



# Preventing the Spread of Quagga and Zebra Mussels

A Time for Action

CALIFORNIA DEPARTMENT OF  
**Fish and Wildlife**



# Quagga and Zebra Mussels

## An Overview



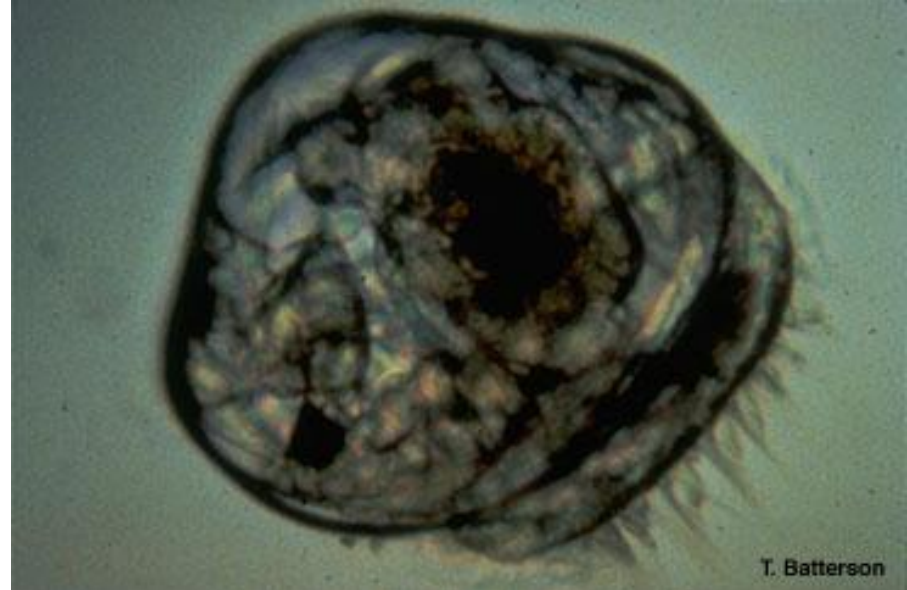
### Description

- Freshwater bivalve
- Small, banded or solid color pattern
- Free-floating larval stage (veligers)



### Impacts

- Destroy fisheries
- Damage boats
- Cripples water systems
- Costs could be billions



# Range in California

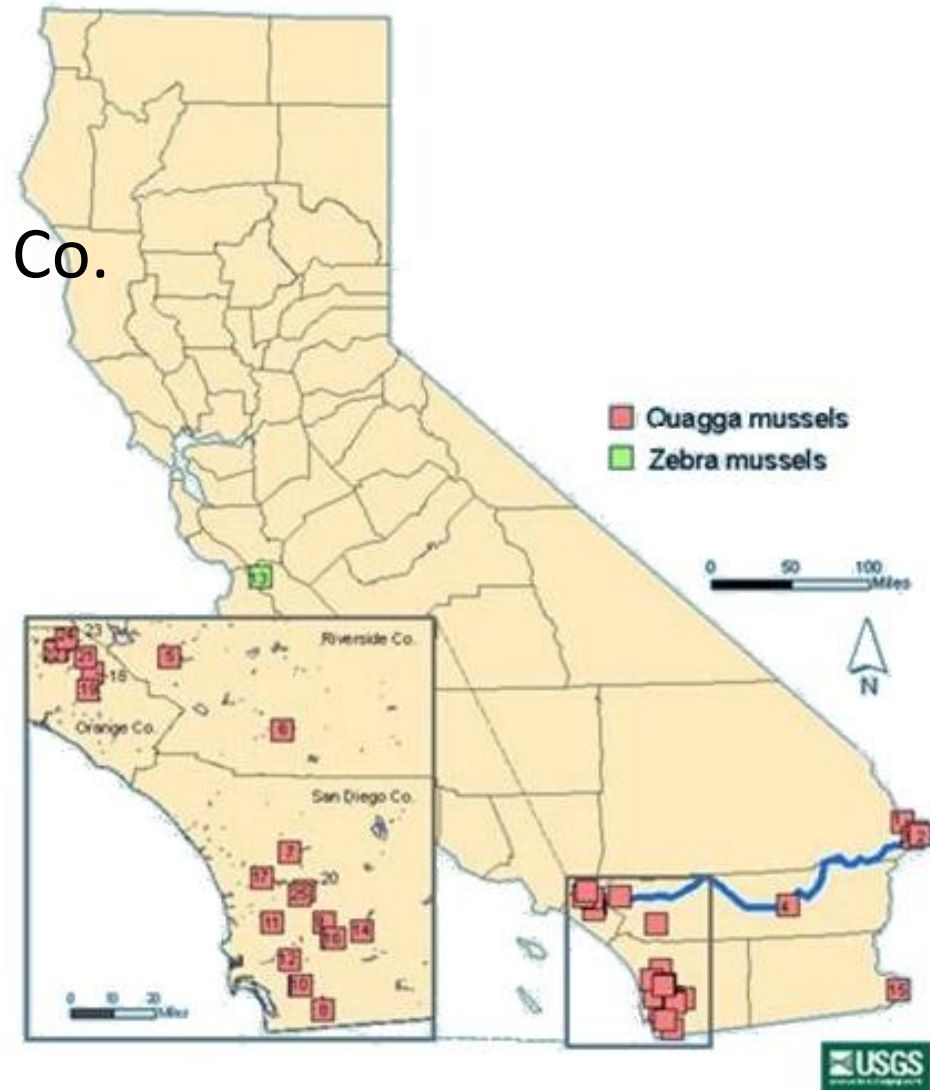


## Quagga Mussel

- Jan 07 Colorado River
- Mar 07 San Bernardino Co.
- Jul 07 Riverside Co.
- Aug 07 San Diego Co.
- Feb 08 Imperial Co.
- Apr 08 Orange Co.

## Zebra Mussel

- Jan 08 San Benito Co.



# Addressing the Invasion- Incident Overview



- Discovered in Lake Mead, Jan '07
- Found in Lake Havasu, MWD diversion intake structure
- CDFW led Incident Command to coordinate response
- Funding allocated
- Statewide surface surveys
- Convened Science Advisory Panel



# Fish and Game

## Code and Regulations



- Restrictions on importation, possession and transport of live animals
- Inspection of conveyances
- Response Plans
- Prevention Programs
- Enforcement Authority
  - CDFA and PARKS (12 Parks)
  - Authority can only be delegated to other state agencies
  - Legislation required to grant local agencies authority

# CDFW's Mussel Management Strategy Goals



Prevent further introductions into the State

Contain mussels within currently infested waters

Eradicate mussels from infested waters if feasible



# Strategy Objectives: Coordination & Collaboration



## **National and Regional Level**

- Invasive Species Advisory Committee
- National Invasive Species Council
- Western Regional Panel on Aquatic Nuisance Species
- 100<sup>th</sup> Meridian Initiative
- Aquatic Nuisance Species Task Force

# Strategy Objectives: Coordination & Collaboration



## State Level

- Invasive Species Council of California
- California Invasive Species Advisory Committee
- California Agencies Aquatic Invasive Species Team
- Quagga/Zebra Mussel Interagency Team

## Local Level

- CDFW Regional Scientists coordinate with and assist local agencies



# Strategy Objectives: Coordination & Collaboration



## Quagga/Zebra Mussel Interagency Team

### State Agencies

Fish and Wildlife  
Food and Agriculture  
Water Resources  
State Parks  
Boating and Waterways  
CalFire  
CalTrans  
Water Resources  
Control Board  
State Lands Commission

### Federal Agencies

Fish and Wildlife Service  
Bureau of Reclamation  
National Parks Service  
Forest Service  
Army Corps of Engineers  
Bureau of Land  
Management  
US Geological Survey

### Local Agency

Metropolitan Water  
District of Southern  
California

# Strategy Objectives: Prevention



## Invasion Process

Source species pool



Transport



Introduction



Establishment



Spread

# Strategy Objectives: Prevention

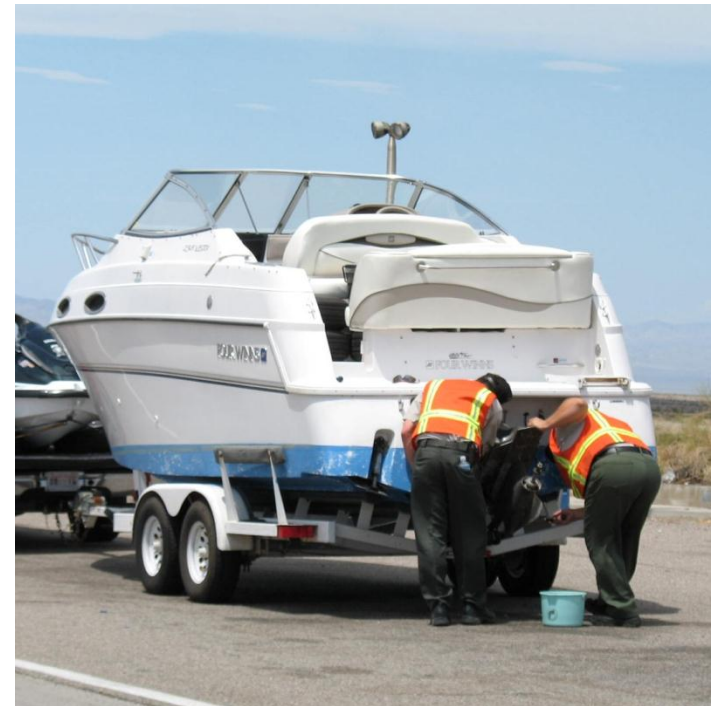


## Prevention Programs

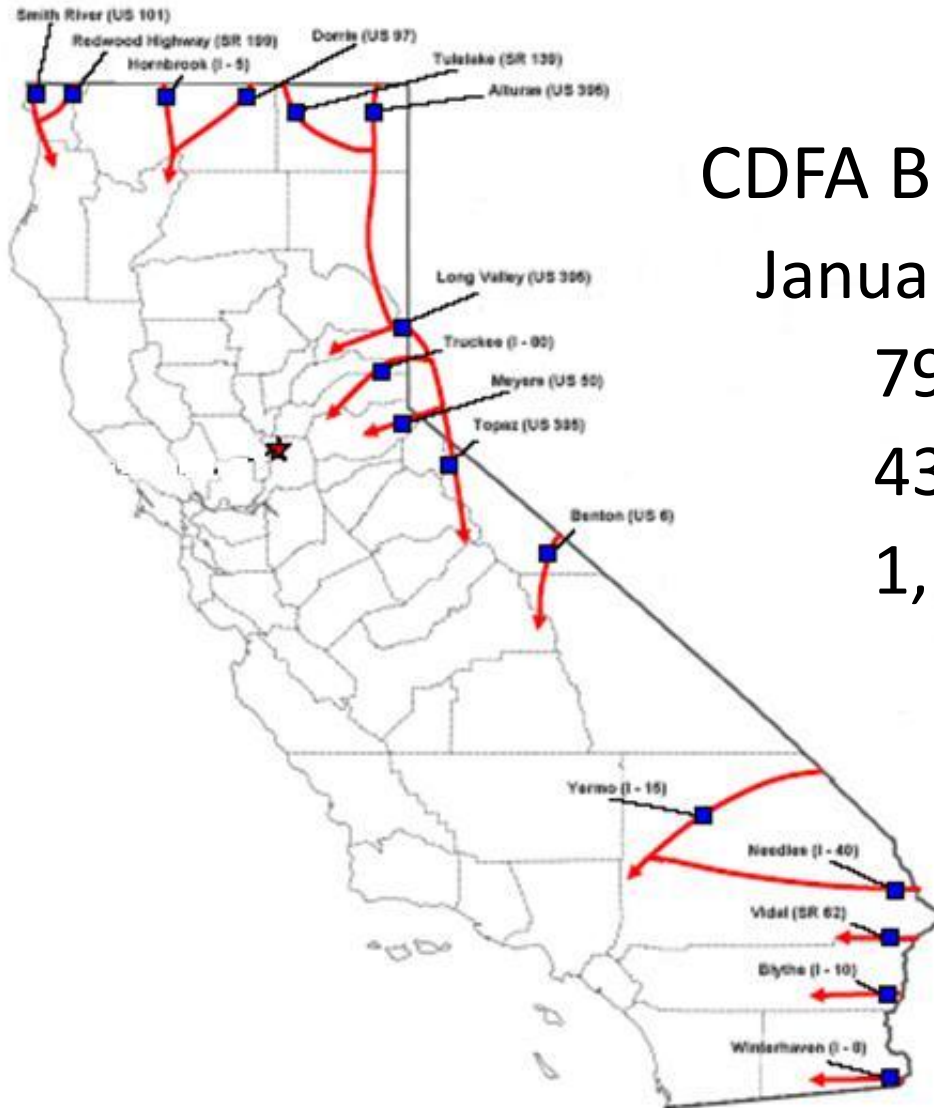
- >250 of Water Agencies in CA

## Existing Resources

- Invasive Mussel Guidebook for Recreational Water Managers and Users
- Recommended Protocols and Standards for Watercraft Interception Programs (UMPS)



# Strategy Objectives: Prevention



## CDFA Border Protection Stations

January 2007 – March 2013

795,523 vessels inspected

43,638 vessels cleaned

1,152 vessels with mussels

# Strategy Objectives: Prevention



## Inspections & Quarantine

- CDFW Regional Scientists
  - Inspect and release quarantined vessels
- Local Programs
  - Bay Area Consortium
  - Lake Tahoe
  - State Parks



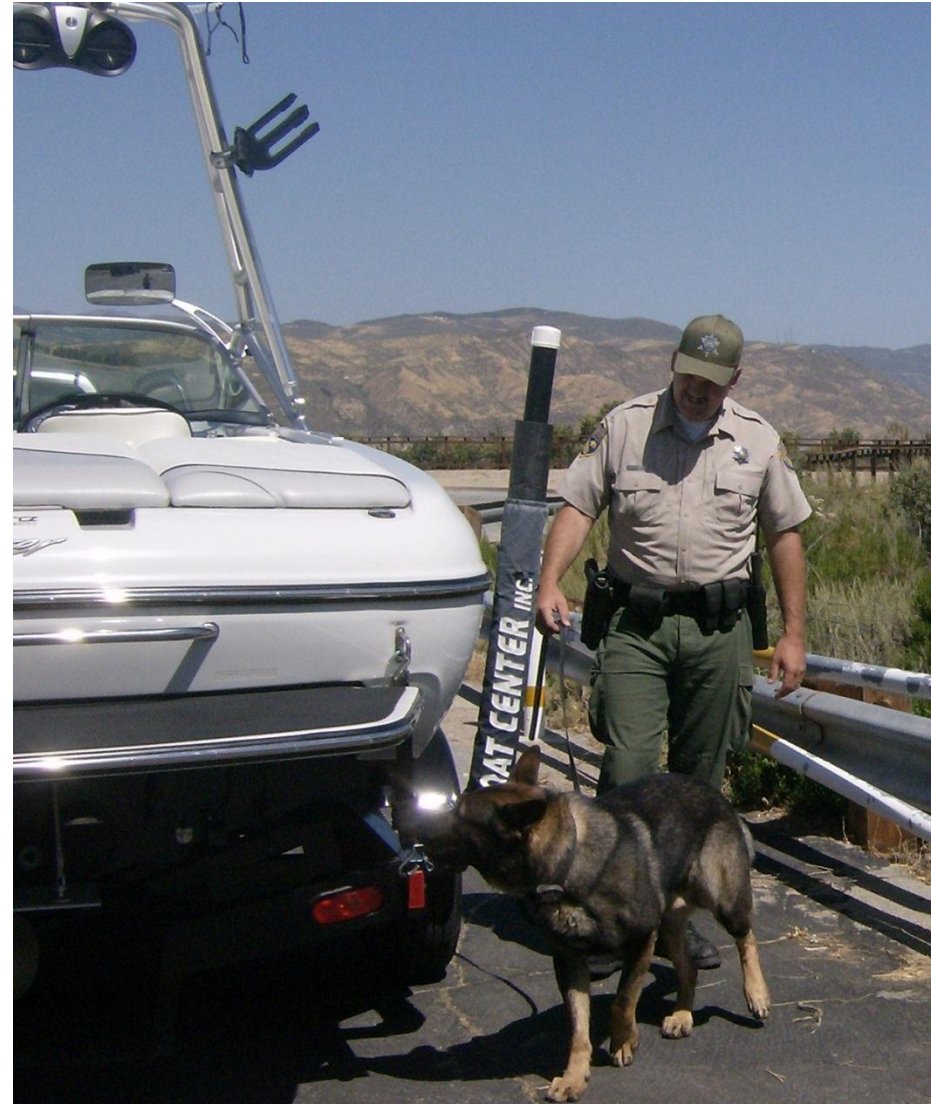
Photo by East Bay Municipal Utility District

# Strategy Objectives: Prevention



## CDFW K-9 Units

- Teams trained to locate certain odors and evidence
- Currently 20 dogs in the program
- Trained to detect adult quagga and zebra mussels



# Strategy Objectives: Prevention



# Strategy Objectives: Prevention



## Dreissenid Mussel Summit

- October 2010
- May 2013

## Watercraft Inspection and Decontamination Trainings

- CDFW Led
- Train the Trainer



# Strategy Objectives: Prevention



## Addressing Other Vectors

Vector	Agency	Action
Tournaments	CDFW	Special Conditions in Permits Organize Watercraft Inspections
Marinas	CDFW	Mailing to marinas throughout CA Special Procedures for Forever Resorts
Commercial Haulers	CDFW & PSMFC	Survey & Letter
Sea Planes	Multi-Agency	DVD
Live Bait	CDFW	Modified Regulations
Aquaculture	CDFW	Meeting & Guidance Document CDFW Hatcheries implementing protocols
Researchers	CDFW	Scientific Collecting Permits
Fire Equipment	CalFire & US Forest Service	Guidelines available on website

# Strategy Objectives: Prevention



## Ongoing Research

- CDFW
  - Veliger Survivability
  - Angler Survey
  
- DWR State Water Project
  - Calcium and pH vulnerability analysis

# Strategy Objectives: Prevention

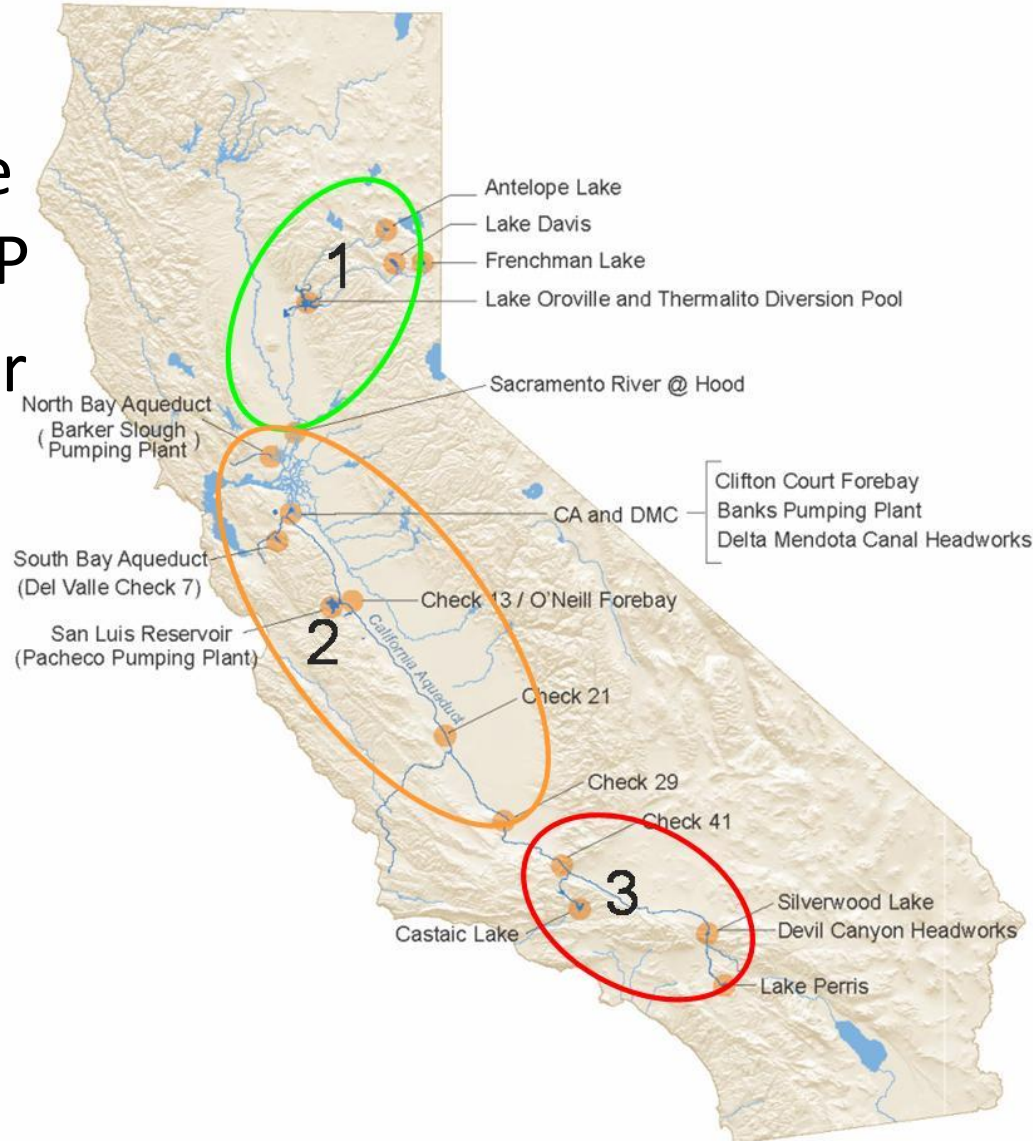


DWR and RNT Consulting  
Research: Assessing the  
Vulnerability of the SWP

**Zone 1** – Unsuitable for  
mussels

**Zone 2** – May support  
mussels

**Zone 3** – Capable of  
supporting mussels



# Strategy Objectives: Detection



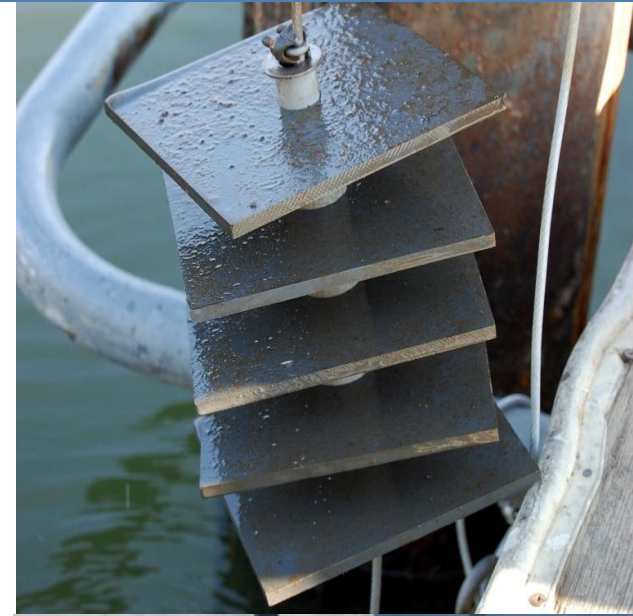
Vulnerability Analysis

Early Detection Monitoring

- Training

Sample Analysis and Identification

- UC Davis Bodega Marine Laboratory



# Strategy Objectives: Control & Eradication



## Response Plans

- 23 infested reservoirs with some type of program in place

## Research

- Marrone Bio Innovations
  - Zequanox
- DWR/RNT Consulting, Inc.
  - pH Manipulation Study



# Strategy Objectives: Information Dissemination



## Outreach & Education

- Quagga/Zebra Mussel Hotline: (866) 440-9530
- Website: [www.dfg.ca.gov/quaggamusel/](http://www.dfg.ca.gov/quaggamusel/)
- Events
- Press Releases/PSAs/Radio Shows
- YouTube Video

# Strategy Objectives: Information Dissemination



## Posters and Rack Cards

**THE MUSSELS ARE HERE!**  
What you can't see will ruin your boat. **DON'T MOVE A MUSSEL!**

**Mussels will ruin your boat, fisheries and California waters!**

**When leaving the water:**

- Inspect all exposed surfaces - small mussels feel like sandpaper to the touch.
- Wash the hull of each watercraft thoroughly.
- Remove all plants and animal material.
- Drain all water and dry all areas.
- Drain and dry the lower outboard unit.
- Clean and dry all live-wells.
- Empty and dry any buckets.
- Dispose of all bait in the trash.
- Wait 5 days in hot weather and up to 30 days when cool and moist. Keep watercraft dry between launches into different fresh waters.

**REPORT MUSSEL FINDS TO 866-440-9530**  
**VISIT [www.dfg.ca.gov/invasives/quaggamusel](http://www.dfg.ca.gov/invasives/quaggamusel)**

**LOOK FOR MUSSELS HERE**

**CHECK YOUR BOAT, TRAILER AND VEHICLE**

**DON'T MOVE A MUSSEL!**  
Clean, drain, dry boat.  
Dispose of live bait.  
Dry 5 days in hot weather & up to 30 days when cool and moist.  
Protect your boat, fisheries and California waters.  
**MUSSEL HOTLINE 866-440-9530**  
[www.dfg.ca.gov/invasives](http://www.dfg.ca.gov/invasives)

**DON'T MOVE A MUSSEL!**  
Quagga/zebra mussels  
ruin boats and destroy waters  
**DON'T LET THEM RIDE WITH YOU!**

Watercraft and equipment can move quagga and zebra mussels from infested waterbodies to uninfested waterbodies. If spread, these mussels can:

- Encrust boat hulls, clog cooling systems, steering equipment
- Alter aquatic ecosystems, resulting in fewer native species and sportfish
- Litter beaches with sharp, foul smelling shells
- Clog water distribution systems, result in higher utility bills



**YOU CAN STOP THEM!**

For more information  
866-440-9530

[www.dfg.ca.gov/invasives/quaggamusel](http://www.dfg.ca.gov/invasives/quaggamusel)



**DON'T SPREAD INVASIVE SPECIES**

You can prevent the spread of quagga and zebra mussels using this checklist every time you exit a waterbody:

- Inspect all watercraft and equipment
- Clean any visible mud, plants, fish or animals from watercraft and equipment
- Drain all water, including from lower outboard unit, ballast, live-well, buckets, etc.
- Dry all areas
- Dispose of debris and live bait in the trash



**STOP AQUATIC Hitchhikers!**  
Prevent the spread of invasive species.  
Clean all recreational watercraft.  
[www.preventionofinvasives.com](http://www.preventionofinvasives.com)



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Smartphone scan for more information.

# Strategy Objectives: Information Dissemination



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## Quagga - Zebra Mussel Information



Information Line: (866) 440-9530

Prevent spreading quagga and zebra mussels by following these steps every time you remove a vessel from the water:

- Physically inspect all exposed surfaces of your boat or watercraft. Very small quagga/zebra mussels will feel like sandpaper to the touch.
- Remove aquatic plants from watercraft, motor, and trailer. Check all underwater fittings and equipment, such as rollers, axle, bilge, and trailer, and above water equipment, such as anchors, and, live wells. Dispose of aquatic plants in the trash.
- Dispose of unused live bait in the trash.
- For personal watercraft, impeller areas can contain quagga/zebra mussels and aquatic plants. Once on the trailer, run the engine for five to 10 seconds to blow out excess water, mussels and plants.
- Drain all water from the watercraft including from the motor, bilges, live wells, and bait buckets.
- Thoroughly wash the hull and all water tanks. This is especially important if the watercraft has been moored for more than a day.
- Preferably wash with a hot water, high-pressure hose, but if unavailable any potable water source is better than nothing.
- If a trailer was used to remove the watercraft from the water, thoroughly wash the trailer as well.
- Drain all wash water and dry the watercraft and trailer.
- Watercraft should remain dry and out of water for a minimum of five days or longer between launches.
- Exercise patience at watercraft inspections. If you have followed these steps you have improved the likelihood you will breeze through an inspection.

[Use Regular Site](#)



# Strategy Objectives: Information Dissemination



## Eye ON Invasives

A California Department of Fish and Wildlife Newsletter

- Quarterly newsletter
- Informs public about activities related to invasive species
- Subscribe by emailing [Invasives@dfg.ca.gov](mailto:Invasives@dfg.ca.gov)



# CDFW Contact Information

Information Hotline  
(866) 440-9530

Website

<http://www.dfg.ca.gov/quaggamussel/>

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