State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

Amend Section 671, Title 14, California Code of Regulations
Re: Invasive Non-native Mussels (including golden, pond and axe-head mussels) and Green Crab

I. Date of Initial Statement of Reasons: July 11, 2025

II. Dates and Locations of Schedule Hearings

(a) Notice Hearing:

Date: August 13-14, 2025 Location: Sacramento, CA

(b) Discussion/ Adoption Hearing:

Date: October 8-9, 2025 Location: Sacramento, CA

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

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

Current regulations in Section 671 contain the list of restricted species that are unlawful for any person to import, transport, or possess except as authorized in a permit issued by the Department. Golden mussel (*Limnoperna fortunei*) was added to the list of restricted animals in via emergency action in December 2024 (Office of Administrative Law File Number 2024-1213-03E).

The proposed changes will add the green crab (*Carcinus maenas*), an invasive, non-native crustacean species, and the *Limnoperna*, *Sinanodonta and Xenostrobus* genera which are invasive, non-native bivalve species, to the list of restricted animals consistent with California Fish and Game Code sections 2118 and 2120.

Background

Green Crab (C. maenas)

The green crab (*C. maenas*), also known as the European green crab, native to the northeast Atlantic Ocean and northern Africa, is an invasive non-native species in California. Green crabs are up to 4 inches in length across the carapace and inhabit a variety of marine and estuarine habitats, with the exception of very high velocity outer coast locations. Green crab has a generalist diet that includes other crustaceans, marine worms, bivalves, and other mollusks.

Green crab first arrived in North America in the early 1800s within ship ballasts and/or attached to ship hulls, and was first detected in California in 1989 in the southern San Francisco Bay. It is suspected that the green crab arrived in seaweed-wrapped live-bait shipments. Since then, green crab has spread throughout California and has been identified in many locations including, but not limited to, San Francisco Bay and Bay Delta, Elkhorn Slough, Bolinas Lagoon, Bodega Bay, Tomales Bay, and Humboldt Bay. Green crab has a relatively long larval duration period (up to 80 days) floating in ocean currents which supports high larval dispersal that could potentially be supporting spread to other areas. Other human-mediated activities such as ballast water discharge and hull fouling may also be factors in spreading green crab.

On July 7, 2017, the Commission received a petition for regulatory change (Petition 2017-006) from Mr. Joshua Russo, President of the Watermen's Alliance, requesting that regulations be adopted to list green crab as an invasive aquatic species. The Department evaluated the petition and provided a recommendation to the Commission to grant the petition for listing due to the following reasons:

- Green crab inhabits most types of marine and estuarine habitats in northern and central California which would suggest there is potential for further population expansion.
- Green crab has caused impacts to bivalve aquaculture, native fisheries, and sensitive habitat in other established populations outside of its native range.
- There is concern that green crab can continue to expand beyond currently established populations in California and cause extensive damage to recreational and commercial fishery resources.
- Washington, Oregon, northeastern states, and Canadian Provinces on the east and west coasts have identified green crab as an aquatic invasive species through listing as a restricted species or implementing various control measures.

At its April 2018 meeting, the Commission agreed with the Department's findings and granted the petition for consideration in a future rulemaking, which would be addressed as part of a future rulemaking package to amend Section 671, allowing for regulatory efficiency by combining it with other necessary changes. Although green crab is fished commercially in its native range, a commercial fishery does not exist in California. Live green crab has been documented (once, in Long Beach) for sale in a California fish market, however this sale appears to be opportunistic and incidental to other crab fisheries. There is anecdotal evidence that some anglers may use recreationally caught green crab as bait. This practice may be occurring incidental to other target recreational fisheries for crab, where the distribution of the target species, for example Dungeness crab, overlaps with green crab. The proposed regulations would prohibit anglers from possessing live green crab. Under the proposed regulation commercial sale of domestically caught or imported live green crab would be prohibited.

Golden Mussel (genus Limnoperna)

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 mussel was 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 is also likely to spread 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.

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). The existing emergency regulations will expire in December 2025 following two 90-day extensions of the emergency regulations in April 2024 (extension 1, Office of Administrative Law File Number 2025-0606-03EE) and June 2025 (extension 2). The proposed rulemaking will serve as the certificate of compliance for the addition of golden mussel to the list of restricted animals.

Golden mussel is known to be established outside of its native range in Hong Kong, Japan, and Taiwan, as well as in Brazil, Uruguay, Paraguay, and Argentina. The initial introductions to these countries and territories were likely the result of ships with biofouling on the hulls and/or through 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.

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).

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

Golden mussel is likely to spread throughout the interconnected Delta, upstream into Delta tributaries, as far west as 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 interconnected waters, 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 mussel is 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, the Department, 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, the Department's executive leadership convened an interagency Golden Mussel Task Force (Task Force), comprised of a steering committee with members representing the Department, DWR, State Parks-Division of Boating and Waterways, State Water Resources Control Board, California State Lands Commission, California Department of Food and Agriculture, U.S. Bureau of Reclamation, and U.S. 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 framework.

On April 16, 2025 the Task Force announced the completion of the Golden Mussel Response Framework (State of California, 2025) (Response Framework). The Response Framework provides the state and partners with a coordinated strategy for moving forward. The scope of recommendations includes containment within waters where golden mussels have been detected, prevention of introductions at uninfested waters, evaluation of existing authorities and gaps, existing funding opportunities and needs, and an approach to partner and public engagement.

In addition, the Department announced a one-time $1 million grant funding opportunity for nonprofit organizations, public agencies, and Tribal governments that own or operate boating facilities. The intention of the grant is to support one-time start-up costs for efforts to prevent the overland spread of invasive mussels from waters where they have been detected and prevent the introduction of invasive mussels to waters of California where they have not been detected.

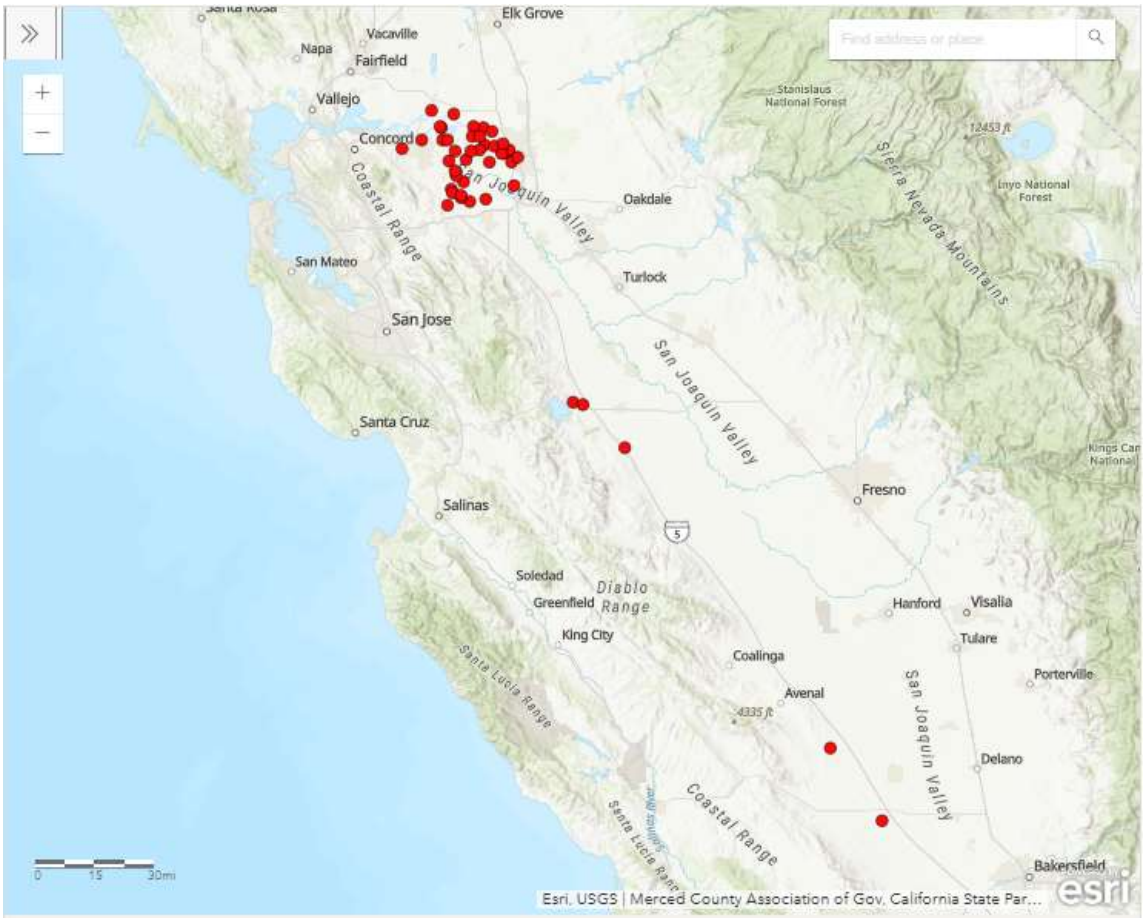
Beyond the immediate threat of golden mussel, the other five species of mussels within the genus *Limnoperna* have the potential to be inadvertently introduced to California, and are highly likely to have similar negative impacts to California as golden mussel. Other species

within the genus *Limnoperna* include *L. siamensis, L. ngocngai, L. bogani, L. sambasensis,* and *L. taprobanensis. Limnoperna* mussels are native to Asia, primarily Southeast Asia. Most *Limnoperna* species can be found in freshwater to estuarine habitats, although it is hypothesized that *L. taprobanensis* is a marine species. *Limnoperna* mussel species are small and range in color from olive-green to reddish-brown. They produce byssal threads which enable them to attach to surfaces.

Outside of golden mussel, there are few records of invasions outside of their native range by other species of *Limnoperna;* however, available literature indicates they may have similar biology and impacts as golden mussels. For example, *L. siamensis* was found to be biofouling in dams where it is native and can occur in large colonies. They can also outcompete fish by filter feeding phytoplankton and zooplankton out of the water column.

Currently there are no federal prohibitions for possessing or moving species within the genus *Limnoperna*; however, the U.S. Fish and Wildlife Service is currently proposing the addition of the genus to the list of injurious wildlife (Lacey Act; United States Code, Title 18, Section 42; Code of Federal Regulations, Title 50, Chapter 1, Subchapter B, Part 16). It is unlikely that any person is intentionally in possession of golden mussel (or other species of *Limnoperna*), 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 of golden mussel, 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 the Department for purposes as defined in the regulations, or through other existing Department permitting processes.

Figure 1. Golden mussel detections as of May 27, 2025 (map updated at https://wildlife.ca.gov/Conservation/Invasives/Species/Golden-Mussel#map). Red dots indicate detections.



Pond Mussels (genus Sinanodonta)

Pond mussels (*Sinanodonta*), also known as Asian pond mussels, are freshwater unionid bivalves with 26 species that are fast-growing and can reach high densities. Three species of *Sinanodonta* that have been documented to be invasive outside of their native ranges include *S. woodiana, S. lauta,* and *S. pacifica.* Species within *Sinanodonta* are difficult to morphologically identify, which has led to extensive misidentification of species. Additionally, the molecular taxonomy within the genus is still being resolved.

In 2010, *S. woodiana* was detected for the first time in the United States within aquaculture ponds in Franklin Township, New Jersey, following an eradication effort for bighead carp. Pond mussels have not been detected in California, or any other U.S. state with the exception of New Jersey. In 2019, an eradication of the pond mussel was attempted in the New Jersey ponds, and 2020 water samples collected in two of the ponds resulted in positive environmental DNA (eDNA) detections, suggesting that the mussels were not successfully eradicated. In 2021 and 2022, water samples taken downstream of the ponds at the confluence of the Raritan River and Millstone River resulted in positive eDNA detections indicating a potential population in the Raritan watershed. A subsequent eradication treatment was performed at the aquaculture ponds in 2024, and SCUBA and

snorkel surveys were conducted in the Raritan watershed. Pond mussels were not detected in these surveys.

Native to Eastern Asia including China and eastern Russia, Japan and Korea, pond mussels are known to be established outside of their native ranges and have spread rapidly to other countries including Kazakhstan, Uzbekistan, Iran, South Korea, Myanmar, Indonesia, Malaysia, Philippines, Borneo, Dominican Republic, Costa Rica, Spain, France, Italy, Germany, Austria, Slovakia, Hungary, the Czech Republic, Poland, Croatia, Serbia, Romania, Moldova, Belgium, Ukraine and Sweden.

Pond mussels reaching up to 12 inches in length have been reported. They are long lived with a life span of approximately 12 years. They can be found in lakes, oxbows, ponds, streams, canals, and rivers. They prefer benthic habitats with fine substrates such as silt, fine sand, and organic material. They are adaptable and can tolerate changing environmental conditions, and cold water temperatures, and have a high tolerance to high levels of nutrients.

Sinanodonta are dioecious, having separate male and female sexes, although a small percentage (2.3 percent) have been recorded to be both sexes and capable of self-reproduction. Characteristic of unionid mussels, the females produce free floating, microscopic, parasitic larvae called glochidia that must attach and encyst into tissue of a freshwater host fish to complete their development and life cycle. The glochidia attach to fish for about 6-14 days before detaching. Known native fish hosts of the mussel include bighead carp, black carp, common carp, grass carp, and silver carp. Of these native host species, common carp are widespread throughout California, and triploid grass carp are limited, but present in southern California. Beyond non-native carp, it is currently unknown which other native and non-native fish species in California could serve as a host for *Sinanodonta*.

Pond mussels pose a threat to California's freshwater ecosystem. They can alter water quality through their filtration, impact sediment stability and movement, and significantly affect aerobic and anaerobic metabolism and nutrient cycling.

Pond mussels also pose a threat to California's native unionid mussels and act as a reproductive competitor and ecosystem engineer. Pond mussels are known to host a range of parasites in their invasive range, potentially including pathogens that present a risk to native bivalves. For example, the presence of inflammatory capsules and infiltrates linked to bacterial infection has been observed in Italian *S. woodiana* populations.

Unlike most unionid species, the glochidia of the pond mussel are generalist and can successfully develop on fish species they would otherwise not encounter in their native range. Due to their lack of host specificity, pond mussels can outcompete native unionids and decrease the quality of hosts available for native mussel species. Once attached, the pond mussel glochidia can induce an immune response in host fish towards native unionid glochidia, decreasing the developmental success of native glochidia. Pond mussels also have a higher rate of host infection by its glochidia and higher fecundity than native unionids. In addition, the shells of the pond mussel can accumulate on the benthic floor and in the sediment, forming a shell layer which reduces the water current velocity near the

bottom, limit light access through the water column, alter benthic microhabitats, and can create physical barriers limiting movement and burrowing of native unionids.

Pond mussels pose a threat to the health of California's fish species. High densities of pond mussel (*S. woodiana*) glochidia attachments to fish are able to decrease fish body weight and alter their physiology. This could negatively affect the growth and physiology of fish stocks and natural fish communities in rivers and lakes, especially for juvenile fish that are readily parasitized by the pond mussel. Furthermore, fish that may have once been resistant to the infection of their native unionid glochidia may become vulnerable to the parasitism of the pond mussel glochidia.

Because of its parasitic glochidia life history, the most common pathway of pond mussel introduction and spread is by stocking and export of fish infested with glochidia. Migrating fish infected with glochidia can further act as a vector of spread and aid in the dispersal of the mussel. Grass carp and silver carp infested with pond mussel glochidia were likely the source of introduction into Europe in 1983. Similarly, bighead carp, grass carp and common carp found in the New Jersey aquaculture ponds were likely the introductory source of the pond mussel.

Within Asia, pond mussels can be used as a food source. They have also been considered a protein source in fish feed. In the pet trade, *S. lauta* is listed on the Aquatic Arts website as an item for sale and marketed for its ability to filter feed and clarify aquarium water.

Based on the establishment of *S. woodiana* in North America, potential vectors of introduction, and anticipated impacts to native species and the environment, prohibiting all species in the genus *Sinanodonta* is warranted. There are currently no federal laws related to *Sinanodonta*; however, the U.S. Fish and Wildlife Service is currently proposing the listing of the genus to the list of injurious wildlife (Lacey Act; United States Code, Title 18, Section 42; Code of Federal Regulations, Title 50, Chapter 1, Subchapter B, Part 16.)

Axe-Head Mussel (genus Xenostrobus)

Axe-head mussel (*Xenostrobus securis*), a small, non-native, invasive, biofouling brackish water bivalve, was discovered on December 6, 2024, just north of the Port of Long Beach and Port of Los Angeles in the lower reaches of Dominguez Channel, Los Angeles County. This detection was made by Department staff conducting early detection monitoring for invasive mussels. This is the first known occurrence of the invasive species in North America. Shortly after, axe-head mussels were detected in high densities at additional sites (Figure 2) including the lower reaches of San Gabriel River (February 21, 2025) and Los Angeles River (February 27, 2025).

Figure 2. *X. securis* sightings in Dominguez Channel (DC), Los Angeles River (LAR), and San Gabriel River (SGR) May 16, 2025. Green pushpins indicate detection.

On March 23, 2025, a watercraft traveling into California from Lake Havasu, Arizona (a lake known to be infested with quagga mussels), was quarantined at the California Border Protection Station in Vidal because adult mussels were found attached to the hull. The mussels were sent to the California Department of Food and Agriculture laboratory and genetically identified as axe-head mussel. From information provided by the watercraft owner, Department staff learned the watercraft had recently been purchased from a parking lot in Newport Dunes Marina, Newport Bay (Orange County), where it was suspected to have been moored. Notably, this is the first known occurrence of overland transport of the axe-head mussel by a trailered vessel to another waterbody and moved across state lines.

Axe-head mussel is one of eight extant species of the genus *Xenostrobus*. These species include *X. pulex* and *X. securis* from Australia and New Zealand, *X. inconstans* from Australia, *X. balani*, *X. mangle* and *X. sambasensis* from Southeast Asia, *X. hepatica* from Fiji, and *X. atratus* from Japan, Korea, and China. All mussels within the genus *Xenostrobus* are small (not exceeding 2 inches) and occupy estuarine or marine habitats. Axe-head mussels (*X. securis*) have been introduced and established outside of their native ranges in Japan, China, Korea, Hong Kong, Italy, France, and Spain.

The confirmed presence of axe-head mussel poses an immediate environmental and economic threat to California and other coastal states and countries because it forms dense colonies and attaches to hard and soft substrates. The axe-head mussel is an ecosystem engineer and can physically change the invaded habitat. It covers soft sediments, negatively impacts native animals living in the sediment, and acts as habitat for other fouling organisms to attach to. It alters zonation patterns within the intertidal and outcompetes native organisms. It has the potential to foul submerged structures, pipelines,

ropes, and watercraft hulls. It also has the potential to negatively impact oyster aquaculture by reducing growth and causing oyster mortality.

Axe-head mussels can reproduce when they reach lengths of under one half inch and generally within their first year. Axe-head mussel has an almost continuous breeding season where it has invaded, and a planktonic larval phase. Adults can live up to two years. Like other biofouling mussels, axe-head mussels form byssal threads that enable them to attach to various types of substrates. Axe-head mussel has a wide salinity tolerance and occurs predominantly in the upper reaches of lagoons and estuaries where salinity is generally very low; they require waters with tidal influence.

Globally axe-head mussels were likely introduced by ballast water discharge and biofouling on ships. The unintentional introduction and spread of axe-head mussel in Italy has been attributed to shellfish farming. Without containment, axe-head mussel is likely to spread via watercraft in the marine environment to other estuaries, brackish waters, and ports of California, other U.S. states and territories, and internationally, and overland on trailered vessels and equipment in North America.

Beyond the immediate threat of axe-head mussel, the other seven species of *Xenostrobus* mussels have the potential to be inadvertently introduced to California, and are likely to have similar negative impacts to California as axe-head mussel. No species of *Xenostrobus* are known to be a species for human consumption, or in aquaculture or aquarium trade. There are currently no federal laws related to *Xenostrobus* mussels.

Proposed Regulations

The proposed regulations add green crab, and the *Limnoperna*, *Sinanodonta,* and *Xenostrobus* genera to the list of live animals restricted from importation, transportation and possession:

Section 671. Importation, Transportation and Possession of Live Restricted Animals.

Amend subsection (c)(8) from Class Crustacea to Class Malacostraca.

This change is necessary to update and correct the Class for the species in this subsection. The Class Crustacea has been reclassified by The International Commission on Zoological Nomenclature to a higher level and is now a subphylum of the phylum Arthropoda. For consistency with the existing format of the list, the proposed regulations update the class name in (c)(8) to Class Malacostraca, which is the appropriate class for the restricted species designated in (c)(8)(A) and (B) and the addition of (C) described below.

Add subsection (c)(8)(C) *Carcinus maenas* (green crab) (D).

Adding green crab, which causes harm to native species and the ecosystems they depend on to survive to the list of restricted animals (as outlined in Petition #2017-006) is necessary to protect against the spread of this invasive species in California. Prohibiting importation, transportation, and possession of this species will prevent further introductions and slow the spread within and outside of California.

Amend subsection (c)(10) Class Bivalvia-Bivalves to move “All members of the genus *Dreissena* (zebra and quagga mussels) (D).” under subsection (A).

Moving this category of bivalves to a new subsection is necessary to better organize dreissenid mussels within the section. This is a non-substantive change.

Add subsection (c)(10)(B) All members of the genus *Limnoperna* (golden mussel) (D).

Adding all members of the genus *Limnoperna* (golden mussel), which can cause harm to native species and the ecosystems they depend on to survive, as well as infrastructure, to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

Add subsection (c)(10)(C) All members of the genus *Sinanodonta* (pond mussel, Asian pond mussel) (D).

Adding all members of the genus *Sinanodonta* (pond mussel), which can cause harm to native species and the ecosystems they depend on to survive to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

Add subsection (c)(10)(D) All members of the genus *Xenostrobus* (axe-head mussel) (D).

Adding all members of the genus *Xenostrobus* (axe-head mussel), which can cause harm to native species and the ecosystems they depend on to survive, as well as infrastructure, to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

(b) Goals and 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 new introductions of species within the *Limnoperna*, *Sinanodonta,* and *Xenostrobus* genera to waterbodies of the state and the translocation of green crab, and extant members of the *Limnoperna* and *Xenostrobus* genera to other waterbodies in the state and beyond, thereby protecting native wildlife, the agricultural interests of the state and public health and safety.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

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.

(d) Specific Technology or Equipment Required by Regulatory Change:

None.

(e) Identification of Reports or Documents Supporting Regulation Change OR Technical, Theoretical, and/or Empirical Studies, Reports, or Documents Relied Upon

Petition # 2017-006 (received August 8, 2017)

California Department of Fish and Wildlife memo with evaluation and recommendation for Petition #2017-006, received March 20, 2018.

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(f) Documents Providing Background Information

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(g) Public Discussions of Proposed Regulations Prior to Notice Publication

- Fish and Game Commission Meeting, April 2018 with regards to green crab
- Fish and Game Commission Meeting, December 2024 for the original emergency for golden mussel
- Fish and Game Commission Meeting, April 2025 (for golden mussel first 90-day emergency extension)
- Fish and Game Commission Meeting, June 2025 (for golden mussel second 90-day emergency extension)

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

No alternatives were identified by or brought to the attention of Commission staff that would have the same desired regulatory effect.

(b) No Change Alternative

Without the proposed changes in regulations, Green Crab, *Limnoperna genus*, *Sinanodonta genus,* and *Xenostrobus* genus would not be included on the restricted animals list and there would be no regulatory authority to help prevent the introduction and/or translocation of these non-native invasive species to waterbodies in the state and beyond. The proposed changes are sought to protect native wildlife and the agricultural interests of the state and public health and safety.

V. Mitigation Measures Required by Regulatory Action

The proposed regulatory action will have no negative impact on the environment; therefore, no mitigation measures are needed.

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) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States

The proposed regulations are not expected to impact businesses, as adding a species to the list of restricted animals in Section 671 does not impose any actions that should be taken by businesses to comply, nor does it impose fees or fines upon them. Because these effects are economically neutral, it is not anticipated that any businesses will experience adverse economic impacts that would affect their ability to compete with businesses from other states as a result of these regulations.

(b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment

The proposed regulations are not expected to impact businesses, as adding a species to the list of restricted animals in Section 671 does not necessitate that any actions should be taken by businesses to comply, nor does it impose fees or fines upon them. Because these effects are economically neutral, it is not anticipated that any businesses will experience adverse economic impacts that would affect the creation or elimination of jobs within the state, create new businesses or eliminate existing businesses, affect the expansion of existing businesses, or benefit worker safety as a result of these regulations. The proposed changes are sought to protect native wildlife and the agricultural interests of the state and public health and safety.

(c) Cost Impacts on a Representative Private Person or Business

The proposed regulations are not expected to create direct cost impacts for businesses or individuals, as adding a species to the list of restricted animals in Section 671 does not necessitate that any actions should be taken by businesses or individuals to comply, nor does it impose fees or fines upon them.

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

Including the species and genera proposed 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 the Department or other state agencies as a result of this action. There may be future complementary authorities or requirements for managing the species proposed that will come from elsewhere, such as legislation, compelling costs associated with preventing the spread of these invasive species.

(e) Nondiscretionary Costs/Savings to Local Agencies: None.

(f) Programs Mandated on Local Agencies or School Districts: None.

(g) 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.

(h) Effect on Housing Costs: None.

VII. Economic Impact Assessment

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The proposed regulations are not expected to impact the creation or elimination of jobs within the state, as adding a species to the list of restricted animals in Section 671 does not necessitate that any actions should be taken by businesses to comply, nor does it impose fees or fines upon them. Because these effects are economically neutral, it is not anticipated that any businesses will need to adjust their workforces in either a positive or negative way as a result of these regulations.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The proposed regulations are not expected to impact businesses, as adding a species to the list of restricted animals in Section 671 does not necessitate that any actions should be taken by businesses to comply, nor does it impose fees or fines upon them. Because these effects are economically neutral, it is not anticipated that any businesses will be created or eliminated as a result of these regulations.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The proposed regulations are not expected to impact businesses, as adding a species to the list of restricted animals in Section 671 does not necessitate that any actions should be taken by businesses to comply, nor does it impose fees or fines upon them. While businesses are required to dispose of the species if found, it is unlikely that they would face a cost burden from disposing of these species from their inventories as they are not widely carried due to a lack of commercial value. Because these effects are economically neutral, the Commission does not anticipate that any businesses will expand or fundamentally change their operations as a result of these regulations.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission anticipates benefits to the health and welfare of California residents from better protection of the State’s natural resources.

The proposed regulations will help to prevent the introduction and/or translocation of members of the *Limnoperna* (golden mussel), *Sinanodonta* and *Xenostrobus* genera to other waterbodies in the state and beyond, which may help to protect water conveyance and hydroelectric power systems.

(e) Benefits of the Regulation to Worker Safety

The Commission does not anticipate impacts to worker safety.

(f) Benefits of the Regulation to the State's Environment

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 new introductions of species within the *Limnoperna*, *Sinanodonta,* and *Xenostrobus* genera to waterbodies of the state and the translocation of green crab, and members of the *Limnoperna* and *Xenostrobus* genera to other waterbodies in the state and beyond, thereby protecting native wildlife, and the agricultural interests of the state.

(g) Other Benefits of the Regulation: None.

Informative Digest/Policy Statement Overview

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

Current regulations in Section 671 contain the list of restricted species that are unlawful for any person to import, transport, or possess except as authorized in a permit issued by the Department. Under emergency regulatory authority, golden mussel (*Limnoperna fortunei*) was added to the list of restricted animals in December 2024 (Office of Administrative Law File Number 2024-1213-03E).

The proposed changes will add green crab (*Carcinus maenas*), an invasive, non-native crustacean species, and the *Limnoperna*, *Sinanodonta* and *Xenostrobus* genera which are invasive, non-native bivalve species, to the list of restricted animals consistent with California Fish and Game Code sections 2118 and 2120.

Background

Green Crab (C. maenas)

The green crab (*C. maenas*), also known as the European green crab, native to the northeast Atlantic Ocean and northern Africa, is an invasive non-native species in California.

Green crab was first detected in California in 1989 in the southern San Francisco Bay. It is suspected that the green crab arrived in seaweed-wrapped bait shipments from the East Coast of the U.S. Since then, green crab has been identified in many California bays and estuaries including, but not limited to, San Francisco Bay and Bay Delta, Elkhorn Slough, Bolinas Lagoon, Bodega Bay, Tomales Bay, Morro Bay and Humboldt Bay. There is concern that green crab can continue to expand beyond currently established populations in California and cause extensive damage to recreational and commercial fishery resources, aquaculture, native fisheries, and sensitive habitat.

On July 7, 2017, the Commission received a petition for regulatory change (Petition 2017-006) from Mr. Joshua Russo, President of the Watermen's Alliance, requesting that regulations be adopted to list green crab as an invasive aquatic species. The Department evaluated the petition and provided a recommendation to the Commission to grant the petition.

At its April 2018 meeting, the Commission agreed with the Department's recommendation and granted the petition for consideration in a future rulemaking.

Golden Mussel (genus Limnoperna)

On October 17, 2024, golden mussel (*L. fortunei*), 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. Additional discoveries of golden mussel have occurred throughout the Delta and interconnected waters, 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 actions to prevent further spread, golden mussel is also likely to spread 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 mussel is known to be established outside of its native range in Hong Kong, Japan, Taiwan, Brazil, Uruguay, Paraguay, and Argentina. 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.

At its December 11, 2024 meeting, the Commission approved an emergency rulemaking to add golden mussel (*L. fortunei*) to the list of restricted animals in Section 671 (Office of Administrative Law File Number 2024-1213-03E). The proposed rulemaking will serve as the certificate of compliance for the addition of *L. fortunei* to the list of restricted animals.

Beyond the immediate threat of *L. fortunei*, the other five species within the genus *Limnoperna* mussels have the potential to be inadvertently introduced to California, and likely to have similar negative impacts to California as *L. fortunei*. Other species within the genus *Limnoperna* include *L. siamensis, L. ngocngai, L. bogani, L. sambasensis,* and *L. taprobanensis. Limnoperna* mussels are native to Asia, primarily Southeast Asia. Most *Limnoperna* species can be found in freshwater to estuarine habitats, although it is hypothesized that *L. taprobanensis* is a marine species.

Outside of *L. fortunei*, there are few records of invasions outside of their native ranges by other species of *Limnoperna;* however, available literature indicates they may have similar biology and impacts as *Limnoperna fortunei*.

Pond Mussels (genus Sinanodonta)

Pond mussels (*Sinanodonta*) (also known as Asian pond mussels) are freshwater unionid bivalves of 26 species that are fast-growing and can reach high densities. Species within *Sinanodonta* are difficult to morphologically identify, which has led to extensive misidentification of species. Additionally, the molecular taxonomy within the genus is still being resolved.

Native to Eastern Asia including China and eastern Russia, Japan and Korea, three species of *Sinanodonta* (*S. woodiana, S. lauta,* and *S. pacifica*) have been documented to be invasive outside of their native ranges and have spread rapidly to other countries including Kazakhstan, Uzbekistan, Iran, South Korea, Myanmar, Indonesia, Malaysia,

Philippines, Borneo, Dominican Republic, Costa Rica, Spain, France, Italy, Germany, Austria, Slovakia, Hungary, the Czech Republic, Poland, Croatia, Serbia, Romania, Moldova, Belgium, Ukraine and Sweden.

In 2010, *S. woodiana* was detected for the first time in the United States within aquaculture ponds in Franklin Township, New Jersey. Pond mussel has not been detected in California, or any other U.S. state with the exception of New Jersey.

Based on the establishment of *S. woodiana* in North America, potential vectors of introduction, and anticipated impacts to native species and the environment, prohibiting all species in the genus *Sinanodonta* is warranted.

Axe-Head Mussel (genus Xenostrobus)

Axe-head mussel (*Xenostrobus securis*), a small, non-native, invasive, biofouling brackish water bivalve, was discovered on December 6, 2024, just north of the Port of Long Beach and Port of Los Angeles in the lower reaches of Dominguez Channel, Los Angeles County. This detection was made by Department staff conducting early detection monitoring for invasive mussels. This is the first known occurrence of the invasive species in North America. Shortly after, axe-head mussels were detected in high densities at additional sites including the lower reaches of San Gabriel River (February 21, 2025) and Los Angeles River (February 27, 2025).

Axe-head mussel is one of eight extant species of the genus Xenostrobus. These species include *X. pulex* and *X. securis* from Australia and New Zealand, *X. inconstans* from Australia, *X. balani*, *X. mangle* and *X. sambasensis* from Southeast Asia, *X. hepatica* from Fiji, and *X. atratus* from Japan, Korea, and China. Axe-head mussel (*X. securis*) has been introduced and established outside of its native ranges in Japan, China, Korea, Hong Kong, Italy, France, and Spain.

Globally axe-head mussel was likely introduced by ballast water discharge and biofouling on ships. Without containment, axe-head mussel is likely to spread via watercraft in the marine environment to other estuaries, brackish waters, and ports of California, other U.S. states and territories, and internationally, and overland on trailered vessels and equipment in North America.

Beyond the immediate threat of axe-head mussel, the other seven species of *Xenostrobus* mussels have the potential to be inadvertently introduced to California, and are likely to have similar negative impacts to California as axe-head mussel.

Proposed Changes

The proposed regulations add green crab, and the *Limnoperna*, *Sinanodonta,* and *Xenostrobus* genera to the list of live animals restricted from importation, transportation and possession:

Section 671. Importation, Transportation and Possession of Live Restricted Animals.

Amend subsection (c)(8) from Class Crustacea to Class Malacostraca to update and correct the Class for the species in this subsection. The Class Crustacea has been

reclassified by The International Commission on Zoological Nomenclature to a higher level and is now a subphylum of the phylum Arthropoda.

Add subsection (c)(8)(C) *Carcinus maenas* (green crab) (D).

Adding green crab, which causes harm to native species and the ecosystems they depend on to survive, to the list of restricted animals is necessary to protect against the spread of this invasive species in California. Prohibiting importation, transportation, and possession of this species will prevent further introductions and slow the spread within and outside of California.

Amend subsection (c)(10) Class Bivalvia-Bivalves to move “All members of the genus *Dreissena* (zebra and quagga mussels) (D).” under subsection (A) to allow for the addition of other species under this class.

Add subsection (c)(10)(B) All members of the genus *Limnoperna* (golden mussel) (D).

Adding all members of the genus *Limnoperna* (golden mussel), which can cause harm to native species and the ecosystems they depend on to survive, as well as infrastructure, to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

Add subsection (c)(10)(C) All members of the genus *Sinanodonta* (pond mussel, Asian pond mussel) (D).

Adding all members of the genus *Sinanodonta* (pond mussel), which can cause harm to native species and the ecosystems they depend on to survive, to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

Add subsection (c)(10)(D) All members of the genus *Xenostrobus* (axe-head mussel) (D).

Adding all members of the genus *Xenostrobus* (axe-head mussel), which can cause harm to native species and the ecosystems they depend on to survive, as well as infrastructure, to the list of restricted animals is necessary to protect against the spread of these invasive species in California. Prohibiting importation, transportation, and possession of the species will prevent further introductions and slow the spread within and outside of California.

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 new introductions of species within the *Limnoperna*, *Sinanodonta,* and *Xenostrobus* genera to waterbodies of the state and the translocation of green crab, and members of the *Limnoperna* and *Xenostrobus* genera 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 species on the list of restricted animals.