

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

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

Date of Statement: May 23, 2025

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. Emergency Regulation in Effect to Date

At its December 11, 2024 meeting, the Commission approved an emergency rulemaking to add golden mussel (*Limnoperna fortunei*) to the list of restricted animals in Section 671 (Office of Administrative Law File Number 2024-1213-03E).

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 by California Department of Water Resources (DWR) staff while conducting routine operations. This was 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). 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. 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 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. Impacts in these invaded regions include heavy encrustations of golden mussels forming dense reef-like structures that block municipal and industrial water supplies, agricultural irrigation, and power plant operations, necessitating ongoing biofouling removal. 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. Adult golden mussel release eggs and sperm into the water column where fertilization occurs. Fertilized eggs develop into planktonic larvae that remain suspended in the water column as they develop. Larvae are microscopic and themselves cannot swim upstream, but can be carried by

flowing water and 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 fibers called byssal threads and develop into adults. Golden mussels can grow in dense colonies of hundreds of thousands of mussels per square meter.

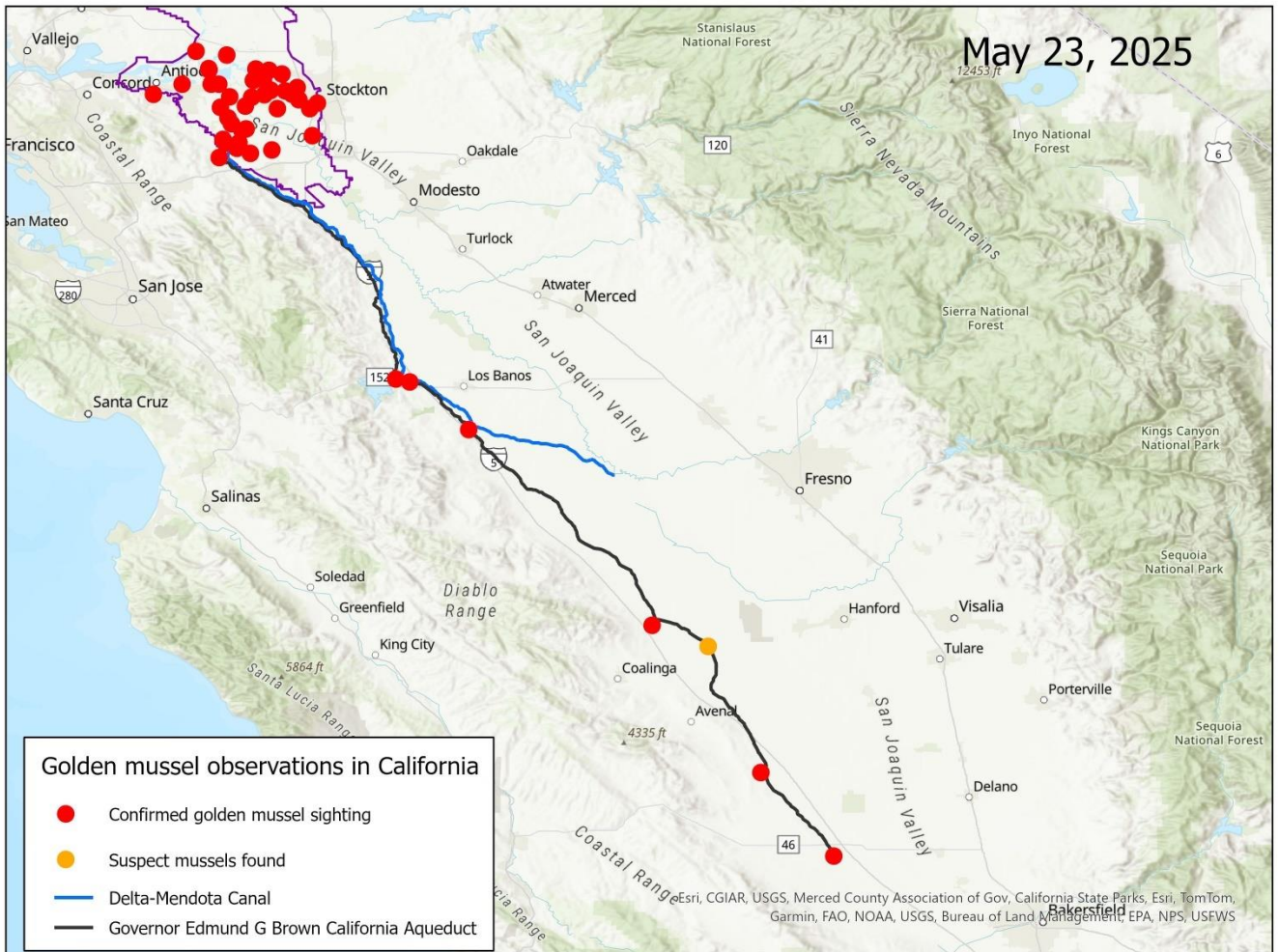
Golden mussels can tolerate a wider range of environmental conditions than the invasive dreissenid mussels. Golden mussel can establish in waters with lower calcium and higher salinity and temperature than dreissenid mussels. Nearly all waters of California are conducive to golden mussel establishment.

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 water from the Delta. Additional discoveries of golden mussel have occurred throughout the Delta and adjacent regions, including the lower reach of the San Joaquin River (San Joaquin County), and at several points in the California Aqueduct including, from north-to-south, Bethany Reservoir (Alameda County), O'Neill Forebay (Merced County), Dos Amigos Pumping Plant (Merced County), Pleasant Valley Pumping Plant (Fresno County), Las Perillas Pumping Plant on the Coastal Branch Aqueduct (Kings County), and Check 24 (Kings County).

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.

In response to the discovery of golden mussel, CDFW, in partnership with other agencies working in the Delta, began delineating the range of golden mussel in the Delta and throughout the state (Figure 1). Shortly thereafter CDFW executive leadership convened a Golden Mussel Task Force, comprised of a steering committee with members representing CDFW, DWR, State Parks-Division of Boating and Waterways, State Water Resources Control Board, California State Lands Commission, California Department of Food and Agriculture, US Bureau of Reclamation, and US Fish and Wildlife Service. The task force also formed eight task-oriented teams of staff from these same agencies, and others, to implement immediate monitoring and outreach efforts, and develop and inform the content of a response plan.

Figure 1. Golden mussel detections as of May 23, 2025 (map updated at <https://wildlife.ca.gov/Conservation/Invasives/Species/Golden-Mussel#map>) .



Currently there are no federal prohibitions for possessing or moving golden mussels. 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 based on the currently effective emergency regulation. Pursuant to Section 671.1, golden mussels could be possessed under a permit issued by CDFW for purposes as defined in the regulations, or other existing CDFW permitting processes.

The interagency Golden Mussel Task Force is currently working to develop a response plan that frames the state and partner strategy for moving forward. The scope will include containment within waters where they have been detected, prevention at uninfested waters, evaluation of existing authorities and gaps, existing funding opportunities and needs, and approach to partner and public engagement.

II. Request for Approval of Readoption of Emergency Regulations

At its December 11, 2024 meeting, the Commission approved an emergency action that added golden mussel to the list of restricted animals.

The current emergency rule will expire on June 18, 2025, unless it is readopted for an additional 90 days. The continuation of the emergency action of adding golden mussel to the list of restricted animals is necessary to protect against the spread of this invasive species in California's waterways, which causes harm to native species and the ecosystems they depend on to survive, until a permanent regulation can be implemented.

III. Statement of Facts Constituting the Need for Readoption of the Emergency Regulatory Action

In response to the emergency situation, the proposed regulatory action readopts the amendment of Section 671 to add golden mussel to the list of restricted animals. The proposed regulation for readoption is the same as the original emergency regulation.

The emergency action added the golden mussel (*Limnoperna fortunei*) species in new subsection 671(c)(10)(B). Readoption of the addition of golden mussel to the list of restricted animals will continue the prohibition of 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.

The readoption will also indirectly continue to allow water managers operating mussel prevention programs grounds to refuse watercraft that are or suspected to be carrying golden mussels from launching into waterways, and 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. Fish and Game Code sections 2118 and 2120 provide broad authority for the restricted species list implemented in Section 671.

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."

IV. Existence of an Emergency and Need for Action

The Commission considered the following factors in determining that an emergency continues 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, therefore, it is appropriate to maintain its restricted species status.

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 continue limiting 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 lapse 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.

V. Readoption Criteria

Same as or Substantially Equivalent

Pursuant to Government Code subdivision 11346.1(h), a readoption may be approved only if the text is "the same as or substantially equivalent to an emergency regulation previously adopted by that agency." The language proposed for this rulemaking is the same as the language of the original emergency regulation.

Substantial Progress

Government Code subdivision 11346.1(h) specifies "Readoption shall be permitted only if the agency has made substantial progress and proceeded with diligence to comply with subdivision (e)" [sections 11346.2 through 11347.3, inclusive].

A regular rulemaking (certificate of compliance) is currently underway and will be presented to the Commission for public notice at its August 13-14, 2025 meeting.

Proposed Action by the Commission

The Commission proposed readoption of the emergency amendment to Section 671 is the same as previously effective.

VI. 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:

Continuing to include golden mussels on the list of restricted animals 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. Continuing to include golden mussel on 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. Continuing to include golden mussel on the list of restricted animals will not have the potential for a fiscal effect on local governments or school districts, 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

VII. 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.

VIII. 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.

IX. 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.

X. Fish and Game Code Section 399 Finding

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

Informative Digest/Policy Statement Overview

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 by California Department of Water Resources (DWR) staff while conducting routine operations. This was the first known occurrence of this highly invasive species in North America. As of May 23, 2025 golden mussel have been documented at multiple additional points downstream, or within close proximity to, the prior detection within the Sacramento-San Joaquin Delta (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 water 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 have been 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 prohibitions for possessing or moving golden mussels. Other than the currently effective emergency regulation, there are no other state prohibitions for possessing or moving golden mussels. Re-adopting the emergency regulations for golden mussel to remain on the list of restricted animals in Section 671 will continue to equip CDFW and local water managers with authority to take action to prevent the overland spread of golden mussels.

In response to the emergency situation, the proposed regulatory action readopts the amendment of Section 671 adding the golden mussel (*Limnoperna fortunei*) species to the list of restricted animals in new subsection 671(c)(10)(B). The proposed regulation for readoption is the same as the original emergency.

Continuing to include golden mussels on the list of restricted animals will keep in place the prohibition on 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. Continuing to include golden mussels on the list of restricted animals 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.