

# Walker River Irrigation District

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## PREVENTION/MONITORING PROGRAM

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Invasive Mussel Prevention/Monitoring Plan  
Bridgeport and Topaz Reservoirs



April 2026

WALKER RIVER IRRIGATION DISTRICT  
410 N Main Street, Yerington, NV 89447

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# Invasive Mussel Prevention/Monitoring Plan

## 1 PURPOSE

This document was developed to guide the development, implementation, and monitoring of a program to prevent the introduction of invasive mussels' species into Bridgeport and Topaz Reservoirs.

In accordance with California Fish and Game Code 2302, this document is developed to assess the vulnerability of the reservoir for the introduction of invasive mussel species, and to develop and implement a program designed to prevent the introduction of invasive mussels.

Development and implementation of a program designed to prevent the introduction of non-native invasive mussel species includes, at a minimum, all of the following:

- Public education consisting of, but not limited to, handouts, flyers, signage, postings and verbal communication & education.
- Monitoring
- Management of those recreational, boating or fishing activities that are permitted which shall include, but not limited to: inspections, decontamination stations and/or information where to decontaminate a vessel, exit inspections and banding of vessels to trailers.

This report summarizes what management and prevention activities have been implemented to prevent the introduction of invasive mussels.

## 2 INTRODUCTION

The District's overall Aquatic Invasive Species (AIS) Program will be consistent with California Department of Fish and Game Code 2302 that requires waterbody managers/owners to assess the vulnerability to invasive mussels (i.e. golden, quagga and zebra mussels) in their water bodies and to develop a prevention and monitoring program. In assessing vulnerability of a waterbody, the California Department of Fish and Wildlife (CDFW) recommends examining four parameters:

1. Nearby infestations
2. Recreational use
3. Access
4. Water quality

### 2.1 MANAGING AUTHORITY

As the agency responsible for operations of the reservoirs and appurtenant recreation facilities included in this report, as well as connecting reservoirs in the system, WRID is responsible for managing an AIS Program that includes its recreational reservoirs. This report will become a part of the District's overall AIS Monitoring and Prevention Program.

### 2.2 ENVIRONMENTAL SETTING

Activities at WRID's reservoirs include sailing, water-skiing, powerboating, kayaking/canoeing, swimming, windsurfing, fishing, camping, picnicking and hiking. WRID's reservoirs are accessible and may be used year-round, although much more heavily during the summer recreation season. The following sections provide a description of the reservoirs addressed in this report.

#### 2.2.1 Bridgeport Reservoir

Bridgeport Reservoir is created by Bridgeport Dam and impounds Robinson Creek and Buckeye Creek. The reservoir is at an elevation of 6464 feet, and is located at 1845 Hwy 182, Bridgeport, California in Mono County. The reservoir was constructed in 1924 for irrigation use, with appurtenant use of recreation. Approximately 45 private property owners immediately surround the reservoir. There are two leased boat launch facilities at Bridgeport Reservoir: Bridgeport Marina RV & Campground and Paradise Shores RV Camp. There are multiple private boat launch areas surrounding the reservoir. WRID is in the process of making non-designated boat launch areas inaccessible for trailered watercraft.

**Table 2-1 Bridgeport Reservoir summary of facilities**

Reservoir Statistics	Recreation Facilities
44,700 acre-feet storage capacity	2 boat launch facilities at 2 campgrounds; multiple private boat launch areas; there are no restrictions on boats or personal watercraft use

#### 2.2.2 Topaz Reservoir

Topaz Reservoir is created by the Topaz Diversion located at the south end of the reservoir and release is controlled by the Topaz outlet gates located on the northeast side of the reservoir. The reservoir is at an elevation of 5009 feet, and is located at 3700 Topaz Park Road, Gardnerville, Nevada in Douglas County, Nevada and Mono County, California. The reservoir was constructed in 1937 for irrigation use, with appurtenant use of recreation.

Approximately 75 private properties/businesses immediately surround the reservoir. There are two leased boat launch facilities at Topaz Reservoir: Topaz Landing Marina & RV Park, and Douglas County State Park Recreation Area. There are multiple private boat launch areas surrounding the reservoir. Nevada Department of Wildlife currently has a Watercraft Inspection & Decontamination station located at the Douglas County State Park Recreation Area (Nevada Aquatic Invasive Species Management Plan, NDOW, 2017). The other lessee, Topaz Landing Marina & RV Park, is responsible for complying with all rules and regulations set forth by Nevada and California. WRID will reach out to private businesses and residences along the shoreline of the reservoir with requirement and educational information. Nevada Department of Wildlife is responsible for the enforcement on the water and WRID will routinely work with them to ensure compliance with all rules and regulations set forth by Nevada and California regarding the reservoir. WRID is in the process of making non-designated boat launch areas inaccessible for trailered watercraft.

Table 2-2 Topaz Reservoir summary of facilities	
Reservoir Statistics	Recreation Facilities
59,600 acre-feet storage capacity	2 boat launch facilities at 2 campgrounds; multiple private boat launch areas; there are no restrictions on boats or personal watercraft use

## 2.3 REGULATORY SETTING

There are multiple authorities from the federal, state, regional and local levels working to manage and minimize the threat and spread of AIS. In California, the CDFW is the primary agency implementing programs to address AIS issues, including limnoperna fortunei and dreissenid mussel infestations. The following sections summarize regulatory agencies and their roles in AIS management in California.

### 2.3.1 Federal

No single federal agency has clear authority over all aspects of AIS management, but many agencies have programs and responsibilities that address aspects of this issue.

#### *US Army Corps of Engineers*

The US Army Corps of Engineers (USACE) is tasked with the development, control, maintenance and conservation of the nation’s water resources in accordance with the laws and policies established by Congress and the Administration. The USACE Los Angeles District serves California, Nevada and Arizona. The USACE Zebra Mussel Research Program was authorized by the Non-Indigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), Public Law 101-646, and is the only federally authorized research program for the development of technology to control zebra mussels. The USACE AIS programs coordinate their research with the CDFW to ensure leveraging of resources.

#### *USDA Forest Service*

USDA Forest Service (USFS) is guided by an internal management policy on AIS and partners with CDFW to address specific species issues. Specific policy direction for the management of all taxa of aquatic and terrestrial invasive species on national forests and grasslands has been issued through Forest Service Manual 2900-Invasive Species Management (FSM 2900) (USFS 2011). Among other requirements, this national USFS policy directive calls for close coordination with state, tribal, and local partners to address invasive species on National Forest System lands and waters, including but not limited to cooperation to implement and enforce statewide AIS management plans and other applicable regulations, plans, and approaches against invasive species. FSM 2900 is supplemented by broad guidance found within the Walker River Irrigation District

National Strategic Framework for Invasive Species Management (USFS 2013). Additionally, western regions of the USFS have adopted the Interagency Standards for Fire and Fire Aviation Operations protocols to address minimizing the transport of AIS in wildland fire fighting activities (USFS 2018).

### ***US Fish and Wildlife Service***

The US Fish and Wildlife Service addresses AIS within the Fisheries and Aquatic Conservation Program, Branch of Aquatic Invasive Species. The program seeks to prevent the introduction and spread of AIS, rapidly respond to new invasions, monitor the distribution and control of established invaders, and foster responsible conservation behaviors through its national public awareness campaigns. The AIS program also builds capacity, coordinates, and implements AIS prevention and control activities authorized under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 and National Invasive Species Act.

## **2.3.2 State, Regional, Local**

### ***State: California Department of Fish and Wildlife***

CDFW's Invasive Species Program works to reduce the negative effects of non-native invasive species on the wildlands and waterways of California. Their AIS goal is to prevent the introduction of these species into the state, detect and respond to introductions when they occur, and prevent the spread of invasive species that have become established. CDFW is the lead agency on the California Invasive Species Management Plan (CAISMP), which works to coordinate state programs and ensures action and efficient resource allocation to address AIS threats in California. The CAISMP defines an invasive species as a species that rapidly reproduces and spreads outside their point of origin and is distinct from 'non-native,' 'nonindigenous,' 'alien' or 'exotic' species, which refers only to the origin of the species and not their rate of reproduction, dispersal or potential to cause harm.

The CAISMP recognizes that one of the most important issues with regard to AIS is not the species that have already invaded but those that might invade in the future, including the golden, zebra, and quagga mussels, which could greatly impact California's freshwater ecosystems as well as its water delivery and irrigation networks. The CAISMP emphasizes the importance of prevention as well as early detection and rapid response in managing AIS in order to minimize the economic impacts of infestations in the state.

CDFW has imposed a number of laws and regulations concerning invasive species via the Fish and Game Code (FGC) that affect WRID as reservoir operators. In regard to invasive mussels, FGC §2300-2303 addresses the transportation of invasive species, and reservoir owner responsibilities for assessing and developing a program to prevent and monitor invasive species.

### ***State: Nevada Department of Wildlife***

NDOW's Aquatic Invasive Species Prevention Program works to prevent the spread of Aquatic Invasive Species threatening Nevada's waterways and to prevent new introductions of aquatic invasive species (NDOW, *AIS Prevention*, 2026). NDOW is the enforcement agency on the waters of Topaz Reservoir and is responsible for the watercraft inspection and decontamination at the Douglas County State Park.

### ***Regional: Mono County***

On March 10, 2026, Mono County Board of Supervisors passed Ordinance No. ORD26-002 'Water Vessel

*Inspection Program'* requiring all trailered watercraft to be inspected and stickered before being launched in bodies of water within Mono County, California. This ordinance is in coordination with Watercraft Inspection & Decontamination stations arranged by Eastern Sierra Watercraft Inspection & Decontamination Coalition.

***Other Regulatory Entities***

In addition to CDFW, the Invasive Species Council of California (ISCC) is a state inter-agency council that represents a high level of leadership and authority in coordinating and ensuring complementary, cost-efficient, environmentally sound, and effective state activities regarding invasive species. Working groups within the committee help to prioritize action tasks and implement an Invasive Species Action Plan along with a Rapid Response Plan.

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## 3 INVASIVE MUSSELS ASSESSMENT OF VULNERABILITY

### 3.1 HISTORY, LIFECYCLE AND IMPACTS

#### 3.1.1 History

Quagga, Zebra, and Golden mussels are prolific invaders that can cause great damage to ecosystems, hydroelectric infrastructure, recreational facilities and boats, and water conveyances. These small mussels can clog water intakes and damage equipment by attaching to boat motors and hard surfaces. They have the ability to damage ecosystems by harming fisheries, smothering native mussels and crayfish, and littering beaches with their sharp shells.

Invasive quagga and zebra mussels were first detected in the Great Lakes in the late 1980s and since then have spread, largely unchecked by natural predators, throughout much of the eastern United States. In addition to the Great Lakes basin, the dreissenid mussels currently infest much of the St. Lawrence Seaway and the Mississippi River drainage system and have begun to spread up the Missouri and Arkansas rivers. The mussels were first detected in the Colorado River system in January 2007 and have since been found in San Diego, Riverside and Orange counties by state and local water agencies. The closest sighting of dreissenid mussels was in January 2008 when zebra mussels were discovered in San Justo Reservoir in San Benito County (Appendix A). To the east of the study area is the State of Nevada. Adult zebra mussels are currently not present; however, in April 2011, Lahontan and Rye Patch Reservoirs in Northern Nevada tested positive for the presence of veligers (larvae). Subsequent sampling since that time has not found any veligers or adult mussels. (Appendix A)

The first North American detection of golden mussel (*Limnoperna fortunei*) was in October 2024 where they were observed in the delta near the Port of Stockton and have been observed in the State Water Project. Although this mussel is similar in appearance and impacts to quagga and zebra mussels, it can establish in waters with wider temperature and salinity ranges. Environmental impacts include loss of native and game fish through competition for the same food sources and as a contributor to harmful, fish killing algal blooms. Recreational impacts of this mussel include waterbody closures, mandatory inspections, reduced numbers of fish and shellfish for consumption, increased launch and/or entry fees. Economic impacts range include costly repairs and maintenance (boats, water infrastructure, hydroelectric facilities), reduced water flow affecting food production, water delivery to homes, and flood control. (California's Invaders: Golden Mussel. CDFW) (Appendix B)

#### 3.1.2 Lifecycle

Quagga, Zebra, and Golden mussels are small, freshwater bivalves that attach to hard and soft substrates, including plants, rocks, man-made materials and structures including docks, dams, canals, aqueduct walls, watercraft hulls, and on other recreation or commercial equipment. A mature female dreissenid mussel can produce over one million eggs per year. In warmer waters, there is the potential for year-round spawning. Eggs develop into microscopic larvae called veligers. Veligers float in the water column and can be transported within water distribution systems as well as in watercraft bilges, ballasts, and live wells, and in any other equipment that holds water. Juvenile and adult mussels secrete byssal threads (small, thin fibers) to attach themselves to substrates and can survive on substrate removed from one body of water and transferred to another. These mussels often cluster in huge colonies from the surface of the water to more than 400 feet in depth.

As veligers grow, they settle out of the water and attach to a substrate where they may then crawl or float in search of a more suitable location. Adult mussels are hardy and can survive out of water for up to a week in warm, dry weather and up to nearly a month in cool, moist weather. Adults and veligers can easily spread between water bodies by watercraft, especially when protected in the crevices of trim tabs, keels, engines, propellers, and anchors. In addition, they may be moved with equipment, trailers, water tanks, construction equipment, fish for stocking, water-based aircraft, firefighting equipment, bait buckets, anglers, and other recreational water equipment. Survival out of water can be prolonged by proximity to damp objects, such as coiled rope, or in enclosed areas.

### **3.1.2.1 Habitat Suitability**

Quagga and Zebra mussels can tolerate fairly wide ranges of environmental conditions. They are often found in water temperatures between 68°F and 77°F and water currents 0.15 to 0.5 meters per second for proper growth. The mussels spawn in water temperatures in the mid-50°F range. While normally a freshwater species, the quagga and zebra mussels can adapt to and inhabit brackish waters, ranging from 0.2 to 2.5 parts per thousand total salinities, in estuarine locations. Quagga and Zebra mussels require calcium, oxygen, and pH ranges for shell development, reproduction, and osmoregulation. They thrive in low-turbidity water, calcium concentrations >20-25mg/L, pH level between 7.4 and 8.5, and Dissolved Oxygen level >90% . Although, they can live in concentrations below 10-12mg/L, pH level between 6.6 to 9.4, and Dissolved Oxygen levels as low as <2.0mg/L or 3.2ppm, their survival and growth are limited. High turbidity reduces their ability to filter feed and results in low population densities.

Golden mussels can inhabit fresh and brackish-water lakes, rivers, creeks, wetlands, bays, and canals with water temperatures ranging from 41-95°F. They can establish in waters with a constant salinity of less than 3 parts per thousand (ppt) and can survive fluctuations of higher salinities. They attach to a wide variety of substrates, both man-made and natural, and at various water depths. Golden mussels are not restricted to hard surfaces and have been found colonizing soft substrates and attached to aquatic plants. Golden mussels also require calcium, oxygen, and pH ranges for shell development, reproduction, and osmoregulation. A key factor in Golden Mussel invasion is their ability to exist in low-calcium waters. Survival has been reported in water calcium levels as low as 3-5 mg/L. They tolerate pH levels between 5.8 to 9.3, and dissolved oxygen levels as low as .2 mg/L.

Bridgeport Reservoir waters are currently tested monthly for temperature, dissolved oxygen, turbidity, and pH; calcium testing will be implemented soon. Based on historical data, Bridgeport Reservoir is a survivable habitat for Golden Mussels in respect to turbidity, water temperature, and calcium, pH, and dissolved oxygen levels. Quagga and Zebra mussels could survive in Bridgeport Reservoir, although the temperature, turbidity, and pH levels do stray from the range of survivability throughout the year.

No water testing is currently performed at Topaz Reservoir; WRID will be seeking a way to have this done. It is suspected that Golden Mussels could survive in the waters at Topaz Reservoir. It is unknown what the survivability would be for Quagga and Zebra mussels.

### **3.1.3 Impacts**

In terms of ecological and economic impacts, quagga, zebra, and golden mussels are three of the most devastating aquatic species to invade North American fresh waters. The arrival of these species to a water system brings the potential to extend devastating impacts. The spread of these mussels threatens the natural environment, water delivery systems, hydroelectric facilities, agriculture, and recreational boating and fishing.

These species of non-native aquatic mollusks wreak havoc on the environment by disrupting the natural food chain and can contribute to the release of harmful bacteria that affect other aquatic species. Quagga, zebra, and golden mussels are filter feeders that consume large portions of the microscopic plants and animals that form the base of the food web. Their consumption of significant amounts of phytoplankton from the water decreases zooplankton and can cause disruption to the ecological balance of entire bodies of water.

The mussels can displace native species, further upsetting the natural food web. In addition to devastating the natural environment, quagga and zebra mussels pose an economic threat to California. The greatest impact will be on infrastructure and water conveyances. Mussels attach to surfaces such as piers, pilings, water intakes and fish screens. These invasives spawn multiple times a year and, as a result, intake structures can become clogged, hampering the flow of water threatening municipal water supply, agricultural irrigation and power plant operations.

### 3.1.4 Vector Pathways

The vulnerability of the waterbodies to vector pathways was assessed by evaluating natural processes and human activities that may serve as pathways by which dreissenid and limnoperna mussels may be introduced into the waterbody. These pathways included potential vectors for the movement of water and contact with the water and are defined at a level of detail appropriate to identify actions necessary to avoid or mitigate the introduction of the mussels. The following discussions and tables identify potential pathways, describe their characteristics, and identify possible management actions that can be taken to address them.

#### 3.1.4.1 Recreational Boating

Recreational equipment, including both motorized and non-motorized vessels, is the main vector by which dreissenid and limnoperna mussels spread in fresh water bodies. Quagga, zebra and golden mussels and their veligers can be found in boat bilges, live wells and motors and are capable of surviving at least three days (up to 30) without water depending on temperature and season. In order to prevent the unwanted spreading of these mussels, WRID suggests that boaters Clean, Drain and Dry all equipment after each use.

Preliminary threats due to recreational use will be evaluated based on visitor and boater use data at the three reservoirs.

**Table 3-4 Recreational boating pathway summary**

<b>Pathway</b>	Recreational boating; includes motorized and non-motorized
<b>Who</b>	The public
<b>What</b>	Boaters come from throughout the state for day-use boating; many visitors are local residents
<b>Where</b>	Bridgeport and Topaz Reservoirs
<b>When</b>	Open for boating year-round; visitation highest May-October from sunrise – dusk
<b>Current efforts to prevent or mitigate an introduction:</b> WRID Lessee staff distributes information and performs visual inspection of watercrafts, signage posted at boat launch facilities.	
<b>Potential management options to prevent or mitigate an introduction:</b>	
<ul style="list-style-type: none"> <li>• Watercraft inspection program for all watercraft (install gates, limit access hours)</li> </ul>	

**Education and outreach opportunities:**

- Conversation preceding and during inspection will convey information
- Post informational poster and handouts on kiosks
- Post permanent metal signs at each boat ramp (*in progress*)

**3.1.4.2 Other Human Activities Contributing to AIS Introduction**

3.1.4.2.1 Fishing/Fish Stocking

Fishing can be from the shore or by boat on the reservoirs and can range from bait fishing to use of artificial lures. Although unlikely because invasive mussels need water to survive, contaminated fishing equipment could be a potential pathway for infestation. WRID lessees can inspect fishing equipment along with boat inspections. Although not covered in this Assessment, release of live bait could introduce invasive species which would fall under an AIS Program.

**Current efforts to prevent or mitigate an introduction:**

WRID Lessee staff will distribute information and perform visual inspection of watercrafts, and signage posted at boat launch facilities.

**Potential management options to prevent or mitigate an introduction:**

- Per Mono County Ordinance No. ORD26-002, all trailered watercraft entering bodies of water in Mono County must be inspected and stickered.

**Education and outreach opportunities:**

- Conversation preceding and during watercraft inspection to convey information
- Post informational poster and handouts on kiosks (e.g., recommend waders without felt bottoms, freeze boots before reintroduction in new waterways, etc.)
- Post permanent metal signs at each dock and boat ramp (*in progress*)

3.1.4.2.2 Fire Suppression Activities

The nature of fighting fire involves water and equipment that moves and carries water. Open water sources are often used to control a fire. Firefighting teams work across the west, and even the nation, and are moved frequently as fire incidents evolve.

Wildfires are a common occurrence in the region from early summer to late fall; CAL FIRE and the US Forest Service (USFS) both utilize WRID reservoirs to source water in battling wildland flames. Although public safety is the first consideration, fire equipment may become a vector in introducing AIS. The National Wildfire Coordinating Group and the Invasive Species Subcommittee have approved the current *Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations* (NWCG 2017). The guide is an interagency, nationwide, research-backed effort to mitigate the risk of transporting and spreading AIS and focuses on procedural processes rather than on the use of large amounts of decontamination chemicals.

The California Environmental Protection Agency suggests guidelines and best management practices to prevent contamination and the spread of AIS, which are identified in the table below. Encouraging the adoption of Interagency Standards for Fire and Fire Aviation Operations protocols to reduce the risk of spreading AIS via equipment is recommended.

<b>Table 3-9 Fire suppression activities pathway summary</b>	
<b>Pathway</b>	Fire suppression equipment; includes engine and portable pump drafting, helicopter buckets, aircraft scoopers
<b>Who</b>	Fire suppression agencies
<b>What</b>	Water collection from waterbodies during fire suppression activities
<b>Where</b>	Bridgeport and Topaz Reservoirs
<b>When</b>	Year-round; highest potential use during fire season May-October, sunrise – dusk
<b>Current efforts to prevent or mitigate an introduction:</b> None	
<b>Potential management options to prevent or mitigate an introduction:</b>	
<ul style="list-style-type: none"> <li>• Avoid transferring water between drainages or between unconnected waters within the same drainage. Do not dump water from one water body (e.g., stream, lake, or reservoir) into another waterbody.</li> <li>• Dispose of excess water over uplands.</li> <li>• Avoid siphoning organic and bottom material when drafting from shallow water.</li> <li>• Switch out a contaminated helicopter bucket with a clean bucket before moving to a new water source.</li> <li>• Visually inspect water handling equipment (snorkel hoses, pumps, foot valves, screens, buckets, intakes and tanks) for mud, debris, or plant parts daily, during maintenance, and after every water dropping mission, when possible. Remove plants and mud from external surfaces.</li> </ul>	
<b>Education and outreach opportunities:</b>	
<ul style="list-style-type: none"> <li>• WRID coordinates with USFS, CAL FIRE, and local fire protection agencies</li> </ul>	

#### 3.1.4.2.3 Float Planes

Float planes are not currently permitted to land on either reservoir unless emergency situations arise.

### 3.1 CONCLUSION

In conclusion, this assessment was an important step in collecting baseline data which indicates that invasive mussels are not found in any of the reservoirs where sampling occurred. However, a growing risk of contamination is recognized based on increasing user numbers at these facilities, both from south to north and east to west. The District’s current method of monitoring of invasive species is high reliant on reports from our lessees, and occasional visual inspection of the outlet tube at Bridgeport. The District is currently developing a comprehensive AIS Program, which will focus on prevention measures including a broader and more active outreach program, increasing inspections of watercrafts, detailed visual inspection of infrastructure, and increased coordination with regional partners to bolster regional efforts, including development of a regional boat decontamination facility.

## 4 MONITORING PROGRAM

### 4.1 MONITORING

Monitoring water conditions and surveying for new infestations are imperative for the successful control of AIS in freshwater reservoirs. It is important to determine and recognize environmental thresholds that may contribute to the foundation of AIS populations in order to successfully control populations. The effects of climate change create increasingly unpredictable and extreme weather patterns in California and may contribute to rapidly changing water chemistry conditions, further increasing the importance of monitoring. Current monitoring for invasive species is highly reliant on reports from lessees regarding sightings on watercraft or on beaches, occasional visual inspection of the Bridgeport outlet tube, and monthly water testing of Bridgeport waters. The District will be working to implement monthly water testing to include pH, dissolved oxygen, turbidity, temperature, and calcium on both reservoirs. The visual inspection aspect will be developed to include expectations of our lessees to ensure all Mono County WID ordinances are followed in regard to boat launching, installation of artificial substrates at the Bridgeport Gatehouse and a TBD location at Topaz Reservoir (when the water levels are too low for artificial substrate, monthly plankton tows will be performed), visual surface inspections looking for shells at the high water mark, or shells attached to rocks and debris. At this time, all water testing and visual inspections of the surface and artificial substrate methods will be performed by WRID staff.

### 4.2 CONTROL/ERADICATION

If AIS infestations are identified, they will warrant significant resources for prompt control and eradication. Determination of whether to 1) minimize impacts and AIS infestation, or 2) to strive for complete eradication and removal of the infestation will depend on evaluation of the following factors:

- Size of population
- Suitability of proven eradication and termination of species lifecycle
- Environmental impact
- Financial requirements of removal and future management
- Level of threat of reintroduction
- WRID's adopted AIS policies

Any need for control or eradication of invasive mussels will require significant coordination with CDFW, Lahontan Regional Water Quality Control Board, and various other local agencies.

### 4.3 RESEARCH

As the spread of AIS increases, understanding of species, including invasive mussels, will evolve. Staying current on AIS environmental thresholds, methods of removal, and the effectiveness of decontamination and other prevention methods will be of the utmost importance. As mentioned in previous sections, WRID will continue to perform water testing for pH, DO, temperature, and turbidity levels at Bridgeport and will begin testing at Topaz as soon as possible. Calcium testing will be implemented into the monthly testing. WRID will be utilizing an Artificial Substrate Datasheet to document the monthly visual inspections of the substrate. A similar form will be used in the event the reservoir levels are too low for the substrates, and a plankton tow must be performed. This information will be retained in WRID files.

## 5 MANAGEMENT AND PREVENTION PLAN

### 5.1 MANAGEMENT OF RECREATIONAL FACILITIES, INCLUDING EDUCATION AND OUTREACH

This section identifies specific management actions selected from the pathway analyses that will be implemented to prevent the introduction of invasive mussels.

Measures are focused on three management actions: public education (e.g. signage, surveys), development of District policies, and participation in development of regional decontamination facilities. Table 5-1 identifies the management actions applicable to each of the identified vector pathways. Further information on the management actions is detailed in the following sections.

Management Actions	Pathways			
	Boating	Fishing	Construction	Fire Suppression
Public education	X	X	X	
Policies			X	X
Decontamination facilities	X*			

\*grant opportunities for a decontamination facility are in progress

#### 5.1.1 Public Education

Public education is critical to prevent the spread of AIS. WRID is in the process of implementing a public education program to inform reservoir users of the infestation risk and measures to prevent introduction and infestations. The program includes outreach techniques such as AIS flyers, facility signage, implementation of a self-inspection program for boaters, and information on the District's website. Users who visit nearby reservoirs (e.g., Truckee and Tahoe) will notice continuity and consistency in launch survey applications and messaging, which will increase and reinforce public knowledge regarding the significance of AIS threats in the region and help establish a better, well-rounded understanding of AIS issues.

Reservoir users will also be encouraged to visit CDFW and DBW websites, as well as the USFWS *Stop Aquatic Hitchhikers* program website or hotline (877-STOP-ANS), for more detailed information.

##### 5.1.1.1 Signage

Signage will provide information to educate boaters and recreationists regarding proper decontamination methods including "Clean, Drain and Dry" messaging. Signage will be placed at future decontamination stations and public entrances to reservoirs, particularly those with boat launches and campgrounds.

#### 5.1.2 WRID Policies

In its effort to comply with the *California Code of Regulations, Title 14, Section 672.1(b)* the District has developed an Invasive Mussel Monitoring and Prevention Program that involves public outreach.

#### 5.1.3 Decontamination Facilities

The District will work with regional partners regarding location of boat decontamination stations, features, access, and management. The District will coordinate with CDFW on this effort.

## **5.2 PREVENTION**

The Walker River Irrigation District Invasive Mussel Prevention/Monitoring Plan identifies the prevention of AIS introductions as the single most cost-effective and environmentally beneficial management approach and is the first line of defense. Because there are no known invasive mussels present in WRID reservoirs at this time, prevention is the highest priority in managing the threat of AIS. Prevention measures at WRID reservoirs will include public education and outreach, and inspection of recreational equipment and vessels prior to entry as well as quarantine of watercraft and equipment that may have been recently exposed to AIS infested waterbodies.

### **5.2.1 Public Education**

Signs will be posted at each of the boat launches at Bridgeport and Topaz reservoirs. Example of the sign is in the design phase. In addition to signage, information flyers are provided to every user that enters the recreation facilities, whether or not they are boaters, and that include information on invasive mussels (Appendix C).

- Adoption of “Clean, Drain, Dry” messaging promoted by the US Fish and Wildlife Service and CDFW to encourage awareness and proper decontamination of all boating and recreation equipment

### **5.2.2 Boaters’ Self-inspection**

At this time, there are two monitored boat launching areas on Bridgeport Reservoir. At each location, boaters are required to check in at the office. Entrance check-in counters at Bridgeport Reservoir RV Park & Marina, and Paradise Shores RV Park will implement a mandatory self-inspection program for all boaters, both motorized and non-motorized. Boaters will be provided with an Aquatic Invasive Species Self-Inspection Form (Appendix D). Furthermore, a lessee representative will do an inspection of each water vessel upon check-in and before the vessel is allowed to enter the water. Watercraft Inspection & Decontamination training opportunity information will be provided to lessees.

Topaz Reservoir has many access points. There are two District-owned boat launch areas (Topaz Landing and Douglas County State Park). Topaz Landing lessees will be required to implement the same mandatory self-inspection program for all boaters, both motorized and non-motorized. Boaters will be provided with an Aquatic Invasive Species Self-Inspection Form (Appendix D). WRID staff is working with private landowners along the Topaz shoreline to educate them on the invasive species risks and will provide the Aquatic Invasive Species Self-Inspection form to each landowner when correspondence is mailed. Douglas County State Park works with Nevada Department of Wildlife who has its own Aquatic Invasive Species Prevention Program and watercraft inspection & decontamination station located at the Douglas County State Park. Watercraft Inspection & Decontamination training opportunity information will be provided to lessees as well as included in correspondence to private land/business owners.

### **5.2.3 Decontamination Stations**

Currently, there is a Watercraft Inspection & Decontamination Station (WID) located at the border office between Nevada and California at Topaz Reservoir. There is also a WID located at the Douglas County State Park on the north side of Topaz Reservoir that is operated by Nevada Department of Wildlife. Eastern Sierra Golden Mussel Collective has been working to set up additional WID stations throughout Mono County.

### **5.3 ANNUAL EVALUATION**

In accordance with California Department of Fish and Wildlife 14 CCR Sections 672 et seq, program implementation will be demonstrated by submitting annual reports that summarize any changes in the reservoir's vulnerability, monitoring results, and activities to the California Department of Fish and Wildlife by March 31<sup>st</sup> of each year.

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# Appendix A

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## Quagga Mussel and Zebra Mussel *Dreissena polymorpha* Pallas and *Dreissena bugensis* Andrusov

Ann Mull, Extension Assistant and Lori R. Spears, Professional Practice Associate Professor

### Quick Facts

- Zebra mussels and quagga mussels are invasive freshwater mollusks native to Eurasia that pose a significant threat to Western aquatic ecosystems.
- Most adults are about the size of an adult human's thumbnail.
- Once these invasive mussels become established, they are difficult to eradicate and require expensive, ongoing maintenance.
- Invasive mussels are highly efficient at filtering water which results in depleted food sources for native species and explosive growth of bottom algae and weeds.
- Infested areas can have devastating impacts on native mussel populations, fisheries, hydropower operations, and municipal water utilities.
- The quagga mussel was first detected in Lake Powell in 2012 and quickly infested the reservoir.
- The zebra mussel is NOT known to occur in Utah, but living specimens were found hitchhiking in imported aquarium "moss balls" sold in Utah and in pet stores nationwide in 2021.



Fig. 1. Zebra mussels (*D. polymorpha*) on beach.



Fig. 2. Quagga mussel (*D. bugensis*) adults.



Fig. 3. Zebra mussel (*D. polymorpha*) adults.

### INTRODUCTION

The quagga mussel and the zebra mussel (Order: Veneroidea, Family: Bivalvia) (ZQM) (Figs. 1-3) are two-shelled mollusks native to the Caspian and Black Seas in eastern Europe and western Asia that spread rapidly and can severely disrupt aquatic ecosystems and critical water infrastructure systems. In North America, these invasive dreissenid mussels were first discovered in the Great Lakes in the late 1980s from discharged contaminated ballast water from ships arriving from Europe or through mature adults attached on anchors stored in the internal compartments of these ships. Within three years, they had been detected in all five Great Lakes. Currently, the Columbia River Basin is one of the few remaining areas in the U.S. that is free from these invasive mussels.

The quagga mussel now occurs in many eastern and midwestern states as well as in select waterbodies in the western states of Arizona, California, Colorado, New Mexico, Nevada, and Utah. In the western U.S., this species was first detected in the lower Colorado River in 2007 in Lake Mead, Lake Mohave, and Lake Havasu, 1,000 miles west of the nearest known colony at that time, likely having been introduced from contaminated trailered watercraft. About a year later, it was found in numerous lakes and reservoirs in California, Colorado, and New Mexico, and in 2012 it was detected in Utah in Lake Powell, where it quickly infested the reservoir. Immature quagga mussels were detected in Utah in Sand Hollow and Deer Creek Reservoirs in 2012 and 2015, respectively, but subsequent sampling of plankton tows yielded no invasive mussels, and these waterbodies are currently considered free of invasive mussels (R. Gibbs, Utah Department of Wildlife Resources aquatic invasive species biologist, personal communication, March 12, 2021).

The zebra mussel now occurs in all large navigable rivers in the eastern U.S. and has been detected from hundreds of inland lakes in 28 states, including Texas, Montana, Colorado, and California (Benson et al., 2021). In Utah, immature zebra mussels were

detected in Emery County in 2008 in Electric Lake and Red Fleet Reservoir. The Utah DWR subsequently conducted and analyzed plankton tows for years following these initial detections and found no invasive mussels. This suggests that environmental conditions were unfavorable for development of these species. These waterbodies are currently considered to not have invasive mussels (R. Gibbs, Utah Division of Wildlife Resources aquatic invasive species biologist, personal communication March 12, 2021).

## DESCRIPTION

ZQM adults are small, up to about 1.5 inches (40 mm) in length with two triangular shells and byssal threads (ropes) on the hinged edge, which are not found on native mussels (Fig. 4). Note that these threads may get pulled out when the mussel is removed from the substrate. Color patterns can vary greatly in both species, and stripes on shells may be bold, faint, horizontal, vertical, or absent.

In areas of species overlap, quagga mussels can more closely resemble zebra mussels and may require genetic identification (Benson et al., 2021, CABI, 2019a). Interbreeding of the two species is considered unlikely under natural conditions (CABI, 2019a).



Fig. 4. Byssal threads on a dreissenid mussel. The threads do not occur on native mussels.

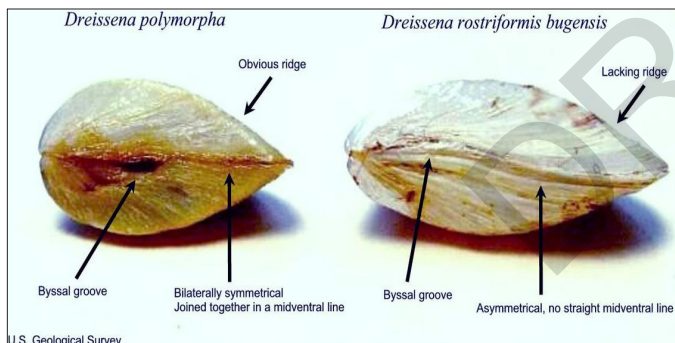


Fig. 5. Zebra mussel (left) and quagga mussel (right).

## Quagga Mussel

The quagga mussel adult has a more rounded appearance than the zebra mussel. Colors vary widely and range from yellowish-brown to completely black, including intermediate forms that have stripes of varying shapes and sizes (Figs. 2, 6, 7). The two shell halves are asymmetrical and form a curved line where they meet (Fig. 5). The ventral (hinge) surface is convex. The thickest portion of the shell is pointed, and a distinguishable white stripe or line that crosses the middle of the shell from the umbo (most prominent, highest part of the shell) toward the posterior end may be visible. A distinct form of quagga mussel that is pale or all white in color occurs in the deep waters of Lake Erie (CABI, 2019a, USFWS, n.d.).



Fig. 6. A quagga mussel adult.



Fig. 7. Quagga mussel adults can have a more rounded appearance.

## Zebra Mussel

The zebra mussel adult has a more flattened appearance than the quagga mussel. The two shells are symmetrical in shape and meet to form a straight midventral line (Fig. 5). The flattened underside enables it to remain upright when placed on a flat surface and is often a distinguishing characteristic (Figs. 3, 8). Colors typically range from black or brown with variable white to yellow zebra-like stripes or zigzag patterns (Fig. 8) (Benson et al., 2021, CABI, 2019b).



Fig. 8. Zebra mussel adults have a more flattened appearance than the quagga mussel. Shells can vary widely in pattern and coloration.

## LIFE HISTORY

ZQMs have three life stages: larval, juvenile, and adult. Adult ZQMs release eggs into fresh or waterbodies such as lakes, reservoirs, rivers, ponds, and quarries in spring to summer. Within 2 days, the eggs hatch into microscopic free-swimming veligers (larvae) that move passively downstream on flowing water for up to a month and eventually attach onto surfaces such as rocks, docks, cement, wood, plastic, metal, rope, and boat hulls. Once anchored, they undergo metamorphosis within 3 to 5 days at 72°F (22 °C) and emerge as juveniles that will grow into adults in 3 to 5 weeks (Benson et al., 2021, CABI, 2019a, McMahon, 2012).

Each adult can filter about 1 liter of water daily as it feeds primarily on algae and phytoplankton. ZQMs become sexually mature in the first or second year, and each female can produce over 40,000 eggs per reproductive cycle and over one million eggs per spawning season (Benson et al., 2021, CABI, 2019a). Adults typically live for 2 to 5 years. Adults and immatures (eggs, larvae) can be introduced to new areas passively from flowing water or as hitchhikers on host material such as watercraft and aquatic plant material sourced from infested waters.

Zebra mussels prefer 68 to 77 °F waters (20 to 25 °C) but can persist in temperatures up to 86 °F (30 °C). They reproduce in water above 54 °F (12 °C) (CABI, 2019b). In areas of overlap, quagga mussels can outcompete zebra mussels, although zebra mussels remain

dominant in inland lakes and rivers (Benson et al., 2021, Hoddle, n.d.). In a laboratory study, ZQM exposed to 5% or greater water salinity resulted in total mortality within 18 days (Spidle et al., 2011).

Quagga mussels tolerate cold waters better than zebra mussels and can survive temperatures between 33 and 86 °F (1 to 30 °C). They reproduce in waters above 48 °F (9 °C). In Lake Mead, they reproduce year-round, and largely settle on surfaces that are from about 20 to 92 feet (6 to 28 m) deep. The highest settlement rates of veligers occur from mid-October to mid-December (Wong et al., 2012). In Lake Michigan, they filter feed year-round and have been found as deep as 540 feet (Hoddle, n.d.).

## IMPACTS

ZQM can cause significant ecological, economical, and recreational impacts (Figs. 9 to 12). They filter and clean the water at unprecedented rates, resulting in depleted food sources (phytoplankton) for native fish and invertebrates, and increased sunlight into waters that can cause explosive growth of bottom algae and nuisance weeds that choke native vegetation and get washed ashore to rot. In established areas, they have been associated with damaging outbreaks of avian botulism and have caused amphipod and fish populations to crash (Hoddle, n.d.). They can suffocate native mussels by anchoring onto them by the thousands and have caused a severe decline of native mussels (Benson et al., 2021). ZQM can be a nuisance by clogging boat motors and requiring mandatory, and at times lengthy, boat inspections, and they can pose health issues by cutting people and animals when walking on beaches covered with the sharp-edged mussels that appear as waters recede. They can affect irrigated agricultural land by infesting canals and pipelines and clog irrigation pumps, screens, and head gates, and reduce pumping capacity. ZQM can rapidly clog pipes and other water inlets and outlets, and can cost the water industry up to \$1 billion annually for management, which typically entails physically dislodging them from surfaces. In Utah, quagga mussel management at Lake Powell from 2000 to 2013 cost over \$7.5 million (NPS, 2018). A possible short-term benefit of ZQM is that water clarity in polluted lakes may benefit by their intensive filtration (Hoddle, n.d.).

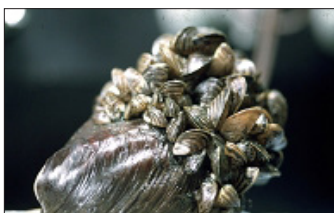


Fig. 9. Zebra mussels on a native freshwater mussel.

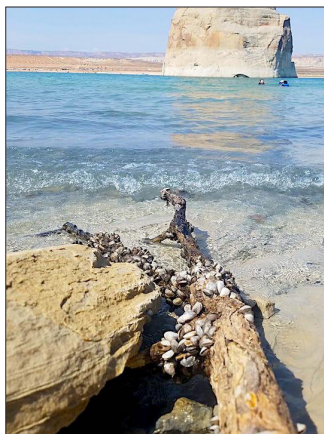


Fig. 10. Quagga mussels on the shore at Glen Canyon National Recreation Area.



Fig. 11. Zebra mussels on grocery cart after only a few months submerged in infested waters.



Fig. 12. Routine cleaning of quagga mussels from penstock gates at Glen Canyon Power Plant.

## ZEBRA MUSSELS IN AQUARIUM MOSS BALLS

In March 2021, zebra mussels were discovered in a variety of algal “moss balls” (a.k.a. Marimo Balls) sold at aquarium and pet-supply stores in at least 42 U.S. states from Alaska to Florida, including Utah, as well as in British Columbia, Canada (Figs. 13 and 14). The

moss ball is a species of green algae that is formed into a 2- to 5-inch diameter ball for use in home aquariums.

The USFWS, the Pet Industry Joint Advisory Council (PIJAC), and the Utah Division of Wildlife Resources (DWR) are urging pet and aquarium stores and aquarium owners to treat all purchased moss balls as though they are infested with zebra mussels and to properly destroy these materials to mitigate the risk of introduction.

Decontamination is highly recommended and is essential if mussels are observed. Keep in mind the veliger stage is microscopic and therefore not easily observed (PIJAC, 2021, USGS, 2021).

Destroy the moss ball using one of the following methods: Freeze it by placing it in a sealable plastic bag in the freezer for a minimum of 24 hours; boil it for a minimum of 1 minute; or submerge in regular, unscented bleach diluted to 1/3 cup per gallon of water for 10 minutes or in undiluted white vinegar for 20 minutes. Once



Fig. 13. A moss ball sold in pest stores that contains an invasive zebra mussel.



Fig. 14. Zebra mussels on imported moss balls.

the moss ball is destroyed, place it and all its packaging in a sealed bag or container and place in the trash. If boiling water, vinegar, or bleach was used, the liquid can be poured down a household drain. Do not pour any liquid into a storm drain. Most importantly, DO NOT flush the moss balls, mussels, aquarium water, or other suspect materials down the toilet and DO NOT dump them outside (USFWS, 2021a).

To decontaminate the aquarium that housed the moss ball(s), place fish and other living organisms in a separate container with water from an uncontaminated source, then sterilize the contaminated aquarium water by pouring it into a separate container, adding 1/3 cup bleach for each gallon of water, and allow it to sit for 10 minutes before pouring down a household drain.

Clean aquarium substrate, rocks, décor, and filter media by using one of the following methods that is in accordance with the manufacturer's recommendations:

*Hot Water Method:* Flush and coat the tank and all accessory surfaces with 120 to 140 °F water for a minimum of 2 minutes.

*Salt Water Method:* Soak aquarium accessories in a saline solution of ½ cup of salt per gallon of water for a minimum of 24 hours. When finished, pour the treated water into a household drain and rinse all items well before setting up the aquarium.

*Bleach Disinfection Method:* Soak aquarium accessories in a solution of 1/3 cup bleach per gallon of water for 15 minutes. Replace the filter media with new media. Ensure all items are rinsed completely prior to setting up the aquarium, and use a dechlorinating product to neutralize any residual chlorine before reintroducing fish and other living organisms (USFWS, 2021a, PIJAC, 2021).

Under certain situations, quarantining your aquarium may be an option. If mussels have not been observed, closely inspect the aquarium weekly for a minimum of 6 months. If you detect the presence of mussels, follow the decontamination steps listed above, and decontaminate and dispose of all live plant material. The aquarium and its contents must be decontaminated prior to resuming selling or trading. The quarantine period ends after 6 months of mussel-free observations (USFWS, 2021b).

## MONITORING

ZQMs are often so tiny that human inspectors can miss them, but performing self-checks and stopping at all mandatory inspection stations when transporting watercraft remain critical steps in stopping their spread. Many incidents of mussels being detected in their second or more inspection stop have been reported. When boating, inspect all watercraft and associated accessories (e.g., dry wells, gear, anchors, lines, and swim ladders) before and after each outing. Also inspect Jet Skis, Waverunners, canoes, kayaks, float tubes, float planes, paddleboards, all SCUBA gear, and all fishing gear, including bait buckets which can transport larvae in the

water. Remove debris, and drain and dry all areas. Leave the drain plugs removed during your trip home. Be aware that ZQMs can live for several days or longer outside of water (Benson et al., 2021).

Hundreds of water samples from Lake Powell are analyzed each year to determine the range and extent of mussel colonization, and these samples are analyzed by methods that include automated particle analysis (FlowCAM) and polymerase chain reaction (PCR) testing which amplifies DNA and enables detection at the planktonic stage (NPS, 2019, USFWS, n.d.). New approaches to monitoring ZQM are being used in California and Washington State, where dogs trained to detect invasive mussels are being employed (Bureau of Reclamation, 2020, WDFW, 2020), and in Utah, where the DWR has plans to decontaminate boats at Lake Powell using a dip tank.

## MANAGEMENT

In the Western U.S., only some states have a ZQM prevention program in place, which poses a serious threat to all western waterbodies. No ecologically sound, wide-scale treatment or technology exists to eradicate or control established ZQM populations, but the spread of mussels is preventable (NPS, 2018; Western Regional Plan on Aquatic Nuisance Species, 2020). In Utah, Glen Canyon National Recreation Area coordinates mussel prevention and containment programs at Lake Powell with the help of about 20 local, state, and federal organizations that include the National Park Service, Bureau of Reclamation, and Utah Division of Wildlife Resources (NPS, 2018).

### *Cultural Control*

Current control methods involve inspections and physically removing the mussels by methods such as scraping, scrubbing, high-pressure water jetting, and hot water sprays. Boaters and other users should clean, drain, and dry boats and other at-risk objects (NPS, 2018).

### *Biological Control*

Although many species are known to be natural enemies of ZQM, reports of their ability to significantly suppress mussel populations are rare and concern only local areas. In North America, ZQMs have few natural predators. In the Great Lakes region, lake sturgeon and blue crab feed on these mussels. Known fish predators are species native to the eastern U.S. and include freshwater drum (*Aplodinotus grunniens*), round goby (*Neogobius melanostomus*), and redear sunfish (*Lepomis microlophus*) (CABI, 2019a). In an infested lake enclosure in the southwestern U.S., introduced redear sunfish stocked at high density levels were efficient at removing adult quagga mussels, but the mussels were not eradicated (Wong et al., 2013). Documented bird predators include greater scaup (*Aythya marila*), lesser scaup (*Aythya affinis*), and goldeneye (*Bucephala clangula*) (CABI, 2019a).

## Chemical Control

Oxidizing biocides such as chlorine, bromine, hydrogen peroxide, ozone, and potassium permanganate have been used for control under certain situations, but chlorination is the most widely used chemical control. Copper sulfate and copper carbonates or chelates can be used in open water systems but require special permits (CABI, 2019a, Hoddle, n.d.).

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- 1 U.S. Environmental Protection Agency - Great Lakes National Program Office, USEPA, Bugwood.org
- 2 Michael Massimi, Barataria-Terrebonne National Estuary Program, Bugwood.org
- 3 National Park Service, [nps.gov/lake/learn/quagga-mussel.htm](http://nps.gov/lake/learn/quagga-mussel.htm)
- 4 Minnesota Aquatic Invasive Species Research Center
- 5 Myriah Richerson, U.S. Geological Survey
- 6, 7, 8 Amy Benson, U.S. Geological Survey, Bugwood.org
- 9 Ohio Sea Grant, [ohioseagrant.osu.edu](http://ohioseagrant.osu.edu)
- 10 David Rankin, National Park Service
- 11 James F. Lubner, University of Wisconsin Sea Grant Institute
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# Appendix B

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## Invasive Species Fact Sheet

# Golden mussel, *Limnoperna fortunei*

### General Description

Golden mussel (*Limnoperna fortunei*) is an invasive bivalve that ranges in color from dark brown to gold. It can reach up to 1 3/4 inches long. Adult mussels form byssal threads that enable them to attach to surfaces. Adult mussels spawn multiple times each year and have the potential to produce thousands of planktonic offspring, called veligers.



Golden mussels, San Joaquin County  
Photo: Jeb Bjerke, CDFW

### Current Distribution

In October 2024, golden mussels were discovered in the Sacramento – San Joaquin Delta and O'Neill Forebay (Merced County). This discovery was the first known occurrence of golden mussel in North America. Originally from China, Thailand, Korea, Laos, Vietnam, Indonesia, and Cambodia, they have invaded waters of other countries and territories including Hong Kong, Japan, Taiwan, Argentina, Brazil, Bolivia, Paraguay, and Uruguay.

### Habitat Suitability

Golden mussel can inhabit fresh and brackish-water lakes, rivers, creeks, wetlands, bays, and canals with water temperatures ranging from 41-95°F. They can establish in waters with a constant salinity of less than 3 parts per thousand (ppt) and can survive fluctuations of higher salinities. They attach to a wide variety of substrates, both man-made and natural, and at various water depths. Golden mussels are not restricted to hard surfaces and have been found colonizing soft substrates and attached to aquatic plants.

### Pathways

Pathways are the mechanisms and processes by which invasive species are moved, intentionally or unintentionally, into a new ecosystem. Golden mussel can be carried in ballast water of ocean-going ships and released with that water. Adult golden mussel can be moved overland attached to watercraft and in-water equipment, and veligers and adults can be moved overland in water contained within watercraft and equipment.

Within interconnected waters, golden mussels can expand their range via the flow of water, and attached to, or entrapped within, watercraft and in-water structures moved within that waterway.

### Impacts

Golden mussels are highly efficient filter feeders and form dense colonies. They consume large quantities of aquatic microscopic plants and animals that native species and sport fish depend on for food. Their colonization of hard surfaces impedes water flow, clogs pipes, and fouls watercraft motors, and necessitates ongoing, costly removal to maintain operational function. These costs result in economic impacts to water conveyances, energy production, recreation, agriculture, and ultimately the public.

### Actions Taken if Found

If you observe golden mussel in California immediately report your sighting to the CDFW Invasive Species Program at <https://arcg.is/10D4G8>, or by email to [Invasives@wildlife.ca.gov](mailto:Invasives@wildlife.ca.gov), or by telephone

## Invasive Species Fact Sheet – Golden mussel, *Limnoperna fortunei*

to (866) 440-9530. Please take clear, close-up photos that include something (such as a pencil or hand) to show size.

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# Appendix C

DRAFT

# DON'T MOVE A MUSSEL

Clean, Drain, and Dry  
to Protect California Waters



*GOLDEN MUSSEL*



*QUAGGA MUSSEL*



*ZEBRA MUSSEL*



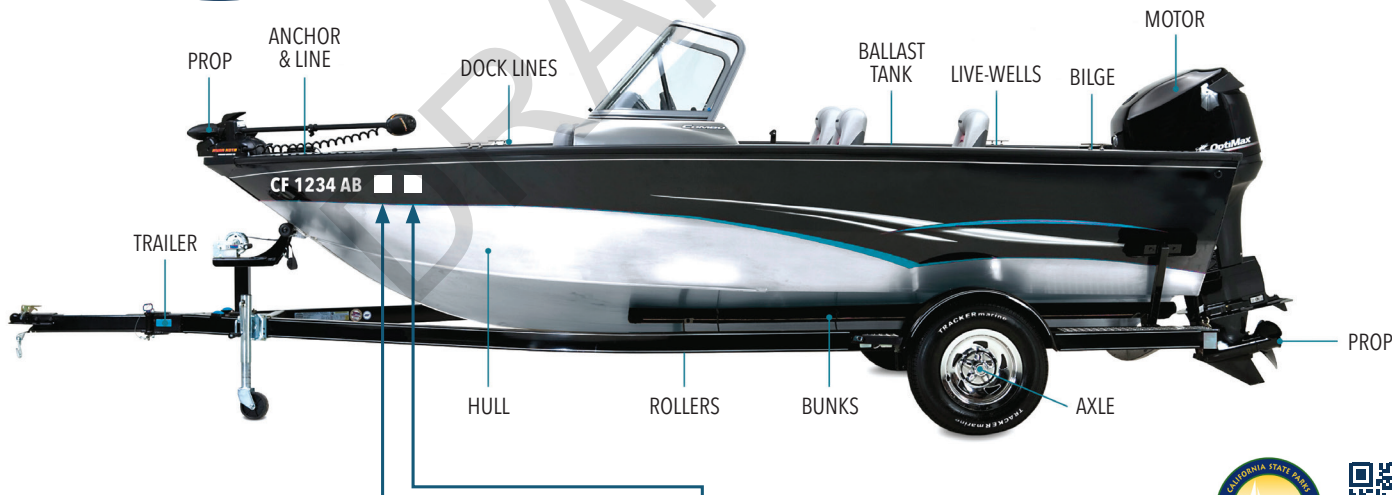
[www.wildlife.ca.gov/Invasives](http://www.wildlife.ca.gov/Invasives) | 866-440-9530

## Prevent the spread of invasive mussels

**CLEAN** your gear, boat, and trailer before leaving the area. Remove plants, animals, and mud. Dispose of unwanted bait and debris in the trash.

**DRAIN** bilge, ballast, wells, and buckets before you leave the parking area, and never drain back into the waterway.

**DRY** equipment before launching into another body of water. Waiting periods can vary – check with your local waterbody.



Display your **DMV Registration** and **Mussel Fee Stickers** on the hull



Appendix D

**AQUATIC INVASIVE SPECIES SELF-INSPECTION CERTIFICATION**

**Section 1: Background**

Invasive species are organisms (plants, animals, or microbes) that are not native to an environment, and once introduced, establish, quickly reproduce and spread, and cause harm to the environment, economy, or human health. Aquatic invasive species pose a threat to lakes and other waterbodies throughout California and can disrupt food chain, impact fish populations, foul docks and ramps, encrust vessels and clog engines, litter shorelines, clog water distribution systems, and could lead to access closures.

Anglers can prevent spreading invasive species by following procedures to **Clean, Drain, and Dry** their vessels and equipment before launching. **Clean, Drain, and Dry** procedures are available at [www.wildlife.ca.gov/invasives/CDD](http://www.wildlife.ca.gov/invasives/CDD).

**Section 2: Instructions**

Use this self-inspection certification when launching on waterbodies that do not have an inspection program, or if the station is closed. Complete this form prior to launching and keep it on the vessel throughout the duration of your stay.

**Section 3: Self-Certification Questions**

- 1) Are you launching your vessel on the same body of water as the last water body where your vessel, trailer, and equipment were last used? (If yes, skip questions 2-5)  
Yes \_\_\_ No \_\_\_
- 2) Is your vessel, trailer, and/or equipment clean of all mud, dirt, plants, fish, and animals inside and outside, including flushing of all live-wells, bilge areas, ballast tanks, and cooling systems?  
Yes \_\_\_ No \_\_\_
- 3) Is your vessel, trailer, and/or equipment drained of all water, including all bilge areas, cooling systems, lower outboard units, ballast tanks, live-wells, buckets, etc.?  
Yes \_\_\_ No \_\_\_
- 4) Is your vessel, trailer, and/or equipment completely dry, or has it been completely dry since its last use?  
Yes \_\_\_ No \_\_\_
- 5) Has your vessel, trailer, and/or equipment been decontaminated (flushed throughout with 140° F water with a contact time of at least 10 seconds) since its last use?  
Yes \_\_\_ No \_\_\_

If you answered “**Yes**” to question 1, OR “**Yes**” to questions 2, 3, and 4, OR “**Yes**” to questions 2, 3, and 5, you may affirm you are **Clean, Drained, and Dry** by completing the form below.

If you answered “No” to one or more of questions 1, 2, 3, or 4 you are not **Clean, Drained and Dry**, and pose a risk of spreading aquatic invasive species. It is recommended you completely dry or decontaminate your vessel, trailer, and/or equipment before completing this form and launching. There is a free decontamination station located at Crowley Lake Fish Camp (right off HWY 395, between Tom’s Place and Mammoth Lakes).

**Section 4: Certification**

I affirm that my vessel, trailer, and/or equipment is/are **clean, drained, and dry** prior to launching at

(Waterbody) \_\_\_\_\_ on (Date) \_\_\_\_\_

Vessel Owners Name: \_\_\_\_\_

Vessel Registration Number: \_\_\_\_\_

Signature \_\_\_\_\_ Print Name \_\_\_\_\_