

Carrie Culver



## Chinese Mitten Crab

*Eriocheir sinensis*



Stephan Gollasch, Gollasch Consulting.

### NATIVE AND INVASIVE RANGE

The Chinese mitten crab is native to the coastal rivers and estuaries of the Yellow Sea in China and Korea. It has been introduced and spread throughout the San Francisco Bay watershed and has migrated as far inland as the Sierra Nevada foothills of California. Range expansion along the west coast is expected. A single male Japanese mitten crab was caught in the Columbia River in 1997, although no Chinese mitten crabs have been captured yet in Oregon or Washington. The sightings are usually reported by fishermen because Chinese mitten crabs are known to be aggressive bait stealers.



Amy Benson, USGS

West Coast distribution of the Chinese mitten crab. Data on map represents established population and species occurrence data. Map created 2/14 by USGS.

### UNITED STATES DISTRIBUTION

In the United States, the species is only established in California, although it has been reported in the Detroit River, Mississippi River, Great Lakes, Gulf Coast, Chesapeake Bay, and Columbia River.

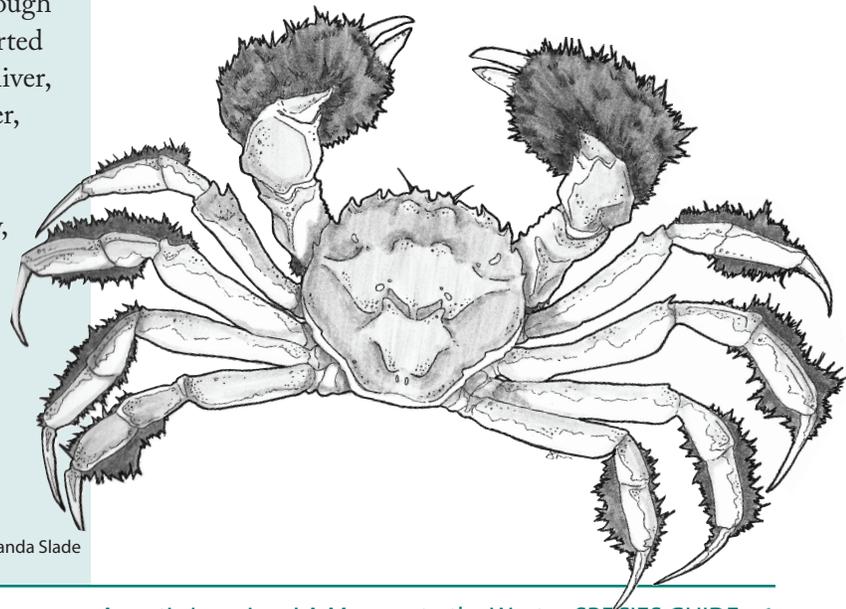
### ECOLOGY

#### Habitat and food webs

Mitten crabs can survive a large range of salinities. Larval development requires a water temperature of at least 9°C to survive with an optimal range of 15–18°C. They are omnivorous and eat vegetation, detritus, mollusks, crustaceans (amphipods, water fleas, and shrimp), fish, and aquatic insects.

#### Life stages

The Chinese mitten crab is unique because it spawns in salt water and matures in freshwater (catadromous life cycle). This is opposite to species like salmon (anadromous life cycle). The crab spends most of its life in freshwater, then migrates to saltwater to reproduce. These massive migrations have clogged fish hatchery equipment and hampered water delivery in Northern California. The mitten crab is reported to mature in 2–3 years in San Francisco Bay. Develop-



Amanda Slade

## Chinese Mitten Crabs



Brian Tsukimura

*Chinese mitten crab shipment found at the Shanghai Airport.*

### COOL FACTS

The most identifiable feature is the dense patch of setae (or “furry”) on its white-tipped claws. The purpose of these “furry” mittens is still unknown. The adult is sexually dimorphic (the male looks different than the female); the male crabs have more setae on their claws than the female crabs.

Based on DNA studies, the Chinese mitten crabs found in the San Francisco Bay are actually from Germany. This means that the Chinese population established in Germany and then was transferred to San Francisco Bay from there.

Juveniles can migrate upstream a hundred miles or more, and can climb over obstacles such as small dams or dikes.

Mitten crabs are considered a delicacy in Asia, and are sold in vending machines, alive! But, they are rare because many of the waters in Asia are polluted and there is a lot of human eating pressure.

A female can carry 250,000–1,000,000 eggs.

ment can range from 1–5 years depending on water temperature. Females carry eggs until hatching and both sexes die soon after the reproduction process.

The furry claws are usually a distinguishing feature of the Chinese mitten crab, although the purpose of these “mittens” is still unknown. (Matt Bentley, Newcastle University)

### How it got here

The most likely mode of transportation is that they were introduced as larvae through ballast water of ships from Europe.

They may also have been introduced on purpose (via luggage on planes) to start a fishery.

### How it spreads

The Chinese mitten crab was first identified in the south San Francisco Bay in 1992 by commercial shrimp trawlers, and quickly spread to the Sacramento and San Joaquin rivers.

Ocean currents and ballast water are capable of spreading the planktonic larvae of this species to new

coastal areas. They can also spread inland through river systems and canals.

It is currently found throughout the San Francisco Bay watershed and has migrated as far inland as the Sierra Nevada foothills of California. Range expansion along the west coast is expected.

### Ecological impacts

The Chinese mitten crab is an opportunistic feeder that preys upon a wide variety of plant and animal materials, making it a predator and competitor with native flora and fauna for limited habitat and resources.

Burrowing causes significant erosion damage to levees, stream banks, and irrigation structures. The



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*Mitten crabs trapped in a fish diversion channel.*

crabs also burrow in soft-sediment banks, which could increase the frequency of flooding events, thus increasing erosion and repair expenses.

The mitten crab disturbs commercial and recreational fishermen by stealing bait, feeding on catch, and getting caught in nets. The spiny carapace and legs can damage fishnets.

In their native range, young Chinese mitten crabs consume young rice shoots.

### Economic impacts

The crabs burrow for shelter and protection from predators, which weakens levees and increases erosion of banks.

The crabs are known to eat salmon, trout, and sturgeon eggs, which may pose a serious threat to the vitality of ecosystems and fisheries along the West Coast.

The most common economic impact of the Chinese mitten crab has been the result of large numbers (up to 200) caught in shrimp trawling nets, which damage the nets, consumes time picking them out, and damages the shrimp to the point that they are not suitable for the bait market. As the crab population grows and spreads across the Bay, it becomes more difficult to avoid unintentionally catching them.

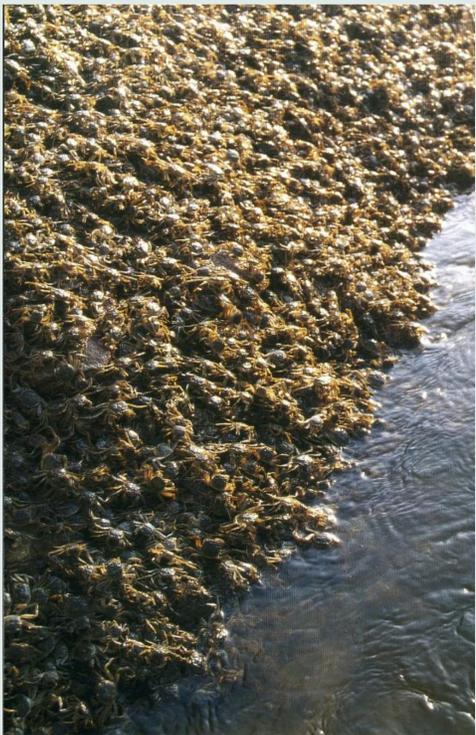
### Health hazards

The crab is a host to the human lung fluke parasite. The fluke also needs an alternate host to complete its life cycle: an invasive snail called *Assiminea parasitologica* (or the “AP snail”). The AP snail is not currently found in the San Francisco Bay with the mitten crab, however,



www.chinahush.com

*Considered a delicacy in China, live mitten crabs are sold on the street in vending machines. This machine is located in a subway station, and it also sells small bottles of vinegar that people use to season their crab. For a story on crab vending machines, see [www.chinahush.com/2010/10/26/crab-vending-machines-in-subway-station/](http://www.chinahush.com/2010/10/26/crab-vending-machines-in-subway-station/)*



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*Thousands of mitten crabs migrate up freshwater streams from estuaries. In the process, they may accumulate in dams or clog fish diversion channels.*

### Crabzilla!

In the fall of 1998, as many as 1 million mitten crabs were collected at the federal and state fish salvage facilities in the south part of the Sacramento–San Joaquin River Delta in California. The crabs clogged the screens, holding tanks, and transport trucks used to salvage fish from the pumping stations.

In response to this glut of crabs in the Delta, the state built “Crabzilla,” an 8-foot wide, 18-foot tall traveling fish screen at its Tracy Fish Collection Facility in Alameda County, CA.

According to the report, “Introduced Species in U.S. Coastal Waters,” (Carlton, 2001), “[Crabzilla] scoops up crabs on a giant revolving wheel while allowing fish to slip through tiny mesh openings. Although the wheel usually spins at speeds of about 2 feet per minute, it can be sped up to around 20 feet per minute if lots of crabs are entering the channel. While the salvaged fish are trucked back to the Delta far from the pumps, the crabs are brushed and pressure hosed off the screen onto a conveyor belt that dumps them into a container. From there, they are hauled to Modesto and ground into fertilizer. to scoop up the crabs so they could be hauled away and ground up for fertilizer.” (p. 19)

Mitten crab numbers declined in the Delta after 2001, and in 2005 were at very low numbers throughout the watershed.

it has been found along the Oregon coast. It could be a serious human health issue if their habitats were to overlap. The Chinese mitten crab is popular as an uncooked delicacy and could spread the parasite to humans if consumed.

### Management strategies

Large-scale physical removal and trapping may reduce population numbers of crabs.

Dams and weirs help aggregate crabs for removal. In the 1920s and 1930s, the German government put in extensive effort to control mitten crab populations in some rivers. Knowing the migratory pattern of the crabs, officials placed traps upstream of dams, which caught juveniles as they migrated upstream. In one of the sites, as many as 113,960 crabs were caught in a single day.

Electrical fencing could also prevent the spread of mitten crabs.

### WHAT YOU CAN DO!

#### Learn how to identify and report mitten crabs

*Where to report depends on where you find them:*

- When found in Oregon, call 1-866-INVADER or go to [OregonInvasivesHotline.org](http://OregonInvasivesHotline.org)
- In Washington, call 1-877-9-INFEST or go to [www.invasivespecies.wa.gov](http://www.invasivespecies.wa.gov).
- In California, go to [www.wildlife.ca.gov/Conservation/Invasives/report](http://www.wildlife.ca.gov/Conservation/Invasives/report).

### INFORMATION GAPS

It is still unclear if there is a purpose for the “furry” mittens.



Flickr: Recording marine life

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## ADDITIONAL RESOURCES

## Web sites

## National Invasive Species Information Center

*Species profile of the Chinese mitten crab.*

<http://www.invasivespeciesinfo.gov/aquatics/mitten-crab.shtml>

## U.S. Geological Survey

*A list of sources of information about the Chinese mitten crab.*

<http://search.usa.gov/search?affiliate=usgs&utf8=%E2%9C%93&query=chinese+mitten+crab&commit=Search>