Invasive Freshwater Mussels in Texas

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San Marcos Aquatic Resources Center

Texas Freshwater Mussel Conservation and Stakeholder Summit in Austin November 14-15, 2017

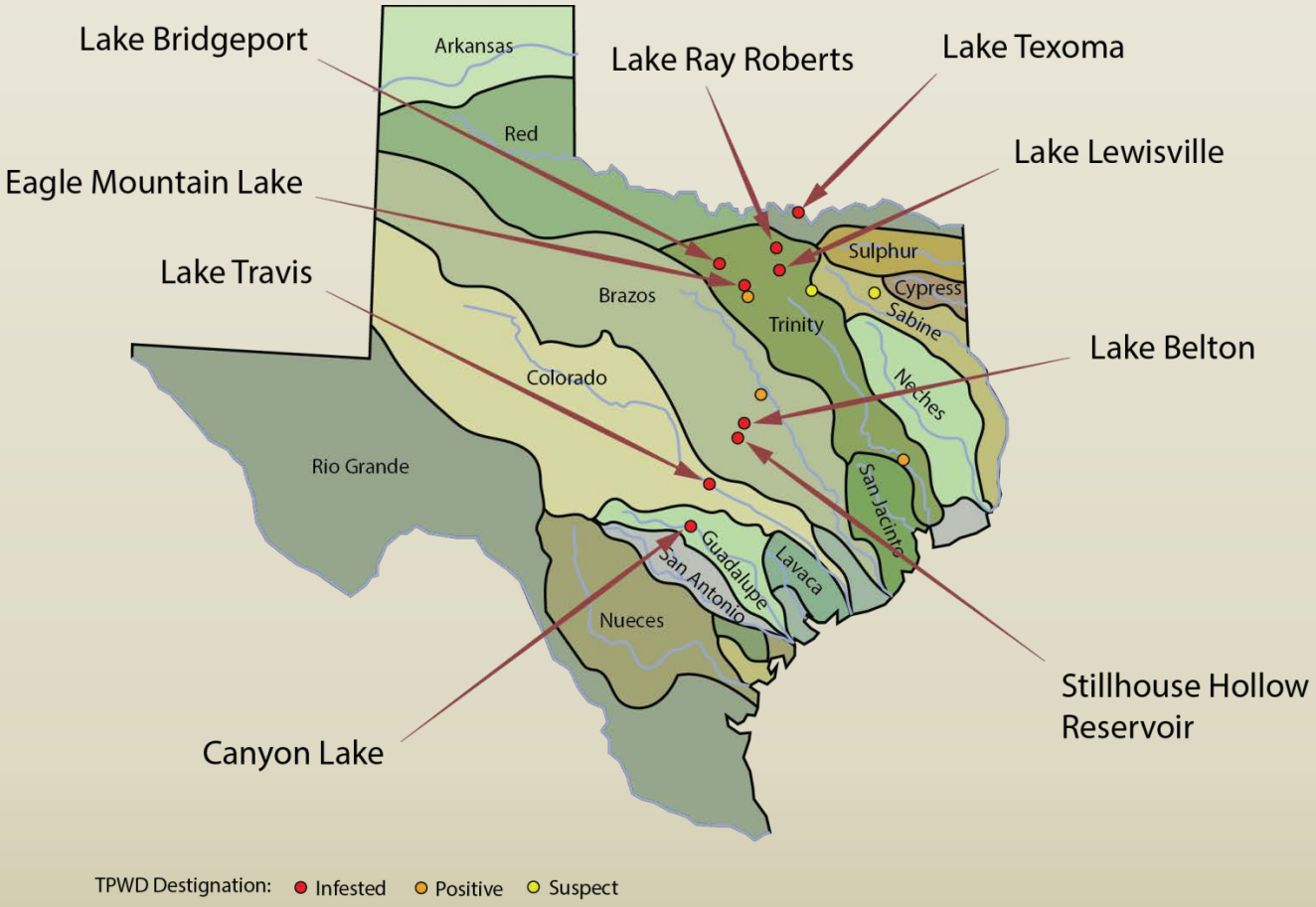
Invaders of North America

Asian Clam
Corbicula fluminea

Zebra Mussel
Dreissena polymorpha

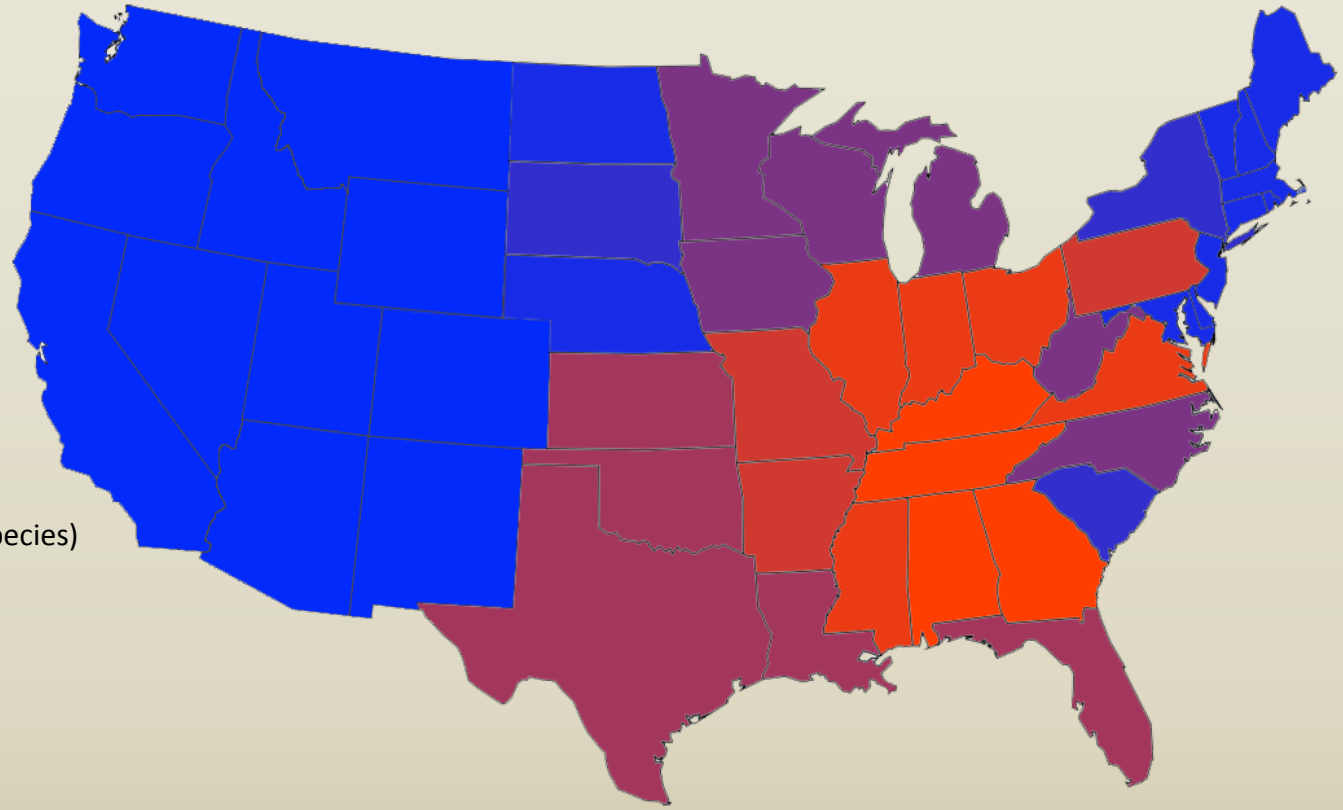
Quagga Mussel
Dreissena rostriformis bugensis

Zebra Mussels in Texas



Freshwater Mussel Diversity

in Contiguous United States



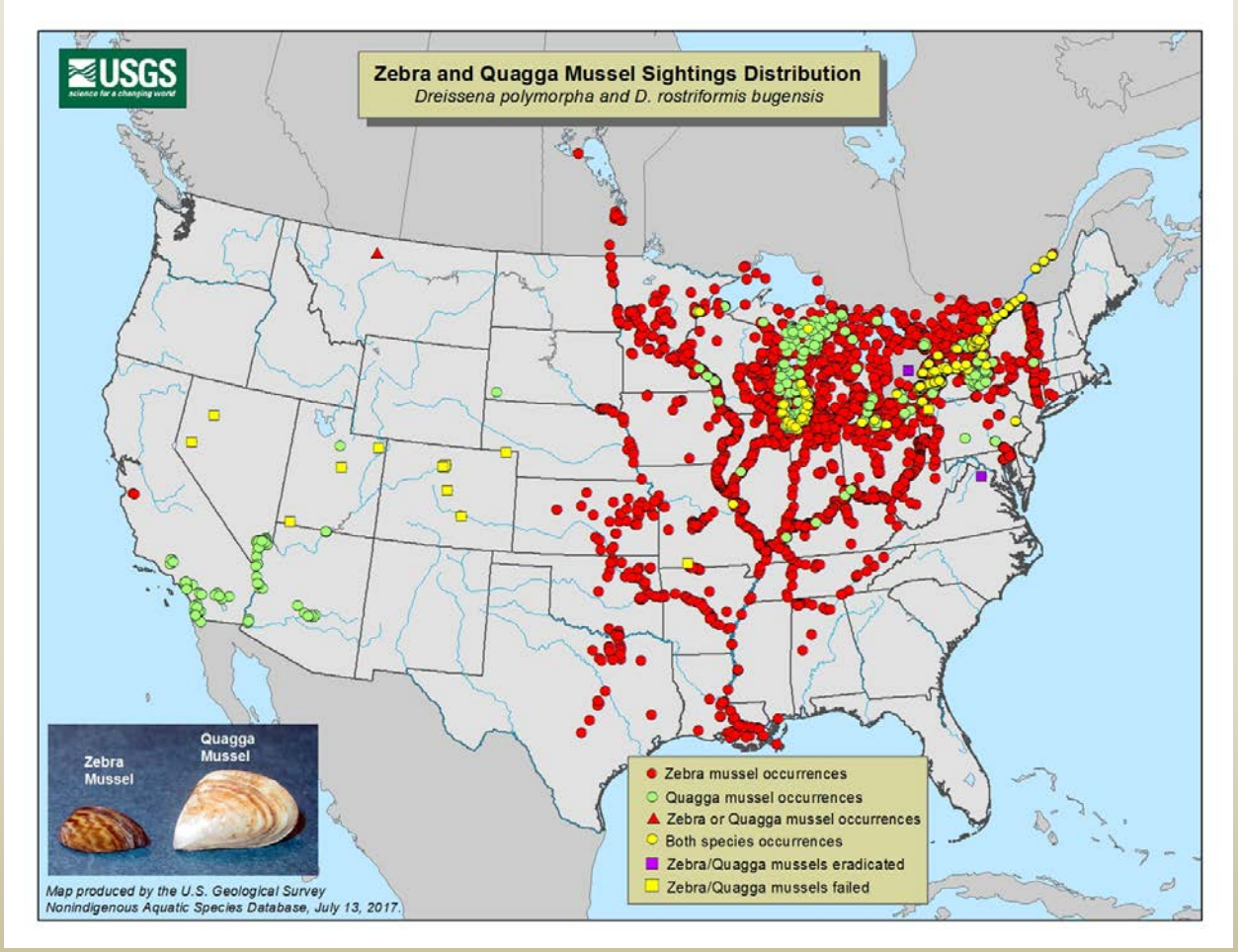
Mussel Diversity

Low (< 10 species)

High (>80 species)

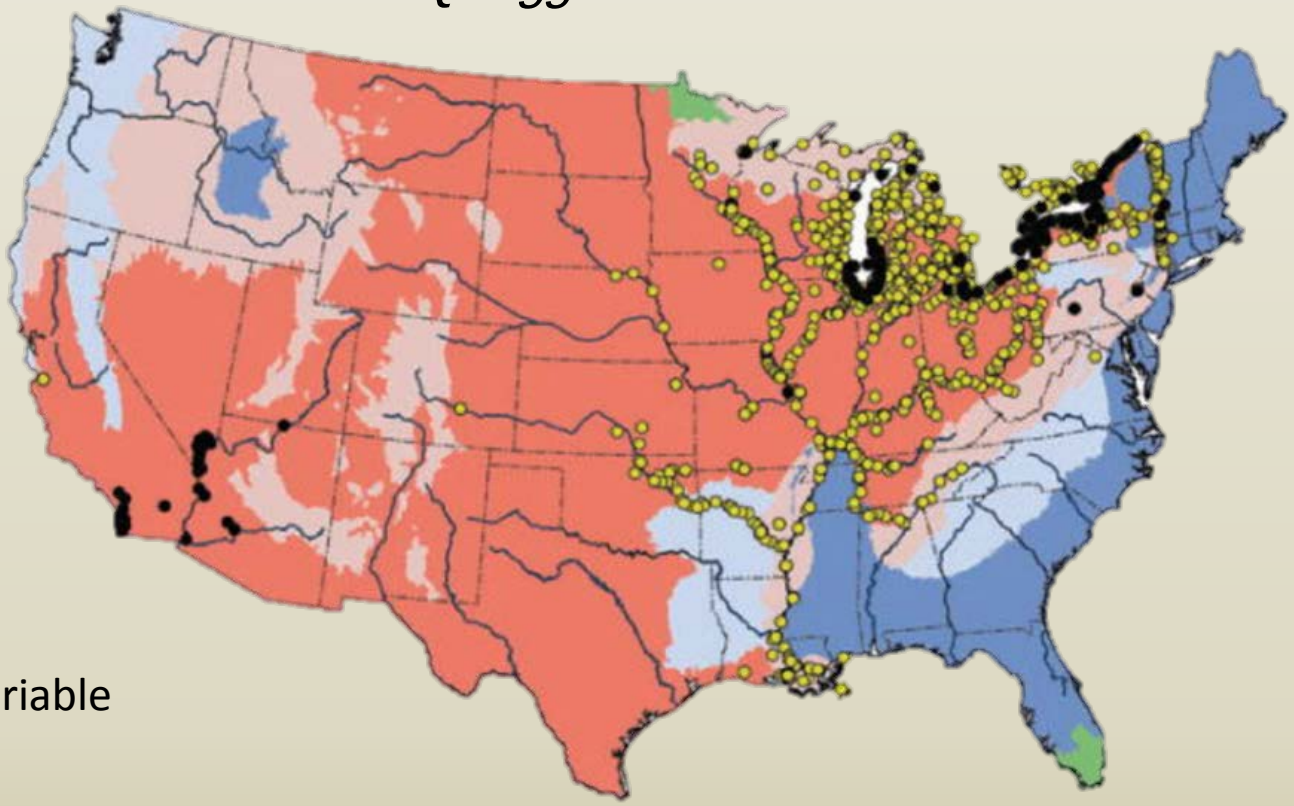
Zebra Mussel Distribution

in Contiguous United States



Calcium-based Risk Assessment

for Zebra/Quagga Mussel Invasion



Invasion Risk

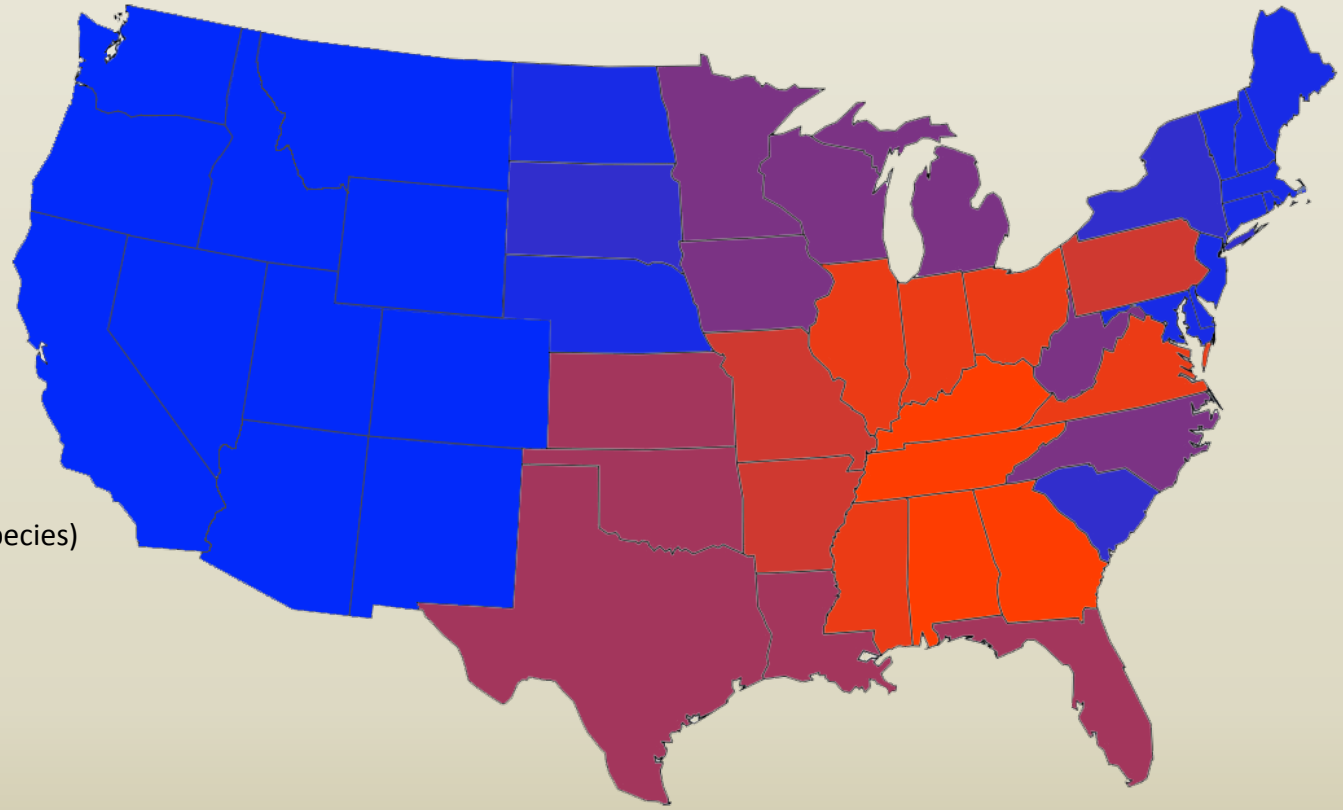
- High
- Highly variable
- Low
- Very Low
- Not assessed

Thomas R Whittier, Paul L Ringold, Alan T Herlihy, and Suzanne M
Frontiers in Ecology and the Environment
Volume 6, Issue 4, pages 180-184, 1 MAY 2008 DOI: 10.1890/070073

CONSERVING AMERICA'S Fisheries

Freshwater Mussel Diversity

in Contiguous United States



Mussel Diversity

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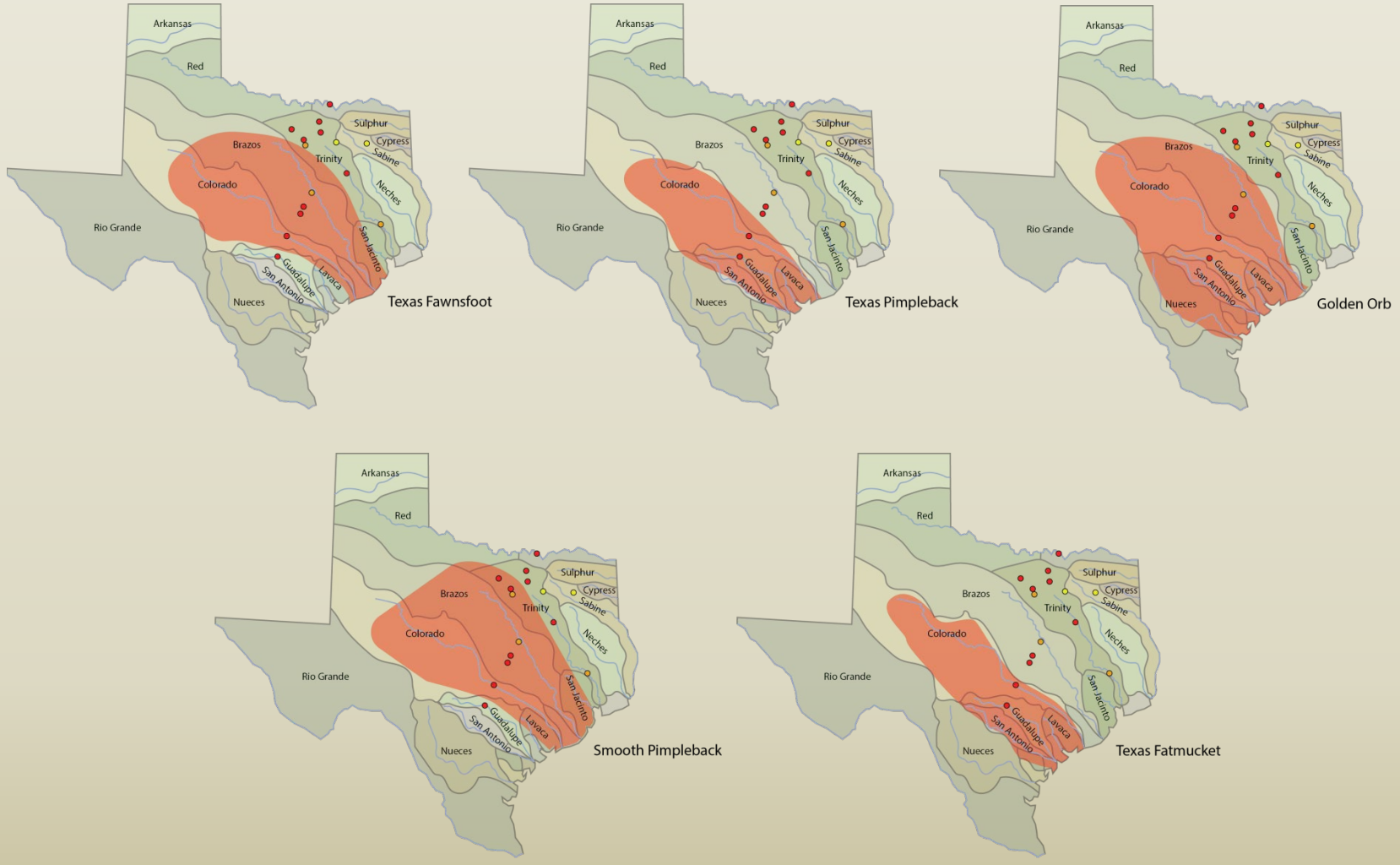
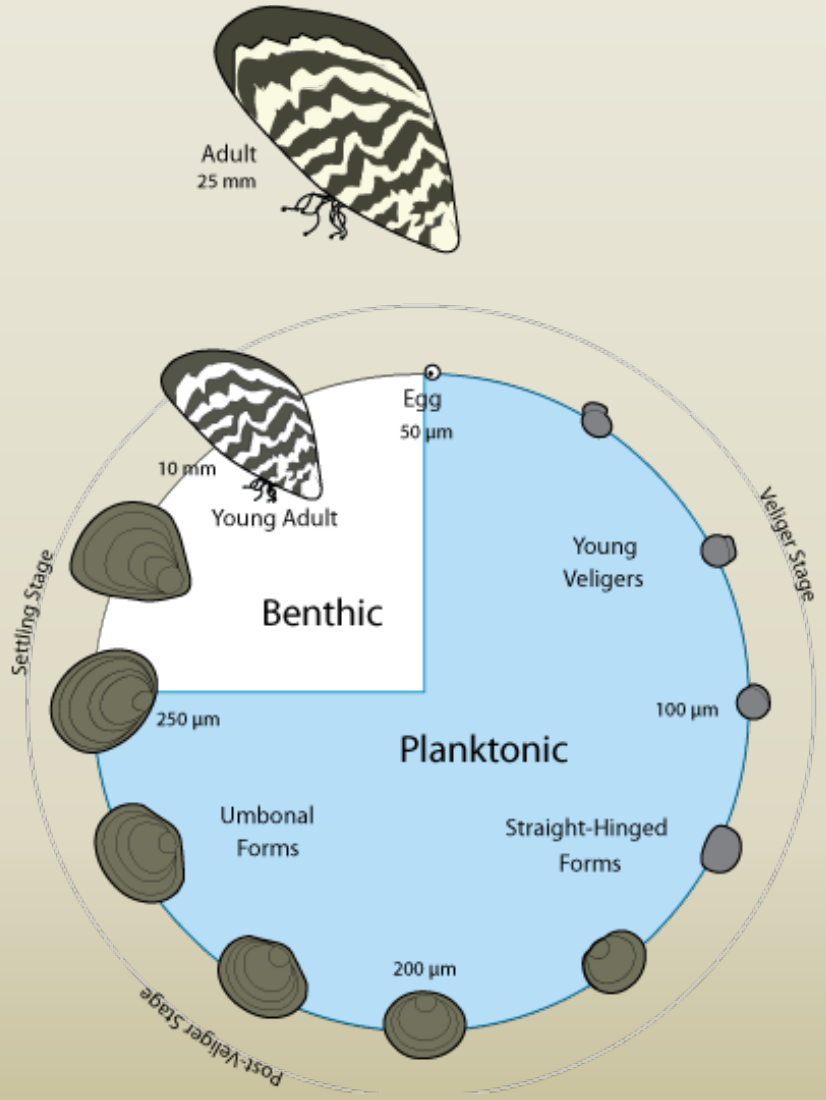
Candidate Species Distribution



Distributions based on Howells, Neck, and Murray 1996

Zebra Mussel Life Cycle



Epifaunal

Epifaunal

Freshwater Mussels

Native Mussels

- Filter feeders
- Parasitic larvae
- Human association is detrimental
- Declining in disturbed areas
- Slower growth
- Lower reproductive potential
- Highly adapted
- Habitat specialists
  - Stable substrate
  - Shallow (<10 m)
- Limited mobility
- Burrow in substrate
- Mostly lotic

Invasive Mussels

- Filter feeders
- Planktivorous larvae
- Human association is beneficial
- Pioneering in disturbed areas
- Faster growth
- Higher reproductive potential
- Highly adaptable
- Habitat generalist
  - Any hard substrate
  - All depths (potentially)
- Highly mobile
- Glue themselves to substrate
- Mostly lentic

TRANSPORTING ZEBRA MUSSELS IS ILLEGAL

Possession or transportation of zebra mussels in Texas is a Class C misdemeanor for the first offense, punishable by a fine of up to $500. Repeat offenses can be elevated to a Class B misdemeanor, punishable by a fine of up to $2,000, jail time up to 180 days, or both.

Boaters are required to drain all water from their vessel, including live wells, bilges, motors and any other receptacles, before approaching or leaving a water body. This applies to all types and sizes of boats used on fresh waters.

ZEBRA MUSSELS HIDE HERE.

CLEAN, DRAIN AND DRY YOUR BOAT.

Clean your boat. Save your lake. Zebra mussels are a small, destructive invasive species threatening to spread across Texas on boats like yours. Already established in Lake Texoma, zebra mussels start out as microscopic larvae and grow to about 1½ inches, but what they lack in size they make up for in the damage they do. They can hurt aquatic life, damage your boat, hinder water recreation and even affect your water supply. It's up to you to stop the spread of zebra mussels. Always clean, drain and dry your boat, trailer and gear for at least a week before traveling to another body of water. **Don't be a carrier.**

HELLO ZEBRA MUSSELS. GOODBYE TEXAS LAKES.

WWW.TEXASINVASIVES.ORG

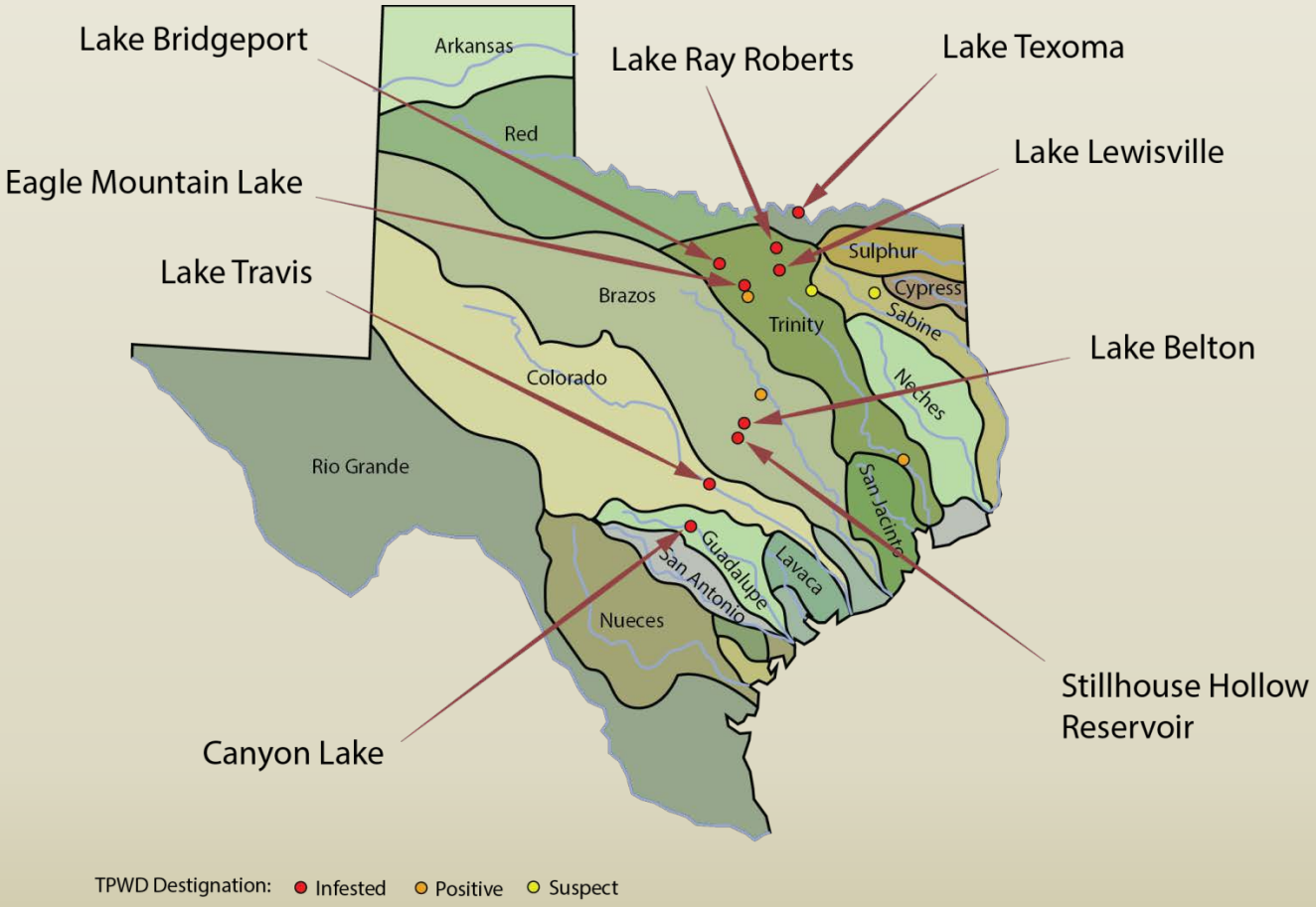
TEXAS PARKS & WILDLIFE

Thanks to our partners: North Texas Municipal Water District • Tarrant Regional Water District • Trinity River Authority • City of Dallas Water Utilities Department • Sabine River Authority • Canadian River Municipal Water Authority • San Jacinto River Authority • Lady Bird Johnson Wildflower Center • Angelina & Neches River Authority • Brazos River Authority

Control

- Chemical Molluscicides: Oxidizing (chlorine, chlorine dioxide) and Non-oxidizing agents
- Manual Removal (high pressure wash)
- Dewatering/Desiccation (freezing, heated air)
- Thermal Flushing (hot water 40 degrees Celsius)
- Visit non-invaded waters first

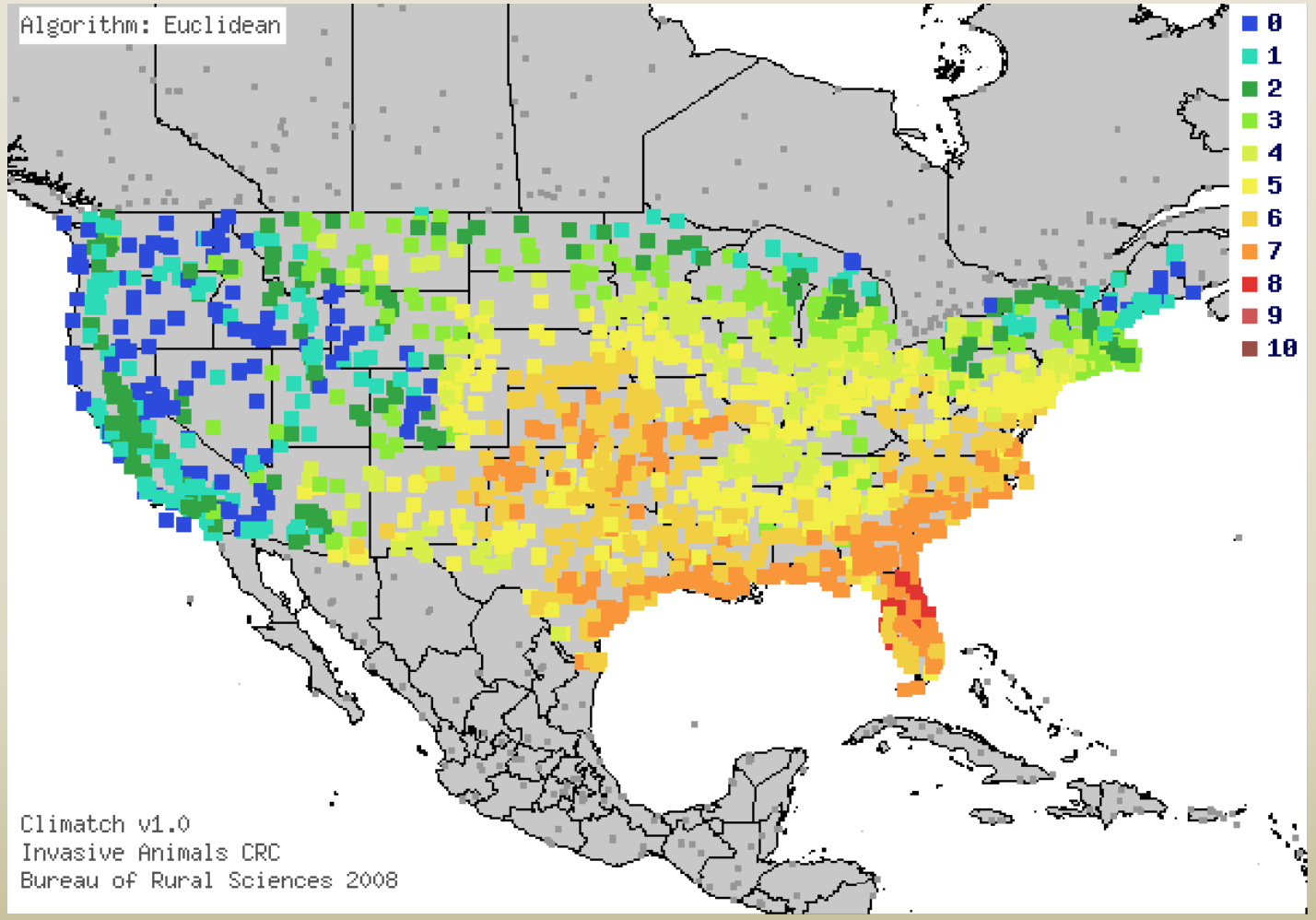
Zebra Mussels in Texas



Limnoperna fortunei

The golden mussel is more tolerant of increased salinity, lower pH and higher temperatures than the zebra mussel.

Climate Match for *L. fortunei*



Low

High

HACCP

Hazard Analysis and Critical Control Points

- A plan of action
- Applies to each activity
- Breaks down an activity into a series of steps
- Allows detailed scrutiny and insertion of controls
- Prescribes acceptable limits in advance
- Requires a backup plan… in advance
- Documents that precautions were taken.

Need Help?

- Regional AIS Coordinator
  - Barak Shemai: barak_shemai@fws.gov
- Texas AIS Team Leader
  - Monica McGarrity: monica.mcgarrity@tpwd.texas.gov