Texas Zebra Mussel Monitoring Efforts

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LCRA Clean Rivers Program:
Mid-Central Water Quality Advisory Committee
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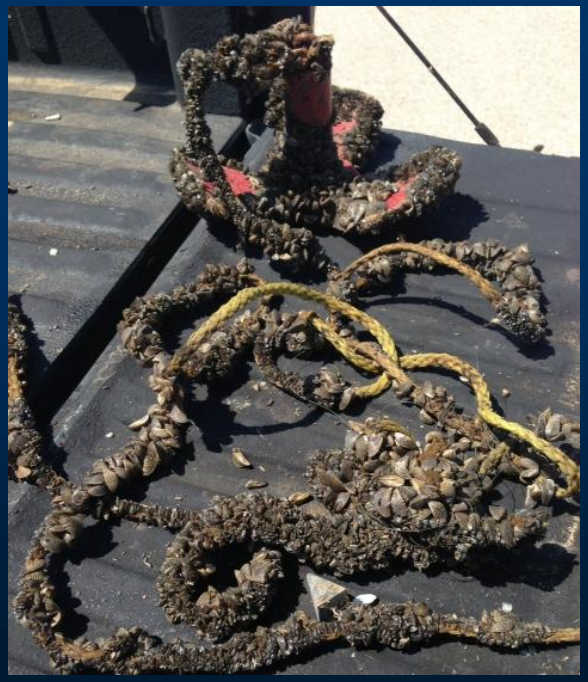
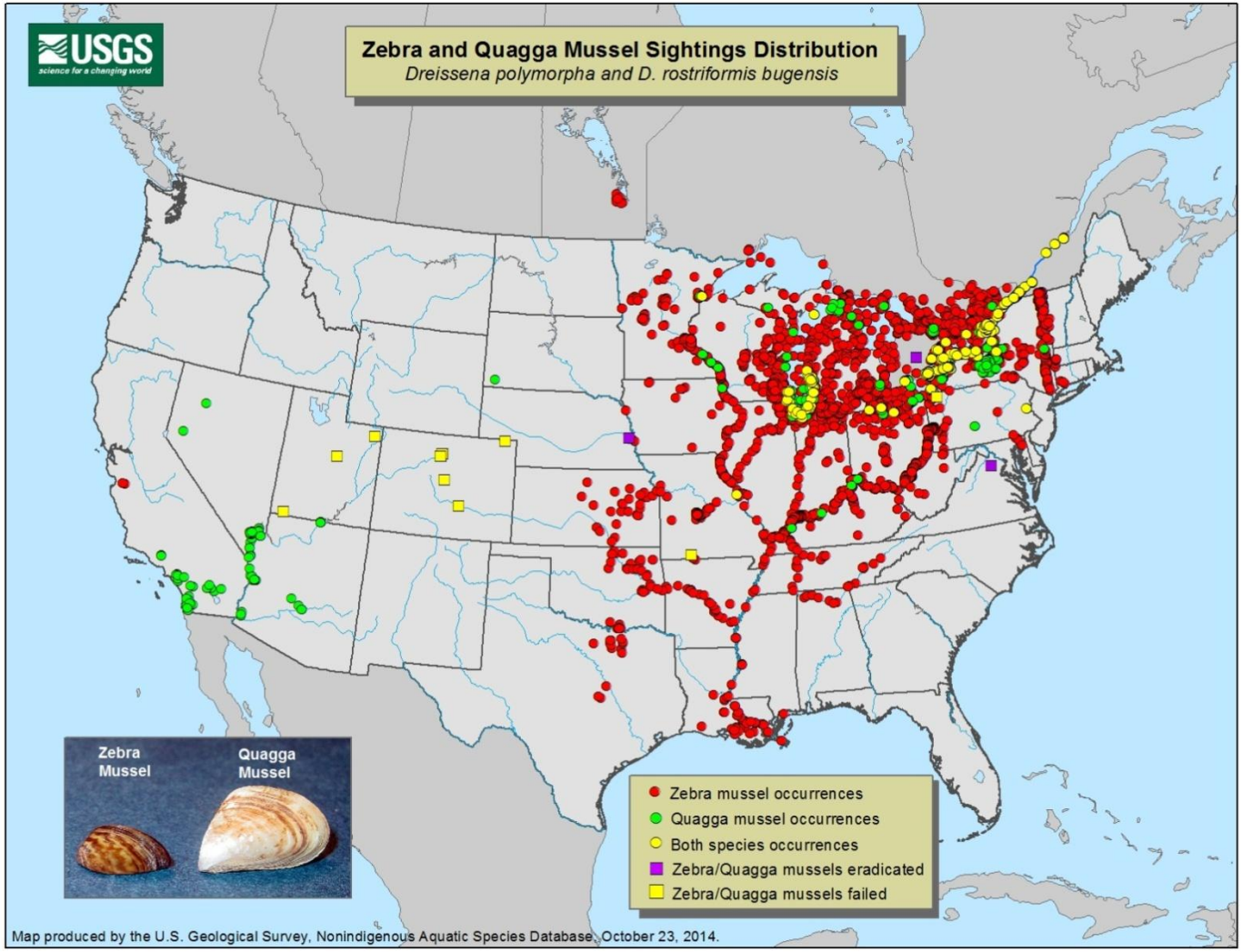
Historical Perspective

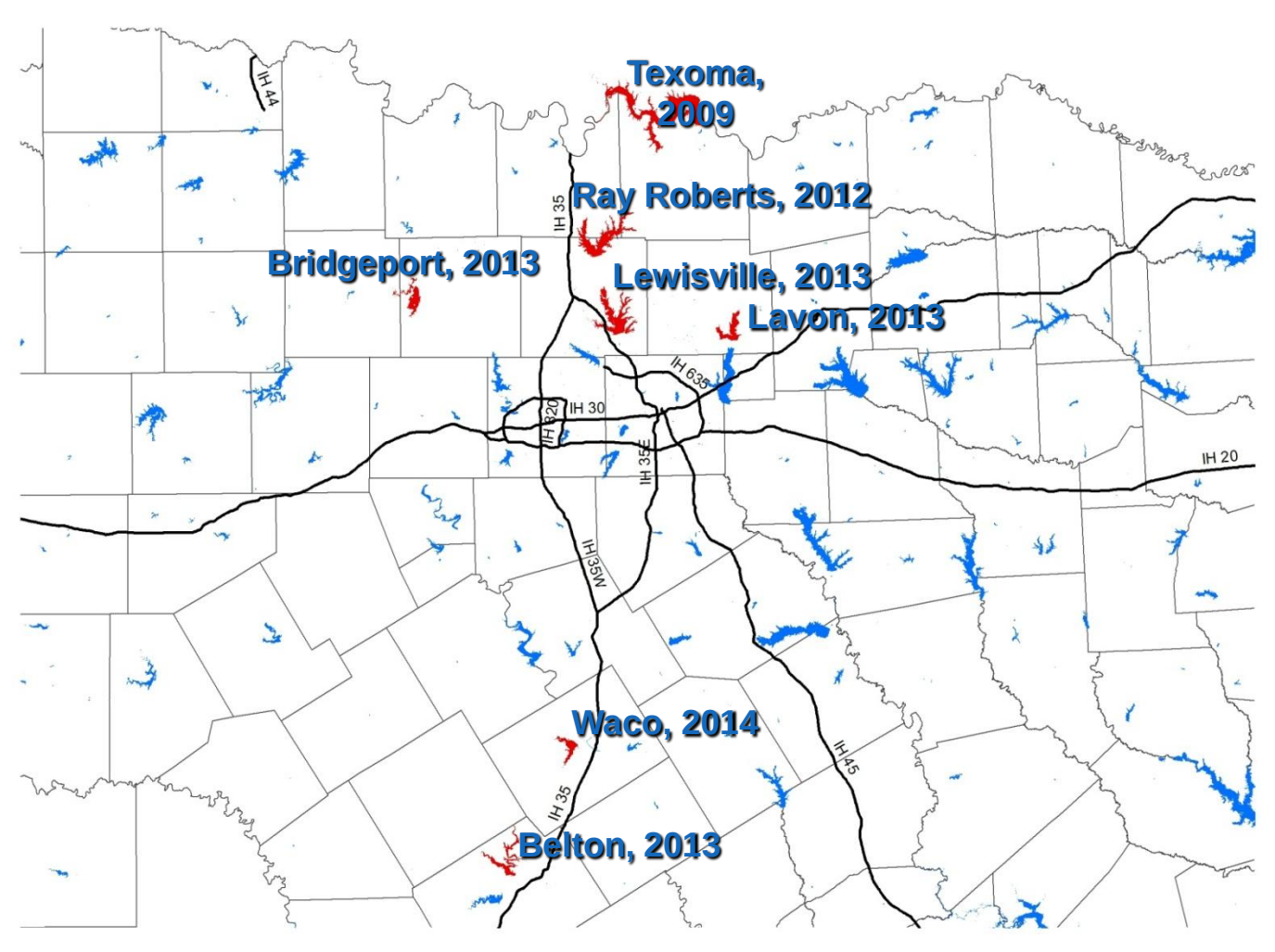
- Zebra Mussels are native to Eurasia
- 1988 - discovered in Lake St. Clair
- Invasion pathway - ocean-going vessels



Current Distribution: North America



Current Distribution: Texas

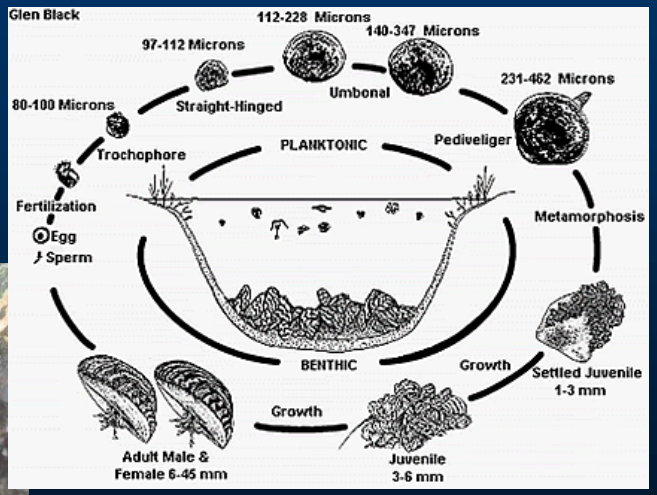


Zebra Mussel Impacts

- Economic
- Ecological
- Recreational

Zebra Mussel Biology

- Microscopic, free-floating larvae
- Juveniles settle, attach to hard surfaces
- Highly efficient filter feeders
- Densities ≥ 700,000/m^2 have been reported
- Tolerate a wide range of conditions
- Survive out of water for days even weeks



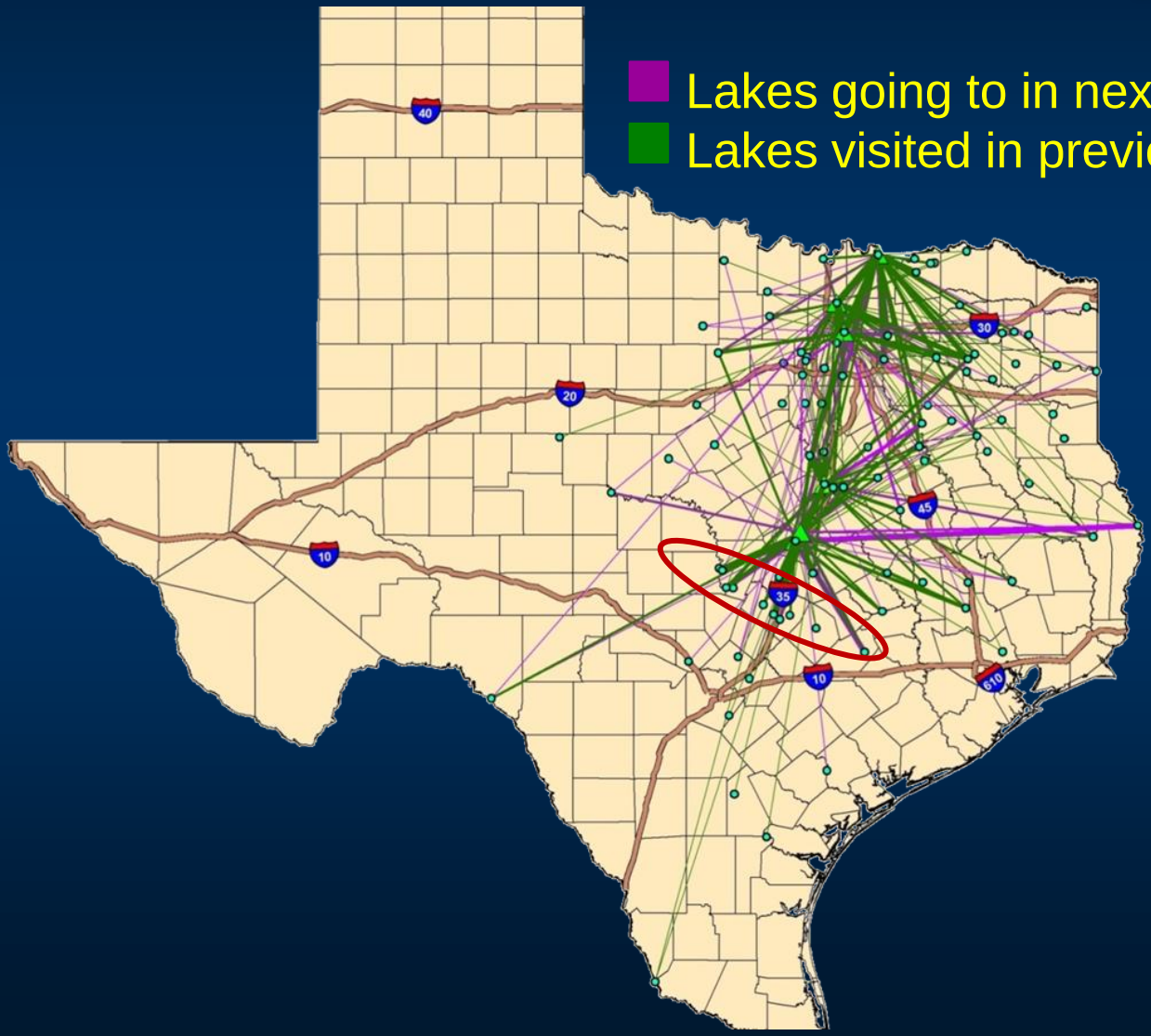
Zebra Mussel Risk Factors

Risk assessment parameters for zebra mussel invasion of Texas and other southwestern United States water bodies.

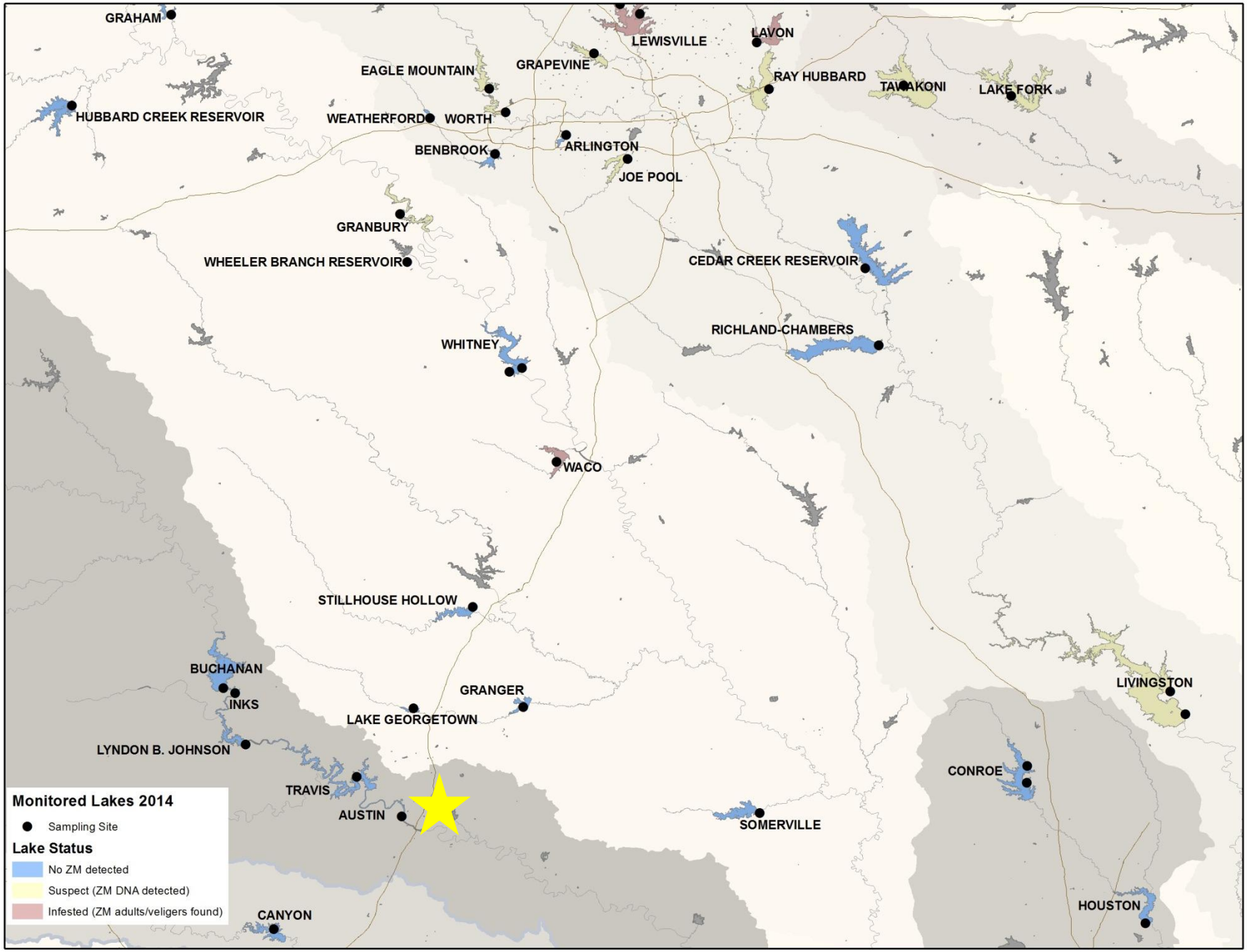
Physical Parameter	Unsuitable	Marginal	Suitable
Average August Water Temperature	**>32° C (>90° F)**	31-32° C (88-90° F)	<31° C (<88° F)
pH	<6.8 or >9.5	6.8-7.4	7.4-9.5
Calcium Ion Concentration	**<12 mg L^{-1}**	12-28 mg L^{-1}	>28 mg L^{-1}
Dissolved Oxygen as % of Air O_2 Saturation	<30% O_2	30-50% O_2	>50% O_2

Chart courtesy of Dr. Bob McMahon, UT-A (article in press)

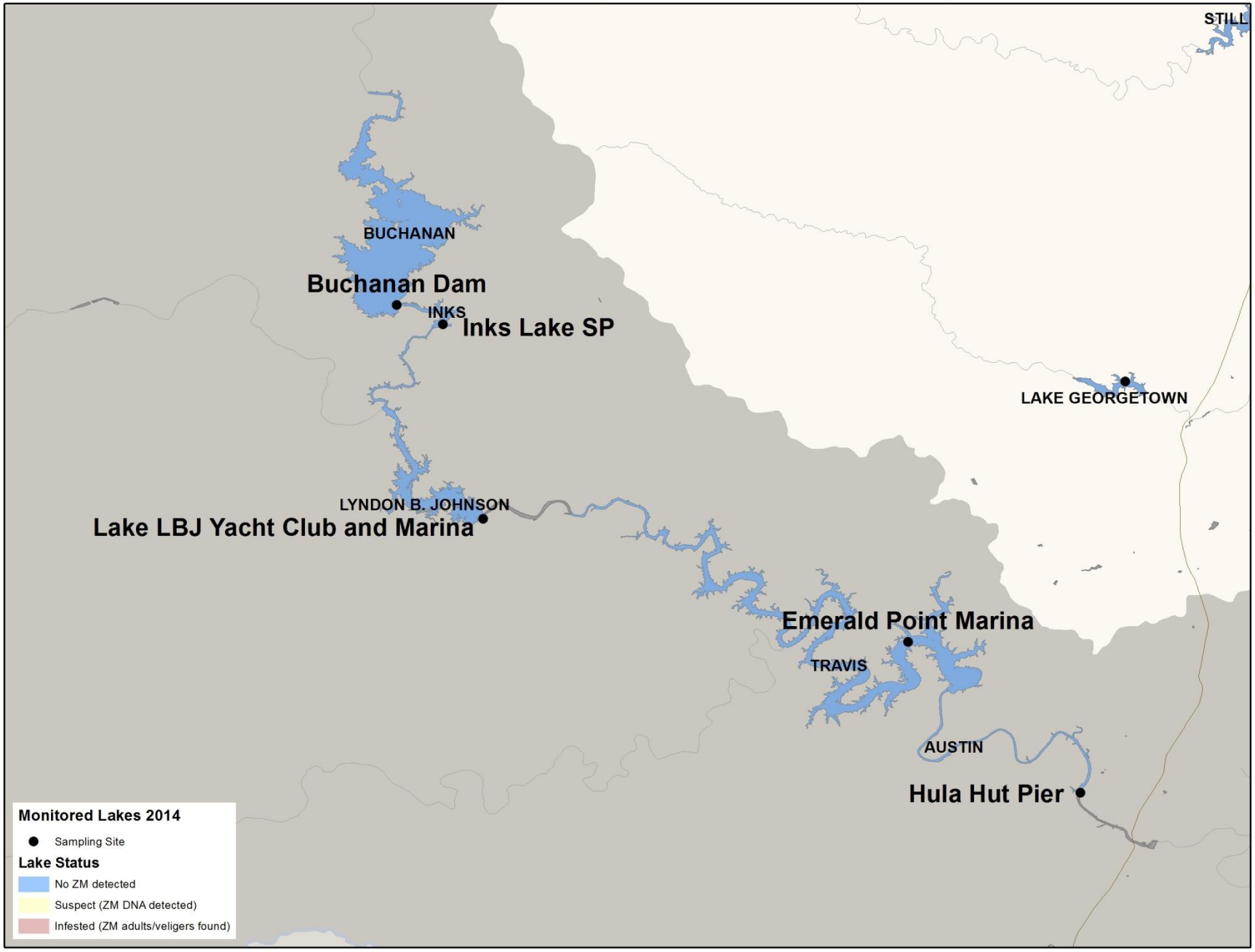
Zebra Mussel Risk Factors: 2014 Boater Surveys



2014 TPWD Statewide ZM Monitoring (33 Lakes)

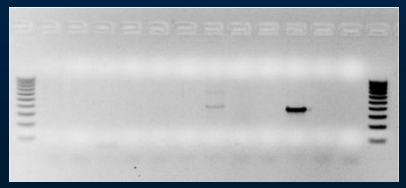


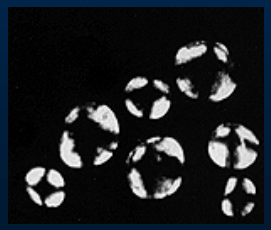
TPWD Statewide ZM Monitoring: Colorado River Basin (5 lakes)



TPWD 2014 Monitoring

- Sites:
  - Management / Habitat Conservation (33 lakes)
  - Hatchery intakes
- Sampling efforts:
  - Plankton sampling (1,000 liters x 2)
    - Microscopy (CPLM / LM)
    - DNA (PCR)
  - Settlement samplers
- Plankton sampling timing:
  - Twice per year – May/June, Oct/Nov
  - Water temperatures ~ 64 - 77° F (18 - 25° C)



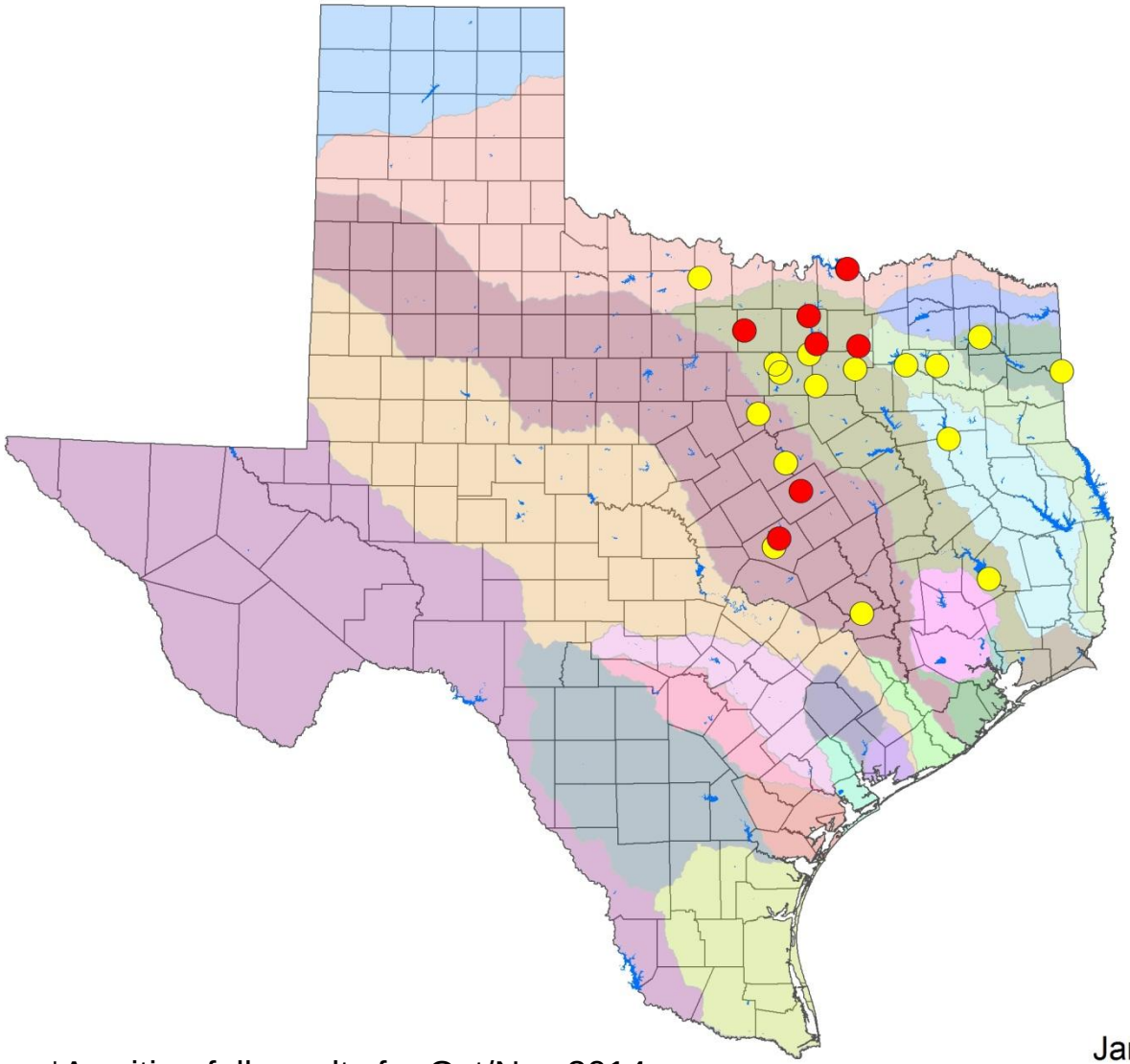


Zebra Mussel Status as of January 2015 *

- Zebra mussels (adults/veligers) found (7) - Belton, Bridgeport, Lavon, Lewisville, Ray Roberts, Texoma, Waco
- Zebra mussel DNA detected (16) - Arrowhead, Bob Sandlin, Caddo, Eagle Mt., Fork, Granbury, Grapevine, Joe Pool, Livingston, Palestine, Ray Hubbard, Somerville, Stillhouse Hollow, Tawakoni, Whitney, Worth

River Basin

- Brazos
- Brazos-Colorado
- Canadian
- Colorado
- Colorado-Lavaca
- Cypress
- Guadalupe
- Lavaca
- Lavaca-Guadalupe
- Neches
- Neches-Trinity
- Nueces
- Nueces-Rio Grande
- Red
- Rio Grande
- Sabine
- San Antonio
- San Antonio-Nueces
- San Jacinto
- San Jacinto-Brazos
- Sulphur
- Trinity
- Trinity-San Jacinto

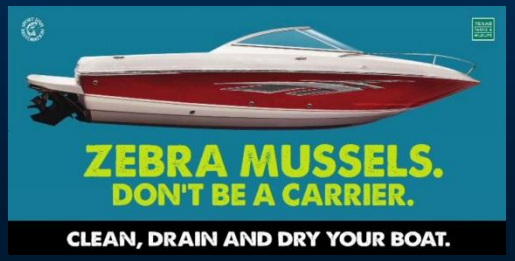


January 9, 2015

*Awaiting full results for Oct/Nov 2014

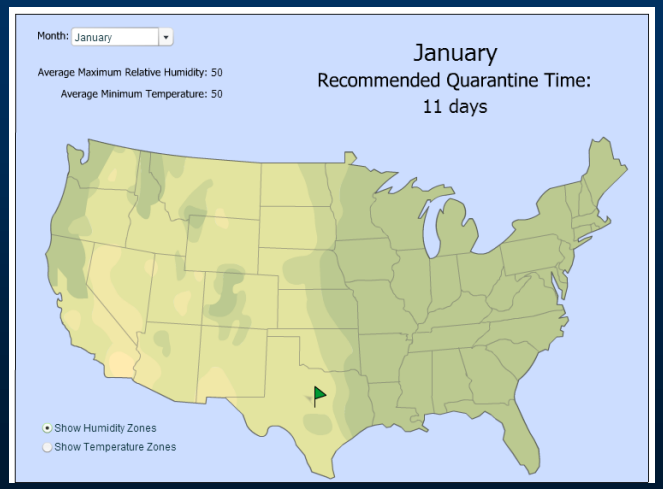
TPWD 2015 Efforts

- Reevaluate monitoring site selection
  - 2014 boater survey data
  - risk assessment
  - “suspect” lakes
  - high-risk lakes
- Coordinate partner sampling efforts
- Collect additional data
  - Surveys
  - Temperature data loggers
- Continue partner outreach campaign



Prevention: Methods

- Clean, Drain, Dry—all boats
- Decontamination—high-risk vessels
  - High Pressure, 140° F water (not bleach)
  - Clean hull/crevices, flush motor & intakes
  - Drying time calculator tool: http://www.100thmeridian.org/emersion.asp



Prevention: Infested Boats

- Report intercepted infested boats to TPWD
- Coordinate prior to receiving high-risk boat from a marina on infested lake
- Central TPWD point of contact:
  - Operation Game Thief: (800) 792-4263

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Questions?