Ramalho et al. 2008)
Productivity Score: 1.4			

Table 3

Susceptibility Attribute	Ranking	Score	Reference
Areal overlap	Most (70–90%) of species concentration is unfished by any fishery	2	(LDWF 2024, pers comm)
Vertical overlap	Target species, high degree of overlap	3	(Romaire 2016)
Seasonal availability	Fisheries overlap with species > 6 months/year	3	(LDWF 2024)
Selectivity of fishery	Species is targeted and is not likely to escape the gear, but "high risk" conditions do not apply	2	(LDWF 2024) (Nagy et al. 2024)
Post-capture mortality	Retained species	3	n/a
Susceptibility Score: 2.6			

Table 4

Vulnerability Score
2.953 (Medium)

1.2 Fishing Mortality

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

Fishing mortality on red swamp crayfish and southern white river crayfish caught in Louisiana is unknown because population assessments have not been performed for these species. Annual catches tend to fluctuate with abundance levels. There are no management practices in place to limit the fishing mortality on crayfish (Global Trust Certification 2011) (LDWF 2024). But it has been suggested in the past that the market demand limits the fishery and prevents overexploitation (Global Trust Certification 2011). Because fishing mortality is generally unknown, fishing mortality is considered a "moderate concern."

White river crayfish *(Procambarus zonangulus)*

1.1 Abundance

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

The abundance of southern white river crayfish in the Atchafalaya Basin of Louisiana is unknown because population assessments and abundance surveys have not been conducted. Southern white river crayfish populations are highly sensitive to environmental parameters, particularly water levels in the rivers and swamps where they dwell. Water levels have a direct impact on landings, because crayfish will burrow when water levels are too low, whereas fishing areas may become more difficult to access when water levels are too high (LDWF 2024, pers comm). During warm months, low oxygen (hypoxic) conditions can occur in the water, causing stress, burrowing, or death, which can result in lower catches (McClain and Romaire 2004; McClain et al. 2007; Global Trust Certification 2011; Bonvillain et al. 2012; Alford and Walker 2013). A productivity-susceptibility analysis (PSA) was conducted, which resulted in a score of 2.865 and medium vulnerability. Because there are no stock data available and the PSA score indicates medium vulnerability, abundance is considered a “moderate concern.”

Supplementary Information

Productivity-Susceptibility Analysis (PSA):

Table 5

Productivity Attribute	Ranking	Score	Reference
Average age at maturity	< 5 years	1	(Albaugh 1973)
Average maximum age	< 10 years	1	(Barnett et al. 2017; Huner and Barr 1991; Taylor and Schuster 2004)
Fecundity	100 to 20,000 eggs per year	2	(Eversole and Mazlum 2002)
Reproductive strategy	Demersal egg layer or brooder	2	(Albaugh 1973)

Productivity Attribute	Ranking	Score	Reference
Density dependence	Compensatory dynamics at low population size demonstrated or likely	1	(Ramalho et al. 2008)
Productivity Score: 1.4			

Table 6

Susceptibility Attribute	Ranking	Score	Reference
Areal overlap	Most (70–90%) of species concentration is unfished by any fishery	2	(LDWF 2024, pers comm)
Vertical overlap	Target species, high degree of overlap	3	(Romaire 2016)
Seasonal availability	Fisheries overlap with species > 6 months/year	3	(LDWF 2024)
Selectivity of fishery	Species is targeted and is not likely to escape the gear, but “high risk” conditions do not apply	2	(LDWF 2024)
Post-capture mortality	Retained species	3	n/a
Susceptibility Score: 2.6			

Table 7

Vulnerability Score
2.953 (Medium)

1.2 Fishing Mortality

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

Fishing mortality on red swamp crayfish and southern white river crayfish caught in

Louisiana is unknown because population assessments have not been performed for these species. Annual catches tend to fluctuate with abundance levels. There are no management practices in place to limit the fishing mortality on crayfish (Global Trust Certification 2011) (LDWF 2024). But it has been suggested in the past that the market demand limits the fishery and prevents overexploitation (Global Trust Certification 2011). Because fishing mortality is generally unknown, fishing mortality is considered a "moderate concern."

Criterion 2: Impacts on Other Species

All main retained and bycatch species in the fishery are evaluated under Criterion 2. Seafood Watch defines bycatch as all fisheries-related mortality or injury to species other than the retained catch. Examples include discards, endangered or threatened species catch, and ghost fishing. Species are evaluated using the same guidelines as in Criterion 1. When information on other species caught in the fishery is unavailable, the fishery's potential impacts on other species is scored according to the Unknown Bycatch Matrices, which are based on a synthesis of peer-reviewed literature and expert opinion on the bycatch impacts of each gear type. The fishery is also scored for the amount of non-retained catch (discards) and bait use relative to the retained catch. To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard/bait score. The Criterion 2 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Factor 2.3 (Fishing Mortality) is Crtitical

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level.*
- *Minimize bycatch.*

Criterion 2 Summary

Criterion 2 score(s) overview

This table(s) provides an overview of the Criterion 2 subscore, discards+bait modifier, and final Criterion 2 score for each fishery. A separate table is provided for each species/stock that we want an overall rating for.

Red swamp crayfish			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
United States - Louisiana - Atchafalaya Basin - Traps - 5,041 mt	2.644	1.000: < 100%	Yellow (2.644)

White river crayfish			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
United States - Louisiana - Atchafalaya Basin - Traps	2.644	1.000: < 100%	Yellow (2.644)

Criterion 2 main assessed species/stocks table(s)

This table(s) provides a list of all species/stocks included in this assessment for each 'fishery' (as defined by a region/method combination). The text following this table(s) provides an explanation of the reasons the listed species were selected for inclusion in the assessment.

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps			
Sub Score: 2.644	**Discard Rate: 1.000**		**Score: 2.644**
Species	**Abundance**	**Fishing Mortality**	**Score**
Red swamp crayfish	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
White river crayfish	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Finfish	2.330: Moderate Concern	5.000: Low Concern	Green (3.413)

The bycatch and retained species in the Louisiana crayfish fishery are generally unknown; however, bycatch is not considered a significant issue in this fishery because the openings of the gear are quite small (LDWF 2024, pers comm). Bycatch is scored according to the Seafood Watch Unknown Bycatch Matrix (UBM), based on a synthesis of peer-reviewed literature and expert opinion on the bycatch impacts of each gear type. The UBM ranks the bycatch susceptibility of different taxonomic groups in various gear types. More information is available in Appendix 2 of the Seafood Watch Standard for Fisheries Version 4. The taxa that are most likely to interact with this fishery include benthic invertebrates and finfish. Benthic invertebrates were excluded from the analysis, because the mesh size requirements allow for

escapement of most benthic invertebrates (LDWF 2024, pers comm). Corals and other biogenic habitats and marine mammals were also noted as vulnerable to this gear type; however, they were not assessed here, because the spatial extent of this fishery does not overlap either taxa in a significant way. Discards in the fishery are considered low (Perez Roda et al. 2019), but the amount of bait used in this fishery is unknown; therefore, using similar crayfish fisheries as a proxy (Romaire et al. 2004) McClain et al. 2007}, we have conservatively estimated bait use to be well below the targeted catch.

Criterion 2 Assessment

Scoring Guidelines

Factor 2.1 - Abundance

(same as Factor 1.1 above)

Factor 2.2 - Fishing Mortality

(same as Factor 1.2 above)

Factor 2.3 - Modifying Factor: Discards and Bait Use

Goal: Fishery optimizes the utilization of marine and freshwater resources by minimizing post-harvest loss. For fisheries that use bait, bait is used efficiently.

Scoring Guidelines: The discard rate is the sum of all dead discards (i.e. non-retained catch) plus bait use divided by the total retained catch.

Ratio of bait + discards/landings	**Factor 2.3 score**
<100%	1
>=100	0.75

Finfish *(Unknown finfish spp.)*

2.1 Abundance

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

The freshwater habitat where crayfish are caught is inhabited by other commercially important fish, including catfish, buffalofish, sunfish, drum, and shad (Fontenot et al. 2001; USFWS 2006). But the specific species of finfish affected by this crayfish fishery are unknown, so we included this taxonomic group based on the results of the Seafood Watch Unknown Bycatch Matrix (UBM). Most stocks of teleost fish that are not from highly vulnerable taxa, from taxa of concern, or endangered or threatened are moderately vulnerable to interactions with this fishing gear. Therefore, because most teleost fish that may potentially interact with this fishery are considered moderately vulnerable to this gear type according to the Unknown Bycatch Matrix, abundance is considered a "moderate concern."

2.2 Fishing Mortality

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Low Concern

In general, traps are considered to have a low impact on other species, and most species are likely able to be released unharmed (Morgan and Chuenpagdee 2003; Perez Roda et al. 2019). The amount and species of finfish caught in this crayfish trap fishery are unknown, so this score was calculated using the Seafood Watch Unknown Bycatch Matrix. Therefore, because finfish have a low susceptibility to interactions with trap fisheries according to the Unknown Bycatch Matrix, fishing mortality is considered a "low concern."

2.3 Discard Rate/Landings

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

< 100%

Information on discards (nonretained catches) is not available for this crayfish fishery, because only catches that are sold are documented on trip tickets (LDWF 2024b). But trap fisheries are generally considered to have low discards and a low impact on nontarget species (Morgan and Chuenpagdee 2003; Perez Roda et al. 2019). Bait in this fishery has historically comprised mainly menhaden and gizzard shad, but can also include invasive carp, buffalofish, herring, and catfish (LDWF 2024, pers comm; McClain et al. 2007). It has

been recommended that 0.25–0.33 lb of bait be used per trap per day in farmed ponds, which is less than the amount of targeted landings per trap, but there is no published information on bait use in the wild-caught crayfish fishery or on the number of traps used in the fishery (Romaire et al. 2004; McClain et al. 2007). Therefore, based on other crayfish trap fisheries, we have conservatively estimated bait use to be less than the targeted catch of crayfish, and the modifying factor for discards and bait use is considered < 100%.

Criterion 3: Management Effectiveness

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

- *5 (Very Low Concern) – Meets the standards of 'highly effective' for all five factors considered.*
- *4 (Low Concern) – Meets the standards of 'highly effective' for 'management strategy and implementation' and at least 'moderately effective' for all other factors.*
- *3 (Moderate Concern) – Meets the standards for at least 'moderately effective' for all five factors.*
- *2 (High Concern) – At a minimum, meets standards for 'moderately effective' for Management Strategy and Implementation and Bycatch Strategy, but at least one other factor is rated 'ineffective.'*
- *1 (Very High Concern) – Management Strategy and Implementation and/or Bycatch Management are 'ineffective.'*
- *0 (Critical) – Management Strategy and Implementation is 'critical'.*

The Criterion 3 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Management Strategy and Implementation is Critical.

Guiding principle

- The fishery is managed to sustain the long-term productivity of all impacted species.

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

Criterion 3 Summary

Fishery	Management Strategy And Implementation	Bycatch Strategy	Scientific Data Collection and Analysis	Enforcement of and Compliance with Management Regulations	Stakeholder Inclusion	Score
Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps	Moderately Effective	Moderately Effective	Ineffective	Highly effective	Highly effective	Red (2.000)

Criterion 3 Assessment

Scoring Guidelines

Factor 3.1 - Management Strategy and Implementation

Considerations: What type of management measures are in place? Are there appropriate management goals, and is there evidence that management goals are being met? Do manages follow scientific advice? To achieve a highly effective rating, there must be appropriately defined management goals, precautionary policies that are based on scientific advice, and evidence that the measures in place have been successful at maintaining/rebuilding species.

Factor 3.2 - Bycatch Strategy

Considerations: What type of management strategy/measures are in place to reduce the impacts of the fishery on bycatch species and when applicable, to minimize ghost fishing? How successful are these management measures? To achieve a Highly Effective rating, the fishery must have no or low bycatch, or if there are bycatch or ghost fishing concerns, there must be effective measures in place to minimize impacts.

Factor 3.3 - Scientific Research and Monitoring

Considerations: How much and what types of data are collected to evaluate the fishery's impact on the species? Is there adequate monitoring of bycatch? To achieve a Highly Effective rating, regular, robust population assessments must be conducted for target or retained species, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are met.

Factor 3.4 - Enforcement of Management Regulations

Considerations: Do fishermen comply with regulations, and how is this monitored? To achieve a Highly Effective rating, there must be regular enforcement of regulations and verification of compliance.

Factor 3.5 - Stakeholder Inclusion

Considerations: Are stakeholders involved/included in the decision-making process? Stakeholders are individuals/groups/organizations that have an interest in the fishery or that may be affected by the management of the fishery (e.g., fishermen, conservation groups, etc.). A Highly Effective rating is given if the management process is transparent, if high participation by all stakeholders is encouraged, and if there a mechanism to effectively address user conflicts.

3.1 Management Strategy And Implementation

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderately Effective

The crayfish trap fishery is managed by the Louisiana Department of Wildlife and Fisheries, using minimal management measures that include reporting through trip tickets, gear restrictions, and permit requirements (LDWF 2024). Mesh traps are used to catch crayfish, and a minimum mesh size of 1.91 cm × 1.75 cm (0.75 in × 0.69 in) is required (LDWF 2024). Fishing is not thought to have the largest impact on crayfish abundance; rather, fluctuations in the population over the years appear to be a response to environmental conditions and seasonal flooding, while fishing pressure has been thought to be kept in check by market demand (Global Trust Certification 2011; McClain and Romaire 2004; Lutz et al. 2011; LSUAC 2012b; Alford and Walker 2013). There are no explicit restrictions on when crayfish can be caught, the amount that can be caught, or the number of traps that can be used, and there are no defined target abundance or fishing level goals (Global Trust Certification 2011) (LDWF 2024). But seasonal flooding and crayfish behavior impose de facto limits on access to the fishery. Therefore, because a few explicit management measures are in place that are expected to be effective but their effectiveness is generally unknown, and it is unlikely that the fishery is having any serious negative impacts on crayfish populations, management strategy and implementation is considered “moderately effective.”

3.2 Bycatch Strategy

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderately Effective

Bycatch is thought to be relatively low in the wild-caught crayfish trap fishery, because of the small mesh openings mandated by gear restrictions, which are intended to target the most marketable size of crayfish (McClain et al. 2007; LDWF 2024). But the gear is not species-specific, and there are no regulations on species or quantity of bycatch that can be caught in this fishery; nor do managers attempt to document bycatch in this fishery (Global Trust Certification 2011; LDWF 2024). Because some gear restrictions are in place to reduce bycatch of nontarget crayfish and other species but the effectiveness of this approach is unknown due to the lack of bycatch monitoring and data collection, bycatch strategy is considered a “moderate concern.”

3.3 Scientific Data Collection and Analysis

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Ineffective

All information on commercial crayfish catches is collected through trip tickets, a reporting mechanism used by the Louisiana Department of Wildlife and Fisheries. The trip tickets document the sale of catches and contain information on the species caught, where they were harvested, which fishers harvested them (including permit number), and who purchased the seafood (LDWF 2024b). There is no known method in place to document discards, bycatch, catch used for bait, unsold catch, or catch retained for personal consumption (Global Trust Certification 2011; LDWF 2024b). Therefore, because minimal data are collected and analyzed, scientific data collection and analysis is considered "ineffective."

3.4 Enforcement of and Compliance with Management Regulations

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Highly effective

The Louisiana Department of Wildlife and Fisheries (LDWF) has clear regulations for the type and design of gear that can be used to catch crayfish and how catch sales should be reported and monitored through trip tickets (LDWF 2024). There are clear descriptions of the types of permits needed to participate in the commercial fishery, including vessel and commercial fishing licenses (LDWF 2024). Within the LDWF, there is a law enforcement division (LED) whose sole function is to enforce the commercial and recreational fishing regulations, and an independent evaluation of the agency's enforcement framework and penalties for violations deemed the agency highly adequate (Global Trust Certification 2011). The LDWF LED has adequate capacity to ensure compliance with regulations for the fishery. In the 2022–23 fiscal year, it conducted a total of 232,150 patrol hours, of which 66,361 were on the water (LDWF 2024d). Each parish employs two to four field enforcement staff, who tailor their patrols to the specific needs and wildlife-based activities of that parish's constituents (ibid). Fishers are required to log their catch through a trip ticket system, which can be audited by LDWF (LDWF 2024). Because enforcement of regulations and monitoring through trip tickets are in place and there is sufficient capacity to ensure compliance, enforcement of and compliance with management regulations is considered "highly effective."

Supplementary Information

VMS is typically required for a fishery's enforcement to be considered "highly effective." This technology serves to track vessels at sea when they are not easily visible. VMS is not typically used in inland fisheries because vessels are relatively conspicuous. As such, the VMS requirement is not taken into account when scoring this fishery.

3.5 Stakeholder Inclusion

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Highly effective

There have been many stakeholders vested in the crayfish industry, such as the Louisiana Crawfish Promotion and Research Board, Louisiana Seafood Promotion and Marketing Board, Louisiana Department of Natural Resources, Louisiana State University Agricultural Center research and extension, Louisiana Crawfish Producers Association-WEST, and crayfish retailers/restaurants. The wild-caught crawfish task force was established in 2005 with the purpose of stakeholders providing advice to the Louisiana Department of Wildlife and Fisheries (LDWF) on management, marketing, and development of this fishery. Unfortunately, this task force does not appear to be active anymore.

In the 2000s, the LDWF conducted a survey to see if crayfish fishers were interested in establishing additional regulations for the fishery; the majority of respondents were not interested, so additional measures have not been put in place (LDWF 2010). There are quite limited management measures in place for this fishery, but those are communicated to participants of the fishery and, even though there have not been active decision-making processes for this fishery in recent years, stakeholders have opportunities to provide input into the management of the fishery through public informational meetings, requested meetings with state and local representatives, and LDWF Commission meetings that occur monthly (LDWF 2024, pers comm; LDWF 2024c). Therefore, because the management process seems to be transparent and includes stakeholder input in a manner that involves major user groups, provides mechanisms to address user conflicts, encourages participation in the management process, and develops relationships between involved parties, stakeholder inclusion is considered “highly effective.”

Criterion 4: Impacts on the Habitat and Ecosystem

This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery's overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment. The final score is the geometric mean of the impact of fishing gear on habitat score (factor 4.1 + factor 4.2) and the Ecosystem Based Fishery Management score. The Criterion 4 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Guiding principles

- Avoid negative impacts on the structure, function or associated biota of marine habitats where fishing occurs.
- Maintain the trophic role of all aquatic life.
- Do not result in harmful ecological changes such as reduction of dependent predator populations, trophic cascades, or phase shifts.
- Ensure that any enhancement activities and fishing activities on enhanced stocks do not negatively affect the diversity, abundance, productivity, or genetic integrity of wild stocks.
- Follow the principles of ecosystem-based fisheries management.

Rating cannot be Critical for Criterion 4.

Criterion 4 Summary

Fishery	Physical Impact of Fishing Gear on the Habitat/Substrate	Modifying Factor: Mitigation of Gear Impacts	Ecosystem-based Fisheries Management	Score
Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps	Score: 3	+1	Moderate Concern	Green (3.464)

Criterion 4 Assessment

Scoring Guidelines

Factor 4.1 - Physical Impact of Fishing Gear on the Habitat/Substrate

Goal: The fishery does not adversely impact the physical structure of the ocean habitat, seafloor or associated biological communities.

- *5 - Fishing gear does not contact the bottom*
- *4 - Vertical line gear*
- *3 - Gears that contacts the bottom, but is not dragged along the bottom (e.g. gillnet, bottom longline, trap) and is not fished on sensitive habitats. Or bottom seine on resilient mud/sand habitats. Or midwater trawl that is known to contact bottom occasionally. Or purse seine known to commonly contact the bottom.*
- *2 - Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Or gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Or bottom seine except on mud/sand. Or there is known trampling of coral reef habitat.*
- *1 - Hydraulic clam dredge. Or dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)*
- *0 - Dredge or trawl fished on biogenic habitat, (e.g., deep-sea corals, eelgrass and maerl) Note: When multiple habitat types are commonly encountered, and/or the habitat classification is uncertain, the score will be based on the most sensitive, plausible habitat type.*

Factor 4.2 - Modifying Factor: Mitigation of Gear Impacts

Goal: Damage to the seafloor is mitigated through protection of sensitive or vulnerable seafloor habitats, and limits on the spatial footprint of fishing on fishing effort.

- *+1 —>50% of the habitat is protected from fishing with the gear type. Or fishing intensity is very low/limited and for trawled fisheries, expansion of fishery's footprint is prohibited. Or gear is specifically modified to reduce damage to seafloor and modifications have been shown to be effective at reducing damage. Or there is an effective combination of 'moderate' mitigation measures.*
- *+0.5 —At least 20% of all representative habitats are protected from fishing with the gear type and for trawl fisheries, expansion of the fishery's footprint is prohibited. Or gear modification measures or other measures are in place to limit fishing effort, fishing*

intensity, and spatial footprint of damage caused from fishing that are expected to be effective.

- *0 —No effective measures are in place to limit gear impacts on habitats or not applicable because gear used is benign and received a score of 5 in factor 4.1*

Factor 4.3 - Ecosystem-Based Fisheries Management

Goal: All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web. Fishing activities should not seriously reduce ecosystem services provided by any retained species or result in harmful changes such as trophic cascades, phase shifts or reduction of genetic diversity. Even non-native species should be considered with respect to ecosystem impacts. If a fishery is managed in order to eradicate a non-native, the potential impacts of that strategy on native species in the ecosystem should be considered and rated below.

- *5 — Policies that have been shown to be effective are in place to protect species' ecological roles and ecosystem functioning (e.g. catch limits that ensure species' abundance is maintained at sufficient levels to provide food to predators) and effective spatial management is used to protect spawning and foraging areas, and prevent localized depletion. Or it has been scientifically demonstrated that fishing practices do not have negative ecological effects.*
- *4 — Policies are in place to protect species' ecological roles and ecosystem functioning but have not proven to be effective and at least some spatial management is used.*
- *3 — Policies are not in place to protect species' ecological roles and ecosystem functioning but detrimental food web impacts are not likely or policies in place may not be sufficient to protect species' ecological roles and ecosystem functioning.*
- *2 — Policies are not in place to protect species' ecological roles and ecosystem functioning and the likelihood of detrimental food impacts are likely (e.g. trophic cascades, alternate stable states, etc.), but conclusive scientific evidence is not available for this fishery.*
- *1 — Scientifically demonstrated trophic cascades, alternate stable states or other detrimental food web impact are resulting from this fishery.*

4.1 Physical Impact of Fishing Gear on the Habitat/Substrate

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Score: 3

Crayfish is fished in the Atchafalaya Basin using traps set on the swamp floor, which generally consists of submerged grass, mud, sand, and tree bases, and is not constructed of any biogenic habitat (e.g., corals, sponges) (LA DNR 2013). Traps remain in the water for 1–2 days before fishers haul them up to retrieve the catch. This could potentially disturb the plants (grass, algae, etc.) and animals (snails, worms, etc.) that live on the bottom, but the potential damage is much less compared to that from marine trap fisheries, where traps are mechanically pulled from the water and scrape along the ocean floor (Eno et al. 2001; NREFHSC 2002; Morgan and Chuenpagdee 2003). Because this fishery uses traps that come in contact with bottom habitats of low concern, physical impact of fishing gear on the substrate is considered a "3."

4.2 Modifying Factor: Mitigation of Gear Impacts

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

+1

Both species of crayfish can be found throughout Louisiana in rivers, streams, swamps, and even roadside ditches (Nagy et al. 2024). Of the total harvest, 85%–90% occurs in the Atachafalaya River Basin (Romaire 2016). Reported landings for 2024 show that the fishery targets < 50% of the species' range within Louisiana (LDWF 2024, pers comm). The remaining habitat is not explicitly protected from fishing activities; however, the behavior of the fishers achieves the same result as deliberately protecting > 50% of the representative habitat. Therefore, mitigation of gear impacts is considered "+1."

Supplementary Information

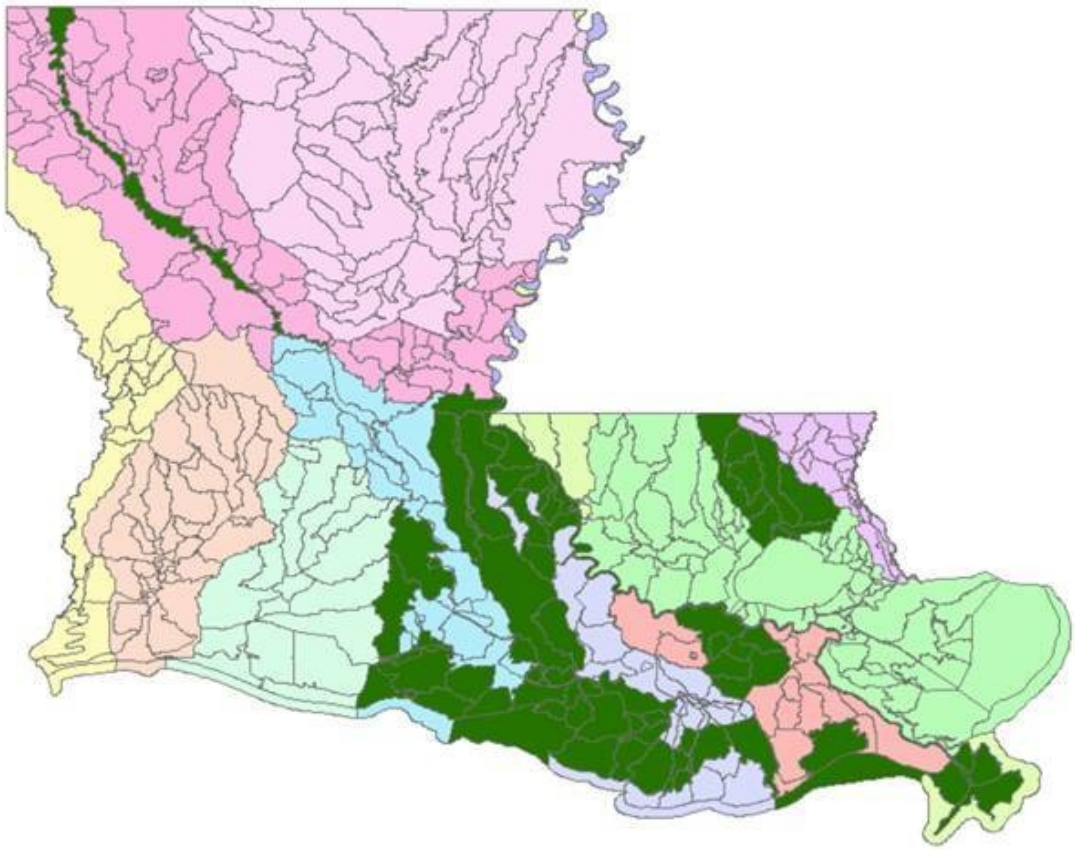


Figure 4: Map of Louisiana river basins (pastels) overlaid with commercial crayfish harvest locations (dark green). Harvest locations are based on 2024 landings records (LDWF 2024, pers comm).

4.3 Ecosystem-based Fisheries Management

Atchafalaya Basin - Atlantic, Western Central - United States - Louisiana - Traps

Moderate Concern

Crayfish plays several roles in the ecosystem, including scavenger (eats dead material and leaf litter) and omnivore (eats plants and meat), and it is known to increase the availability of nutrients in the system through digestion and through burrowing as physical ecosystem engineers (Taylor et al. 1996; Gutiérrez-Yurrita et al. 1998; McClain et al. 2007) (Nagy et al. 2024). Crayfish also serves as food for larger fish (Taylor et al. 1996; Gutiérrez-Yurrita et al. 1998; McClain et al. 2007). There are no environmental assessments of this fishery's impacts on the ecosystem and few management measures to protect ecosystem functioning; however, the damage and pressure from the fishery on the ecosystem and food web are thought to be minimal, based on the fishing gear, the life history of crayfish, and the habitat used by crayfish (Global Trust Certification 2011). Because the fishery lacks management to account for the species' ecological roles but detrimental food web

impacts are not likely, ecosystem-based fisheries management is considered a “moderate concern.”

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Scientific review does not constitute an endorsement of the Seafood Watch® program, or its seafood recommendations, on the part of the reviewing scientists. Seafood Watch® is solely responsible for the conclusions reached in this report.

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Appendix A: 2020 Updates to Louisiana Wild Crayfish Report

This report was reviewed for any significant stock status and fishery management updates on August 5, 2020. No new information was found that would indicate that the final rating was no longer accurate.

Appendix B: 2024 Updates to Louisiana Wild Crayfish Report

This report was reviewed for any significant stock status and fishery management updates in 2024, and it was determined that a reassessment was necessary to update it to Version 4 of the Seafood Watch Standard. Updated landings information was obtained and included in the updated assessment (LDWF 2024, unpublished data). Although no new information was found that would indicate that there have been significant changes to management or available data regarding stock status since the previous version of the assessment, a new productivity-susceptibility analysis (PSA) was conducted in Criterion 1 as part of the update to Version 4 of the Seafood Watch Standard. An additional species of crayfish—southern white river crayfish (*Procambarus zonangulus*)—was identified and included in this update, although the two crayfish species are not separated in landings data and the scores in each criterion are similar. This update resulted in some score changes in Criterions 2 and 4, although the overall rating for red swamp crayfish remains yellow (and the overall rating for the newly added southern white river crayfish is yellow).