

California's Quagga/Zebra Mussel Invasion



Quagga Mussel



Zebra Mussel

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California Department of Fish and Game

February 24, 2009

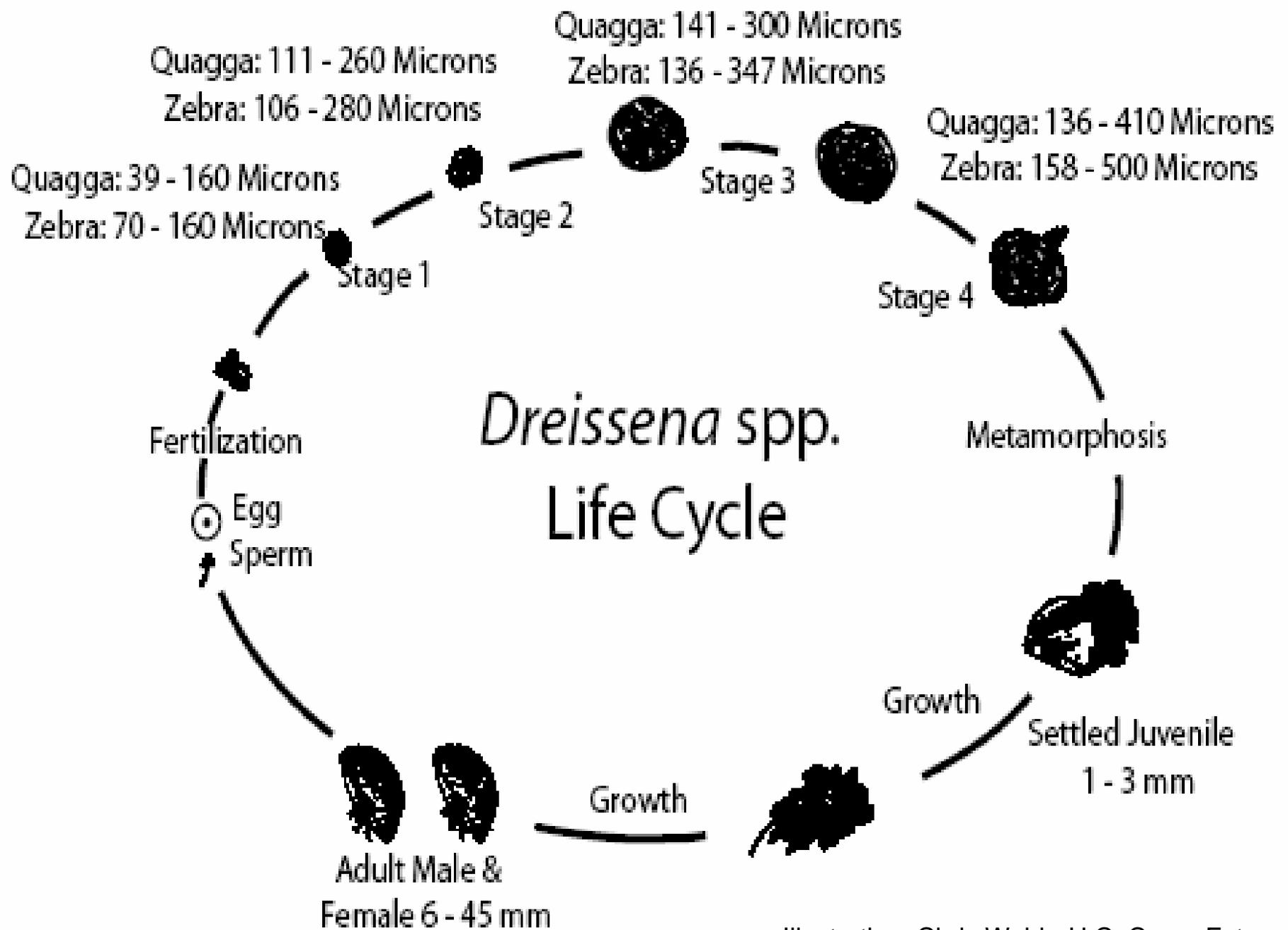


Illustration: Chris Webb, U.C. Coop. Ext.

8 weeks



Photo: Jeff Janik, DWR

12 weeks



Photo: Jeff Janik, DWR

Deployed
6/11,
Retrieved
8/8 and 9/3

23 weeks

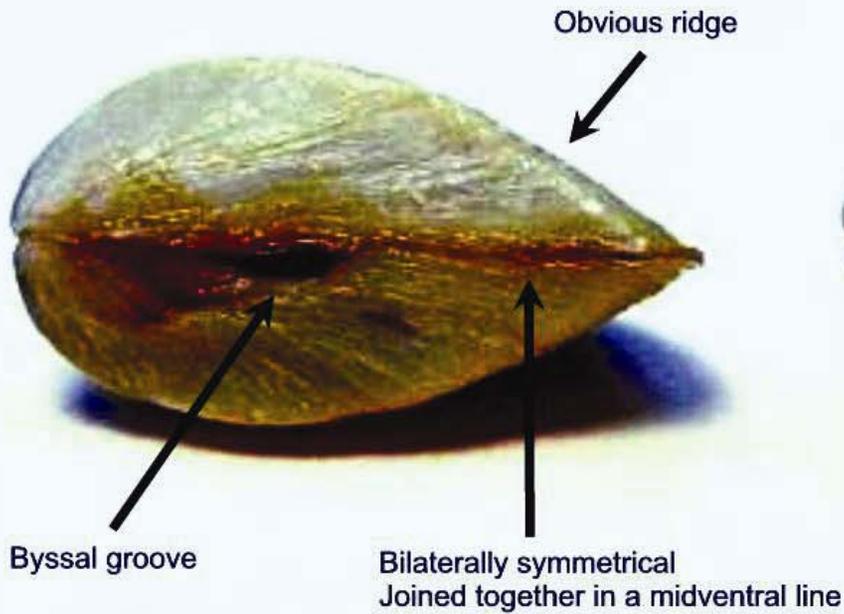


Photo: Jeff Janik, DWR

Deployed
6/11,
Retrieved
11/19

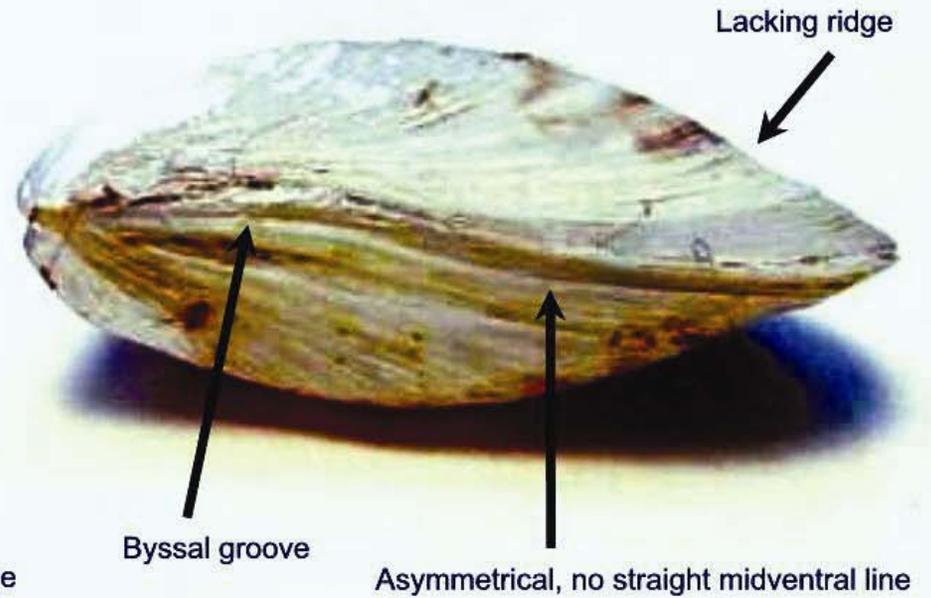
Zebra mussel

Dreissena polymorpha



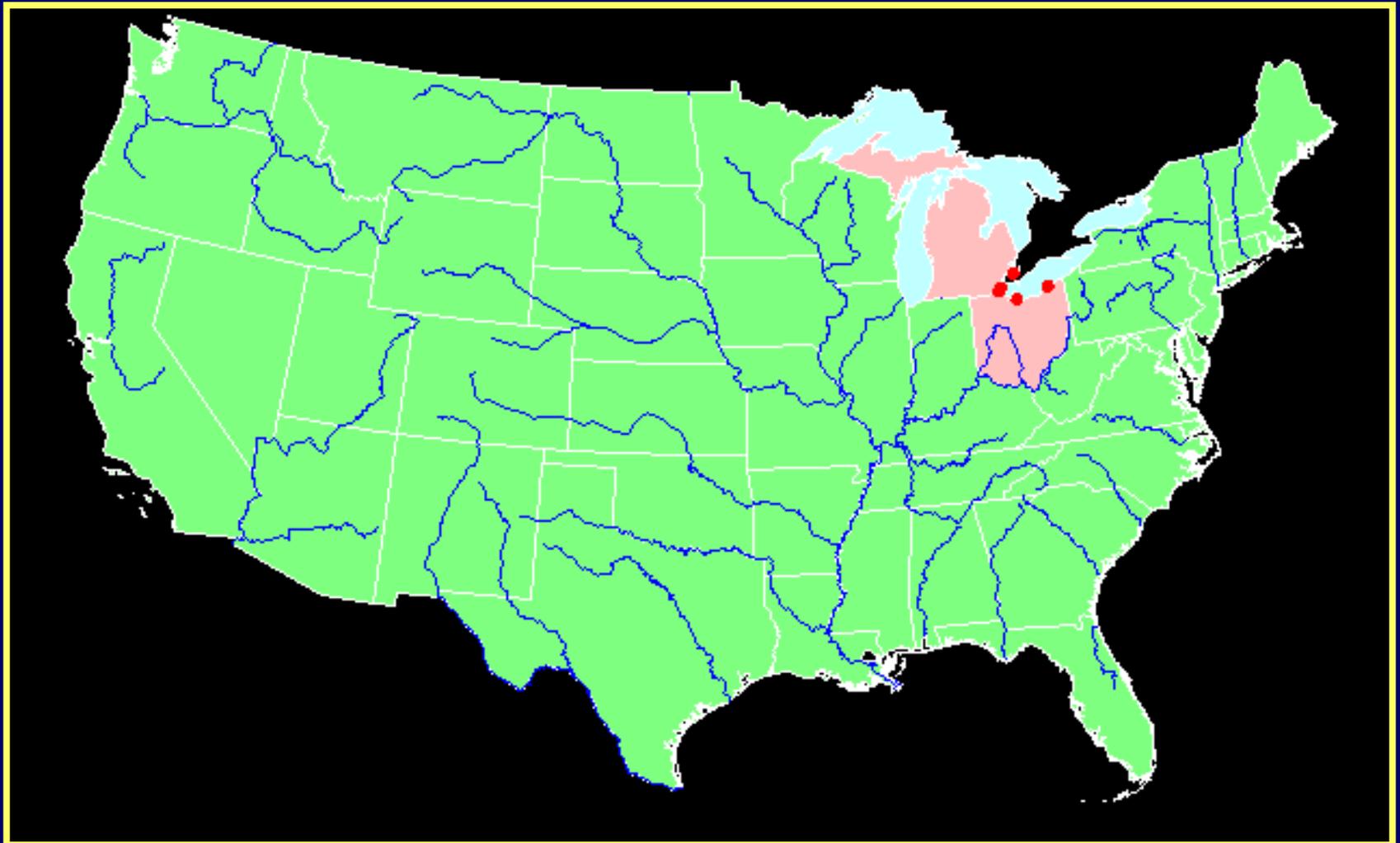
Quagga Mussel

Dreissena rostriformis bugensis

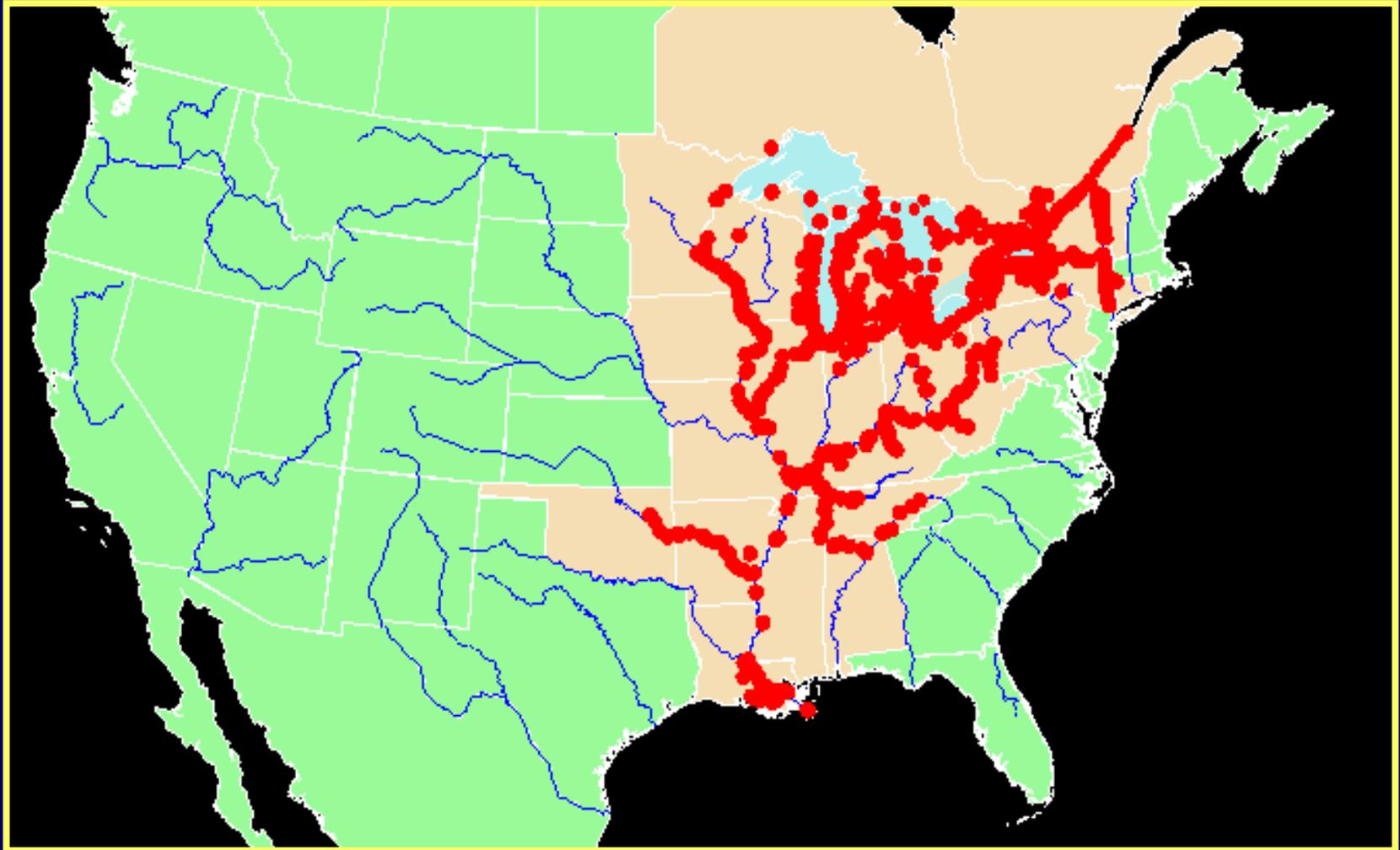


History of Invasion

Dreissenid Mussel Range 1988



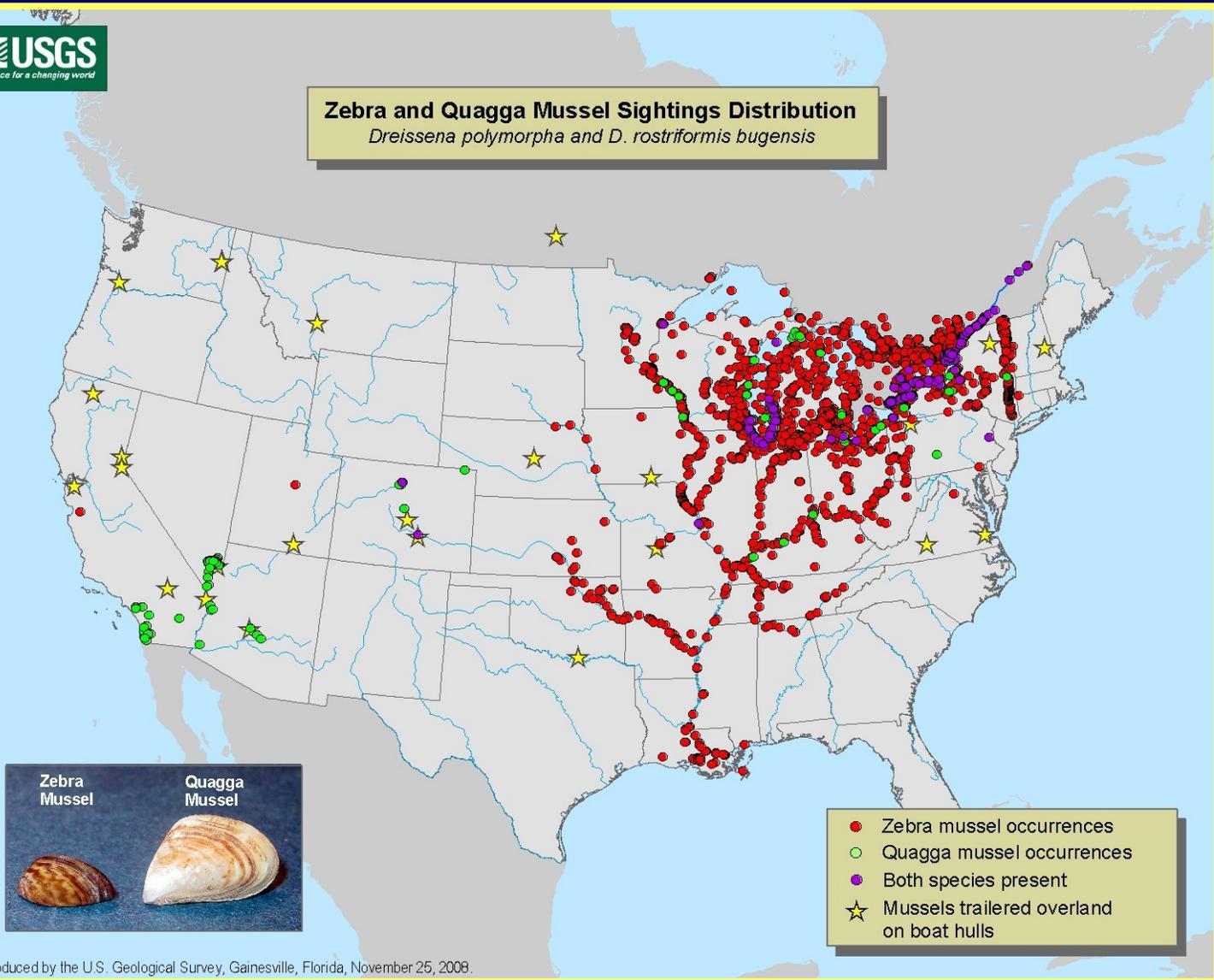
Range in 1998



Range October 2008



Zebra and Quagga Mussel Sightings Distribution *Dreissena polymorpha* and *D. rostriformis bugensis*



Environmental Impacts



Competition with native filter feeders

Change in overall nutrient dynamics

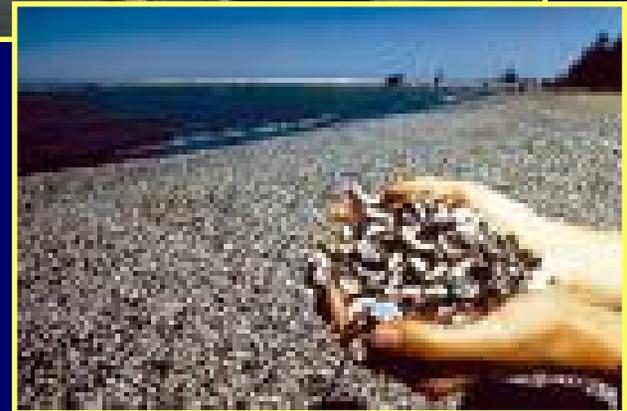
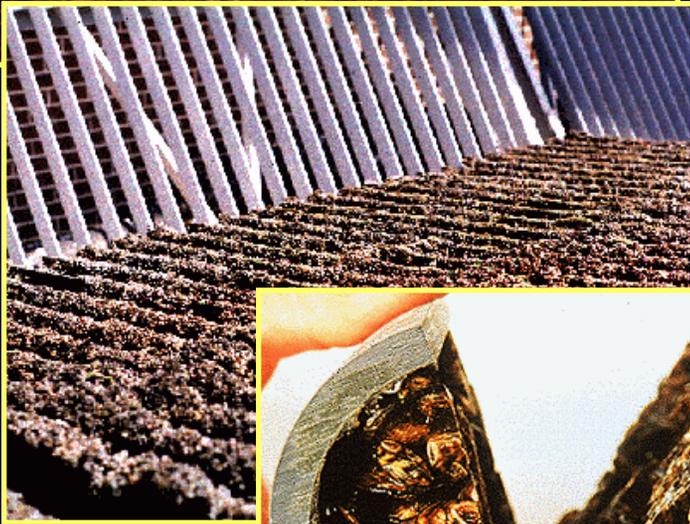
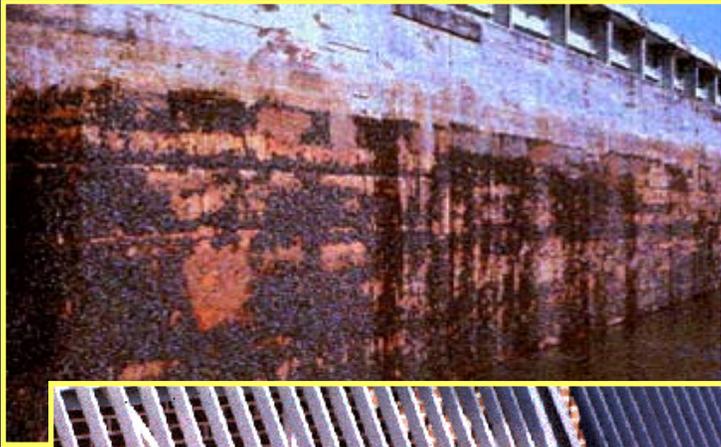


Changes in water clarity and chemistry

- Algal blooms

Bioaccumulation of toxic substances in food chain

Economic Impacts

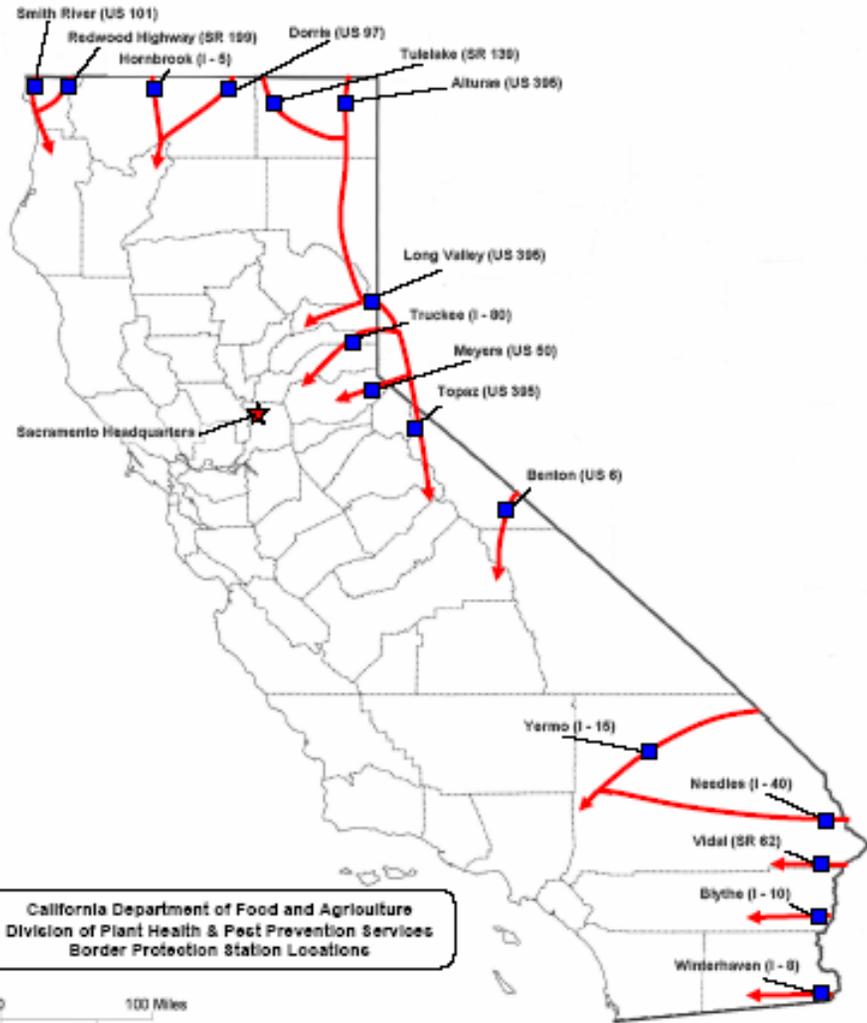


Addressing the Invasion- Incident Overview

- Discovered in Lake Mead on January 6, 2007
- Formed an Incident Command, coordinated response
- Found at Lake Mohave, Lake Havasu, MWD diversion intake structure
- Funding allocated



CA Dept. of Food and Agriculture



11/4/2008 gwl

1/29/07-1/1/09

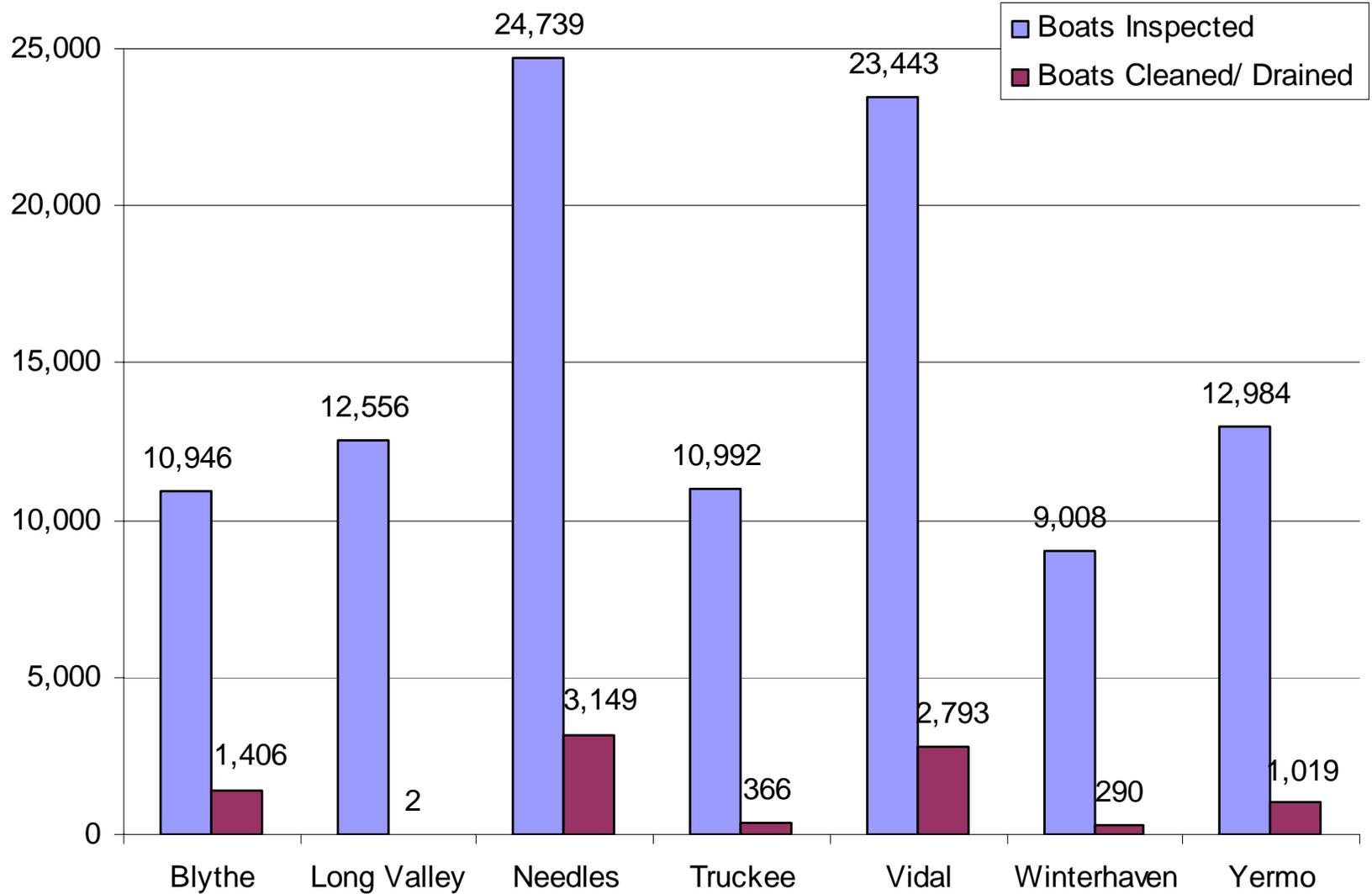
187,426 vessels inspected

17,796 vessels cleaned

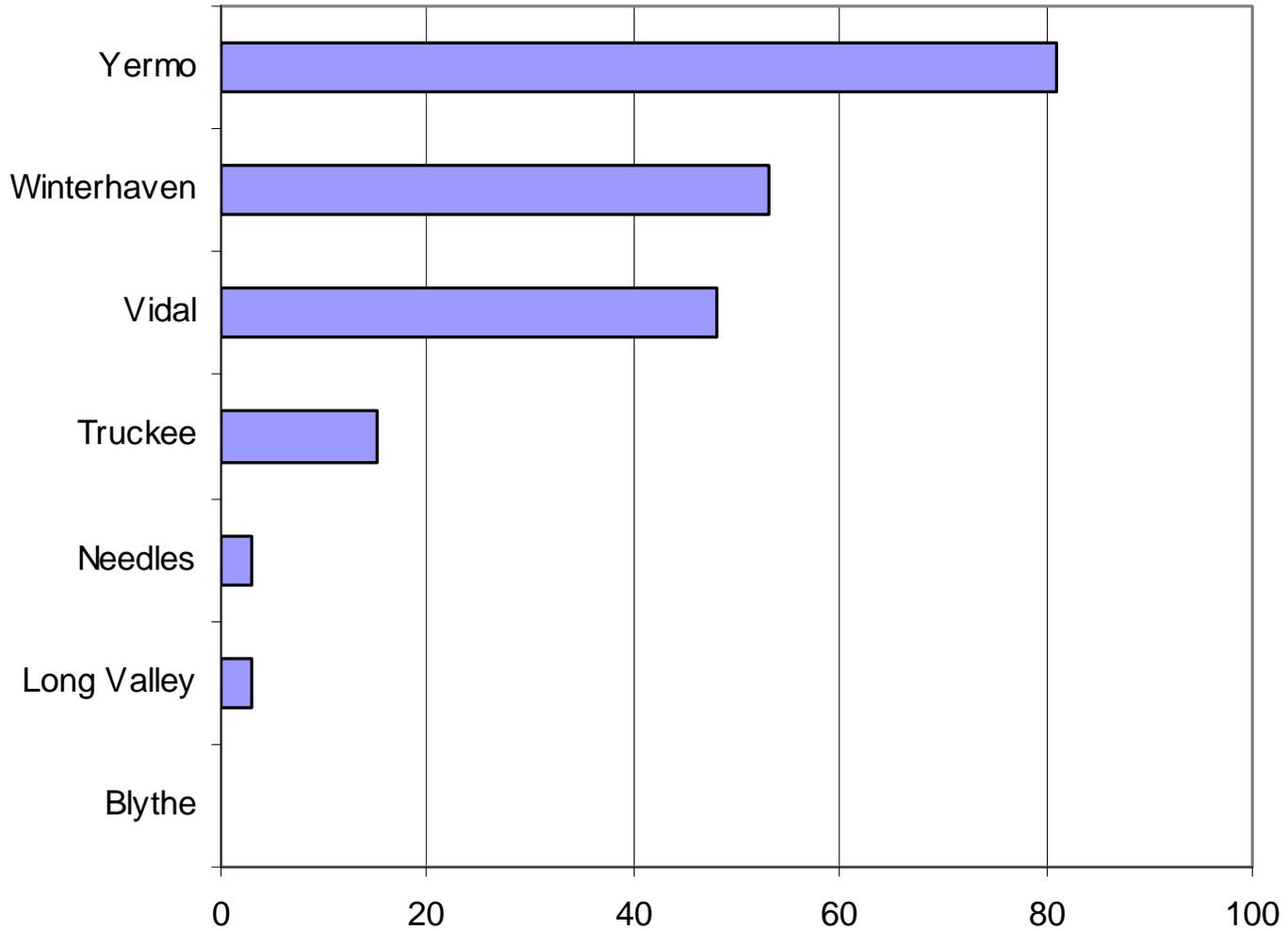
309 vessels with mussels



CDFA Border Protection Station Watercraft Traffic 2008



Confirmed Quagga/Zebra Mussel Finds



Range in California

Quagga Mussel

- Lake Mead - January 6, 2007
- San Bernardino Co. - March 2007
- Riverside Co. - July 2007
- San Diego Co. - August 2007
- Imperial Co. - February 2008
- Orange Co. - April 2008

Zebra Mussel

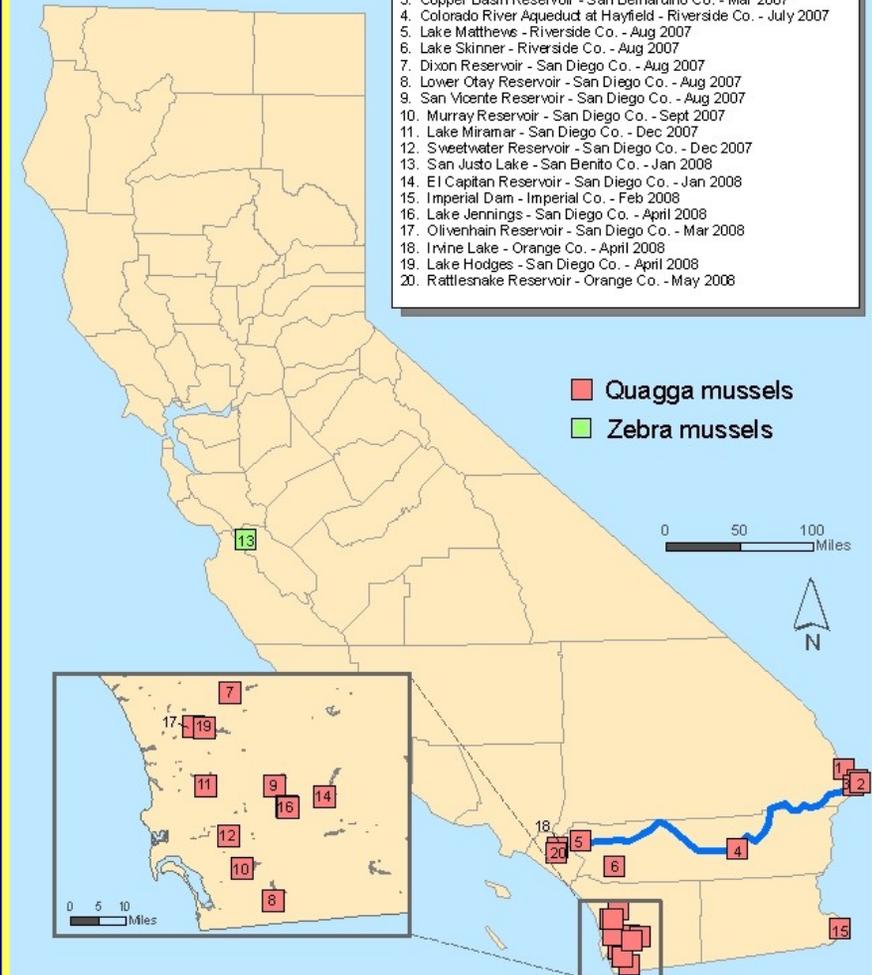
- San Benito Co. - January 2008

QUAGGA AND ZEBRA MUSSEL SIGHTINGS DISTRIBUTION IN CALIFORNIA

2007 - 2008

LOCATIONS

1. Lake Havasu - San Bernardino Co. - Jan 2007
2. Colorado River at Parker Dam - San Bernardino Co. - Jan 2007
3. Copper Basin Reservoir - San Bernardino Co. - Mar 2007
4. Colorado River Aqueduct at Hayfield - Riverside Co. - July 2007
5. Lake Matthevs - Riverside Co. - Aug 2007
6. Lake Skinner - Riverside Co. - Aug 2007
7. Dixon Reservoir - San Diego Co. - Aug 2007
8. Lower Otay Reservoir - San Diego Co. - Aug 2007
9. San Vicente Reservoir - San Diego Co. - Aug 2007
10. Murray Reservoir - San Diego Co. - Sept 2007
11. Lake Miramar - San Diego Co. - Dec 2007
12. Sweetwater Reservoir - San Diego Co. - Dec 2007
13. San Justo Lake - San Benito Co. - Jan 2008
14. El Capitan Reservoir - San Diego Co. - Jan 2008
15. Imperial Dam - Imperial Co. - Feb 2008
16. Lake Jennings - San Diego Co. - April 2008
17. Olivenhain Reservoir - San Diego Co. - Mar 2008
18. Irvine Lake - Orange Co. - April 2008
19. Lake Hodges - San Diego Co. - April 2008
20. Rattlesnake Reservoir - Orange Co. - May 2008



Statewide Monitoring Program



DFG K-9 Unit



Early Detection Monitoring Manual for Quagga and Zebra Mussels



Manual Cover: CA Sea Grant Extension Program

Outreach and Education

DON'T MOVE A MUSSEL!

Mussels will ruin your boat, fisheries and California waters!

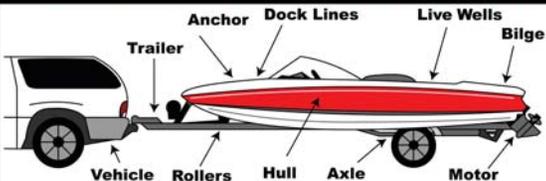
When leaving the water:

- **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

LOOK FOR MUSSELS HERE



CHECK YOUR BOAT, TRAILER AND VEHICLE

¡No Mover Un Mejillón!

Los Mejillones de Quagga/Zebra arruinan los barcos y destruyen las aguas

¡NO LOS DEJE MONTAR CON USTED!

Los mejillones de Quagga/zebra podrían resultar a un desastre ambiental y económico en las aguas de California. Pueden causar un cambio en la especie nativa, el equilibrio ecológico de agua. Los mejillones tapan la tubería de los embarcaderos, y arruinan los botes. La transferencia de agua infestada a otra agua por mejillones.



¡SE PUEDE DETENER!

Para más información

866-440-9530

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!

Quagga/zebra mussels in California waters could result in an environmental and economic disaster. They can cause a shift in native species and disrupt the ecological balance of entire bodies of water. The mussels clog water pipes, boat piers, and ruin boat motors. Transferring a boat from an infested water to another water could spread the mussels.



YOU CAN STOP THEM!

For more information
866-440-9530

www.dfg.ca.gov/invasives/quaggamusel

THE MUSSELS ARE HERE!

What you can't see will ruin your boat!

This...



Microscopic



...will do this!



DON'T MOVE A MUSSEL!

Clean, drain, dry boats & equipment
Dispose of live bait in trash

Dry 5 days in hot weather & up to 30 days when cool & moist

Protect your boat, fisheries and California waters!

MUSSEL HOTLINE 866-440-9530
www.dfg.ca.gov/invasives/quaggamusel

Hotline 1 (866) 440-9530

Webpage <http://www.dfg.ca.gov/invasives/quaggamusel/>

Watercraft Inspection and Decontamination Training

Numerous classes held throughout the state over the last two years.

Attendees from local, state and federal agencies, marina operators, etc.



Photos: Quagga Inspection Services

Water Managers Guidebook

General Information about Quagga and Zebra
Mussels

Prevention Techniques

How To Determine If Your Water Body Has
Quagga or Zebra Mussels

See “Information Resources” on the
Quagga/Zebra page at www.dfg.ca.gov

On-Going Coordination that DFG is Involved With

- Interstate Task Force (states and US)
- CA Interagency Task Force (state and US)
- Technical Committee (entities conducting monitoring, academic experts)
- DFG Regional Quagga/Zebra Staff
 - With local agencies
 - With DFG HQ and one another

Current Goals

- Prevent further introductions into the state
- Contain mussels within currently infested waters
- Eradicate mussels from infested waters if feasible

Road Issues

- Decontamination of equipment used on bridge projects
- Decontamination of boats and scuba dive gear used during bridge inspections
- Clean, drain and dry

DFG Contact Information

Public Information Line

1-866-440-9530

Webpage –DFG Home Page or

<http://www.dfg.ca.gov/invasives/quaggamusel>