



Backflow Prevention Program Update

Planning Committee

December 10, 2024

Overview

- Backflow Prevention Background
- Cross-Connection Control Policy Handbook (CCCPH) Overview
- Impact to District Backflow Prevention Program
- Fiscal Impacts
- Next Steps

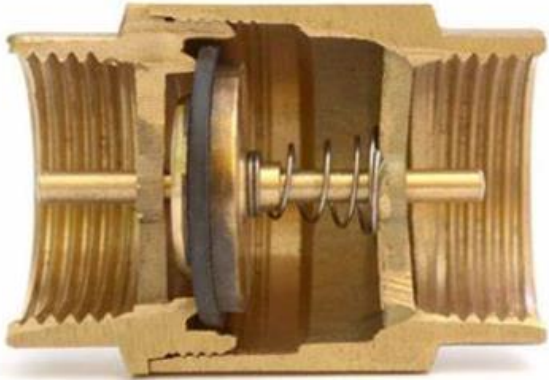
Backflow Prevention Background

- California's Safe Drinking Water Act requires public water systems ensure that the distribution system will not be subject to backflow from backpressure or back siphonage
- District conducts hazard assessments to identify actual and potential hazards, applies principles of backflow protection and prevention, and implements cross-connection control policies and procedures
- California State Water Board, Division of Drinking Water (DDW) requires the District to track and ensure that the approximately 18,800 backflow prevention assemblies (BPA) installed on private properties are tested annually by a certified backflow tester

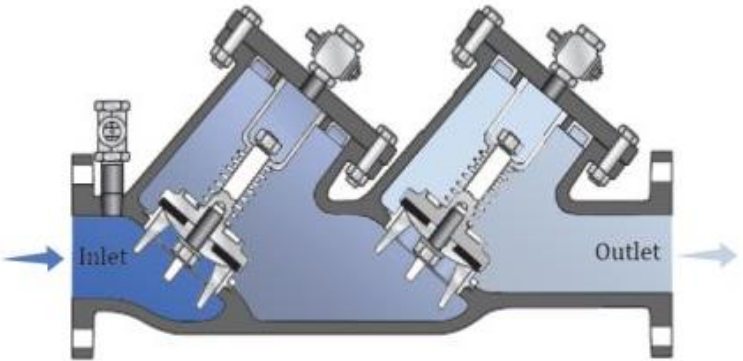
Backflow Protection Assemblies (BPAs)



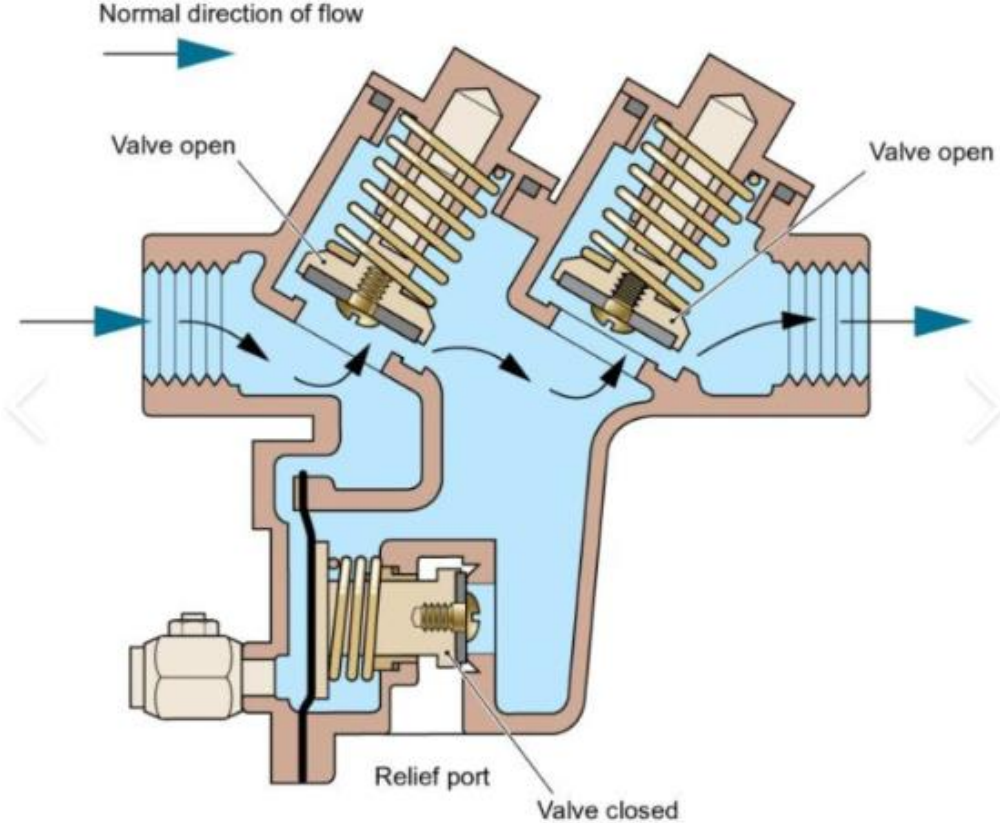
Air gap on water tank



Single check valve



Double check valve



Reduced Pressure (RP) assembly

CCCPH Overview

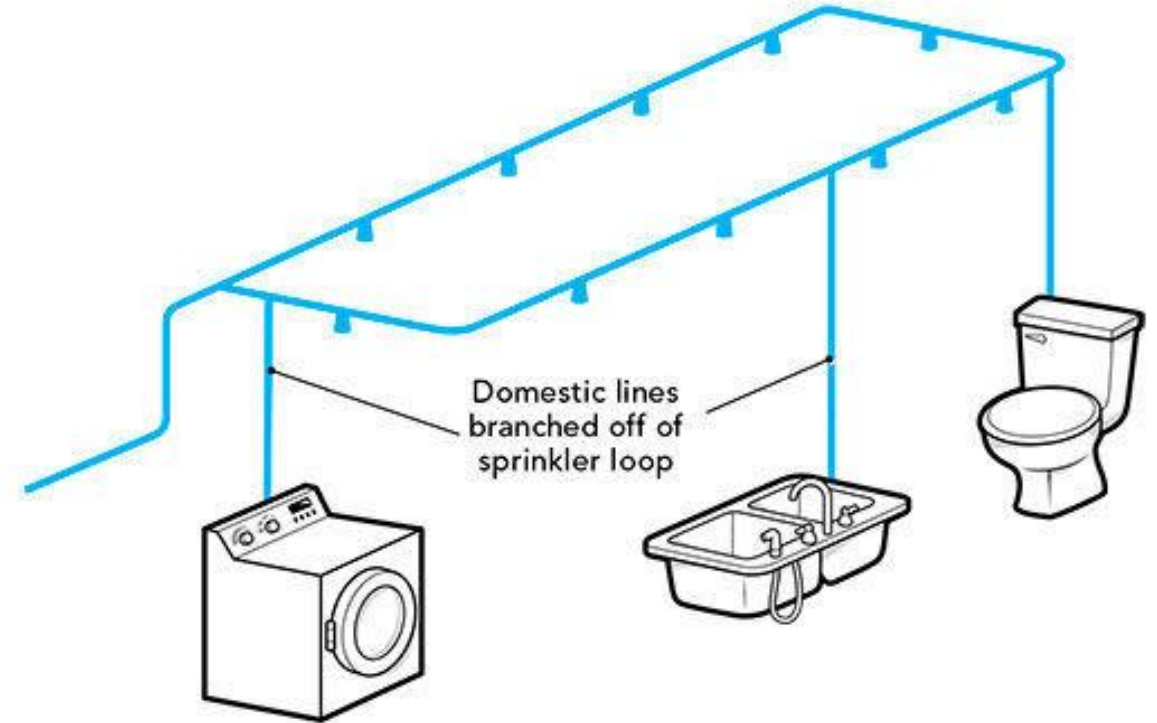
- CCCPH replaces Title 17 of the Health Code for regulating Backflow Prevention
- CCCPH is more stringent than Title 17
- District must submit a Cross-Connection Control Plan to the Division of Drinking Water (DDW) by July 1, 2025
- District met with DDW on November 6, 2024 to discuss proposed actions and timelines within the District's draft plan

Areas of Concern

- Residential Fire Sprinklers
- Hydrant Meters (portable connections to hydrants)
- Residential Wells
- Residential Hazard Assessment
- Assignment of costs

Residential Fire Sprinklers

- CCCPH requires backflow protection from residential fire sprinklers, which may contain stagnant water.
- District is working with local fire and building departments to promote installation of passive protection for future installations to reduce installation costs for consumers
- District is proposing that past installations be approved with less stringent BPA as they were built to code at the time of installation (and risk/hazard is low)



Fire sprinkler example layout with passive purge from Fine Homebuilding

BPA = backflow protection assembly

Hydrant Meters

- Currently, the District issues a 3-inch hydrant meter for a variety of uses (e.g., temporary water supply for construction projects)
- Customers pay for the use of the hydrant meter
- District hydrant meters have an internal check valve for backflow protection
- All hydrant meters are tested annually



Hydrant Meters

- CCCPH requires a RP (shown in black)
- Assemblies are heavier and more expensive to construct
 - 50 pounds
 - Staff must coordinate installation with customer



Hydrant Meters

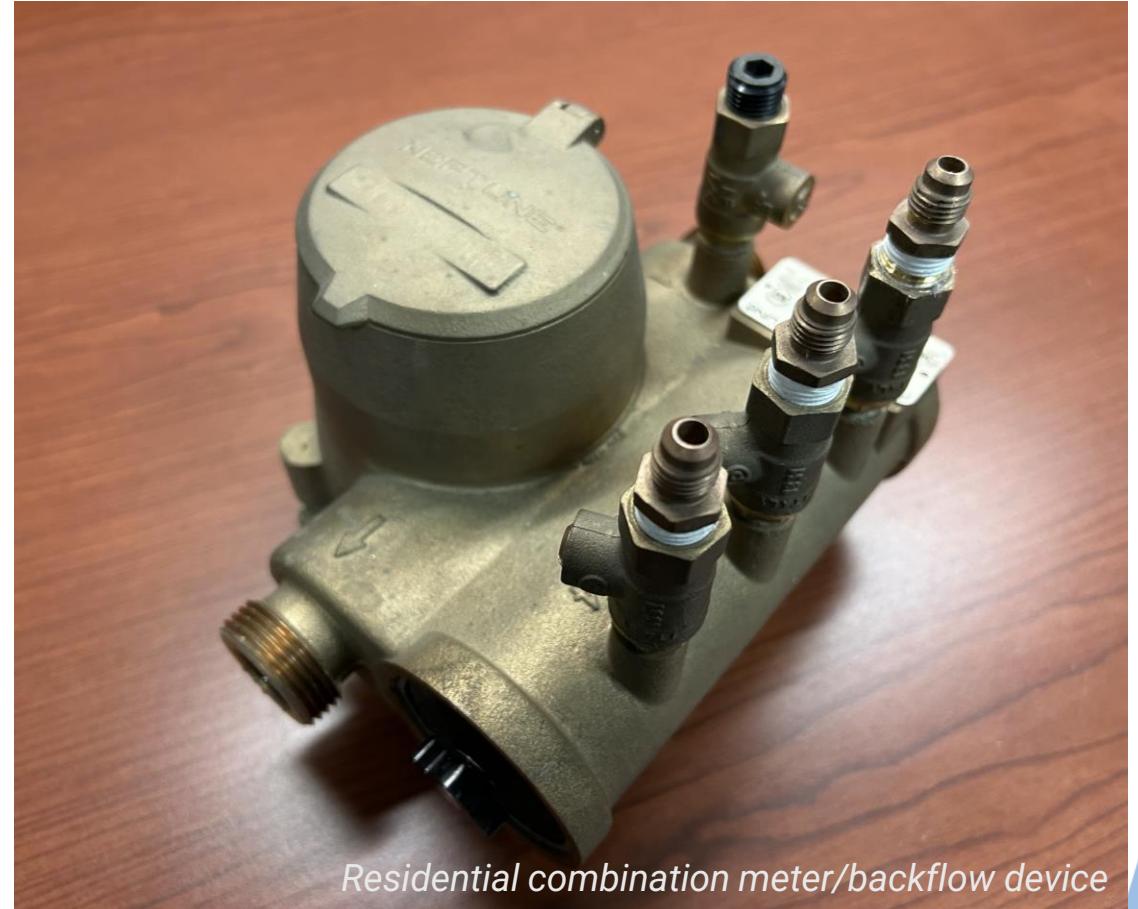
District Proposal to DDWs

- Issue 1-inch with hydrant meter with BPAs where applicable
 - Lighter, cheaper, easy to install/use
- Ensure airgaps are used when connections are hard-mounted to vehicles
 - Eliminates need for RP
- Issue RP 3-inch hydrant meters when needed



Residential Wells

- The District has installed approximately 4,600 BPAs for residential customers with wells
- Combination meter/backflow assemblies or standalone double check assemblies are typically used
- CCCPH requires a higher-grade backflow device (i.e., a RP device)
- Upgrades may be needed for up to 4,000 residential customers as existing backflow devices wear out



Impact to Residential Accounts (Wells)

- Per Section 26 of the District's Regulations Governing Water Service (Section 26)
 - Approximately 4,600 BPAs on residential services are tested annually and maintained by the District
 - BPAs for accounts with residential wells are installed by the District
- On October 8, 2024, the planning committee agreed with staff's recommendation to revise Section 26 and assign costs for residential BPAs (installation, maintenance and annual testing) to the account holder
- A public hearing is required for the Board to amend the ordinance

Residential Hazard Assessments

- All 340,000 residential services now require a hazard assessment
- Full hazard assessments may be triggered by change in use from residential to commercial
- Trigger for hazard assessments may include alternate methods
 - GIS tools, business licenses, etc.
- DDW indicated a frequency of 20 to 30 years is acceptable
 - Consistent with meter replacements
 - Staff replacing and/or reading meters would determine if a hazard assessment is required



District staff replacing a meter

Commercial Hazard Assessments

- Approx 62,000 commercial services
 - Approximately 32,000 were assessed when the service was initiated
 - 14,000 were required to install BPAs based on on-site hazards
 - 30,000 have not been assessed in last 30 years
- CCCPH requires commercial services to be periodically re-assessed
- Additional resources may be required depending if state accepts District's 30-year frequency proposal for all 62,000 accounts



District staff inspecting new construction

Potential Fiscal Impact

- Residential Fire Sprinklers
 - No cost to the District or consumer if state accepts District proposal
- Hydrant meters
 - Up to \$1 million for new 1-inch meters and retrofit of some 3-inch meters
 - Costs recovered with updates to Rates & Charges
- Residential Wells
 - Retrofits could cost up to \$20 million to upgrade 4,000 accounts to RP
 - Staff recommends assigning these costs to customers through changes to the District's Regulations Governing Water Service (Section 26)
- Residential Hazard Assessments
 - Work within existing staffing/programs
- Commercial re-assessment Program
 - Requires additional resources on an ongoing basis to conduct surveys (~\$500,000/year)

Next Steps

- Bring proposed modifications to Section 26 to the full Board for consideration during the Fiscal Year 2026/2027 budget process
- Update rates and charges for hydrant meters (Fall 2025)
- Launch public outreach to notify impacted customers
- Submit draft plan to DDW by July 1, 2025
- Receive and respond to DDW comments to the District's plan in Fall 2025

Questions?





Discovery of Golden Mussels in the Delta

Planning Committee

December 10, 2024

Presentation Overview

- Introduce *Limnoperna fortunei*
- What We Know
- California Observations
- What We Don't Know
- EBMUD Strategy



Graphic courtesy of
California Department of
Fish & Wildlife

What We Know

- Freshwater bi-valve *Limnoperna Fortunei* aka Golden Mussel
- Native to southeast Asia, has rapidly spread in South America since early 1990s
 - Argentina, Uruguay, Brazil
 - Move upriver at rates ranging from 10 to 150 miles/year
- Highly invasive
 - Small body size (typically about 1-2 inches)
 - Develop rapidly and have high reproduction rates
 - More robust than quagga & zebra mussels (tolerate wide range of pH and calcium)

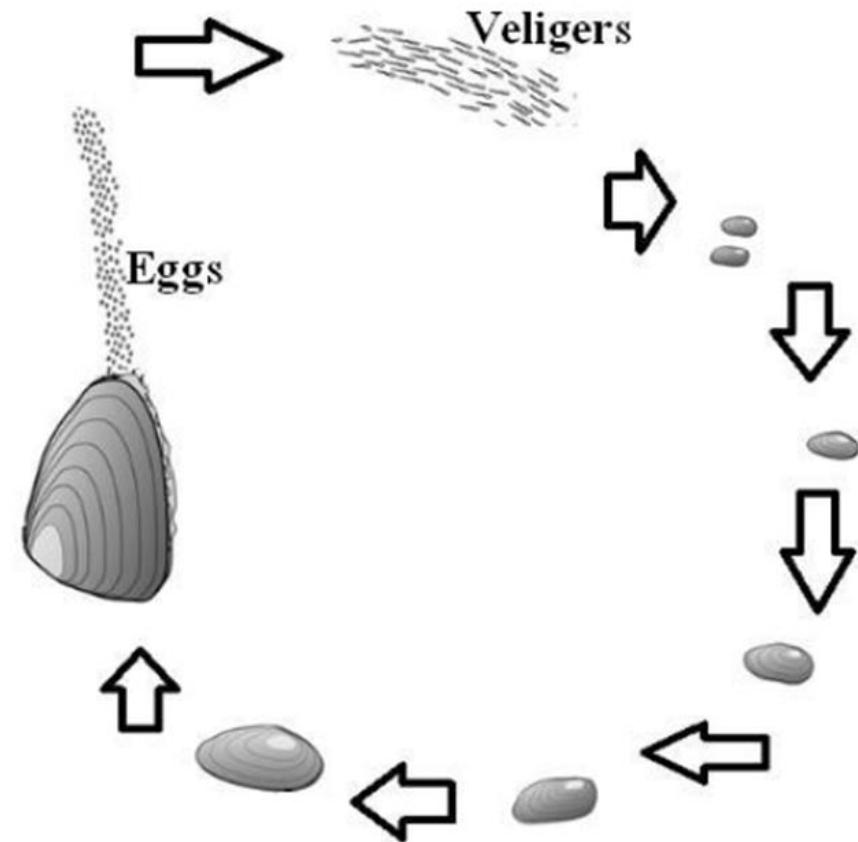
5 Global Distribution



Figure 1. Known global distribution of *Limnoperna fortunei*. Observations are reported from China, Japan, Thailand, Vietnam, Cambodia, Lao People's Democratic Republic, Brazil, Uruguay, and Argentina. Map from GBIF Secretariat (2020).

Golden Mussel Life Cycle

- Veligers – microscopic, planktonic larval stage
- Settlers – newly settled juveniles, feel like sandpaper
- Adults – larger individuals seen with the naked eye
 - Sexually mature at 1 year
 - Lifespan approximately 2-3 years



Graphics courtesy of
California Department of
Fish & Wildlife

Impact to Ecosystem and Infrastructure

- Ecosystem Impacts – potential for severe adverse impacts to the ecosystem
 - Filter water & remove nutrients
 - Permanently alter the food web
 - Suffocate native species
- Infrastructure Damage
 - Decrease flow capacity of pipes & channels, damage structures
- Water Quality Impacts - biofouling through respiration and postmortem decay
 - China 2013 – massive mussel die-off caused taste and odor issues in drinking water system
 - Mussel colony die-offs promote growth of spoilage bacteria, potentially pathogenic bacteria

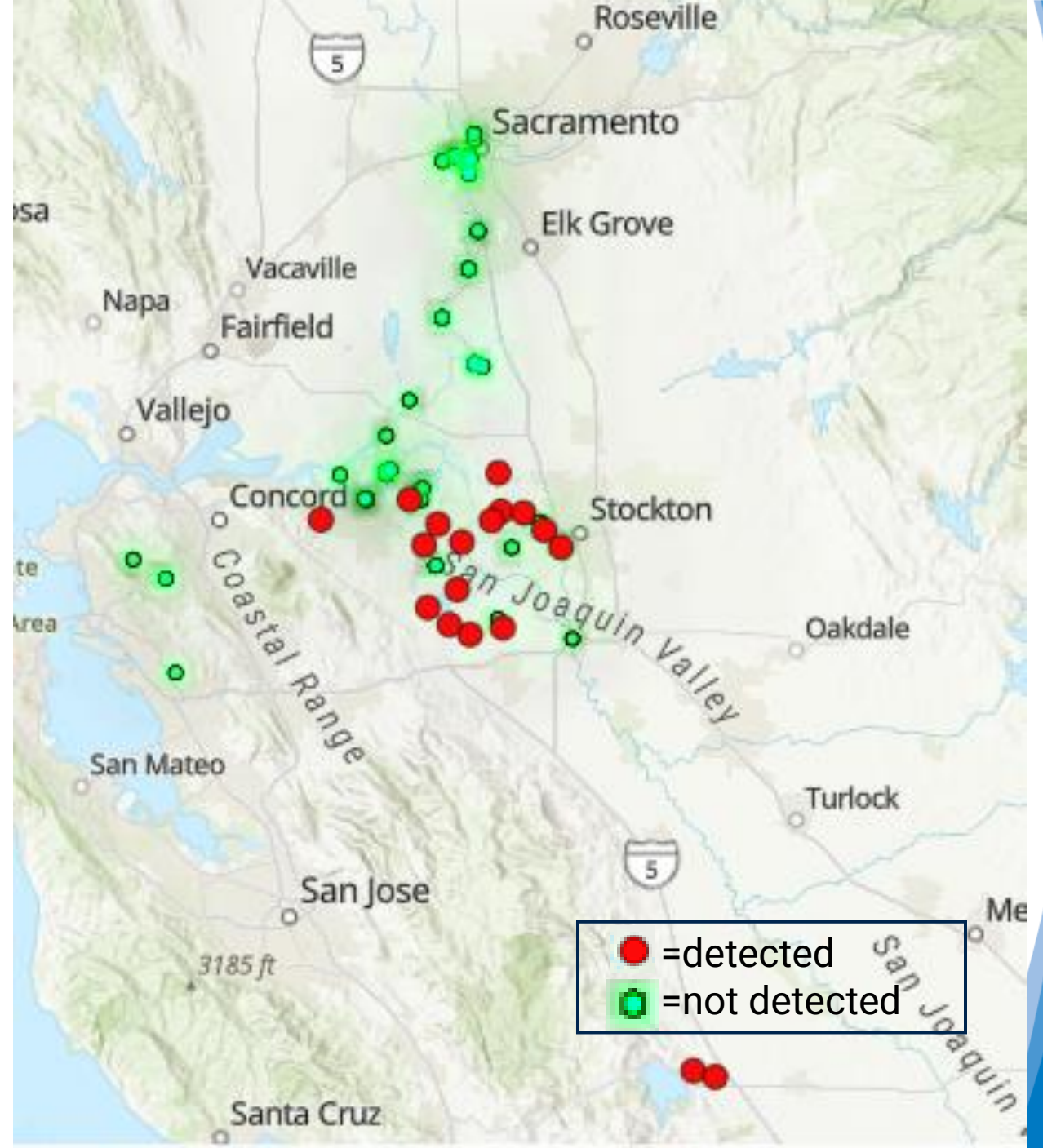


Cooling pipe at a hydroelectric plant in Brazil

California Observations

(as of 12/3/2024)

- Appeared quickly - >30 adults appeared on a single substrate plate in less than 30 days
- Adults are mobile (leaving their byssal threads behind)
- Adults are colonizing sediments as well as solid substrates
- Presence of both adults and veligers have been confirmed

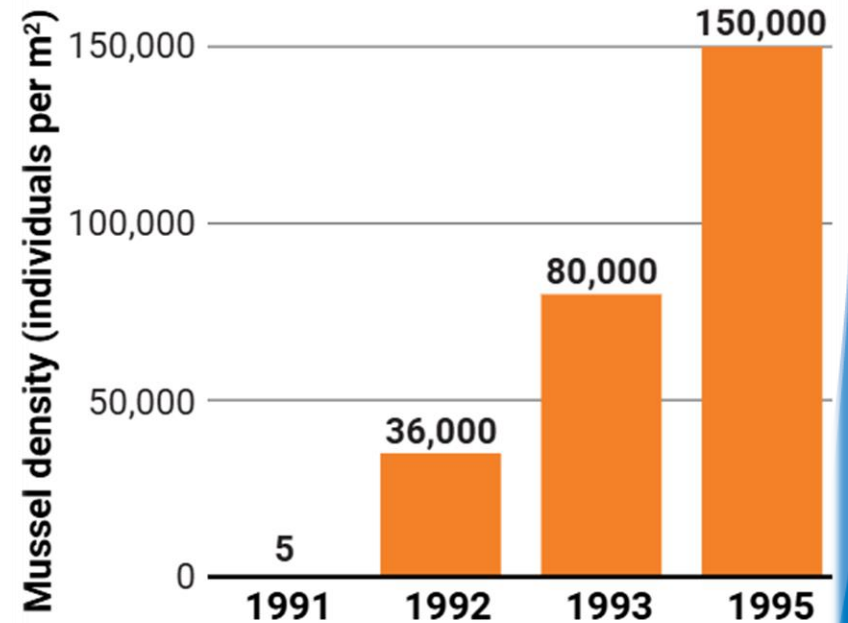


What We Don't Know

- Can they survive & thrive in the local ecosystems - Delta, Pardee, San Pablo, etc?
- Habitat Suitability/Mitigation measures?
 - Numerous variables have been studied in Asia
 - Flow velocity (>0.3 m/s, <1.4 m/s)
 - Temperature (survive 5-35 °C, reproduce 15-25 °C)
 - Chemistry (total nitrogen, ammonia nitrogen, dissolved oxygen, pH, etc)
 - Survive and reproduce in pH 5-10 and Ca 1-50 mg/L (prefer Ca >5 mg/L)

Exponential invasion

After arriving in Argentina, golden mussels quickly multiplied on rocks at the La Plata River. The population there is now stable at 85,000 per square meter.



(GRAPHIC) K. FRANKLIN/SCIENCE; (DATA) GUSTAVO DARRIGRAN/NATIONAL UNIVERSITY OF LA PLATA

Potential Control Strategies - Mostly Unproven at Full-scale

- Biological
 - Native predators?
 - Biocides (Bulab 6002 inactivate larvae, Zequanox may kill mussels)
- Physical
 - Thermal, UV, mechanical cleaning, desiccation, high frequency turbulent flow
- Chemical
 - Chlorination (dependent on life-stage, temp, etc. – lacking studies)



Photo courtesy of
California Department of
Fish & Wildlife

EBMUD Strategy

Monitor District Reservoirs

- Visual substrate inspections for adults
- Veliger tows for DNA analyses

Defend – Protect Critical Entry Points with exclusion/inspections

- Camanche (temp closure)
- Pardee (closed for season)
- San Pablo (closed for season)
- Upper San Leandro (protect from imports, Freeport)
- Coordinate with other reservoir owners
- District facilities may remain closed until mitigation measures in place

Mitigate

- Freeport
- Investigate Engineered Solutions
- Science is lacking

Next Steps

- Continue monitoring of District reservoirs and facilities
- Coordinate monitoring of Freeport intakes and evaluate mitigation measures
- Track statewide monitoring to determine rate of spread and population densities
- Evaluate and implement mitigation strategies for District boat launch facilities
- Status update to Planning Committee early next year

Questions?

