

## Staff Summary for December 11-12, 2024

**16. Golden Mussel Emergency Regulation****Today's Item**Information Action 

Discuss and consider taking emergency action to add golden mussel (*Limnoperna fortunei*) to the list of animals restricted from live importation, transportation and possession.

**Summary of Previous/Future Actions**

- **Today's adoption hearing**

**December 11-12, 2024****Background**

On October 17, 2024, golden mussel, an invasive, freshwater bivalve native to rivers and creeks of China and Southeast Asia, was discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta (Delta). The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality; its arrival in California is a state, national, and international concern, representing the first confirmed detection in North America. Immediate steps are necessary to stop the spread of golden mussel to prevent the translocation of this non-native, invasive species to other waterbodies in the state and beyond.

Golden mussels can tolerate a wider range of environmental conditions than the invasive quagga and zebra (dreissenid) mussels, including less calcium requirements and higher tolerances for salinity and water temperatures. Nearly all waters of California are conducive to golden mussel establishment. Without containment, golden mussels are likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, to other ports and inland waters of North America, and potentially abroad.

As ecosystem engineers, golden mussels can permanently change ecosystem function. Where golden mussels establish, they create large encrustations of reef-like structures in a stream or river. The increase in organic matter shifts varied microhabitats and their diversity to monocultures of species, slowly eliminating aquatic species diversity. In waterways where golden mussels are present, heavy encrustations of golden mussels block municipal and industrial water intakes, requiring ongoing removal; harm native species in the ecosystem; facilitate aquatic weed growth; and diminish water quality. Spread of golden mussels out of the Delta into fresh and brackish waters would cause infrastructure damage across the state and could threaten water delivery and electric power delivery from hydroelectric operations.

The proposed emergency regulation will add golden mussel to the list of restricted animals, which will prohibit importation, transportation, and possession of live golden mussels. Adding golden mussels to the list will reduce the potential for people to introduce and move golden mussels to other waters of the state and prevent damage to native wildlife and their habitats, protect agricultural interests of the state, and protect public health and safety.

As required by Section 2118 of the California Fish and Game Code, the California Department of Food and Agriculture has been notified and concurs with the proposed action to add golden mussel to the list of restricted animals (Exhibit 7).

## Staff Summary for December 11-12, 2024

A notice of proposed emergency action was distributed December 4, 2024 in order to facilitate filing the rulemaking with the Office of Administrative Law as quickly as possible should the Commission adopt the regulation today. Other pertinent documents are available in exhibits 1 through 6 and Exhibit 8.

### Significant Public Comments (N/A)

### Recommendation

**Commission staff:** Find that an emergency exists, find that the project is exempt from the California Environmental Quality Act, and adopt the proposed emergency regulation adding golden mussel to the list of restricted animals as proposed in Exhibit 3 and discussed today.

**Department:** Adopt the regulation as proposed in Exhibit 3.

### Exhibits

1. [Department memo transmitting draft emergency statement, received November 26, 2024](#)
2. [Draft emergency statement and informative digest](#)
3. [Draft proposed regulatory language](#)
4. [Draft economic and fiscal impact statement \(STD. 399\)](#)
5. [Department news release, dated October 31, 2024](#)
6. [Department presentation](#)
7. [California Department of Food and Agriculture concurrence email, dated November 14, 2024](#)
8. [Department memo and draft notice of exemption, received November 26, 2024](#)

### Motion

Moved by \_\_\_\_\_ and seconded by \_\_\_\_\_ that the Commission finds, pursuant to Section 399 of the California Fish and Game Code, that adopting the proposed emergency regulation is necessary for the immediate conservation, preservation, and protection of birds, mammals, fish, amphibians, or reptiles, including, but not limited to, their nests or eggs and for the immediate preservation of the public peace, health and safety, or general welfare.

The Commission further determines that this project is exempt from the California Environmental Quality Act as an action necessary to protect a natural resource and the environment pursuant to the guidelines in California Code of Regulations, Title 14, sections 15307 and 15308.

The Commission further determines, pursuant to Section 11346.1 of the California Government Code, that an emergency situation exists and finds the proposed regulation is necessary to address the emergency.

Therefore, the Commission adopts the emergency regulation to amend Section 671, as discussed today.

## Memorandum

**Date:** November 22, 2024

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject:** **Item for December 12, 2024 Fish and Game Commission Meeting: Submittal of Emergency Statement and Regulatory Documents to Amend Section 671, Title 14, California Code of Regulations, Re: Golden Mussels**

Please find attached the Findings of Emergency and Statement of Proposed Emergency Regulatory Action to Amend Section 671, of Title 14, California Code of Regulations (CCR). The proposed regulations would add golden mussel to the list of restricted animals to make unlawful the importation, possession, and transportation of live golden mussel in California.

On October 17, 2024, golden mussel, an invasive, freshwater bivalve, was discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta. The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, and water quality. Its arrival is a state, national, and international concern. Immediate steps are necessary to stop the spread of this invasive species to prevent the translocation of this species to other waterbodies in the state and beyond.

The proposed emergency regulation will amend Title 14, Section 671 to add golden mussel to the list of restricted animals. Adding golden mussel to the list of restricted animals will prohibit importation, transportation, and possession of live golden mussels, thereby reducing the potential for people to move them to other waters of the state and preventing damage to native wildlife and their habitats, protecting agricultural interests of the state, and protecting public health and safety.

The Department requests submission of this emergency action to the Office of Administrative Law after consideration at the December meeting. If you have any questions or need additional information, please contact Jay Rowan, Chief, Fisheries Branch at [fisheries@wildlife.ca.gov](mailto:fisheries@wildlife.ca.gov). The Department point of contact for this emergency regulation should identify Environmental Program Manager, Martha Volkoff. She can be reached at [Invasives@wildlife.ca.gov](mailto:Invasives@wildlife.ca.gov).

ec: **Department of Fish and Wildlife**

Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
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Martha Volkoff, Env. Program Manager  
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Wildlife and Fisheries Division

Robert Pelzman, Assistant Chief  
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**Fish and Game Commission**

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State of California  
Fish and Game Commission  
Finding of Emergency and Statement of Proposed Emergency Regulatory Action

Emergency Action to Amend Section 671  
Title 14, California Code of Regulations  
Re: Golden Mussel

Date of Statement: November 14, 2024

Throughout this document, CDFW refers to the California Department of Fish and Wildlife, and Commission refers to the California Fish and Game Commission. Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

## I. Statement of Facts Constituting the Need for Emergency Regulatory Action

### ***Background***

Golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was discovered for the first time on October 17, 2024, in the Port of Stockton by California Department of Water Resources (DWR) staff while conducting routine operations. This is the first known occurrence of this highly invasive species in North America. Shortly after, golden mussels were detected at additional sites in the Sacramento-San Joaquin Delta (Delta), including Turner Cut downstream of the Port of Stockton (October 23), Middle River (October 31), Old River (November 7), and in the San Joaquin River upstream of the Port of Stockton (November 5). Golden mussels were also detected in O'Neill Forebay on October 25 and at the outlet of O'Neill Forebay to the California Aqueduct on October 31 (Figure 1). O'Neill Forebay is a forebay of San Luis Reservoir, which is a joint use facility of the California State Water Project and federal Central Valley Project located in Merced County.

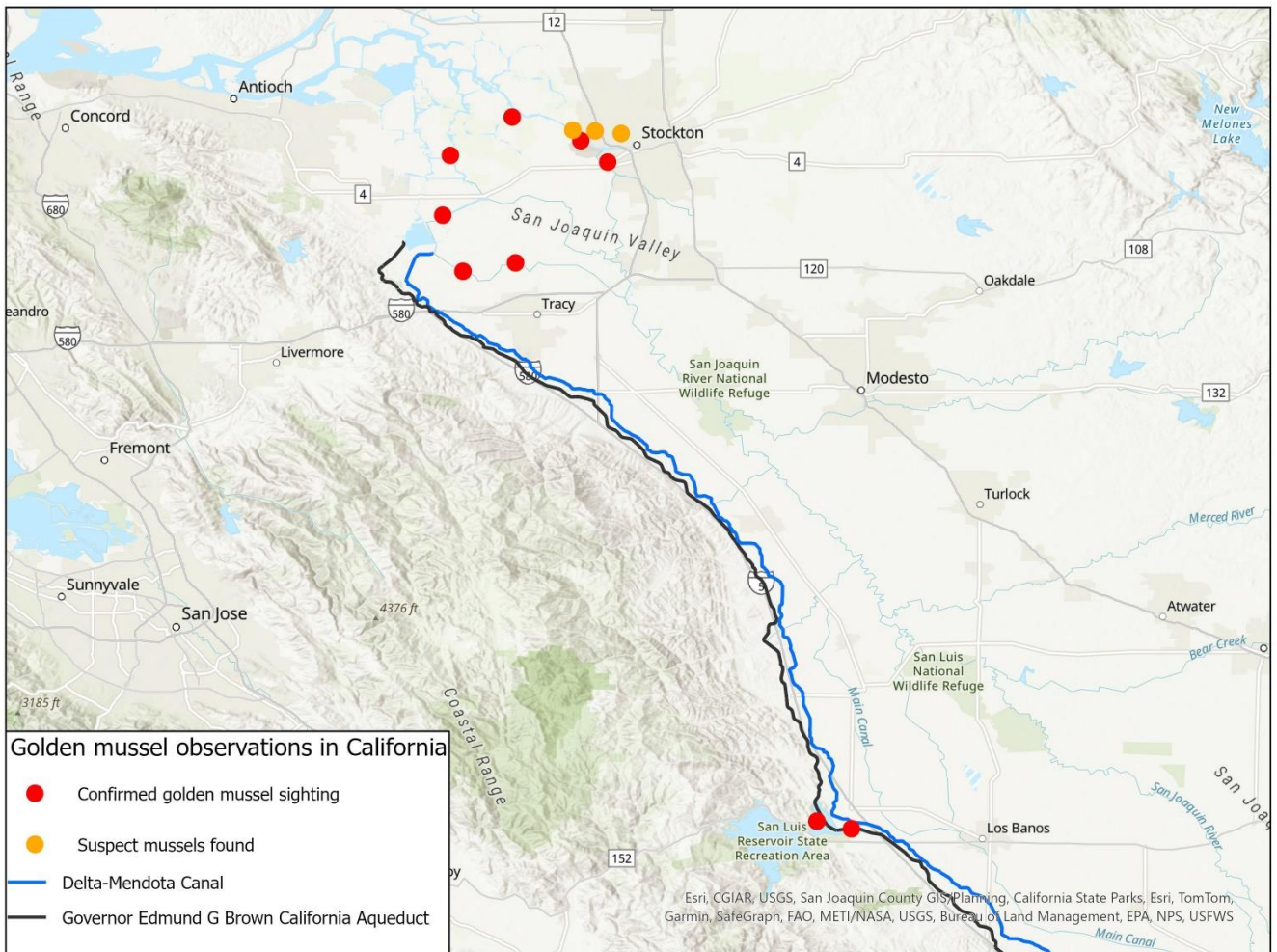
Golden mussels in the Delta pose a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Their presence in California is of statewide, national, and international concern. Without actions to prevent further spread, golden mussel have the potential to be moved overland on trailered watercraft and equipment out of the Delta and to nearby and distant fresh and brackish waters, including rivers, lakes, and reservoirs within California and the rest of North America.

Golden mussels are native to rivers and creeks of China and Southeast Asia. They are known to be established outside of their native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay, and Argentina. The initial introductions to these countries were likely the result of ships with biofouling on the hulls and/or ballast water release. In most cases, the invaded range has expanded upstream from the point of introduction, and inland from ports through local, human-mediated pathways. Within the invaded range, significant impacts resulting from the dense colonization of golden mussels on hard surfaces are widely documented.

Golden mussels have similar appearance, biology, and impact as quagga and zebra (dreissenid) mussels. Golden mussels are small, typically under 1.5 inches in length with shell color that is light golden to darker yellowish-brown to brown color. They firmly attach to hard to semi-hard surfaces.

Shortly after fertilization, the larvae become mobile, capable of coordinated swimming, and disperse in the water column. Larvae are microscopic and themselves cannot swim upstream, but can be carried by human-mediated pathways such as water within watercraft. Once a suitable substrate is found, juvenile mussels settle and attach themselves to the substrate by strong, silky fibers called byssal threads and develop into adults. Golden mussels can grow in dense colonies of hundreds of thousands of mussels per square meter.

Figure 1. Golden mussel detections as of November 14, 2024.



Golden mussels can tolerate a wider range of environmental conditions than dreissenid mussels, meaning they are able to establish in environments where dreissenid mussels are unable to invade. Because they require less calcium to survive and reproduce than dreissenid mussels, nearly every waterbody in California is at risk of becoming infested with golden mussels if they are introduced. Golden mussels tolerate higher salinity than dreissenid mussels, making the brackish parts of estuaries, such as Suisun Bay, suitable for golden mussel establishment. They also tolerate warmer water temperatures compared to dreissenid mussels.

Like dreissenid mussels, golden mussels pose an environmental threat to California since they are ecosystem engineers and can profoundly change the food web of an invaded ecosystem. They can impact native species and sports fish by competing for food sources. They can also increase water clarity due to intense filter feeding, resulting in degraded water quality, algal blooms, and increased aquatic vegetation growth that requires control to maintain navigation.

Like dreissenid mussels, golden mussels pose an economic threat to California's infrastructure and recreation industries. Heavy encrustations of golden mussels form dense reef-like structures that block municipal and industrial water supplies, agricultural irrigation, and power plant operations, necessitating ongoing biofouling removal. Millions of dollars are spent annually to maintain infrastructure and efforts to prevent the further spread of dreissenid mussels in California.

Golden mussels can also impact recreation by limiting recreational opportunities, encrusting docks and beaches, and colonizing recreational equipment including watercraft hulls, engines, and steering components. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted aquatic ecosystems.

Golden mussels were likely introduced to the Port of Stockton, San Joaquin County, by a ship traveling from an international port. Golden mussels are likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as the Suisun Bay, and southward via the State Water Project and Central Valley Project that draw from the Delta. Without containment, golden mussels are also likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

CDFW, California Department of Parks and Recreation (California State Parks), California Department of Food and Agriculture, DWR, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, and other state, federal, and local agencies regularly coordinate through the CDFW's Invasive Species Program. This partnership aims to limit the spread of invasive species in California's waterways, which cause harm to native species and the ecosystems they depend on to survive. These agencies are mobilizing to delineate the infestation and prevent the further spread of golden mussels. Currently there are no federal or state prohibitions for possessing or moving golden mussels.

Currently, it is unlikely that any person is intentionally in possession of golden mussel, as they are not known to be a species for human consumption, for aquaculture or in the aquarium trade. In the event someone were to be in possession, intentionally or unintentionally, those mussels should be euthanized upon enactment of this emergency regulation. Thereafter, pursuant to Section 671.1, golden mussels could be possessed under a permit issued by CDFW for purposes as defined in the regulations.

### ***Proposed Emergency Regulations***

In response to this emergency situation, the proposed regulatory action amends Section 671 to add golden mussel to the list of restricted animals. This amendment adds subsection (B) to subsection (c)(10) Bivalves, where (A) currently covers all members of the genus *Dreissena* (zebra and quagga mussels). The new subsection (B) adds the golden mussel (*Limnoperna*

*fortunei*) species. Adding golden mussel to the list of restricted animals will immediately prohibit importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Adding golden mussel to the list of restricted species will also allow water managers operating mussel prevention programs grounds to refuse watercraft from launching into waterways. Additionally, it will allow law enforcement personnel to detain vessels or equipment until such time as they no longer pose a threat to the environment.

Fish and Game Code sections 2118 and 2120 provide broad authority for the restricted species list implemented in section 671 of Title 14, CCR. Cooperation with the California Department of Food and Agriculture is required for consideration of the addition or removal of classes, families, genera, and species from the list of restricted species (subdivisions 2118(j) and (k)). Given the ramifications for spread of golden mussel, its presence is considered, "...undesirable, and a menace to native wildlife or the agricultural interests of the state."

## II. Findings for the Existence of an Emergency

The Commission considered the following factors in determining that an emergency does exist at this time.

### ***The magnitude of potential harm:***

In waterways where golden mussels are present, heavy encrustations of golden mussels have blocked municipal and industrial water intakes compelling ongoing biofouling removal (Xu et al. 2015; Zhao et al. 2019), harmed native species in the ecosystem (Boltovskoy and Correa 2015; Cataldo et al. 2012), facilitated aquatic weed growth, and diminished water quality (Zhang et al. 2022). Spread of golden mussel out of the Delta into fresh and brackish waters would cause infrastructural damage across the state, and could threaten water delivery and electric power delivery from hydroelectric operations (for example, O'Neill Forebay). As ecosystem engineers, golden mussels can permanently change ecosystem function. As large encrustations of reef-like structures grow in a stream or river, the increase in organic matter shifts varied microhabitats and their diversity to monocultures of species, slowly eliminating aquatic species diversity (Mouthino, 2021).

Given the very real harms presented by golden mussels, individuals within and entering California should not be importing, transporting, or possessing them, and so making them a restricted species is appropriate.

### ***The existence of a crisis situation:***

These discoveries in the Delta are the first known occurrences of golden mussels in North America. The further spread of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure, electric power delivery from hydroelectric operations, and water quality.

Because of rapid mussel colonization of infrastructure and water conveyances, this new invasion is a significant threat to the Delta and waterbodies statewide, nationally, and internationally. Impacts are far-reaching, from water transfers inclusive of the Central Valley Project and State



Water Project, to water agencies and distributors, to recreationists. Adverse impacts could be felt to recreation, transportation and shipping, agriculture, and municipal water supplies.

***The immediacy of the need:***

There is a significant immediate need to stop the spread of this invasive species to prevent the translocation of this species to other waterbodies in the state and beyond. There is an immediate need to conduct vessel inspections to reduce the spread of the aquatic invasive species. CDFW law enforcement needs to be able to inspect watercraft and quarantine any vessels that are infested with golden mussels. Water managers must be able to refuse vessels and equipment that are or suspected to be carrying golden mussels from launching into lakes, reservoirs, or other waterways where golden mussels are not known to be present.

Previous cases, such as in South America, have seen ultra-rapid expansion after the first infestation (e.g., Darrigran and Damborenea 2005), invading both natural areas and human infrastructure. Aside from natural mussel propagation, spread is assisted by human activities including commerce, fishing, and recreation. Any delay in facilitating vessel inspections could allow the mussel's range to spread to new areas and compromise efforts to control it.

CDFW is continuing to work with state, local, and federal agencies to enhance monitoring efforts, communicate additional detection and response information, and coordinate on potential next steps. If the spread of this species is not prevented, more waterways will be infested, further increasing the threat to uninfested waters.

***Whether the anticipation of harm has a basis firmer than simple speculation:***

Ecosystem degradation, infrastructure biofouling, and water quality decreases are all documented potential effects from golden mussel invasion. Costs for maintenance, control, and surveillance have skyrocketed following its spread in other invaded areas (Darrigran and Damborenea 2005). Golden mussel is also quite adaptable to a broad range of environmental conditions; it tolerates a wide range of temperatures, salinity, and other water quality factors, making its spread to disparate areas much more likely even than other bivalve invaders.

California's experience with dreissenid mussels over the last 17 years has demonstrated prevention and containment is effective to slowing the spread of mussels and avoiding widespread impacts resulting from invasive mussel establishment. This success would not have been achieved without the necessary authority.

### **III. Impact of Regulatory Action**

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following initial determinations relative to the required statutory categories have been made:

**(a) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:**

Adding golden mussels to the restricted species list does not necessarily compel a requirement to act upon state agencies, but rather enables existing programs to include the species in their enforcement actions for detection and prevention. As such, the Commission does not anticipate any direct costs or savings to CDFW or other state agencies as a result of

this emergency action. There may be future complementary authorities or requirements for managing golden mussels that will come from elsewhere, such as legislation, compelling costs associated with preventing the spread of golden mussels.

**(b) Nondiscretionary Costs/Savings to Local Agencies:**

None. Adding golden mussel to the list of restricted animals will not have the potential for a fiscal effect on local governments, as the regulation only adds the species to the restricted animals list without prescribing specific enforcement actions to be taken by local government entities.

**(c) Programs Mandated on Local Agencies or School Districts:**

None. Adding golden mussel to the list of restricted animals will not have the potential for a fiscal effect on local governments, as the regulation only adds the species to the restricted animals list without mandating specific enforcement actions or programs to be taken by local government entities.

**(d) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code: None.**

**(e) Effect on Housing Costs: None**

**IV. Technical, Theoretical, and/or Empirical Studies, Reports, or Documents Relied Upon:**

California Department of Fish and Game. 2008. [California Aquatic Invasive Species Management Plan](#); Draft Rapid Response Plan. State of California, Resources Agency. Available from: [California Aquatic Invasive Species Management Plan](#)

Smith, R. and L. McMartin. 2011. [Bay Delta Rapid Response Plan For Dreissenid Mussels](#). U.S. Fish and Wildlife Service developed for the California Department of Fish and Game #P0685514. Stockton, CA.

**V. Documents Providing Background Information**

Boltovskoy, D., E. Paolucci, H. J. MacIsaac, A. Zhan, Z. Xia, and N. Correa. 2022. What we know and don't know about the invasive golden mussel *Limnoperna fortunei*. Hydrobiologia. <https://doi.org/10.1007/s10750-022-04988-5>.

Boltovskoy, D., and N. Correa. 2015. Ecosystem impacts of the invasive bivalve *Limnoperna fortunei* (golden mussel) in South America. Hydrobiologia 746:81–95.

Cataldo, D., I. O' Farrell, E. Paolucci, F. Sylvester, and D. Boltovskoy. 2012. Impact of the invasive golden mussel (*Limnoperna fortunei*) on phytoplankton and nutrient cycling. Aquatic Invasions 7:91–100.

- Darrigran, G. A., and M. C. Damborenea. 2005. A South American bioinvasion case history: *Limnoperna fortunei* (Dunker, 1857), the golden mussel. *American Malacological Bulletin* 20:105–112.
- Moutinho, S. 2021. A Golden Menace. An invasive mussel is devastating ecosystems as it spreads through South American rivers, threatening the Amazon basin. *Science* 374: 390-393. Available from: <https://www.science.org/content/article/golden-mussels-devastating-south-american-rivers-amazon-may-be-next>
- Xu, M., Z. Wang, N. Zhao, and B. Pan. 2015. Growth, reproduction, and attachment of the golden mussel (*Limnoperna fortunei*) in water diversion projects. *Acta Ecologica Sinica* 35:70–75.
- Zhang, J., M. Xu, L. Sun, D. Reible, and X. Fu. 2022. Impact of golden mussel (*Limnoperna fortunei*) colonization on bacterial communities and potential risk to water quality. *Ecological Indicators* 144:109499.
- Zhao, N., M. Xu, K. Blanckaert, C. Qiao, H. Zhou, and X. Niu. 2019. Study of factors influencing the invasion of Golden Mussels (*Limnoperna fortunei*) in water transfer projects. *Aquatic Ecosystem Health & Management* 22:385–395.

## VI. Authority and Reference

Authority: Sections 2118 and 2120, Fish and Game Code.

Reference: Sections 1002, 2116, 2118, 2118.2, 2118.4, 2119, 2120, 2122, 2123, 2124, 2125, 2126, 2127, 2150, 2190 and 2271, Fish and Game Code.

## VII. Fish and Game Code Section 399 Finding

Pursuant to Section 399 of the Fish and Game Code, the Commission finds that the adoption of this regulation is necessary for the immediate preservation of the public peace, health and safety, or general welfare.

## Informative Digest/Policy Statement Overview

Golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was discovered for the first time on October 17, 2024, in the Port of Stockton, San Joaquin County. This is the first known occurrence of this highly invasive species in North America. As of November 13, 2024 golden mussels have been detected at 9 additional sites in the Sacramento-San Joaquin Delta and State Water Project.

Golden mussels were likely introduced to the Port of Stockton by a ship traveling from an international port. Golden mussels are likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as the Suisun Bay, and southward via the State Water Project and Central Valley Project that draw from the Delta. Without containment, golden mussels are likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

Golden mussels are native to rivers and creeks of China and Southeast Asia. They are known to be established outside of their native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay, and Argentina. Within the invaded range, significant impacts resulting from the dense colonization of golden mussels on hard surfaces are widely documented.

Golden mussels in the Delta pose a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Their presence in California is of statewide, national, and international concern.

Golden mussels have similar appearance, biology, and impact as quagga and zebra (dreissenid) mussels. Golden mussels can tolerate a wider range of environmental conditions than dreissenid mussels, including less calcium, higher salinity, and warmer water temperatures. Nearly all waters of California are conducive to golden mussel establishment.

Golden mussels are ecosystem engineers and can profoundly change natural environments. They threaten California's infrastructure, recreation, municipal and industrial water supplies, the robust agricultural industry, and power plant operations. Millions of dollars are already spent annually to maintain infrastructure and prevent further spread of dreissenid mussels in California, and golden mussel are anticipated to increase these costs significantly.

Golden mussels can also impact recreation by limiting recreational opportunities, encrusting docks and beaches, and colonizing recreational equipment including watercraft hulls, engines, and steering components. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted aquatic ecosystems.

The California Department of Fish and Wildlife (CDFW) and partners are in the beginning stage of mobilizing a statewide response, including delineation of the infestation and implementing containment to prevent the further spread of golden mussels. Currently there are no federal or state prohibitions for possessing or moving golden mussels. Addition of golden mussel to the list of restricted animals in Section 671 will equip CDFW and local water managers with authority to take action to prevent the overland spread of golden mussels.

In response to this emergency situation, the proposed regulatory action amends Section 671 to add golden mussel to the list of restricted animals. This amendment adds subsection (B) to subsection (c)(10) Bivalves, where (A) currently covers all members of the genus *Dreissena* (zebra and quagga mussels). The new subsection (B) adds the golden mussel (*Limnoperna fortunei*) species. Adding golden mussel to the list of restricted animals will immediately prohibit importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Adding golden mussel to the list of restricted species will also allow water managers operating mussel prevention programs grounds to refuse vessels and equipment that are or suspected to be carrying golden mussels from launching into lakes, reservoirs, or other waterways where golden mussels are not known to be present. Additionally, it will allow law enforcement personnel to inspect watercraft and quarantine any vessels that are infested with golden mussels and/or detain vessels or equipment until such time as they no longer pose a threat to the environment.

***Benefits of the Regulation:***

The California Legislature has declared that some wild animals are a threat to native wildlife or the agricultural interests of the state and that some wild animals are a threat to public health and safety. It is the Legislature's intention that the importation, transportation and possession of wild animals be regulated to protect the native wildlife and agricultural interests of the state against damage from the existence at large of certain wild animals and to protect the health and safety in this state. The proposed regulations will help to prevent the translocation of this golden mussel to other waterbodies in the state and beyond, thereby protecting native wildlife, the agricultural interests of the state and public health and safety.

***Consistency and Compatibility with Existing Regulations***

Article IV, Section 20 of the State Constitution specifies that the Legislature may delegate to Commission such powers relating to the protection and propagation of fish and game as the Legislature sees fit. The Legislature has delegated to the Commission the power to regulate the importation, transportation and possession of wild animals to protect the native wildlife, agricultural interests of the state, and the health and safety in this state. (Fish and Game Code Section 2118). The Commission has reviewed its own regulations and finds that the proposed regulations are consistent with other regulations in Title 14, CCR, and therefore finds that the proposed regulations are neither inconsistent nor incompatible with existing state regulations. The Commission has searched the California Code of Regulations and finds no other state agency regulations pertaining to adding golden mussel to the list of restricted animals.

## Proposed Emergency Regulatory Language

Section 671, Title 14 CCR, is amended to read:

### § 671. Importation, Transportation and Possession of Live Restricted Animals.

(a) It shall be unlawful to import, transport, or possess live animals restricted in subsection (c) below except under permit issued by the department. Permits may be issued by the department as specified herein and for purposes designated in Section 671.1 subject to the conditions and restrictions designated by the department. Except for mammals listed in Fish and Game Code Section 3950 or live aquatic animals requiring a permit pursuant to Fish and Game Code Section 2271, no permit is required by this section for any animal being imported, transported, or possessed pursuant to any other permit issued by the department. Cities and counties may also prohibit possession or require a permit for these and other species not requiring a state permit.

(b) The commission has determined the below listed animals are not normally domesticated in this state. Mammals listed to prevent the depletion of wild populations and to provide for animal welfare are termed “welfare animals”, and are designated by the letter “W”. Those species listed because they pose a threat to native wildlife, the agriculture interests of the state or to public health or safety are termed “detrimental animals” and are designated by the letter “D”. The department shall include the list of welfare and detrimental wild animals as part of DFG MANUAL NO. 671 (2/25/92) IMPORTATION, TRANSPORTATION AND POSSESSION OF RESTRICTED SPECIES, to be made available to all permittees and other interested individuals.

(c) Restricted species include:

[...No changes to subsections (c)(1) through (c)(9)(D)1...]

(10) Class Bivalvia-Bivalves

~~All members of the genus *Dreissena* (zebra and quagga mussels) — (D).~~

(A) All members of the genus *Dreissena* (zebra and quagga mussels) (D).

(B) *Limnoperna fortunei* (golden mussel) (D)

(11) Transgenic Aquatic Animals.

Includes freshwater and marine fishes, invertebrates, amphibians, and reptiles (D).

NOTE: Unpermitted transgenic aquatic animals are determined to be detrimental to native wildlife, therefore the exemption provided for in Fish and Game Code Section 2150(e) is not applicable.

NOTE: Authority cited: Sections 2118 and 2120, Fish and Game Code.

Reference: Sections 1002, 2116, 2118, 2118.2, 2118.4, 2119, 2120, 2122, 2123, 2124, 2125, 2126, 2127, 2150, 2190 and 2271, Fish and Game Code.

**ECONOMIC IMPACT STATEMENT**

DEPARTMENT NAME <b>California Fish and Game Commission</b>	CONTACT PERSON <b>David Thesell</b>	EMAIL ADDRESS <b>fgc@fgc.ca.gov</b>	TELEPHONE NUMBER <b>916 902-9291</b>
DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400 <b>Emergency Action to Amend Section 671, Title 14, CCR, Re: Add Golden Mussel to List of Restricted Animals</b>			NOTICE FILE NUMBER <b>Z</b>

**A. ESTIMATED PRIVATE SECTOR COST IMPACTS** *Include calculations and assumptions in the rulemaking record.*

1. Check the appropriate box(es) below to indicate whether this regulation:

- |  |   |
|--|---|
| <input type="checkbox"/> a. Impacts business and/or employees  | <input type="checkbox"/> e. Imposes reporting requirements                |
| <input type="checkbox"/> b. Impacts small businesses           | <input type="checkbox"/> f. Imposes prescriptive instead of performance   |
| <input type="checkbox"/> c. Impacts jobs or occupations        | <input type="checkbox"/> g. Impacts individuals                           |
| <input type="checkbox"/> d. Impacts California competitiveness | <input checked="" type="checkbox"/> h. None of the above (Explain below): |

**Emergency action: No economic assessment is required, only a fiscal impact assessment required (California Government Code Section 11346.1)**

***If any box in Items 1 a through g is checked, complete this Economic Impact Statement.  
If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.***

**California Fish and Game Commission**

2. The \_\_\_\_\_ estimates that the economic impact of this regulation (which includes the fiscal impact) is:  
(Agency/Department)

- Below \$10 million  
 Between \$10 and \$25 million  
 Between \$25 and \$50 million  
 Over \$50 million *[If the economic impact is over \$50 million, agencies are required to submit a [Standardized Regulatory Impact Assessment](#) as specified in Government Code Section 11346.3(c)]*

3. Enter the total number of businesses impacted: \_\_\_\_\_

Describe the types of businesses (Include nonprofits): \_\_\_\_\_

Enter the number or percentage of total businesses impacted that are small businesses: \_\_\_\_\_

4. Enter the number of businesses that will be created: \_\_\_\_\_ eliminated: \_\_\_\_\_

Explain: \_\_\_\_\_

5. Indicate the geographic extent of impacts:  Statewide  
 Local or regional (List areas): \_\_\_\_\_

6. Enter the number of jobs created: \_\_\_\_\_ and eliminated: \_\_\_\_\_

Describe the types of jobs or occupations impacted: \_\_\_\_\_

7. Will the regulation affect the ability of California businesses to compete with other states by making it more costly to produce goods or services here?  YES  NO

If YES, explain briefly: \_\_\_\_\_

**ECONOMIC IMPACT STATEMENT (CONTINUED)**

**B. ESTIMATED COSTS** *Include calculations and assumptions in the rulemaking record.*

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ \_\_\_\_\_
  - a. Initial costs for a small business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_
  - b. Initial costs for a typical business: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_
  - c. Initial costs for an individual: \$ \_\_\_\_\_ Annual ongoing costs: \$ \_\_\_\_\_ Years: \_\_\_\_\_
  - d. Describe other economic costs that may occur: \_\_\_\_\_
  
2. If multiple industries are impacted, enter the share of total costs for each industry: \_\_\_\_\_
  
3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements. *Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted.* \$ \_\_\_\_\_
  
4. Will this regulation directly impact housing costs?  YES  NO  
If YES, enter the annual dollar cost per housing unit: \$ \_\_\_\_\_  
Number of units: \_\_\_\_\_
  
5. Are there comparable Federal regulations?  YES  NO  
Explain the need for State regulation given the existence or absence of Federal regulations: \_\_\_\_\_
  
- Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ \_\_\_\_\_

**C. ESTIMATED BENEFITS** *Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: \_\_\_\_\_
  
2. Are the benefits the result of:  specific statutory requirements, or  goals developed by the agency based on broad statutory authority?  
Explain: \_\_\_\_\_
  
3. What are the total statewide benefits from this regulation over its lifetime? \$ \_\_\_\_\_
  
4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: \_\_\_\_\_

**D. ALTERNATIVES TO THE REGULATION** *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: \_\_\_\_\_



**ECONOMIC AND FISCAL IMPACT STATEMENT  
(REGULATIONS AND ORDERS)**

STD. 399 (Rev. 10/2019)

**Draft Document****ECONOMIC IMPACT STATEMENT (CONTINUED)**

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 1: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

Alternative 2: Benefit: \$ \_\_\_\_\_ Cost: \$ \_\_\_\_\_

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: \_\_\_\_\_

4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs?  YES  NO

Explain: \_\_\_\_\_

**E. MAJOR REGULATIONS** *Include calculations and assumptions in the rulemaking record.****California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.***1. Will the estimated costs of this regulation to California business enterprises **exceed \$10 million**?  YES  NO***If YES, complete E2. and E3******If NO, skip to E4***

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: \_\_\_\_\_

Alternative 2: \_\_\_\_\_

*(Attach additional pages for other alternatives)*

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 1: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

Alternative 2: Total Cost \$ \_\_\_\_\_ Cost-effectiveness ratio: \$ \_\_\_\_\_

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

 YES  NO*If YES, agencies are required to submit a [Standardized Regulatory Impact Assessment \(SRIA\)](#) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: \_\_\_\_\_

The incentive for innovation in products, materials or processes: \_\_\_\_\_

The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: \_\_\_\_\_

**FISCAL IMPACT STATEMENT**

**A. FISCAL EFFECT ON LOCAL GOVERNMENT** *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

- a. Funding provided in \_\_\_\_\_  
Budget Act of \_\_\_\_\_ or Chapter \_\_\_\_\_, Statutes of \_\_\_\_\_

- b. Funding will be requested in the Governor's Budget Act of \_\_\_\_\_  
Fiscal Year: \_\_\_\_\_

2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)  
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ \_\_\_\_\_

*Check reason(s) this regulation is not reimbursable and provide the appropriate information:*

- a. Implements the Federal mandate contained in \_\_\_\_\_

- b. Implements the court mandate set forth by the \_\_\_\_\_ Court.

Case of: \_\_\_\_\_ vs. \_\_\_\_\_

- c. Implements a mandate of the people of this State expressed in their approval of Proposition No. \_\_\_\_\_

Date of Election: \_\_\_\_\_

- d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: \_\_\_\_\_  
\_\_\_\_\_

- e. Will be fully financed from the fees, revenue, etc. from: \_\_\_\_\_

Authorized by Section: \_\_\_\_\_ of the \_\_\_\_\_ Code;

- f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in \_\_\_\_\_

3. Annual Savings. (approximate)

\$ \_\_\_\_\_

4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

5. No fiscal impact exists. This regulation does not affect any local entity or program.

6. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**FISCAL IMPACT STATEMENT (CONTINUED)**

**B. FISCAL EFFECT ON STATE GOVERNMENT** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

*It is anticipated that State agencies will:*

a. Absorb these additional costs within their existing budgets and resources.

b. Increase the currently authorized budget level for the \_\_\_\_\_ Fiscal Year

2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

3. No fiscal impact exists. This regulation does not affect any State agency or program.

4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

**C. FISCAL EFFECT ON FEDERAL FUNDING OF STATE PROGRAMS** *Indicate appropriate boxes 1 through 4 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

1. Additional expenditures in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

2. Savings in the current State Fiscal Year. (Approximate)

\$ \_\_\_\_\_

3. No fiscal impact exists. This regulation does not affect any federally funded State agency or program.

4. Other. Explain \_\_\_\_\_  
\_\_\_\_\_

FISCAL OFFICER SIGNATURE

DATE



*The signature attests that the agency has completed the STD. 399 according to the instructions in SAM sections 6601-6616, and understands the impacts of the proposed rulemaking. State boards, offices, or departments not under an Agency Secretary must have the form signed by the highest ranking official in the organization.*

AGENCY SECRETARY

DATE



*Finance approval and signature is required when SAM sections 6601-6616 require completion of Fiscal Impact Statement in the STD. 399.*

DEPARTMENT OF FINANCE PROGRAM BUDGET MANAGER

DATE



## STD 399 Addendum

### Emergency Action to Amend Section 671 Title 14, California Code of Regulations Re: Add Golden Mussel to List of Restricted Animals

#### Economic Impact Statement

##### Background

Golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was discovered for the first time on October 17, 2024, in the Port of Stockton by California Department of Water Resources (DWR) staff while conducting routine operations. This is the first known occurrence of this highly invasive species in North America. Golden mussels were also detected in O'Neill Forebay on October 25 and at the outlet of O'Neill Forebay to the California Aqueduct on October 31. O'Neill Forebay is a forebay of San Luis Reservoir, which is a joint use facility of the California State Water Project and federal Central Valley Project located in Merced County.

Golden mussels in the Delta pose a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Their presence in California is of statewide, national, and international concern.

Golden mussels can tolerate a wider range of environmental conditions than dreissenid mussels, meaning they are able to establish in environments where dreissenid mussels are unable to invade. Because they require less calcium to survive and reproduce than dreissenid mussels, nearly every waterbody in California is at risk of becoming infested with golden mussels if they are introduced. Golden mussels tolerate higher salinity than dreissenid mussels, making the brackish parts of estuaries, such as Suisun Bay, suitable for golden mussel establishment. They also tolerate warmer water temperatures compared to dreissenid mussels. Golden mussels can grow in dense colonies of hundreds of thousands of mussels per square meter.

Like dreissenid mussels, golden mussels pose an environmental threat to California since they are ecosystem engineers and can profoundly change the food web of an invaded ecosystem. They can impact native species and sports fish by competing for food sources. They can also increase water clarity due to intense filter feeding, resulting in degraded water quality, algal blooms, and increased aquatic vegetation growth that requires control to maintain navigation.

Like dreissenid mussels, golden mussels pose an economic threat to California's infrastructure and recreation industries. Heavy encrustations of golden mussels form dense reef-like structures that block municipal and industrial water supplies, agricultural irrigation, and power plant operations, necessitating ongoing biofouling removal. Millions of dollars are spent annually to maintain infrastructure and efforts to prevent the further spread of dreissenid mussels in California.

Golden mussels can also impact recreation by limiting recreational opportunities, encrusting docks and beaches, and colonizing recreational equipment including watercraft hulls, engines,

and steering components. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted aquatic ecosystems.

Golden mussels were likely introduced to the Port of Stockton, San Joaquin County, by a ship traveling from an international port. Golden mussels are likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as the Suisun Bay, and southward via the State Water Project and Central Valley Project that draw from the Delta. Without containment, golden mussels are also likely to spread overland on trailered vessels and equipment to other fresh and brackish waterbodies throughout California, and to other ports and inland waters of North America, and potentially abroad.

CDFW, California Department of Parks and Recreation (California State Parks), DWR, U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, and other state, federal, and local agencies regularly coordinate through the CDFW's Invasive Species Program. This partnership aims to limit the spread of invasive species in California's waterways, which cause harm to native species and the ecosystems they depend on to survive. These agencies are mobilizing to delineate the infestation to prevent the further spread of golden mussels. Currently, there are no federal or state prohibitions for possessing or moving golden mussels.

In response to this emergency situation, the proposed regulatory action amends Section 671 to add golden mussel to the list of restricted animals. Adding golden mussel to the list of restricted animals will immediately prohibit importation, transportation, and possession of live golden mussels, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Adding golden mussel to the list of restricted species will also allow water managers operating mussel prevention programs grounds to refuse watercraft from launching into waterways. Additionally, it will allow law enforcement personnel to detain vessels or equipment until such time as they no longer pose a threat to the environment.

#### **A. Estimated Private Sector Cost Impacts**

1. Answer: h. None of the above.

Emergency regulations do not require an economic impact statement; only fiscal impacts must be evaluated (California Government Code Section 11346.1).

#### **Fiscal Impact Statement**

##### **A. Fiscal Effect on Local Government**

Answer: 5. No fiscal impact.

None. The proposed regulations to amend Section 671 Title 14, CCR to add golden mussel to the list of restricted animals will not have the potential for a fiscal effect on local governments, as the regulation only adds the species to the restricted animals list without prescribing specific enforcement actions to be taken by local government entities.

**B. Fiscal Effect on State Government**

Answer: 3. No fiscal impact exists. This regulation does not affect any state Agency or program.

Adding golden mussels to the restricted species list does not necessarily compel a requirement to act upon state agencies, but rather enables existing programs to include the species in their enforcement actions for detection and prevention. As such, the Commission does not anticipate any direct costs or savings to CDFW or other state agencies as a result of this emergency action. There may be future complementary authorities or requirements for managing golden mussels that will come from elsewhere, such as legislation, compelling costs associated with preventing the spread of golden mussels.

**C. Fiscal Effect on Federal Funding of State Programs**

Answer: 3. No fiscal impact.

The proposed emergency action will not have the potential for a fiscal effect on the federal funding of state programs.

## Invasive Non-Native Golden Mussel Discovered in the Sacramento–San Joaquin Delta

October 31, 2024



**Golden mussel** (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was recently discovered in the Port of Stockton by California Department of Water Resources staff while conducting routine operations. Suspected golden mussels have also been identified at O'Neill Forebay in Merced County and are currently undergoing genetic testing for confirmation.

This discovery is the first known occurrence of golden mussels in North America. The species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, water conveyance systems, infrastructure and water quality.

In waterways where this species is present, heavy encrustations of golden mussels have blocked municipal and industrial water intakes, necessitated ongoing biofouling removal, harmed native species in the ecosystem, increased water clarity due to intense filter feeding, and diminished water quality.

The California Department of Fish and Wildlife (CDFW), California State Parks, California Department of Water Resources (DWR), U.S. Fish and Wildlife Service, Bureau of Reclamation, and other state, federal, and local agencies regularly coordinate through the Aquatic Invasive Species program. This partnership aims to limit the spread of invasive species in California's waterways, which cause damage to native species and the ecosystems they need to survive.

Golden mussels were likely introduced to California by a ship traveling from an international port. They are likely to spread throughout the Delta and through the water conveyance systems associated with it. Without containment, golden mussels are likely to spread to other freshwater bodies in California, and to other ports and inland waters of North America, and abroad.

Following the initial discovery of golden mussels in the Port of Stockton, observations of additional mussels have been made on monitoring equipment downstream. Species confirmation is pending for these organisms. Golden mussels are similar in appearance, biology, and impacts to quagga and zebra mussels and are a continued priority for prevention and containment in inland waters of Southern California and across the state.

Golden mussels are native to rivers and creeks of China and Southeast Asia. They are known to be established outside of their native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay and Argentina. The initial introductions to these countries were also likely the result of ships from biofouling on the hulls and/or ballast water release. In most cases, the invaded range has expanded upstream from the point of introduction and inland from ports through local, human-mediated pathways. Within the invaded range significant impacts are widely documented resulting from the dense colonization of golden mussels on hard surfaces.

The California Natural Resources Agency and its partners call upon everyone working and recreating in waters of the state to clean, drain and dry watercraft and equipment every time it is removed from a waterbody. This simple measure has served to prevent spreading quagga and zebra mussels and is equally effective in stopping the overland spread of golden mussels. DWR is now conducting boat inspections at O'Neill Forebay in an effort to reduce the spread of aquatic invasive species.

CDFW is continuing to work with state, local, and federal agencies to enhance monitoring efforts, communicate additional detection and response information, and coordinate on potential next steps. Please report organisms observed in California suspected to be golden mussels to CDFW's [Invasive Species Program](#). Include the specific location of the observation, and at least one clear close-up photograph of the organism, and your contact information. Submit reports via one of the following options:

Online at [wildlife.ca.gov/Conservation/Invasives/Report](https://wildlife.ca.gov/Conservation/Invasives/Report)

Via email to [invasives@wildlife.ca.gov](mailto:invasives@wildlife.ca.gov)

Via telephone to (866) 440-9530

To prevent the spread of invasive mussels, be sure to clean, drain and dry your boats. Learn more at California State Parks' Division of Boating and Waterways page, <https://dbw.parks.ca.gov/StopQZ>(opens in new tab).





DWR



# EMERGENCY 671 LISTING: GOLDEN MUSSEL

*Limnoperna fortunei*

**PRESENTATION TO THE CALIFORNIA FISH AND GAME COMMISSION**

December 12, 2024 | Jay Rowan

Wildlife and Fisheries Division/Fisheries Branch

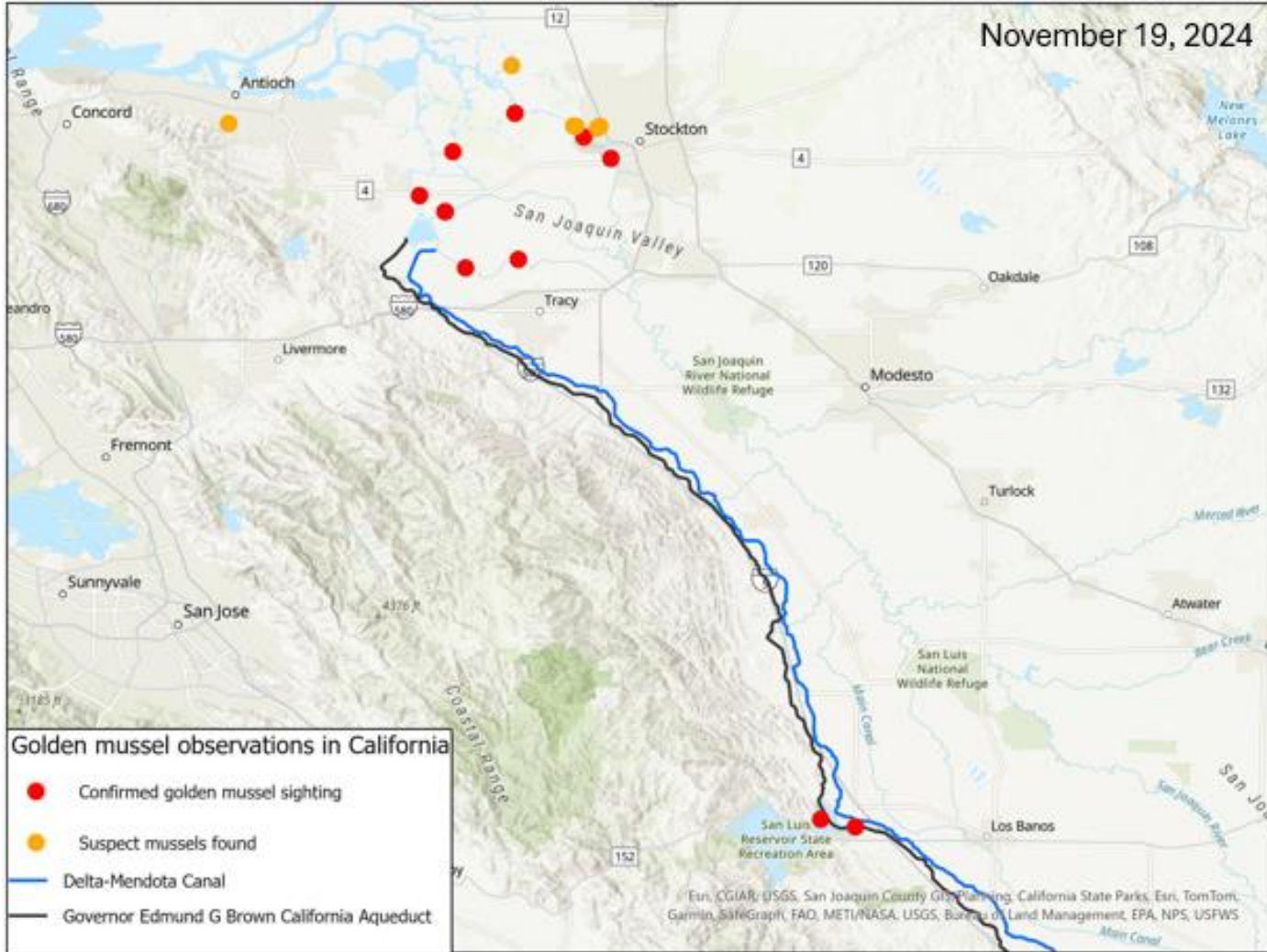
# Golden Mussels

- First detection in North America
- Likely introduced by a ship from an international port
- Mass colonization of infrastructure, necessitating ongoing removal to maintain operation
- Intensive filter feeding and colonization alters the environment
- Nearly all California fresh and brackish waters are suitable for establishment

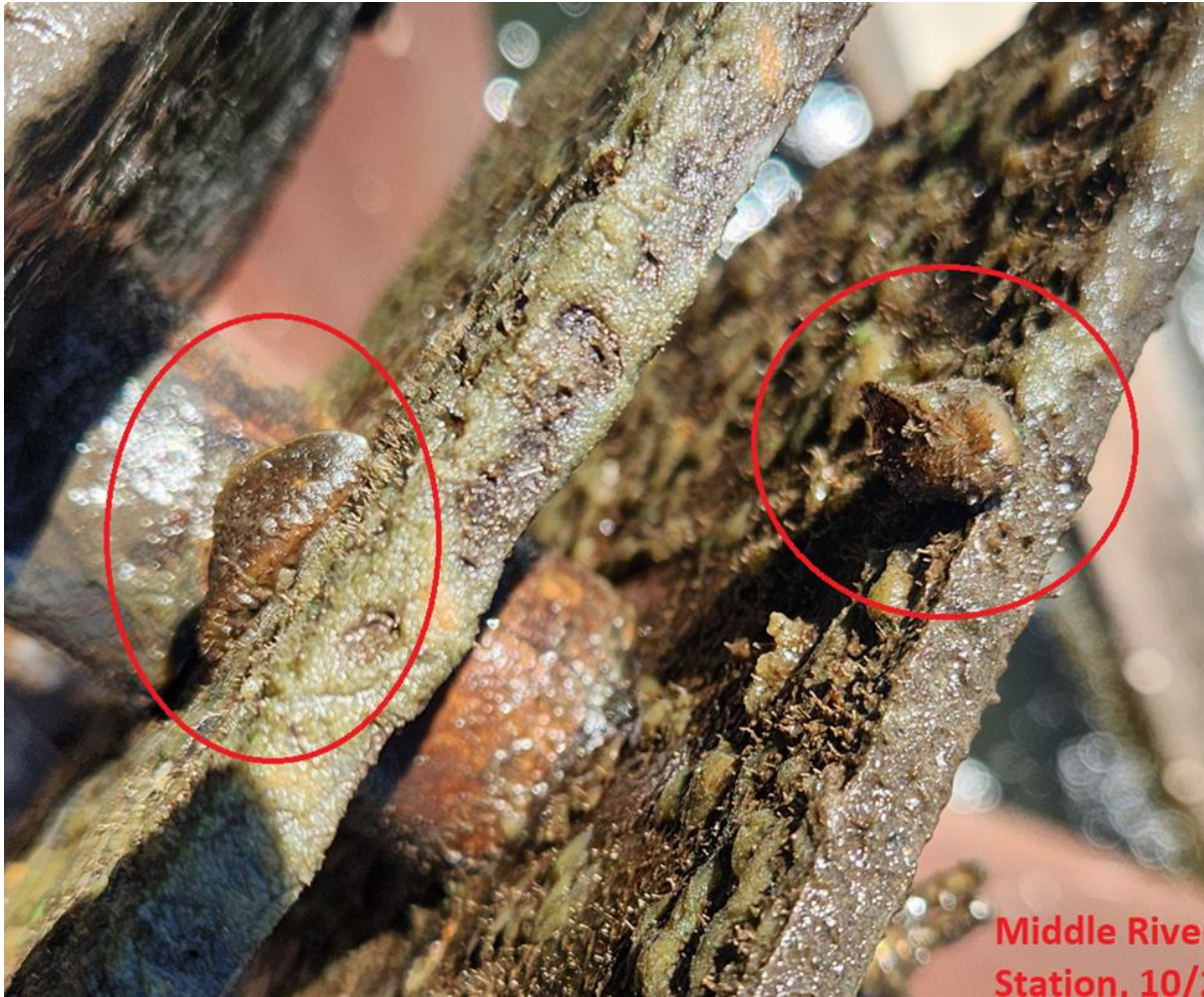


*DWR monitoring equipment. Oct 2024.*

# Detections to Date



# Response Actions in Progress



Middle River  
Station, 10/

Contra Costa County. Oct 2024

- Task Force
- Education and Outreach
- Monitoring
  - Existing resources
  - Expanding lab capability
  - Training scent K9s
- Containment
  - Commercial ballast emergency regulations
  - Agricultural Pest
  - Add to Restricted Species List

# Urgency for Emergency Regulatory Action



- Threat to native species and their habitat
- Threat to water conveyance systems; agriculture, power generation, domestic water, and the economy
- Urgency to contain over-land spread by trailered vessels and equipment
- No state or federal laws prohibit possession or transport of golden mussel in California

# Immediate Value to Adding to Restricted Species List



- Deters removal and moving of mussel-fouled watercraft/equipment from the Delta without cleaning
- Provides local water managers inspecting for quagga/zebra mussels legal basis to deny entry if golden mussels are found
- Creates authority for law enforcement to mandate cleaning or impound mussel-fouled watercraft/equipment

# Timeline

- October 17, 2024 – First detection
- December 12, 2024 – Request for emergency regulatory action to list as a detrimental restricted species
- Effective date upon OAL approval if adopted
- 2025 – complete full rulemaking process for permanent addition



DWR. Oct 2024.

# Credits | Questions | Contact

Jay Rowan

Branch Chief

Fisheries Branch

[Fisheries@wildlife.ca.gov](mailto:Fisheries@wildlife.ca.gov)





# Comparison between Q/Z mussels and Golden mussels

Parameter	Numeric Value		QZ Mussel References	Golden Mussel References
	QZ mussels	Golden mussel		
Adult Size (shell size)	≤50 mm (2 in)	20-46 mm (~ <sup>3</sup> / <sub>4</sub> to 2 in)	Benson et al. 2024	Morton 2015
Sexual Maturity (shell size)	8–9 mm (~ <sup>1</sup> / <sub>3</sub> in)	6-8 mm (~ <sup>1</sup> / <sub>4</sub> to <sup>1</sup> / <sub>3</sub> in)	Benson et al. 2024	Xu et al. 2013
Longevity	3-5 years	2-10 years	Karatayev and Burlakova 2022	Iwasaki and Uryu 1998
Depth	≤130 m (427 ft)	0.5-40m (1.5-131ft), 10m* (33 ft)	Benson et al. 2024	Darrigran 2022
Temperature (adult survival)	1-32 °C (34-90°F)	5-35 °C (41-95°F)	Karatayev and Burlakova 2022	Oliveira et al. 2010
Temperature (larval devel)	20-22 °C (68-72°F)	16-28 °C (61-82°F)	Benson et al. 2024	Ricciardi 1998
Spawning	12-18 °C (54-64°F)	16– 28 °C (61-82°F)	Claxton & Mackie 1998	Darrigran et al. 2003
Salinity	≤4 ppt	≤3 ppt, 23 ppt**	Benson et al. 2024	Sylvester et al. 2013
pH	7-9	5-10	Mackie and Claudi 2010	Yang et al. 2023
Calcium	≤8 mg/L	≤1 mg/L	Mackie and Claudi 2010	Mackie and Brinsmead 2017
DO	<0.1 mg/L, ≤7mg/L*	<0.5 mg/L, 3.7-11.2 mg/L*	Benson et al. 2024, Mackie and Claudi 2010	Boltovskoy et al. 2006, Mackie and Brinsmead 2017
Water Flow Velocity	<2 m/s	<1m/s, 0.3-0.9 m/s*	Benson et al. 2024	Matsui et al. 2001
Veliger Larval Size	50-356 um	90-490 um	Karatayev and Burlakova 2022	Ernandes- Silva 2015

**From:** [Volkoff, Martha@Wildlife](mailto:Volkoff,Martha@Wildlife)  
**To:** [Hornbaker, Victoria@CDFA](mailto:Hornbaker,Victoria@CDFA)  
**Cc:** [Alminas, Ona@Wildlife](mailto:Alminas,Ona@Wildlife); [Mitchell, Karen@Wildlife](mailto:Mitchell,Karen@Wildlife)  
**Subject:** RE: Request for Concurrence: Addition of Golden Mussel to Title 14, Section 671 List of Restricted Species  
**Date:** Thursday, November 14, 2024 7:43:55 PM

---

Hi Victory, this email is totally adequate – thank you for your quick response!

Kind Regards,  
Martha

---

**From:** Hornbaker, Victoria@CDFA <[victoria.hornbaker@cdfa.ca.gov](mailto:victoria.hornbaker@cdfa.ca.gov)>  
**Sent:** Thursday, November 14, 2024 7:38 PM  
**To:** Volkoff, Martha@Wildlife <[Martha.Volkoff@wildlife.ca.gov](mailto:Martha.Volkoff@wildlife.ca.gov)>  
**Cc:** Alminas, Ona@Wildlife <[Ona.Alminas@wildlife.ca.gov](mailto:Ona.Alminas@wildlife.ca.gov)>; Mitchell, Karen@Wildlife <[Karen.Mitchell@wildlife.ca.gov](mailto:Karen.Mitchell@wildlife.ca.gov)>  
**Subject:** RE: Request for Concurrence: Addition of Golden Mussel to Title 14, Section 671 List of Restricted Species

**WARNING:** This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Good evening, Martha

CDFA Plant Health and Pest Prevention Services concurs with CDFW taking emergency regulatory action to list golden mussel as a Restricted Species under Fish and Game Code Section 671. Please let me know if this email will suffice or if you need an official response on letterhead.

Best regards,

Victoria

---

**From:** Volkoff, Martha@Wildlife <[Martha.Volkoff@wildlife.ca.gov](mailto:Martha.Volkoff@wildlife.ca.gov)>  
**Sent:** Friday, November 8, 2024 1:30 PM  
**To:** Hornbaker, Victoria@CDFA <[victoria.hornbaker@cdfa.ca.gov](mailto:victoria.hornbaker@cdfa.ca.gov)>  
**Cc:** Alminas, Ona@Wildlife <[Ona.Alminas@wildlife.ca.gov](mailto:Ona.Alminas@wildlife.ca.gov)>; Mitchell, Karen@Wildlife <[Karen.Mitchell@wildlife.ca.gov](mailto:Karen.Mitchell@wildlife.ca.gov)>  
**Subject:** Request for Concurrence: Addition of Golden Mussel to Title 14, Section 671 List of Restricted Species

**CAUTION : [External Email]** - This email originated from outside of our CDFA organization. Do not click links or open attachments unless you recognize the sender and know the content is expected and is safe.

Hello Victoria,

Per our meeting today regarding California's response to the recent discovery of golden mussel, please find attached CDFW's request for CDFA concurrence with an emergency regulatory action to list golden mussel as a Restricted Species under Fish and Game Code Section 671.

Thank you for your prompt consideration of this request,  
Martha

Martha Volkoff  
Environmental Program Manager  
Invasive Species Program  
Fisheries Branch  
California Department of Fish and Wildlife  
PO Box 944209  
Sacramento, CA 94244  
[Martha.Volkoff@wildlife.ca.gov](mailto:Martha.Volkoff@wildlife.ca.gov)  
(916) 203-2255

Office Address  
1010 Riverside Parkway  
West Sacramento, CA 95605



State of California – Natural Resources Agency  
DEPARTMENT OF FISH AND WILDLIFE  
Fisheries Branch  
P.O. Box 944209  
Sacramento, CA 94244-2090  
[wildlife.ca.gov](http://wildlife.ca.gov)

GAVIN NEWSOM, Governor  
CHARLTON H. BONHAM, Director



November 8, 2024

Victoria Hornbaker  
Director, Plant Health and Pest Prevention Division  
California Department of Food and Agriculture  
1220 N Street  
Sacramento, CA 95814

REQUEST FOR DEPARTMENT OF FOOD AND AGRICULTURE CONCURRENCE  
FOR ADDING GOLDEN MUSSEL TO CCR TITLE 14, SECTION 671 AS A  
RESTRICTED SPECIES

Dear Victoria Hornbaker:

The Department of Fish and Wildlife is proposing to add golden mussel (*Limnoperna fortunei*) to Title 14, Section 671(c) as a detrimental restricted animal. This request for emergency regulatory action is calendared for consideration at the December 11-12, 2024 Fish and Game Commission meeting.

Golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, was discovered in the Port of Stockton on October 17, 2024, and subsequently in surrounding adjacent waterways within the Delta, and in O'Neill Forebay, approximately 60 miles south of State Water Project's Banks Pumping Plant/Clifton Court Forebay.

This discovery is the first known occurrence of golden mussels in North America. The species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, domestic and agricultural water conveyance systems, infrastructure and water quality. Outside of their native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay and Argentina golden mussel have heavily encrusted and blocked municipal and industrial water intakes, necessitating interruption in service and ongoing biofouling removal, harmed native species in the ecosystem, increased water clarity due to intense filter feeding, and diminished water quality.

In accordance with Fish and Game Code Section 2118(i) and (k), the Department requests your concurrence that golden mussel are "undesirable and a menace to the native wildlife or the agricultural interests of the state."

Thank you,

Martha Volkoff  
Invasive Species Program Manager

Victoria Hornbaker, Director, Plant Health and Pest Prevention Division  
November 8, 2024  
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Ecc:

Ona Alminas  
CDFW Regulations Unit  
[Ona.Alminas@wildlife.ca.gov](mailto:Ona.Alminas@wildlife.ca.gov)

Karen Mitchell  
Fisheries Branch  
[Karen.Mitchell@wildlife.ca.gov](mailto:Karen.Mitchell@wildlife.ca.gov)

# Memorandum

**Date:** November 22, 2024

**To:** Melissa Miller-Henson  
Executive Director  
Fish and Game Commission

**From:** Charlton H. Bonham  
Director

**Subject: Notice of Exemption: Emergency Action to Amend Section 671, Title 14, California Code of Regulations, Re: Golden Mussel**

Attached please find the Draft Notice of Exemption (NOE) and Attachment prepared pursuant to Section 15062 of the California Environmental Quality Act (CEQA) Guidelines. The NOE is not anticipated to change; therefore, this early submission gives the California Fish and Game Commission (Commission) notice of the Department of Fish and Wildlife's (Department) recommendation to rely categorical exemptions for the proposed action.

## **CEQA Exemption**

Golden mussel (*Limnoperna fortunei*) is an invasive, freshwater bivalve, native to rivers and creeks of China and Southeast Asia. On October 17, 2024, golden mussels were discovered in the Port of Stockton and soon after at additional sites in the Sacramento-San Joaquin Delta. The presence of the species poses a significant immediate threat to the ecological health of the Delta and all waters of the state, the operations of water conveyance systems, agricultural interests, hydroelectric power generation, infrastructure, water quality, and the economy. Their arrival is a state, national, and international concern.

Golden mussels are similar in appearance, biology, and impacts as those of quagga and zebra (dreissenid) mussels. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted affected aquatic ecosystems. Golden mussels can tolerate a wider range of environmental conditions than dreissenid mussels, including less calcium, higher salinity, and warmer water temperatures.

Nearly all waters of California are conducive to golden mussel establishment.

Golden mussels are ecosystem engineers and can profoundly change natural environments. They threaten California's infrastructure, recreation, municipal and industrial water supplies, the robust agricultural industry, and power plant operations. Millions of dollars are already spent annually to maintain infrastructure and prevent further spread of dreissenid mussels in California, and golden mussel are anticipated to increase these costs significantly.

The proposed emergency action will amend Section 671, Title 14, CCR to add golden mussel to the list of restricted animals. Adding golden mussels to the list of restricted animals will prohibit the importation, transportation, and possession of live golden mussels in California. See attachment for full description.

*Categorical Exemptions to Protect Natural Resources and the Environment*

Categorically exempt projects are classes of projects that the State Resources Agency has determined not to have a significant effect on the environment; therefore, these projects are exempt from the requirement for the preparation of environmental documents (CEQA Guidelines Section 15300, et seq.).

The review effort by Department staff pursuant to CEQA Guidelines Section 15061 has led staff to conclude that the proposed amendment to Section 671, Title 14, CCR, falls within the class 7 and 8 categorical exemptions (CEQA Guidelines sections 15307 and 15308). The proposed regulations will help prevent the spread of golden mussels to other waters of the state and prevent damage to native wildlife and their habitats.

*No Exceptions to Categorical Exemptions Apply*

As to the exceptions to categorical exemptions set forth in CEQA Guidelines Section 15300.2, including the prospect of unusual circumstances and related effects, the Department's review was guided by the California Supreme Court's decision in *Berkeley Hillside Preservation v. City of Berkeley*.

Staff has reviewed all of the available information possessed by the Department relevant to the issue and does not believe adoption of the regulations poses any unusual circumstances that would constitute an exception to the categorical exemptions set forth above. Compared to the activities that fall within Class 7 and Class 8, which include the given example of wildlife preservation activities such as the effort here, there is nothing unusual about the proposed regulations. Therefore, staff does not believe that the Commission's reliance on Class 7 and Class 8 categorical exemptions is precluded by the exceptions set forth in CEQA Guidelines Section 15300.2.

If you have any questions regarding this item, please contact Environmental Program Manager Martha Volkoff at [Martha.Volkoff@wildlife.ca.gov](mailto:Martha.Volkoff@wildlife.ca.gov).

ec: **Department of Fish and Wildlife**

Chad Dibble, Deputy Director  
Wildlife and Fisheries Division

Jay Rowan, Branch Chief  
Fisheries Branch  
Wildlife and Fisheries Division

Melissa Miller-Henson, Executive Director  
Fish and Game Commission  
November 22, 2024  
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Martha Volkoff, Env. Program Manager  
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Kimberley Chow, Attorney  
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Wildlife and Fisheries Division

**Fish and Game Commission**

David Thesell  
Deputy Executive Director

Sherrie Fonbuena  
Analyst



**Notice of Exemption****Appendix E**

**To:** Office of Planning and Research  
P.O. Box 3044, Room 113  
Sacramento, CA 95812-3044

**From:** (Public Agency): California Fish and Game  
Commission  
P.O. Box 944209  
Sacramento, CA 94244-2090

Project Title: Emergency Action to Amend Section 671, Title 14, CCR, Re: Golden Mussel

Project Applicant: N/A

Project Location - Specific: Statewide

Project Location - City: NA

Project Location - County: NA

Description of Nature, Purpose and Beneficiaries of Project:

Addition of golden mussel (*Limnoperna fortunei*), an invasive, non-native freshwater bivalve, to the list of restricted animals in Section 671, Title 14, California Code of Regulations. Adding golden mussel to the list of restricted animals prohibits importation, transportation, and possession of live golden mussels in California.

Name of Public Agency Approving Project: California Fish and Game Commission

Name of Person or Agency Carrying Out Project: California Department of Fish and Wildlife

Exempt Status: **(check one):**

- Ministerial (Sec. 21080(b)(1); 15268);
- Declared Emergency (Sec. 21080(b)(3); 15269(a));
- Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- Categorical Exemption. California Code of Regulations, Title 14, sections 15307 and 15308, Class 7 and 8
- Statutory Exemptions. State code number:

Reasons why project is exempt:

See attachment.

Lead Agency

Contact Person: Melissa Miller-Henson

Area Code/Telephone/Extension: (916) 653-4899

**If filed by applicant:**

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project?  Yes  No

Signature:

Date:

Title: Executive Director

Signed by Lead Agency  Signed by Applicant.

Date Received for filing at OPR:

## ATTACHMENT TO NOTICE OF EXEMPTION

### Emergency Amendment to Section 671, Title 14, California Code of Regulations, Re: Golden Mussel

At its December 11-12, 2024 meeting, the California Fish and Game Commission (Commission) took final action under the California Fish and Game Code and the California Administrative Procedure Act with respect to the above-named project. In taking its final action for the purposes of the California Environmental Quality Act (CEQA, Public Resources Code, Section 21000 *et seq.*), the Commission adopted an emergency amendment to Section 671, Title 14, California Code of Regulations (CCR). In compliance with the California Environmental Quality Act (CEQA; Public Resources Code Section 21000 *et seq.*), relying on categorical exemptions to protect natural resources and the environment (CEQA Guidelines, Title 14, sections 15307 and 15308, CCR).

#### Categorical Exemptions to Protect Natural Resources and the Environment

In compliance with the California Environmental Quality Act (CEQA; Public Resources Code Section 21000 *et seq.*), the Commission adopted the amendments to Section 671, Title 14, CCR, relying for purposes of CEQA on the class 7 and 8 categorical exemptions. This action added golden mussel to the list of restricted animals consistent with Fish and Game Code Section 2118 and 2120. In general, these exemptions apply to agency actions to protect natural resources and the environment. Class 7 actions include those taken by regulatory agencies to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for protection of the environment. Class 8 actions include those taken by regulatory agencies to assure the maintenance, restoration, enhancement, or protection of the environment where the regulatory process involves procedures for the protection of the environment.

Golden mussel (*Limnoperna fortunei*) is an invasive, non-native freshwater bivalve. Golden mussels are native to rivers and creeks of China and Southeast Asia. They are known to be established outside of their native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay and Argentina. The initial introductions to these countries were likely the result of ships from biofouling on the hulls and/or ballast water release. In most cases, the invaded range has expanded upstream from the point of introduction and inland from ports through local, human-mediated pathways. Within the invaded range, significant impacts resulting from the dense colonization of golden mussels on hard surfaces are widely documented.

On October 17, 2024, golden mussels were discovered in the Port of Stockton by Department of Water Resources staff while conducting routine operations. Shortly after, golden mussels were detected at additional sites in the Sacramento-San Joaquin Delta (Delta), including Turner Cut downstream of the Port of Stockton (October 23), Middle

River (October 31), Old River (November 7), and in the San Joaquin River upstream of the Port of Stockton (November 5). Golden mussels were also detected in O'Neill Forebay on October 25 and at the outlet of O'Neill Forebay to the California Aqueduct on October 31. O'Neill Forebay is a forebay of San Luis Reservoir, which is a joint use facility of the California State Water Project and federal Central Valley Project located in Merced County. These detections represent the first known occurrence of golden mussels in North America.

The spread of golden mussel out of the Delta into freshwater rivers, lakes, and reservoirs would cause infrastructural damage across the state, and could threaten water delivery and electric power delivery from hydroelectric operations (for example, O'Neill Forebay). Because of rapid mussel colonization of infrastructure and water conveyances, this new invasion is a significant threat to the ecological health of the Sacramento-San Joaquin Delta (Delta) and all waters of the state, water conveyance systems, infrastructure and water quality.

Golden mussels have similar appearance, biology, and impact as quagga and zebra (dreissenid) mussels. Dreissenid mussel infestations resulted in the temporary and permanent closure of waterbodies to the public and have negatively impacted affected aquatic ecosystems. Golden mussels can tolerate a wider range of environmental conditions than dreissenid mussels, including less calcium, higher salinity, and warmer water temperatures. Nearly all waters of California, including the brackish parts of estuaries, such as Suisun Bay, are conducive to golden mussel establishment.

Like dreissenid mussels, golden mussels pose an environmental threat to California since they are ecosystem engineers and can profoundly change the food web of an invaded ecosystem. They can impact native species and sports fish by competing for food sources. They can also increase water clarity due to intense filter feeding, resulting in degraded water quality, algal blooms, and increased aquatic vegetation growth that requires control to maintain navigation.

### **Protection of the Environment**

Golden mussels in the Delta pose a significant immediate threat to the state's environment, ecological health of the Delta and all waters of the state, and water quality. Their presence in California is of statewide, national, and international concern. Without actions to prevent further spread, golden mussels are also likely to spread overland on trailered watercraft and equipment to other fresh and brackish waterbodies throughout California, to other ports and inland waters of North America, and even potentially abroad.

Immediate steps are necessary to stop the spread of this invasive species to prevent the translocation of this species to other waterbodies in the state and beyond. If spread of this species is not prevented, more waterways will be infested, further increasing the threat to uninfested waters.

The emergency regulation amended Section 671, Title 14, CCR, to add golden mussel to California's list of restricted animals. Adding golden mussel to the list of restricted animals will make it unlawful to transport, possess, and import live golden mussels in California, thereby deterring people from moving them to other waters of the state and providing enforceability if golden mussels are found in someone's possession. Adding golden mussel to the list of restricted species will also allow water managers already operating mussel prevention programs grounds to refuse vessels and equipment that are or suspected to be carrying golden mussels from launching into lakes, reservoirs, or other waterways where golden mussels are not known to be present. Additionally, it will allow law enforcement personnel to inspect watercraft and quarantine any vessels that are infested with golden mussels and/or detain vessels or equipment until such time as they no longer pose a threat to the environment.

Addition of the golden mussel to the list of restricted species supports class 7 and 8 exemptions towards the maintenance and preservation of the ecological health of the Delta, as well as the systems in place for public health and safety as noted above. The proposed Project would assist with protection of the environment, thus is the proper subject of CEQA's Class 7 and Class 8 categorical exemptions.