North Central Texas Council of Governments

Problematic Invasive Species and Their Impact on Water Quality in North Texas

February 23, 2021

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Prepared in cooperation with the Texas Commission on Environmental Quality and U.S. Environmental Protection Agency

North Central Texas Council of Governments
Environment & Development

www.nctcog.org/WaterResources

Procedures for Webinar

- The webinar will be recorded and posted to NCTCOG's website under the green banner called "Webinars" here: https://www.nctcog.org/envir/natural-resources/water-resources
- All registrants and attendees will receive an email with the presentation slides and a subsequent email when the recording is posted.
- Please keep your microphone on mute until the Question-and-Answer period at the end of the presentations.
- Thank you!

Invasive Species Management

Rachel Richter
Urban Wildlife Biologist
Texas Parks and Wildlife

What is an invasive species?

- Any living thing that is **not native** to a particular ecosystem and **causes harm** to the environment, the economy, or human health
- Grow, spread, and reproduce quickly
- $137 billion annually

Vegetation and Water Quality

- Makes banks resistant to erosion
- Slow and store water
- Filter out contaminants
- Increased groundwater recharge
- Important wildlife habitat

Invasive Plants Impact Water Quality

- Erosion
- Alter floodplain structure
- Modify stream hydrology
- Damage to infrastructure
- Suppress native vegetation
- Altered soil chemistry
- Water availability

Management and Prevention

- Conduct site assessments
- Limit disturbance to native plant communities
- Train maintenance staff and contractors
- Develop a maintenance plan:
  - If possible, use equipment at only one site
  - Visit high-quality sites first
  - Clean equipment

Management and Prevention

- Use native topsoil for fill dirt
- Use native plants in landscaping
- Provide residents/businesses with a list of recommended plants
- Mechanical, manual and chemical removal
- Mobilize volunteer organizations

Non-native Waterfowl

Water Quality


Photo Credit: KSAN

Management Options

- Outreach and education
- Feeding ordinances

Management Options for Non-native Waterfowl

- No state regulations for non-native waterfowl
- Oiling or addling eggs
- Trap and remove

Nutria

- Eat 3lbs of plants per day
- Create burrows
- Destabilize banks
- Damage infrastructure
- Disease vectors

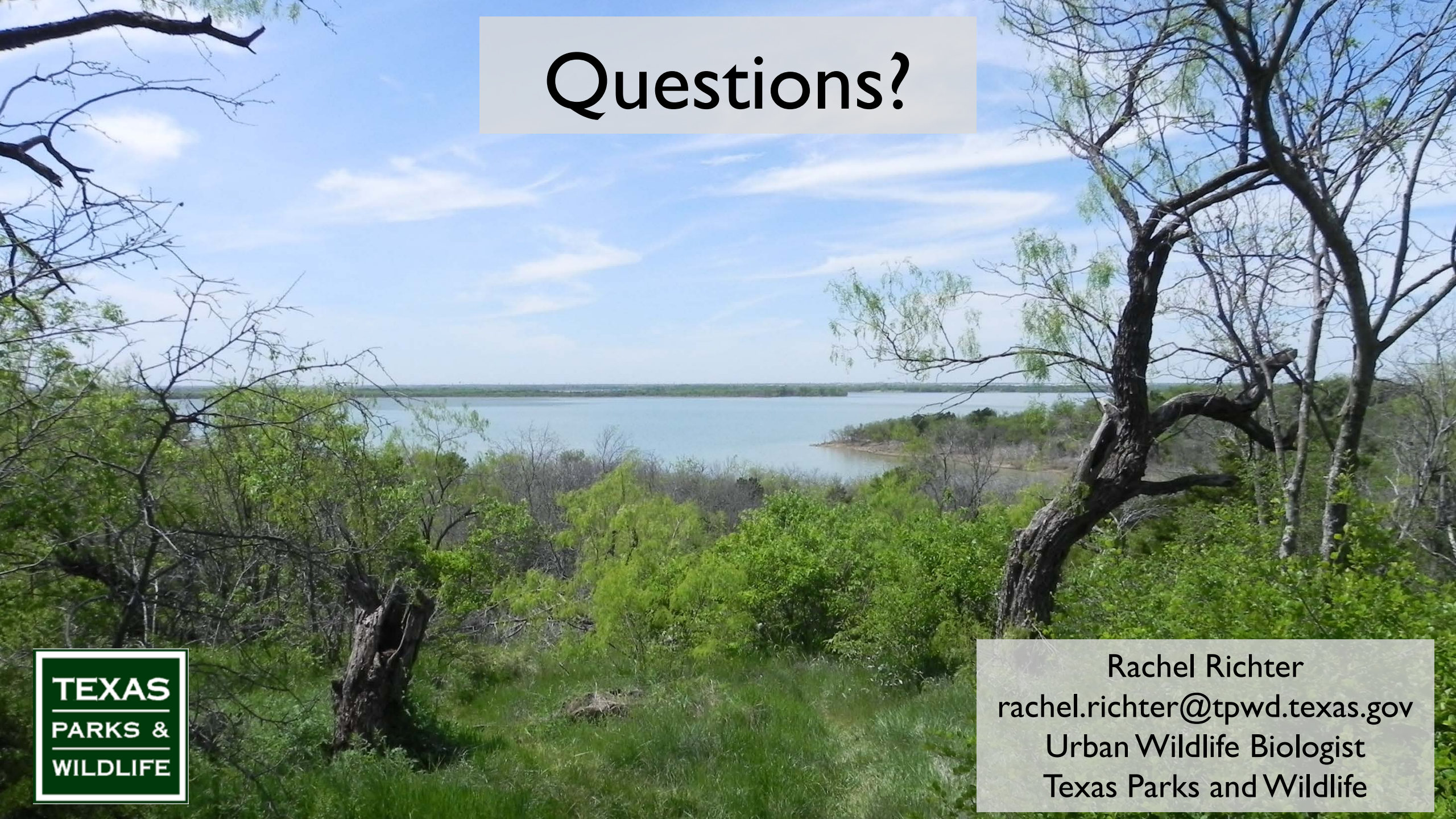
Feral Hogs

- Rooting
- Wallowing
- Disease vectors
- Population will triple in 5 years without control measures
- $1.5-$2.5 billion in damage annually

Control Methods

Management Strategies

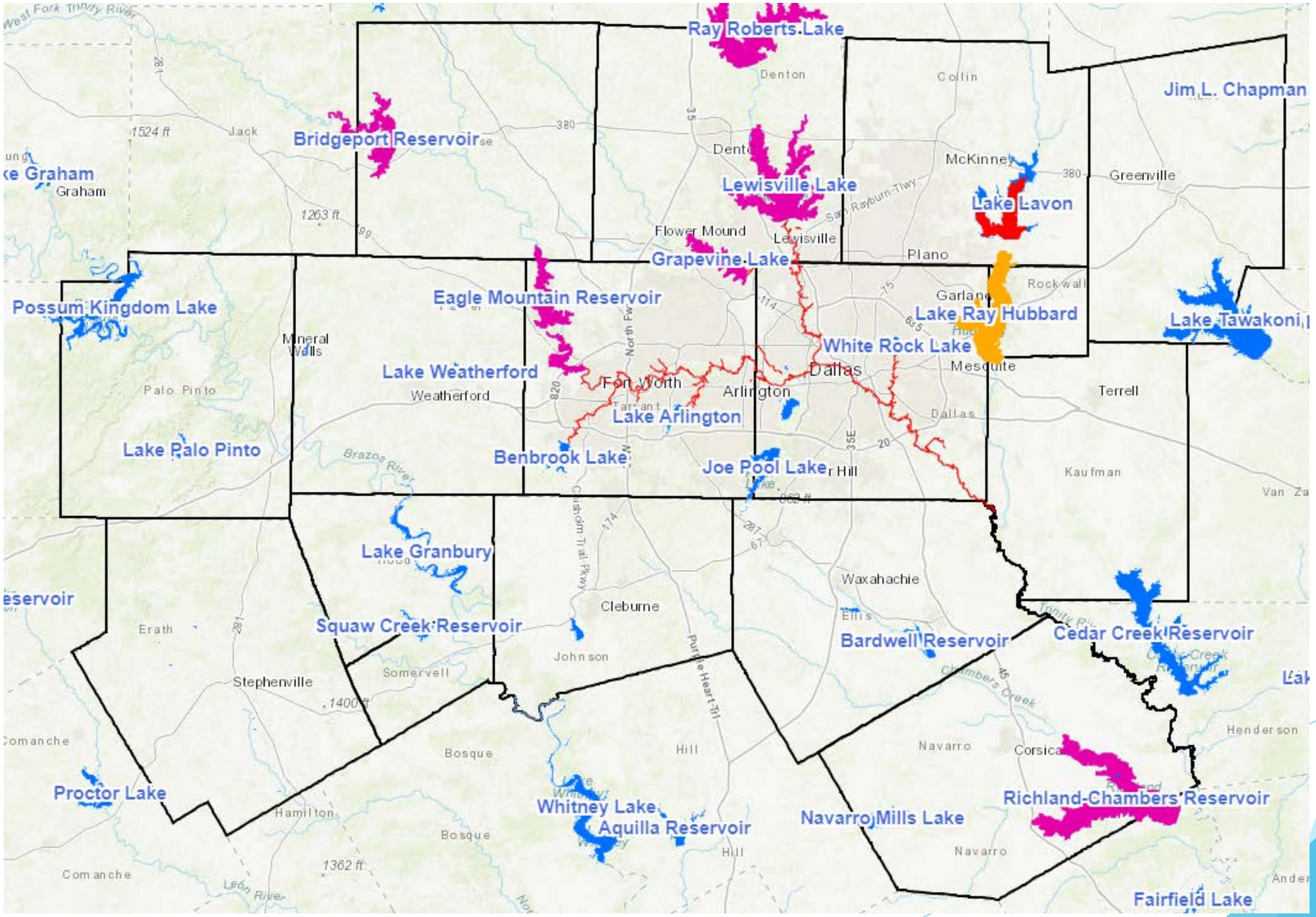
- Develop a plan
- Consult with animal welfare and health experts
- Public education and outreach
- Promote healthy ecosystems and clean water



Questions?

Rachel Richter
rachel.richter@tpwd.texas.gov
Urban Wildlife Biologist
Texas Parks and Wildlife

Status of Zebra Mussel Infestation in NCTCOG Region



Legend

Infested Reservoirs

Positive Reservoir

Trinity River - Positive

Suspect Reservoir

Reservoirs

NCTCOG Counties

Source: Data from Texas Parks & Wildlife Department, Reservoir mapping data from Texas Commission on Environmental Quality, https://gis-tceq.opendata.arcgis.com/search?categories=water. February 23, 2021

John Tibbs – TPWD Inland Fisheries Biologist, Waco
Contact the AIS Team: AquaticInvasives@tpwd.texas.gov

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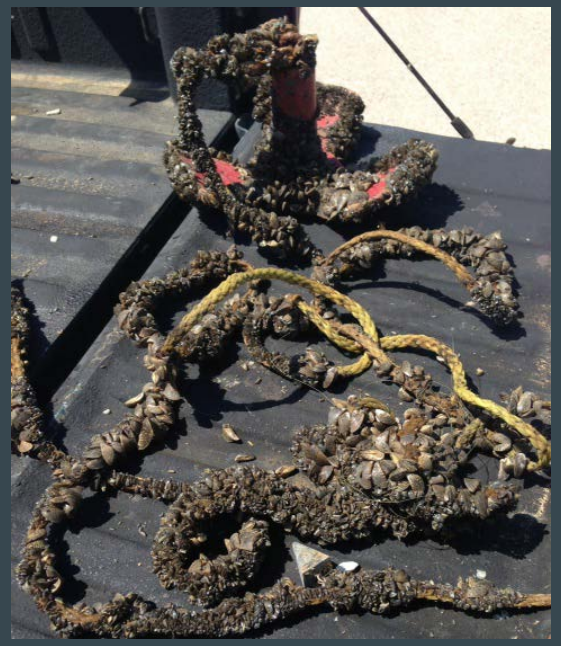
Zebra / Quagga Mussel (ZQM) Invasion

- TWO closely related species
- Native to Eurasia – Black & Caspian Sea drainages
- Invasive in Europe
- Invaded North America by 1988 (Lake St. Clair, Canada)
- Invasion pathway - ocean-going vessels
- Zebra mussels found in Lake Texoma in Texas in 2009



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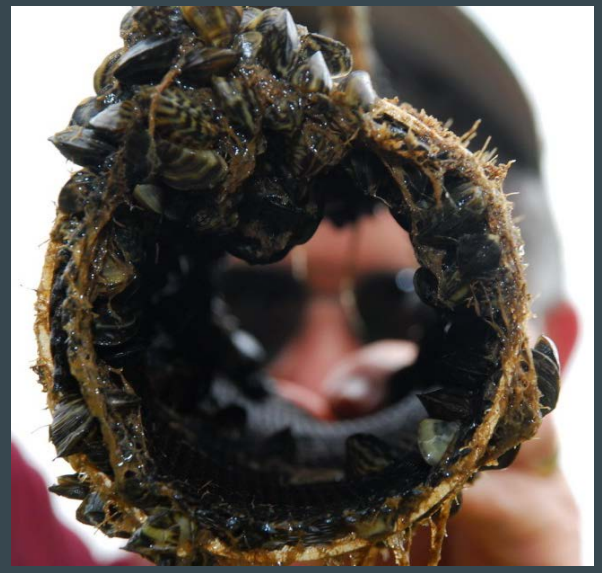
Economic Impacts

- Cleaning intake structures and pipelines
- Increased pumping expenses
- Increased maintenance and repairs
- Retrofitting costs ~$1.8M



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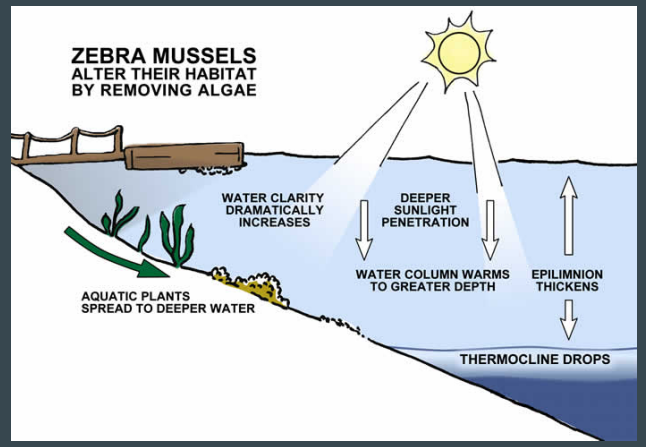
Ecological Impacts

- Decrease plankton/productivity
- Contribute to harmful algal blooms
- Increase water clarity; increase vegetation
- Alter food web / fish community
- Biomagnify pollutants, create “dead zones”
- Smother native mussels



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Recreational Impacts

- Foul boat hulls/motors; plug water intake systems
- Colonize hard structures (docks, piers, buoys, bridges, etc.) and beaches

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Zebra Mussel Identification

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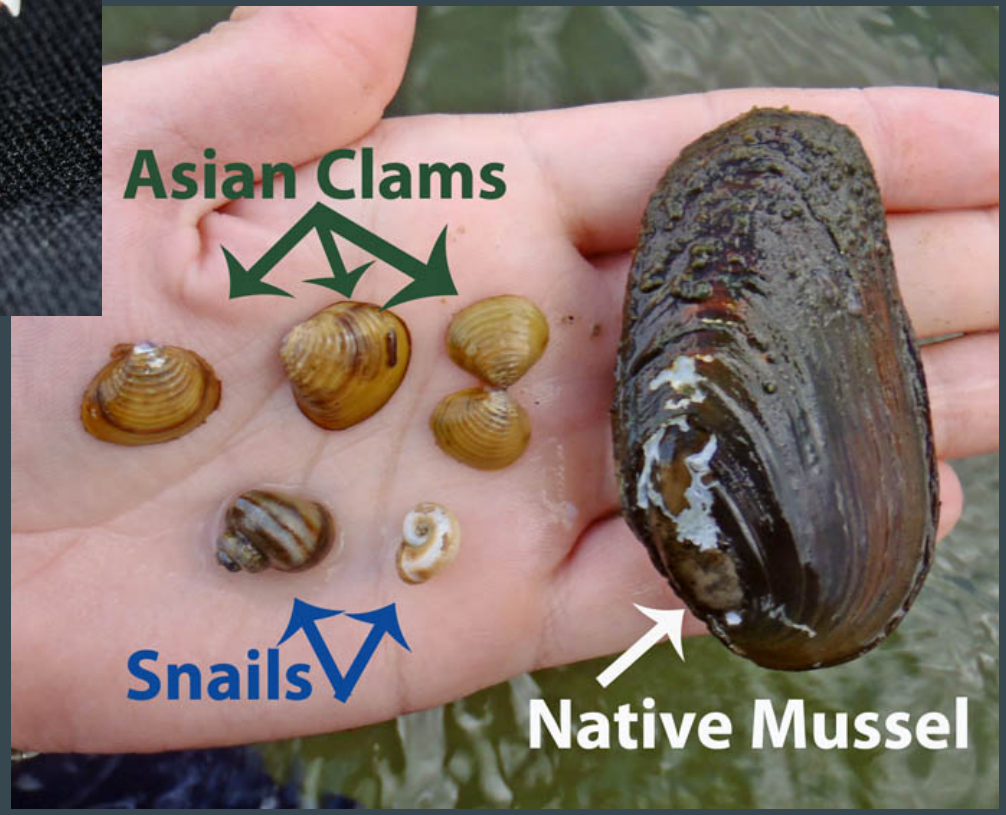
Commonly Mistaken Species



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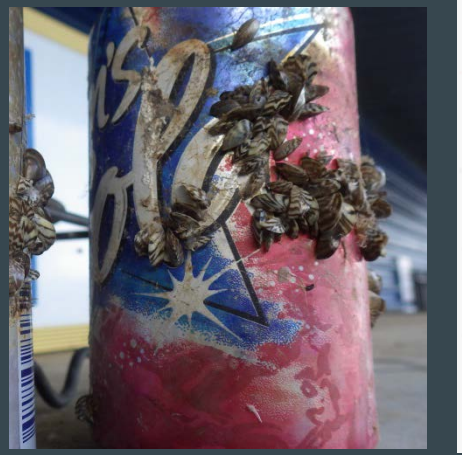
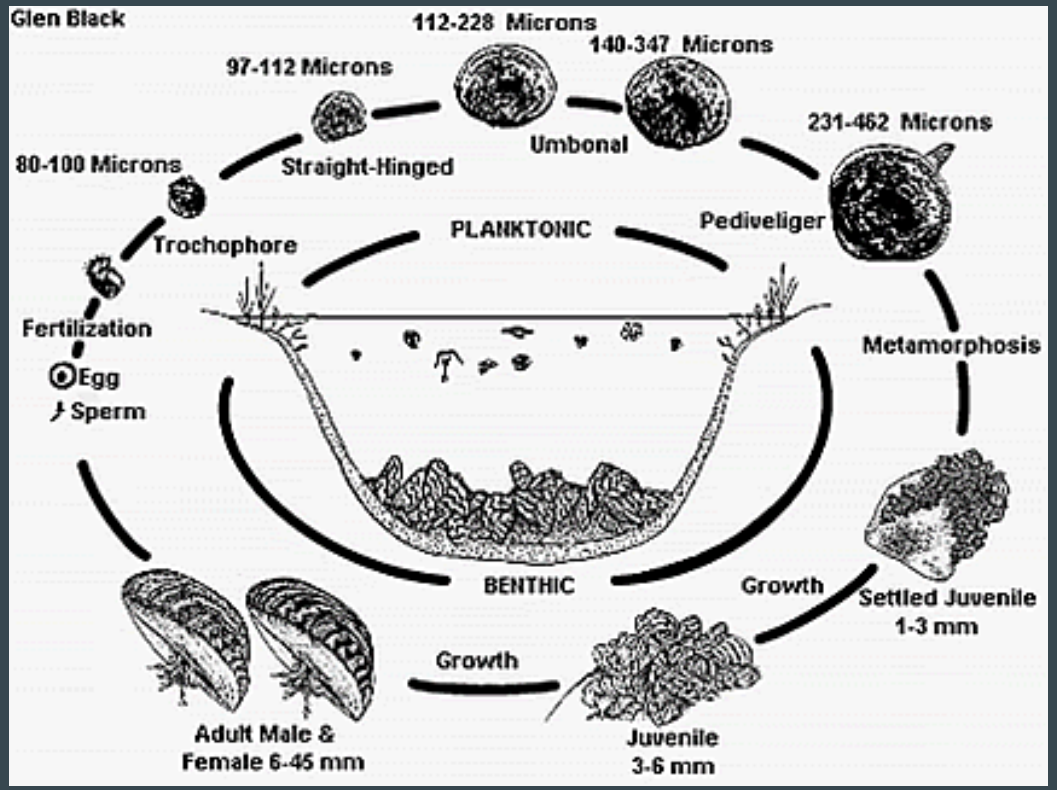
Zebra Mussel Biology

- Spawn up to 1 million eggs/year
- Larvae are microscopic and free floating for 4-8 weeks
- Juveniles settle, attach to hard surfaces (flow/turbulence inhibits)
- Lake thermocline affects survival depth (25 – 40 feet)





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Methods of Dispersal

- Barges, boats, recreational equipment
- Downstream flows
- Water transfers
- Fish / animals (birds unlikely)

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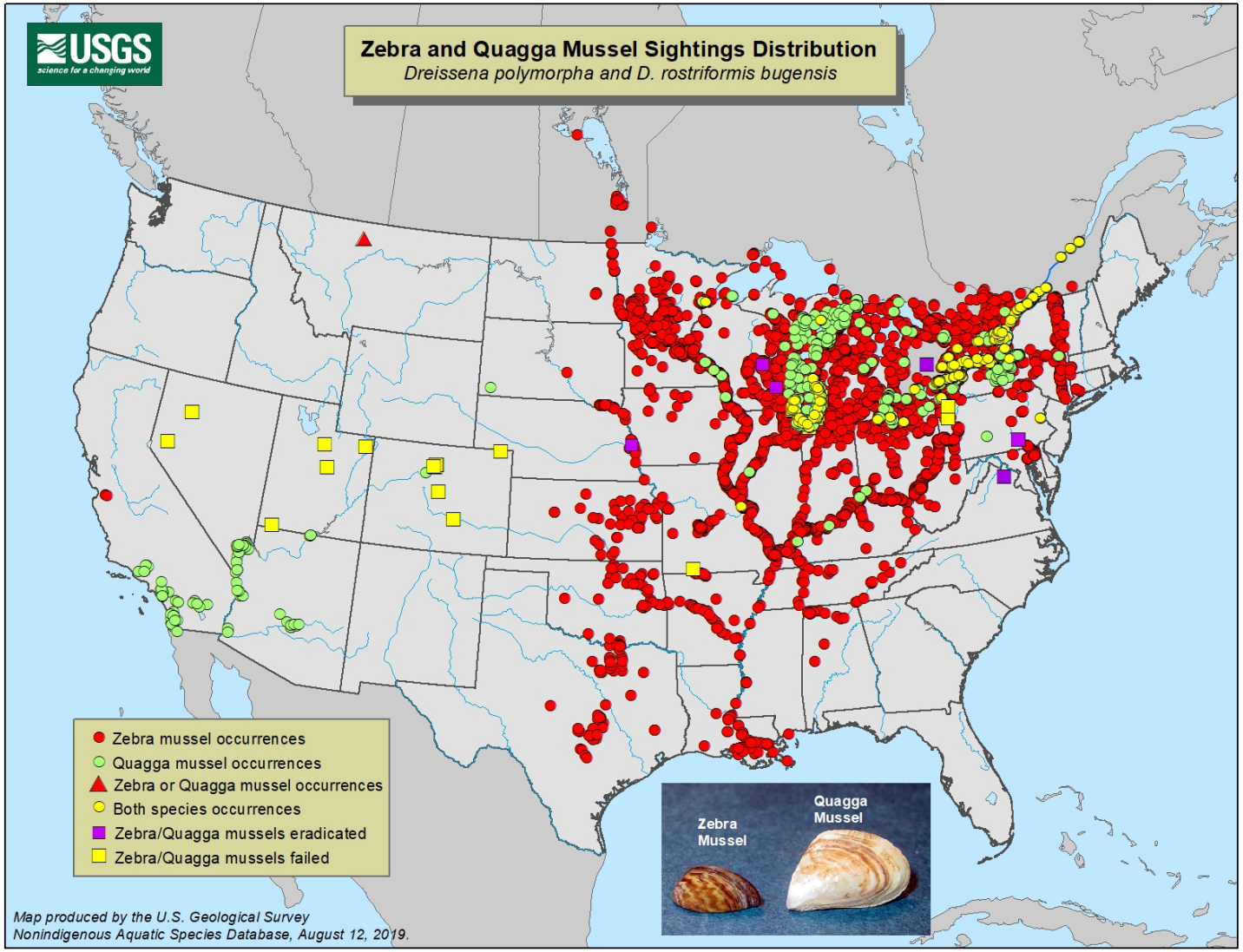
North American ZQM Distribution



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Water Body Status Classifications

Infested – established; reproducing population.

Positive – detected more than once; no evidence of reproduction (yet…)

Suspect – single detection

Inconclusive – DNA or an unverified suspect organism found in the past year

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Zebra Mussels Status Update

Infested (23 lakes, 5 river basins) – Austin, Belton, Bridgeport, Buchanan, Canyon, Dean Gilbert, Eagle Mountain, Georgetown, Granger, Grapevine, Lady Bird, Lewisville, Livingston, Lyndon B. Johnson, Marble Falls, O.H. Ivie, Pflugerville, Randell, Ray Roberts, Richland Chambers, Stillhouse Hollow, Texoma, and Travis.

Positive (7) – Dunlap, Fishing Hole, Lavon, McQueeney, Placid, Walter E. Long, and Worth; also river reaches downstream of infested lakes on the Colorado, Guadalupe, Lampasas, Leon, Little, Red, and Trinity rivers

Suspect (1) –Ray Hubbard

Inconclusive – environmental DNA has been found in a number of lakes—this is merely a caution that boaters must be extremely vigilant on prevention efforts and sampling effort should increase.

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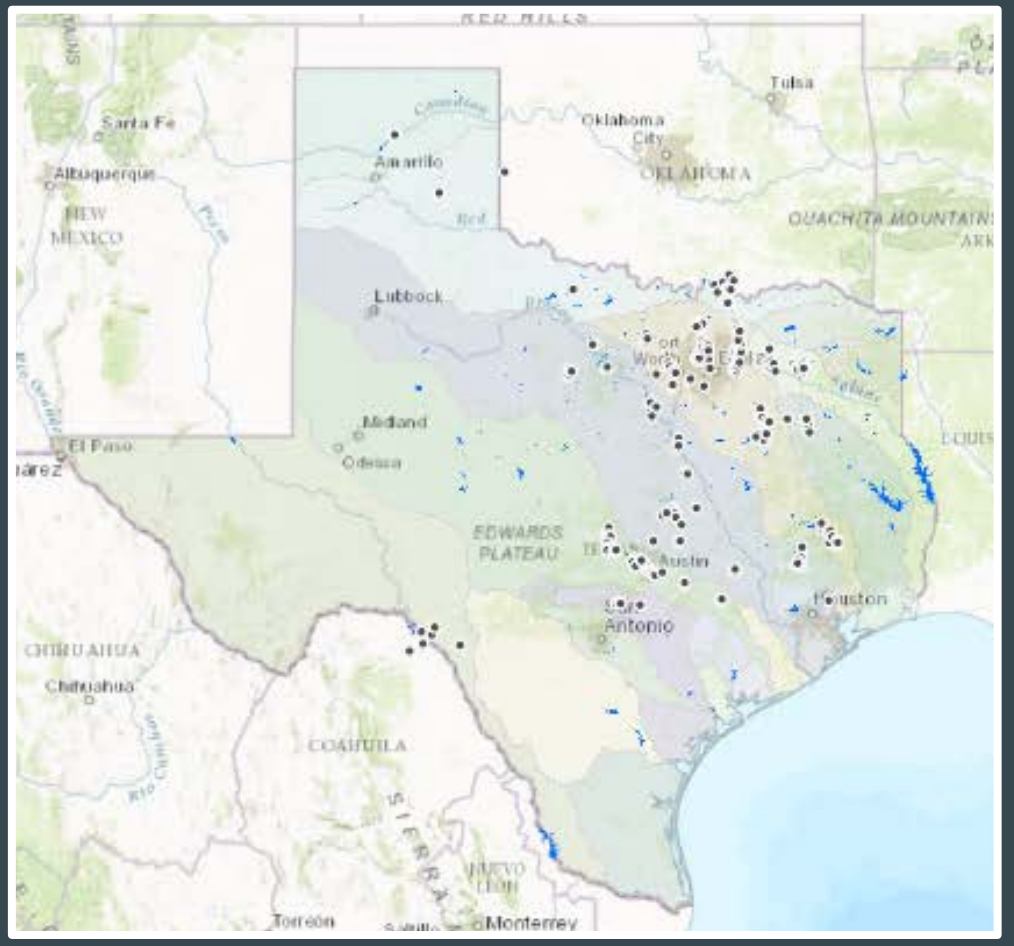
Coordinated Monitoring Efforts

>50 Water Bodies, numerous partners



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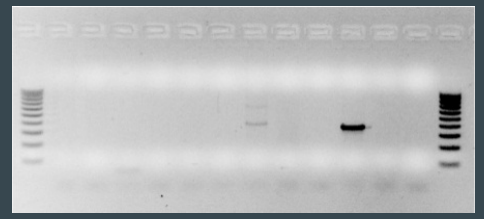
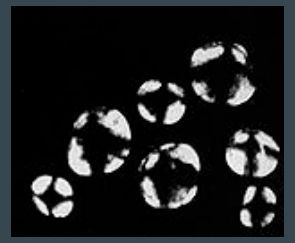
Coordinated Monitoring Efforts

- Plankton sampling (veliger larvae)
  - Twice per year – May/June, Oct/Nov
  - Water temperatures ~ 64 - 77˚F (18 - 25 ˚C)
  - Analysis
    - Microscopy (CPLM / LM)
    - eDNA (PCR)





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Coordinated Monitoring Efforts

- Settlement Samplers (juveniles/adults)
- ‘Rock Kick’ Substrate Surveys (juveniles/adults)

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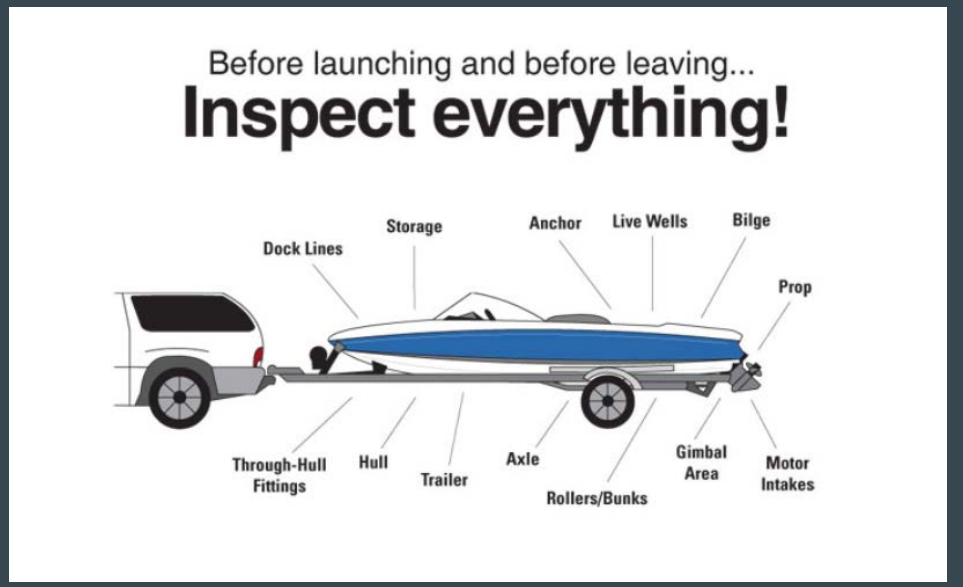
Lake Waco Zebra Mussel Efforts/Partnerships

- **Lake Waco outreach and response plan**
  - **Prevention** – boat inspections and public awareness (TPWD, USACOE, City of Waco, Marina owners)
  - **Detection** – settlement samplers, shoreline surveys, plankton samples and marina inspections (TPWD, City of Waco, Baylor University)
  - **Response** – ID treatment and mitigation options, purchase equipment and materials, implement (TPWD, USACOE, City of Waco)

Prevention

Clean, Drain, and Dry

- Clean – remove all mud, plants, and other debris from boat and gear including the anchor and anchor line.
- Drain – drain all water from compartments on the boat and the motor—raise and lower the motor to drain fully.
- Dry – leave all compartments open, lay anything that has come in contact with lake water out to dry



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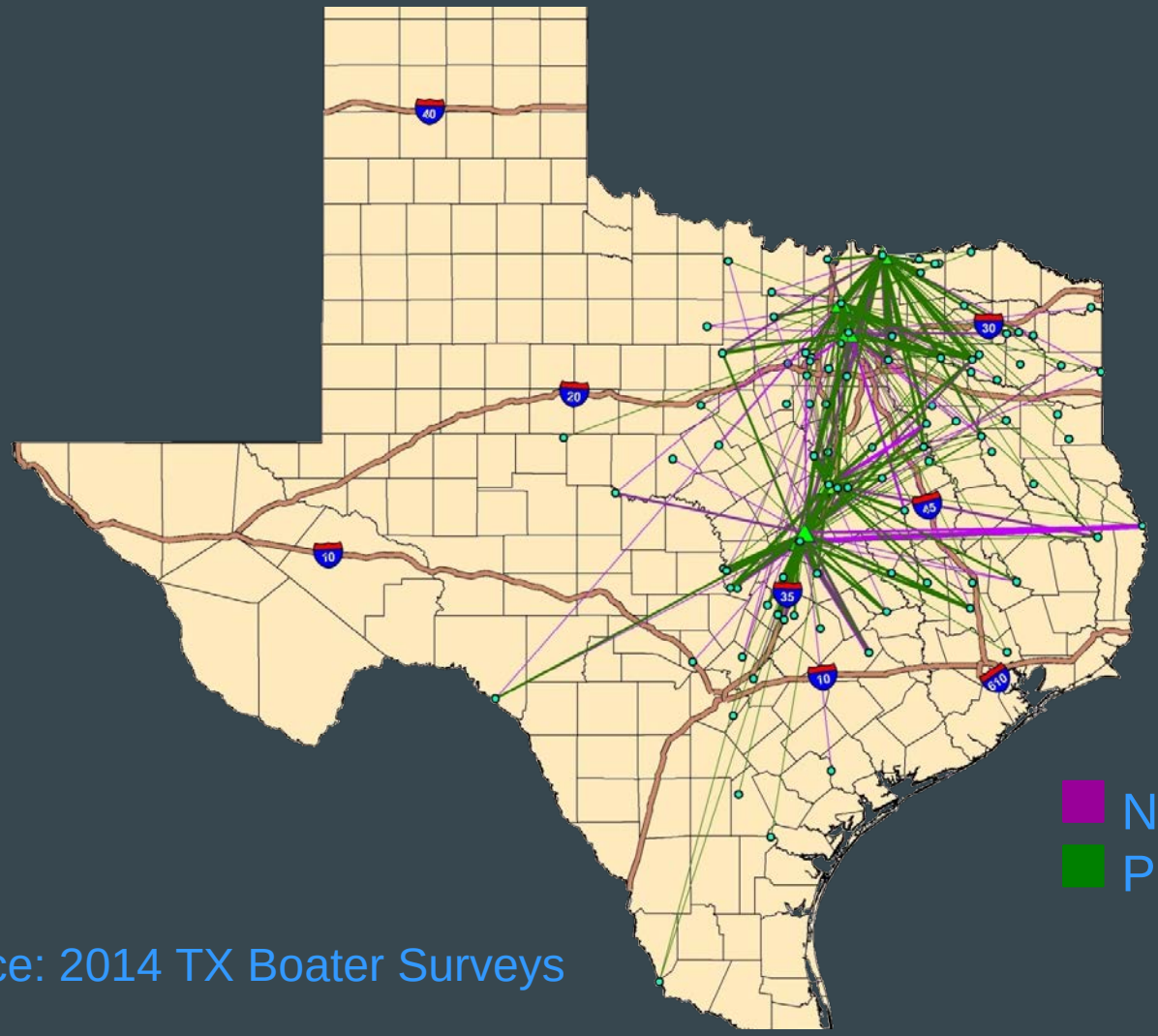
Prevention

Zebra Mussel Risk Factors: Overland Transport



Next 30 days
Previous 30 days

Source: 2014 TX Boater Surveys

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Detection

- **Sept 26, 2014 zebra mussels first documented at a private Country Club boat ramp – not a ramp where boat inspectors had been working**
- **Sept 29 & 30, 2014 TPWD conducted additional surveys – adult zebra mussels only found on and adjacent to the private boat ramp**

Response

- Additional surveys, including those by scuba divers, only revealed zebra mussels near the private boat ramp
- Oct 3, 2014 City of Waco, USACE and TPWD personnel met to discuss the introduction and possible treatment options
- Chemical treatments were dismissed due to it being a drinking water source and the amount of time it would take to get the necessary permits
- Decided to try covering the area with heavy tarpaulins to suffocate or starve them

Response

- Obtained National Permit 18 from the USACOE
- 9 tarps were ordered with a delivery of Oct 20, 2014
- Tarps were 30 mil polyvinylchloride, measured 150’ X 35’ and weighed roughly 950 lbs each
- Oct 21, 2014 staff from the City, TPWD and USACOE began placing the tarps over the football field sized area and finished the job on Oct 23

Response

- Tarps were unrolled manually and pulled into place by using two boats. Tarps were overlapped by 5-7 feet to help ensure complete coverage
- Commercial divers helped install the tarps
- Roughly 2,000 sandbags were used to secure the tarps

Response

- March 17-19, 2015 Tarps were removed
- Heavy equipment was used to pull the tarps out of the water
- Anoxic conditions appeared to have been achieved over much of the area

Prevention/Detection

- After 5 years of sampling twice per year, no zebra mussel larvae, adults or DNA have been detected.
- Lake Waco zebra mussel status is now “undetected/negative”
- Important to remember that this was a localized infestation of adults only, and no reproduction was detected. Zebra mussel positive, but not yet infested.
- In most situations, the reservoir is already infested when adult zebra mussels are detected.
- Prevention and Detection efforts still ongoing.

Summary points

- Prevention and detection efforts remain the most effective way to slow the spread of Zebra Mussels.
- Partnerships are vital to those efforts.
- Success stories like Lake Waco are extremely rare. Early detection is key.
- Once one reservoir in a watershed is infested, downstream reservoirs are next.


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North Central Texas Council of Governments Webinar

Thank you for attending!

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