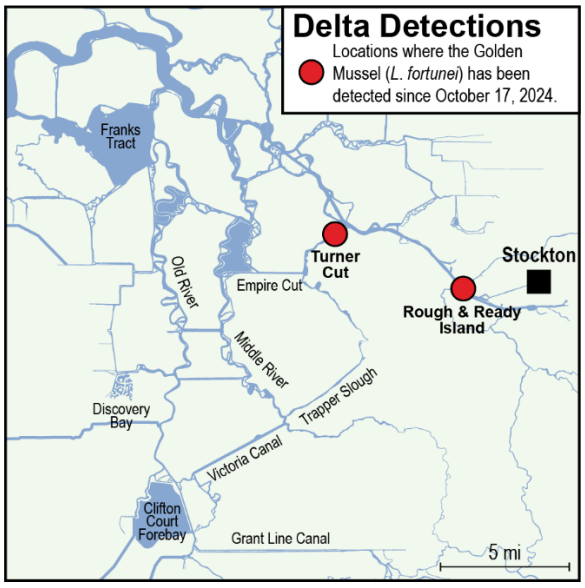
Golden Mussel (*Limnoperna fortunei*)

A new invasive mollusk was discovered in the Delta in October 2024.

Fast Facts

- Golden Mussels (*Limnoperna fortunei*) were found at Rough & Ready Island near Stockton, California on October 17, 2024.
- The Golden Mussel has been identified as one of the **highest-risk** invasive species globally
- This is the **first-ever** detection of the Golden Mussel in North America.
- Capable of rapid spread (> 240 km/yr in Brazil), these mussels post an **immediate and urgent threat** to both the Delta ecosystem and water-based built infrastructure.
- DWR is contributing to a multi-agency team to monitor and report Golden Mussel sightings and coordinate on possible strategies for control and eradication.



Map showing locations where the Golden Mussel has been found in the Sacramento – San Joaquin Delta since October 17, 2024.

Physiology & Ecology

Physical Description: Golden Mussels are sessile (non-moving) bivalves (two-shelled mollusks) whose color varies from a light golden to darker yellowish-brown and brown hues. Adult shells are typically 2-3 cm in diameter, with some reaching sizes of >4 cm. Golden Mussels typically grow in dense, reeflike colonies containing as many as 200,000 organisms per square meter.

Habitat: Originating from China and southeast Asia, Golden Mussels now inhabit shallow (< 10 m), freshwater aquatic environments worldwide. They tolerate many environmental stressors including wide ranges of temperature, pollution, and low oxygen. Preferring fresh water, Golden Mussels can nevertheless tolerate salinity of up to 10 ppt for as much as 30 days (Sylvester et al., 2013).

Life History: Larvae develop into a mobile life stage (i.e., veligers) that propagate through water bodies before reaching the settling stage roughly 11-20 days after spawning. They then colonize hard surfaces and grow into adult mussels, remaining attached for the rest of their life span.

Ecosystem Impacts: Golden Mussels are effective ecosystem engineers capable of catalyzing environmental changes equivalent to those caused by Zebra and Quagga Mussels in the Great Lakes. They can dramatically reduce plankton abundance, leading to broad food web impacts. Their ability to rapidly colonize surfaces jeopardizes infrastructure in any infested water bodies.

Monitoring Notes: Golden Mussel colonies typically attach to solid substrates. They are found piers, moorings, rocks, boats, and other submerged objects but can survive subaerial exposure in tidal systems (Boltovskoy et al., 2022). The do not inhabit in soft sediments and are therefore unlikely to be detected using typical benthic monitoring approaches (e.g., grabs and cores).

Questions? Email mussel@water.ca.gov

Golden Mussel shells collected in October 2024 at a water quality station at Rough & Ready Island near Stockton in San Joaquin County, California, USA. Photo: Elizabeth Wells, Ph. D. (DWR)

Golden mussels colonizing the exterior housing of water quality equipment at Rough and Ready Island in October 2024. Photo: Jay Aldrich (DWR)

Golden Mussels colonizing a water pipe at a hydroelectric plant in Brazil (Mountinho, 2021).

*Shells of the invasive Golden Mussel (*Limnoperna fortunei*) showing general morphology (Boltovskoy, 2017).*

References

Boltovskoy et al. (2022) "What we know and don't know about the invasive golden mussel *Limnoperna fortunei*" *Hydrobiologia*. pp 1-48. doi: 10/npxb.

Fusaro et al. (2024) *Limnoperna fortunei*: U.S. Geological Survey, Nonindigenous Aquatic Species Database and NOAA Great Lakes Aquatic Nonindigenous Species Information System.

Moutinho (2021) "A Golden Menace" *Science*. Vol. 374(6566), pp. 390–393. doi: 10/npkd.

Sylvester et al. (2013) "Fluctuating salinity improves survival of the invasive freshwater golden mussel at high salinity: implications for the introduction of aquatic species through estuarine ports." *Biological Invasions.* Vol. 15, pp. 1355–1366. doi: 10/gvxd4c.