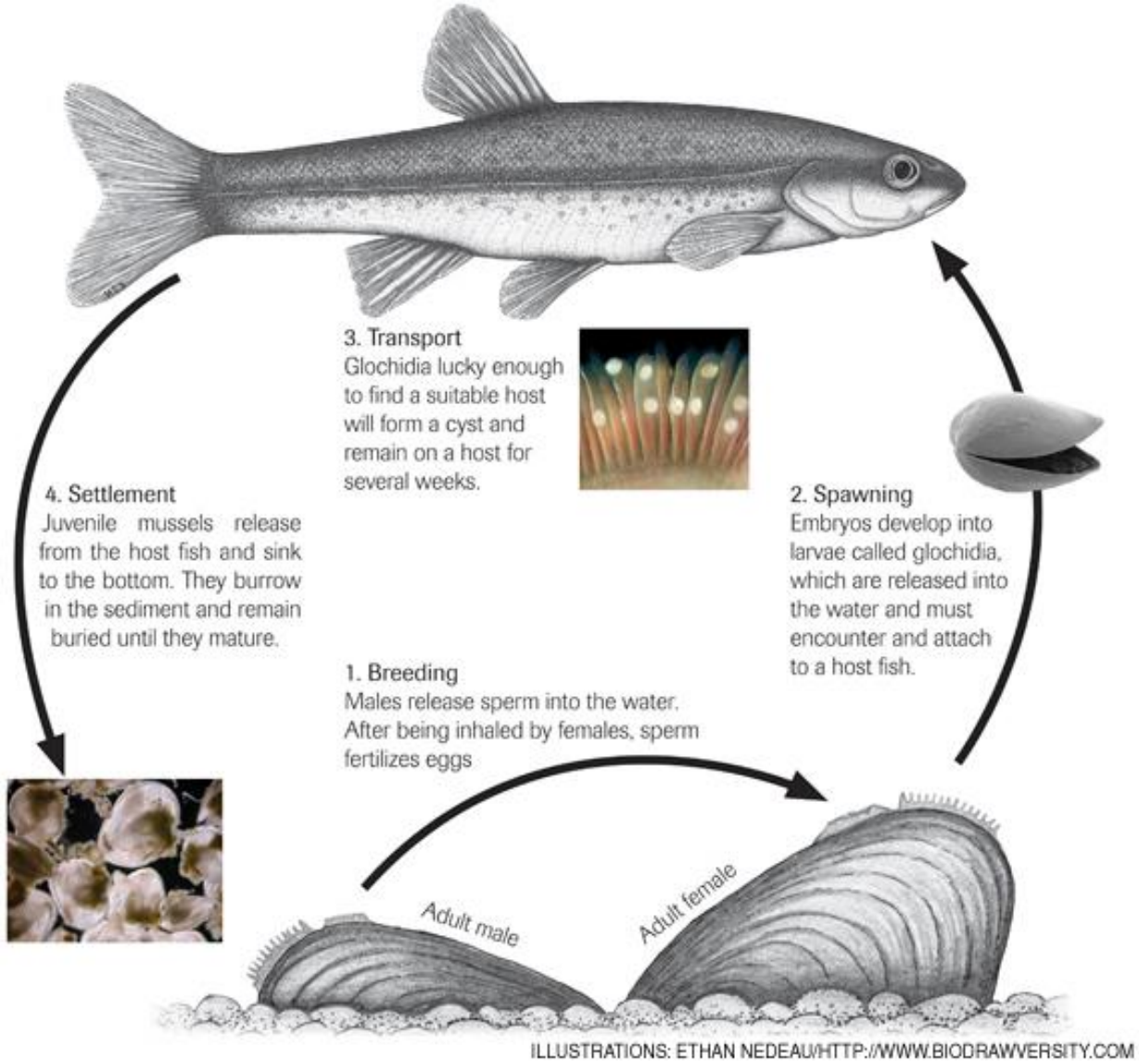
TCEQ Freshwater Mussel Monitoring

Lauren Pulliam
Surface Water Quality Monitoring
Texas Commission on Environmental Quality

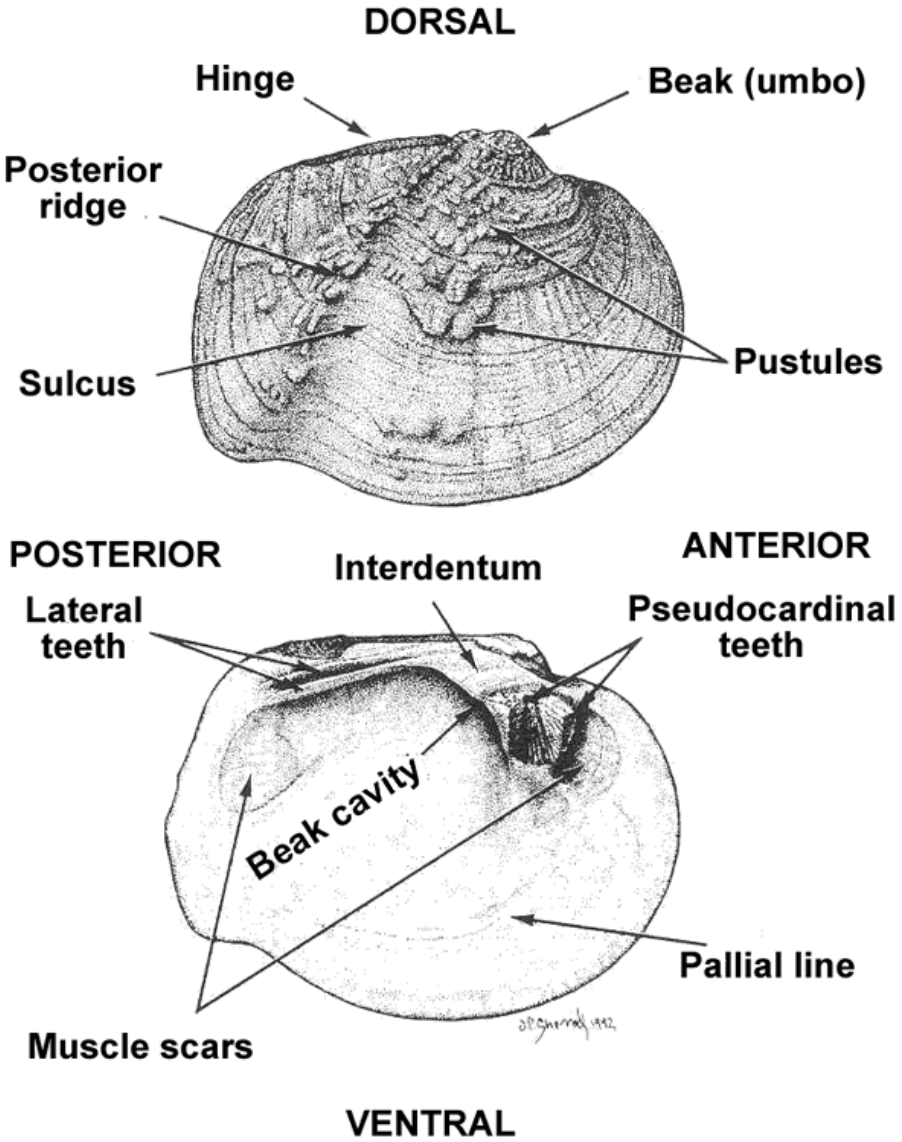
Freshwater Mussels

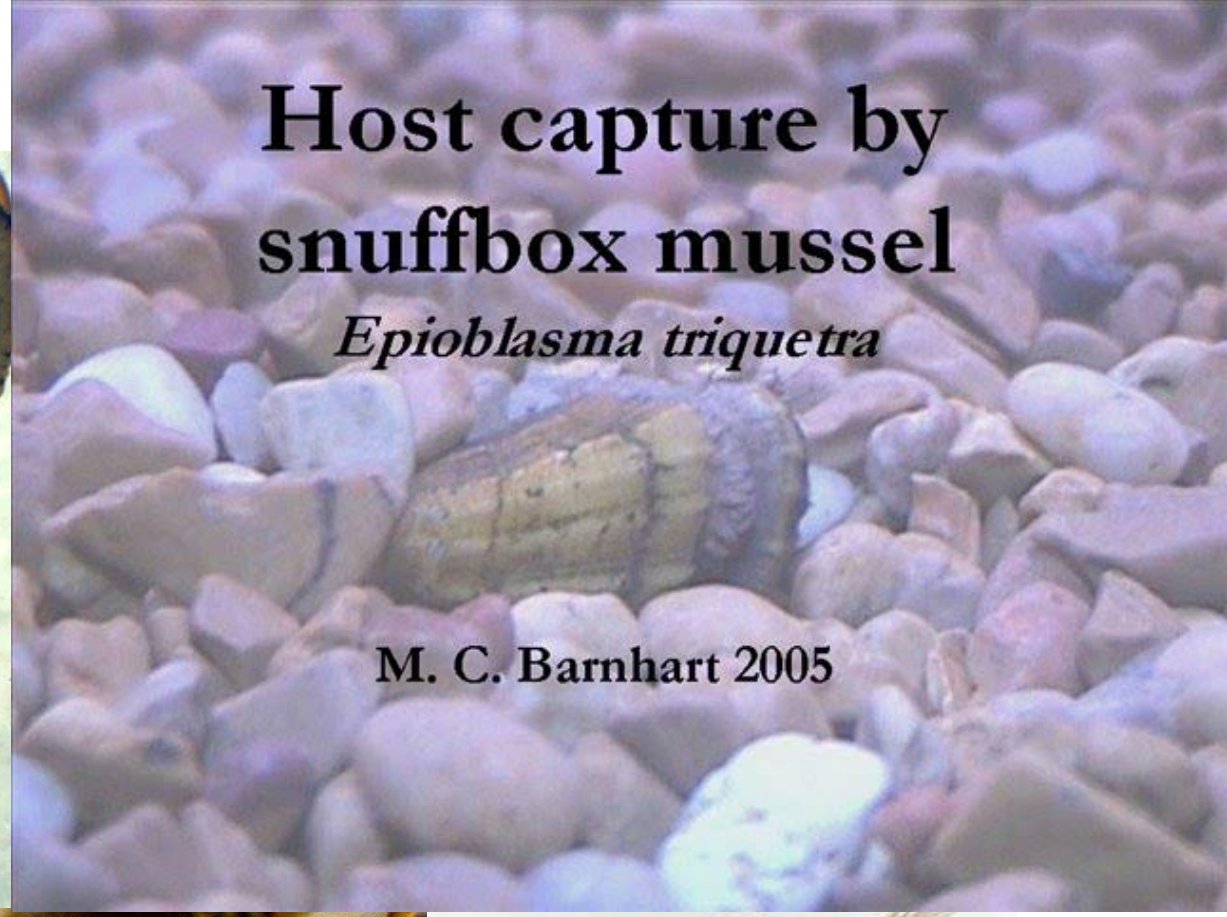
- Highest freshwater mussel diversity in NA (~300 species)
- ~52 species in Texas
- Importance:
  - food source for fish, mammals, and birds
  - contribute to nutrient cycling (filtering, burrowing)
  - shells provide habitat for benthic organisms
  - dense mussel beds stabilize substrates
  - bioindicators
- Most imperiled aquatic taxa in North America

Mussel Morphology and Life History



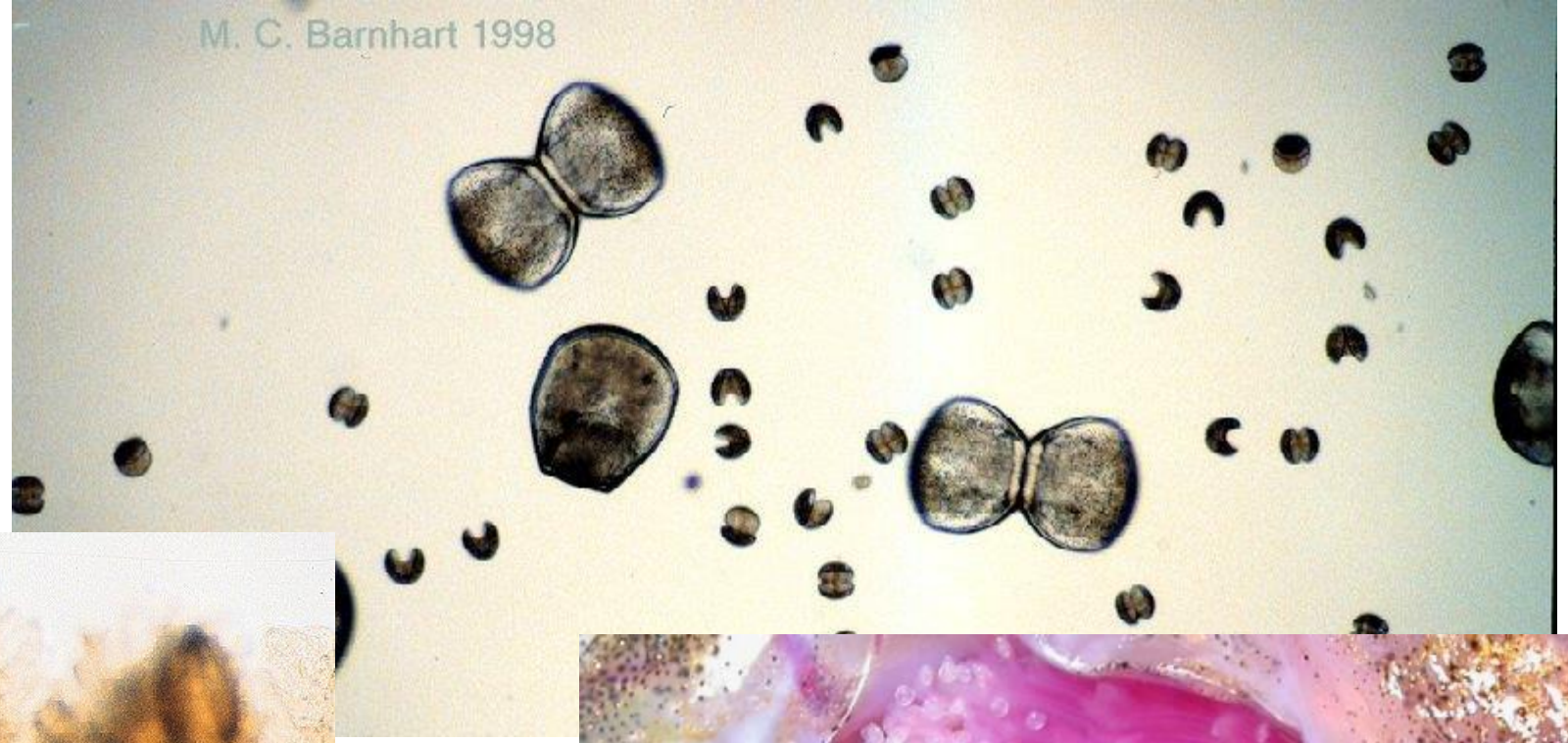
Life cycle of a typical freshwater mussel.





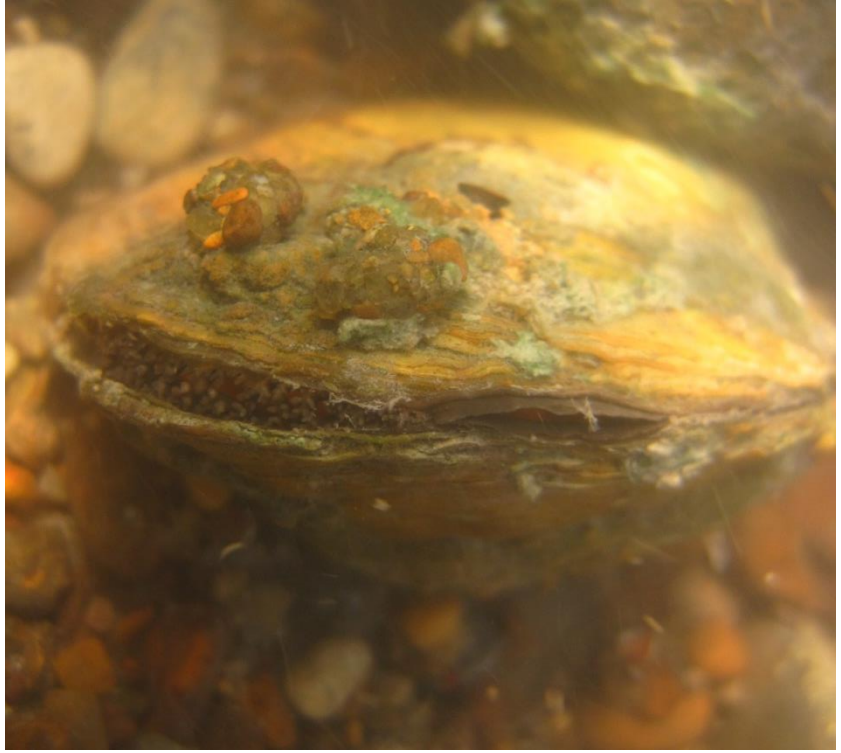
Barnhart, M. C. 2008. Unio Gallery: http://unionid.missouristate.edu.

Freshwater Mussel Glochidia



Freshwater Mussel Habitats

- Variable habitat preferences
  - Riffles, runs, backwaters
  - Stable mud, sand, gravel
- Function of:
  - Flow conditions
  - Substrate
  - Temperature
  - Water quality



Freshwater Mussel Sampling Designs and Collection Methods

Designs:

- Complete coverage, qualitative, quantitative

Methods:

- Tactile, visual, snorkel, SCUBA

Evidence of Mussel Beds

Sampling Hazards

Status of TCEQ Mussel Monitoring

- Draft protocol under development
  - TPWD/TCEQ Interagency Bioassessment Workgroup
  - SWQM Procedures Manual Vol. 2
    - Existing visual protocol
    - Protocol needed for live mussels
- FW Mussel Parameter Codes in SWQMIS database
- Future biological training events to include mussel monitoring

Draft SWQM Mussel Monitoring Protocol

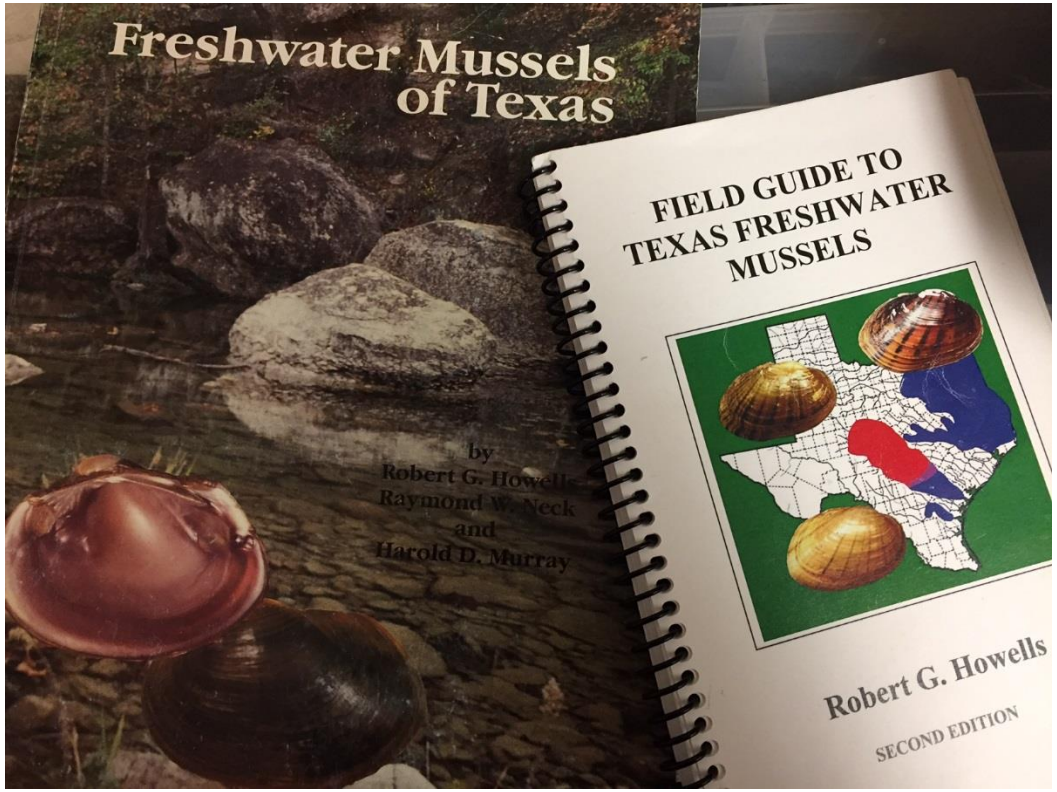
- Pilot study to test protocol at 5-10 sites in FY2017
  - QAP in progress
- Collecting:
  - mussel assemblage and habitat data
    - Live mussels (photo vouchers)
    - Dead mussels (retain shells and record shell condition)
    - Habitat and substrate type, survey area
  - instantaneous flow
  - field parameters
  - conventional water quality
  - physical habitat data
- Protocol will be revised and added to SWQM Procedures Volume 2

Draft SWQM Mussel Monitoring Protocol

- Qualitative timed search
  - Species presence
  - Species richness
- Survey area
  - Physical Habitat Assessment reach
  - Downstream → upstream
  - Wadeable streams only
- **5 person hour minimum** in all available habitats
  - with 4 person field crew, five 15-minute search periods = 5 person hours (75 minutes total survey time)
- Survey period April-November
- Combination of tactile, visual, snorkel collection

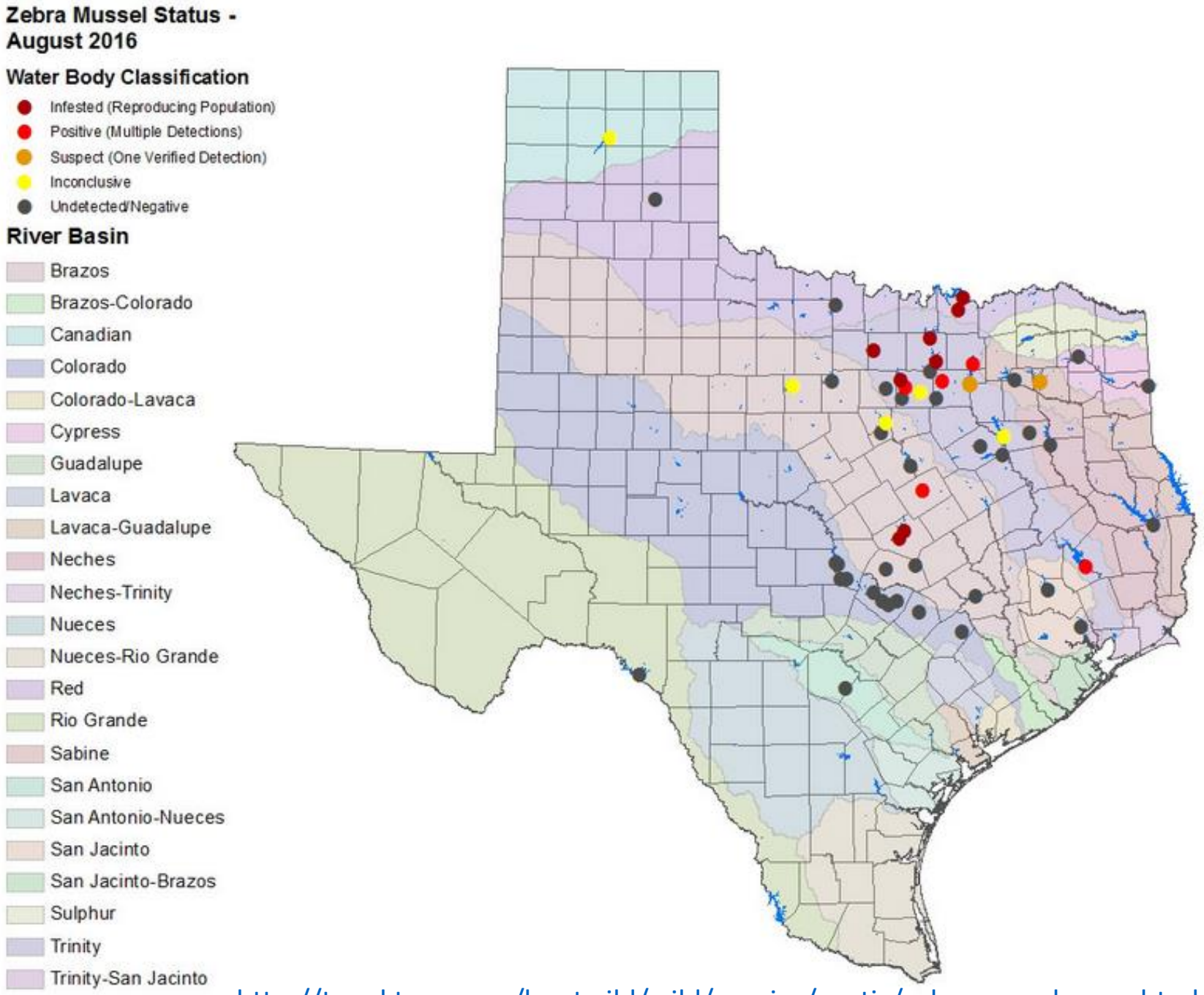
Prior to Sampling…

- Review historical data:
  - Mussel surveys & distribution (TPWD TX Natural Diversity Database, survey reports, publications, regional malacologists)
  - Water quality & flow
- Equipment:
  - Mask/snorkel
  - Gloves
  - Sieve buckets/mesh bags
  - Identification guides
  - Field datasheets
  - Ruler
  - Handheld GPS unit
  - Digital camera
  - Wetsuit & weight belt
  - Aquascope



Zebra Mussel Decontamination

- SWQM Procedures Manual update:
  - Examine equipment and remove visible plants and animals
  - Drain all water from boat
  - Dry boat and trailer for at least one week
  - Wash boat, motor, and trailer with high-pressure, hot (140°F) water for several minutes
- What methods are currently in use?



http://tpwd.texas.gov/huntwild/wild/species/exotic/zebramusselmap.phtml

Questions

Contact Information:

Lauren Pulliam

TCEQ Surface Water Quality Monitoring Team

lauren.pulliam@tceq.texas.gov

512-239-4597

Field Day Groups and Teams

Bass (Group 1)				Catfish (Group 2)			
Guadalupe	Striped	Spotted	Smallmouth	Blue	Channel	Madtom	Bullhead
Brian Sims	Justin Cortes	Erin Moran	Andres Garcia	Jenna Olsen	Rachel Fields	Brandon Byler	Jerry Wiegreffe
Alex Smith	Dave Bass	Chad Kinsfather	John Martin	Douge Knabe	Jason Woods	Karen Sablan	Kelly McKnight
Kayla Rohrbach	Jose Martinez	Scott Griffith	Angela Kirkpatrick	Chris Pearson	Ross Morgan	Hilary Cosby	Elizabeth Kompanik
Kirk Fleener	Wilson Snyder	Lauren Parish	Chris Caudle	Alma Duarte	Doug Robinson	Lythia Metzmeier	Elsa Hull
Veronica Guerrero	Jay Halepeska	Daniele Baker	Ed Ragsdale	Cathy Anderson	Adam Whisenant	Chris Friesenhahn	Andrew Sullivan
Tom Heitman	Mokles Rahman	Terra Lindgren	Dan Burke	Drucilla Meirer	Terry Schertz	Faith Hambleton	Melissa Keller
		Levi Sparks					

Bugs (Group 3)				Mussels (Group 4)			
Dragonflies	Mayflies	Stoneflies	Beetles	Fatmuckets	Lilliputs	Bankclimbers	Pistolgrips
Hannah Lucia	Sam Sugarek	Luke Sanders	Sarah Eagle	Leah McIntosh	Randi Belz	Lauren Willis	Will Merrell
Rodi Rodibaugh	James Knightstep	Addison Stuckey	John Gallagher	Dave Cowan	Russell Bond	Mike Buttram	Shellie McCumber
Leslie Grijalva	Julie White	Chris Dziuk	Ken Crane	Cliff Moore	Robert Speight	Chris Podzemny	Scott McWilliams
Mike Vanbuskirk	Stacey Carr	Bill Ross	Chuck Brown	Robin Pugh	Richard Baetz	Gerry Arrambide	Brad Monk
Neri De La Garza	Jill Csekitz	Anne Rogers	Lyanne Lara	Robby Ozment	Rodney Adams	Lisa Marshall	Pat Bohannon
Amir Poursamadi	Jason Godeaux		Laura Ryckman	Chuck Dvorsky	Ray Everitt	Marty Kelly	Sarah Kirkland
			Tara Bushnoe		Travis Linscomb		