Public Health Effects

- Crabs may be an intermediate host to the Oriental lung fluke, *Paragonimus westermani*, which causes tuberculosis-like symptoms in humans.
- Humans may risk infection by eating raw or undercooked infected crabs. However, neither the lung fluke nor any of the freshwater snail species that serve as the primary intermediate host for the fluke in Asia have been found in California.
- Researchers from the University of California at Santa Barbara are investigating the potential for freshwater snails inhabiting the watershed and for the Chinese mitten crab to serve as primary and secondary hosts, respectively, to the North American and Oriental lung flukes.
- A preliminary study conducted by the Department of Health Services has shown that mitten crabs can bioaccumulate toxic substances to levels harmful to humans.

Agricultural Effects

- In its native range, juvenile mitten crabs have been reported to damage rice crops by consuming young rice shoots and burrowing into rice field levees.
- Many rice farmers in China successfully culture mitten crabs in their rice fields under controlled conditions resulting in a benefit to both rice and crab production.
- California rice growers have reported no adverse effects.

Infrastructure Effects

- Large congregations of crabs during the fall downstream migration adversely affect fish salvage operations at the Central Valley Project's and State Water Project's fish protection facilities.
- Although a large population of crabs burrowing into levees and banks over many years could weaken these structures, no measurable damage to levees due to burrowing has been detected.

Ecosystem Effects

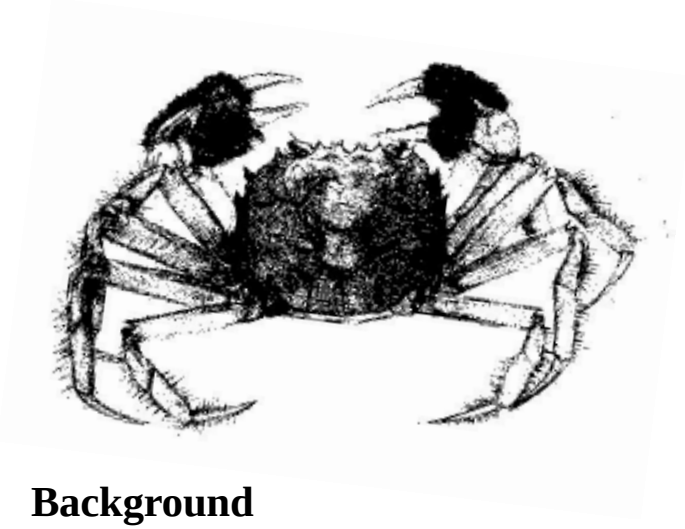
The ecological effects of a large mitten crab population are the least understood of all potential effects. A large population of mitten crabs could change the structure of the estuary's fresh and brackish water benthic (bottom-dwelling) communities through direct predation and competition. The California Department of Water Resources is currently investigating this issue.

Mitten crabs could also affect fish populations by either preying on eggs and young or by competing for food resources. One issue often mentioned is the mitten crab's potential effect on California's threatened and endangered salmonids. Although mitten crabs have the ability to reach salmon and steelhead spawning grounds, the cold water temperatures and high flows may deter the crab, reducing the possibility of predation on salmonid eggs and young.

Fishery Effects

- High crab abundance affects the commercial bay shrimp fishery by damaging catch and nets and increasing the time spent sorting the catch.
- The Chinese mitten crab may compete with the signal crayfish (*Pacifastacus leniusculus*), possibly affecting the commercial crayfish fishery by excluding crayfish from traps, reducing catch quality over time, and reducing the overall crayfish population.
- Mitten crabs often steal bait, creating a major nuisance to recreational anglers and affecting the businesses that rely on recreational fishing.
- The high value of the Chinese mitten crab as a food item suggests the potential for a new fishery. However, the California Fish and Game Commission denied several proposals to establish a commercial fishery. Commercial harvest may accelerate the spread of the mitten crab and encourage introduction of other exotic species.

The Chinese Mitten Crab



Background

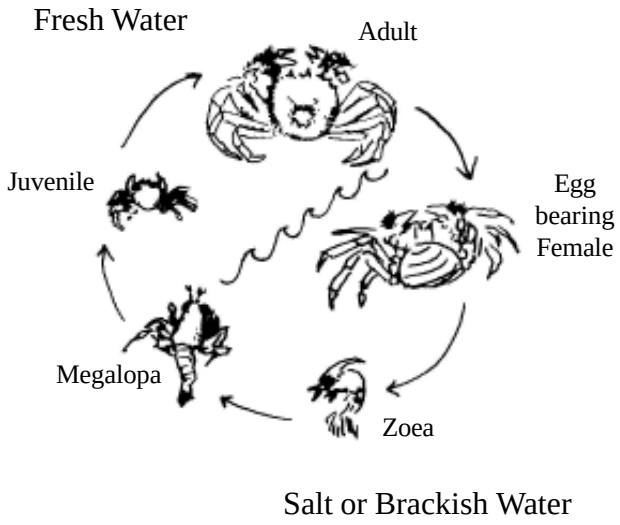
The Chinese mitten crab, *Eriocheir sinensis*, is native to the rivers of China and Korea that flow into the Yellow Sea, where it is commonly called the river crab or Shanghai crab. Accidental introductions to Europe in the early 1900s resulted in established populations of the Chinese mitten crab in Germany, the Netherlands, and England. It was first collected in San Francisco Bay in 1992 by commercial shrimp trawlers. It is now established throughout San Francisco Bay and its watershed, including the Delta, and the Sacramento and San Joaquin rivers.

The Chinese mitten crab is thought to have been introduced to California either intentionally to establish a fishery or accidentally through ballast water discharge. The crab has the potential to disperse along the West Coast of North America via ocean currents, ballast water, or intentional human transport.

In California, monitoring programs and investigations are currently under way to determine the extent to which the Chinese mitten crab will influence the State's resources, infrastructure, and citizens.

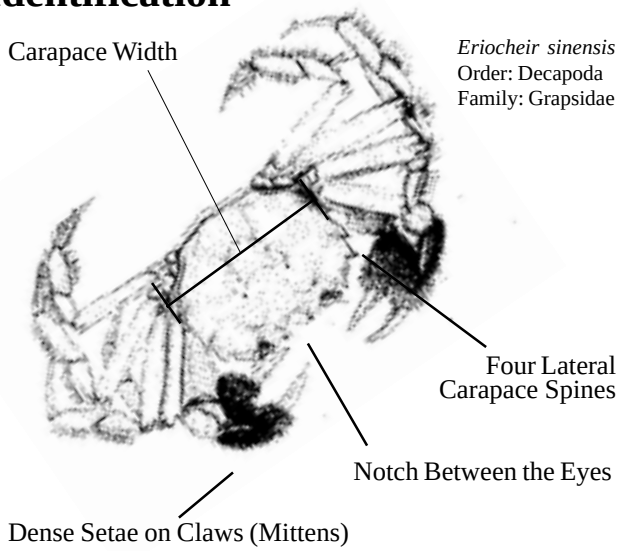
Life History

The Chinese mitten crab is catadromous. Generally, crabs rear in fresh water and migrate to brackish or salt water in fall to reproduce. They mate in winter, and the females carry the eggs under the abdominal flap until the larvae hatch in late winter and spring. The larvae are planktonic for 1 to 2 months and go through several developmental stages (zoeae and megalopa). Megalopae settle to the bottom in late spring and early summer and develop into juvenile crabs. Juvenile crabs migrate upstream to rear in brackish and fresh water. In California, most Chinese mitten crabs probably mature in 1 to 2 years; however, the life span is reported to be 1 to 5 years elsewhere, depending on water temperature and salinity.

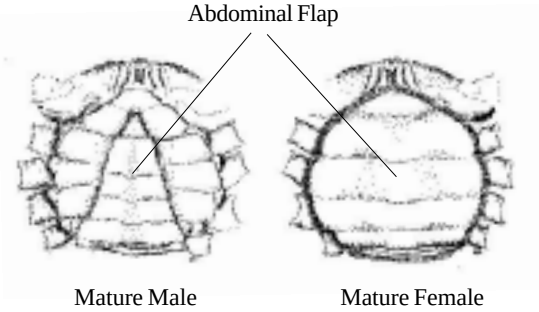


Juvenile crabs are common in the intertidal zone and are found in burrows, root wads, and aquatic vegetation. Juveniles may also be found subtidally in shallow water, often in beds of submerged aquatic vegetation, or deep water channels. Mitten crabs are omnivorous and opportunistic scavengers, eating both plant and animal matter.

Identification



A dense covering of hairlike setae on each claw is the most conspicuous diagnostic feature of the Chinese mitten crab. However, juveniles smaller than 25 mm (1 inch) carapace width (CW) lack setae on their claws. The setae become denser on the claws and legs as the crab matures. The walking legs are twice as long as the carapace, and carapace length is roughly equal to carapace width. The mitten crab carapace has 4 spines on each side and a deep notch between the eyes. Mitten crab color ranges from brown to olive-green. Adult crabs range in size from 35 to 100 mm (1.4 to 4 inches) CW.



Males have a "bell" shaped abdominal flap. Females have a "beehive" shaped abdominal flap that broadens as they mature.

Mitten Crab Facts

- Depending on size, one female can produce 250,000 to 1 million eggs. However, most offspring die before reaching maturity.
- Both sexes reproduce once and die soon after reproduction.
- Mitten crabs can migrate downstream at a rate of 8 to 12 km (5 to 7.5 miles) per day.
- Mitten crabs are adept walkers and readily leave the water to bypass migration obstacles.
- Juvenile crabs are more likely to burrow than adult crabs.

Legal Status and Regulations

The Chinese mitten crab is on the California Department of Fish and Game's (CDFG) List of Prohibited Species, as well as the U.S. Fish and Wildlife Service's List of Injurious Wildlife. Live Chinese mitten crabs may not be possessed, transported, or imported.

Mitten crabs may be fished recreationally, however, catch may be kept only if crabs are killed immediately after capture. Recreational anglers must possess a current California sport fishing license and comply with CDFG regulations. Permitted gear and take limits vary by water body. Please contact CDFG for current mitten crab sport regulations.

Requests to establish a commercial fishery for the Chinese mitten crab were denied by the California Fish and Game Commission.

Interagency Ecological Program

For more information, visit http://www.iep.ca.gov