



Freshwater Mussels in Austin, Texas

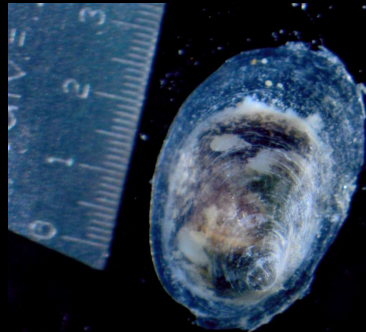
Liz Johnston
Texas Water Webinar
June 18, 2019



What They Are Not: Gastropods and Other Bivalves



Non-native Asian clam (*Corbicula*)



Limpet (*Ferrissia*)



Aquatic Snail (*Elimia*)



Zebra Mussels (*Dreissena*)



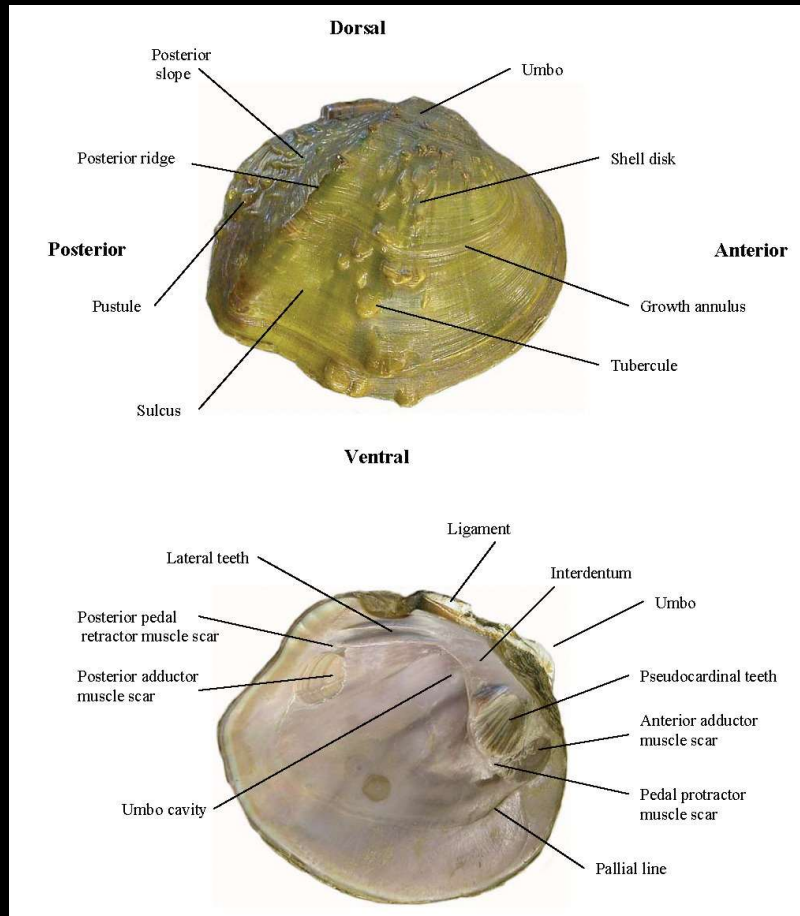
Pacific Blue Mussels



Dinner

Native Unionid Mussels

Living Rocks



Ecological Benefits: River's Liver

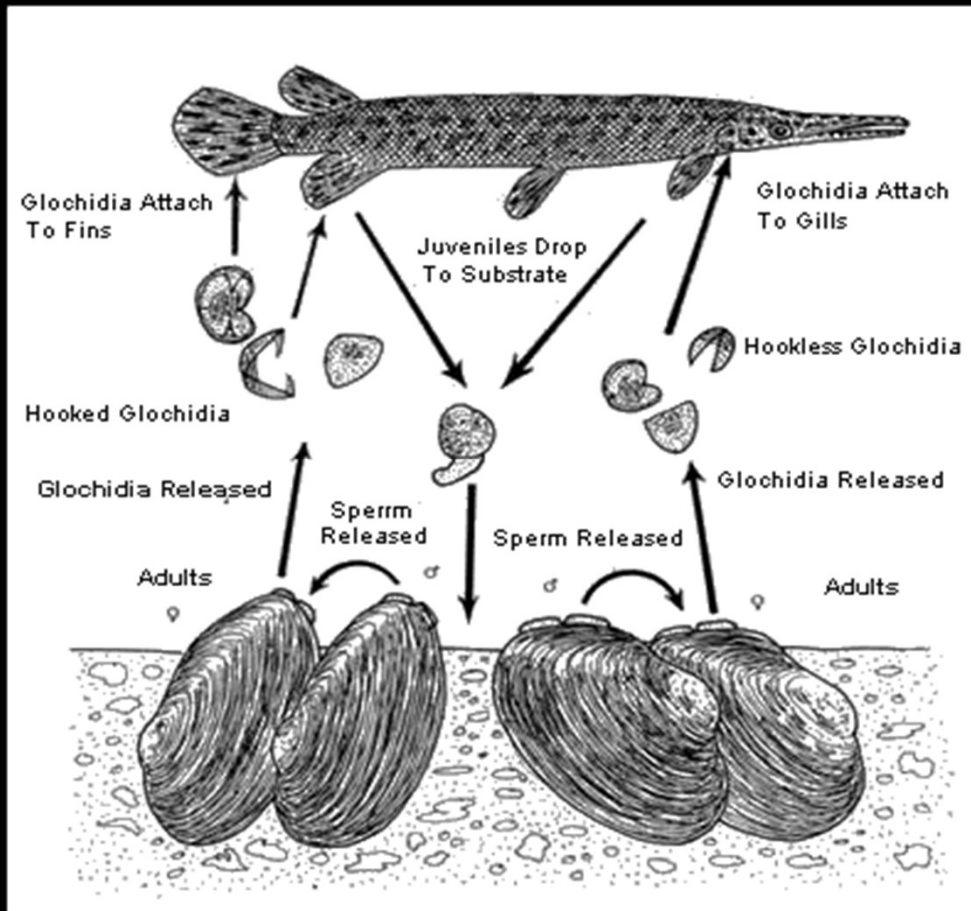


- Increase Water Clarity
- Stream Bottom Stabilization
- Food
- Habitat
- Indicators of Stream Health (Canary in the Coal Mine)



Complicated Life Cycle

Fish Hosts



https://tpwd.texas.gov/huntwild/wild/wildlife_diversity/texas_nature_trackers/mussel/biology/

Mantle Lures



Chris Barnhart



Joel Sartore, National Geographic Photo Ark

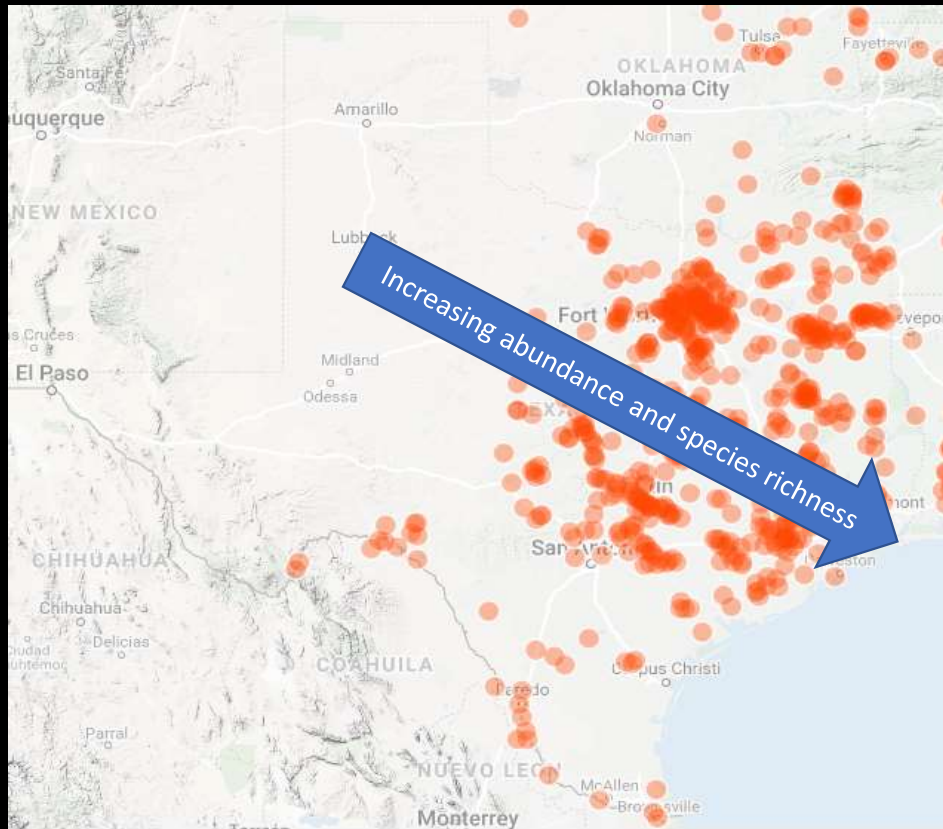
Poll Question #1

The Unionid larva that attach to fish hosts are called:

- a. Veligers
- b. Glochids
- c. Glochidia
- d. Lilliputs

Where are they found in Texas?

iNaturalist Observations



- Approximately 50 species in TX
- All major river basins and many tributaries
 - Brazos
 - Colorado
 - Cypress
 - Guadalupe
 - Neches
 - Nueces
 - Rio Grande
 - Sabine
 - San Antonio
 - Trinity

Presence depends on river basin, host fish presence, flow variability, ecoregion, etc.

"Distribution of unionid freshwater mussels and host fishes in Texas. A study of broad-scale spatial patterns across basins and a strong climate gradient"
Dascher, E.D., Burlakova, L.E., Karatayev, A.Y. et al. Hydrobiologia (2018) 810: 315.
<https://doi.org/10.1007/s10750-017-3168-5>

Why are they where they are?

- Suitable substrate
- Stable substrate
- Water quantity
 - Dessication
 - Respiration
 - Temperature
- Water quality
- Fish hosts
- Stream order
- Food availability

EXAMPLE: Site with mussels



Diverse population of mussels found on tributary to Wilbarger creek containing key habitat elements.

EXAMPLE: Site with few mussels



Few mussels found in deep muck in certain parts of Lake Austin.

Threats

- Dams
- Urbanization (siltation, poor water quality, wastewater effluent)
- Land Use (ex: sand/gravel mining)
- Historic overharvesting (buttons)
- Climate change (extreme weather)
- Zebra mussels



Mansfield Dam



Gilleland Creek is heavily influenced by wastewater effluent.



Zebra mussels will negatively impact reservoir populations of native mussels.

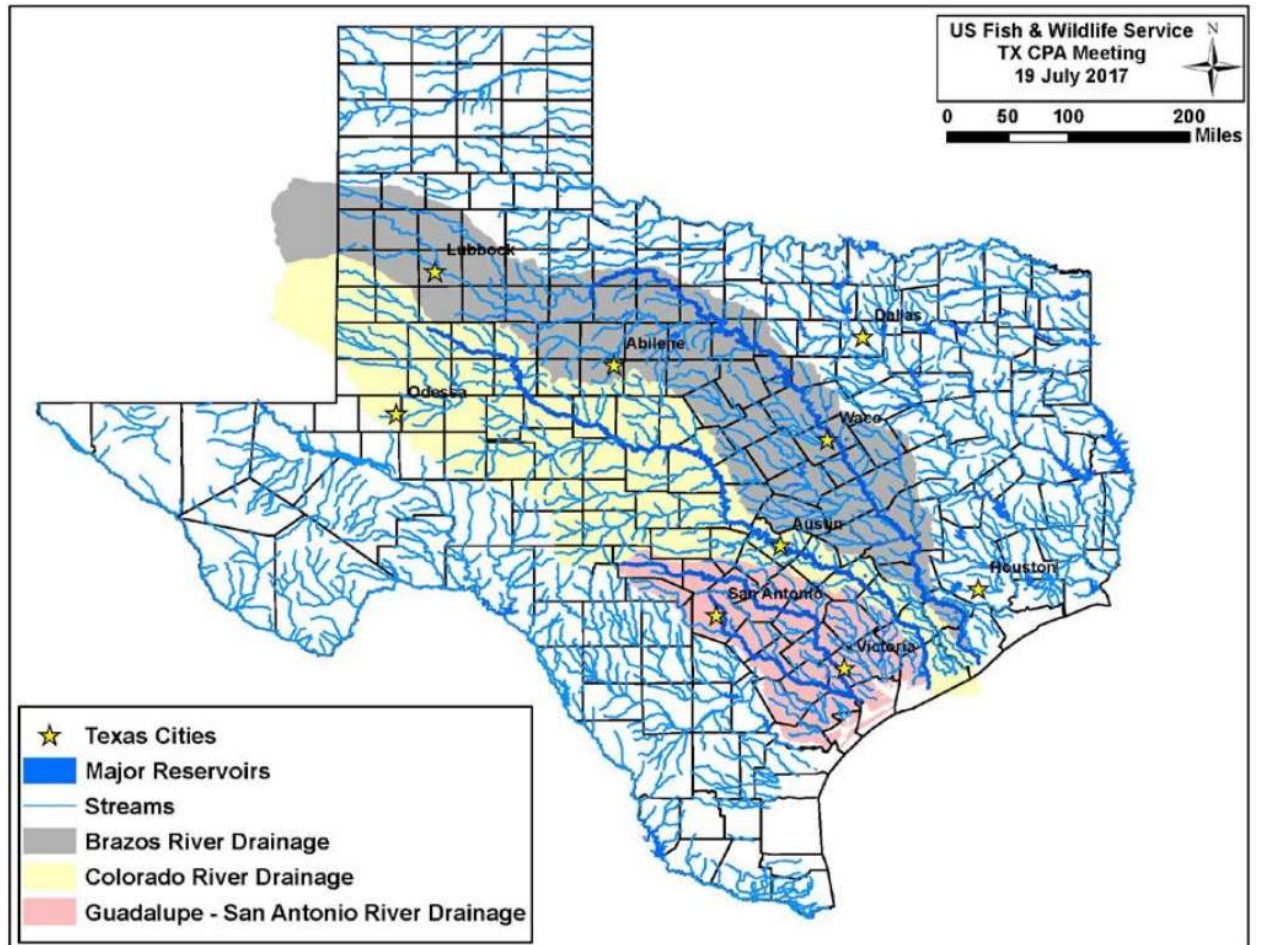
Poll Question #2

What are key threats to Unionid mussels?

- a. Dams
- b. Siltation
- c. Zebra mussels
- d. Climate extremes
- e. All of the above

Endangered Species Listing (FWS)

- **Brazos River**
 - (Upper and Lower)
 - Clear Fork
 - Navasota River
 - Little River
- **Colorado River**
 - (Upper and Lower)
 - Concho River
 - San Saba River
 - Llano River
 - Pedernales River
 - Onion Creek
- **Guadalupe River**
 - (Upper and Lower)
 - San Marcos River



Colorado River Candidate Species

- Texas Fatmucket (*Lampsilis bracteata*)
- Texas Pimpleback (*Cyclonaias petrina*)
- False Spike (*Quadrula mitchelli*)
- Texas Fawnsfoot (*Truncilla macrodon*)
- ~~Smooth Pimpleback (*Quadrula houstonensis*)~~



Texas Fatmucket (*Lampsilis bracteata*) from Lower Onion Creek.

Threatened Freshwater Mussels (Bivalvia: Unionidae) of Texas

 <i>Fusconaia askewi</i> Texas Pigtoe TPWD-Threatened	 <i>Fusconaia lananensis</i> Triangle Pigtoe TPWD-Threatened	 <i>Lampsilis bracteata</i> Texas Fatmucket TPWD-Threatened ESA-Candidate	 <i>Lampsilis satura</i> Sandbank Pocketbook TPWD-Threatened	 <i>Obovaria jacksoniana</i> Southern Hickorynut TPWD-Threatened
 <i>Platobema riddellii</i> Louisiana Pigtoe TPWD-Threatened	 <i>Popenaias popeti</i> Texas Hornshell TPWD-Threatened ESA-Candidate	 <i>Potamilus amphichaerus</i> Texas Heelsplitter TPWD-Threatened	 <i>Potamilus metneckayi</i> Salina Mucket TPWD-Threatened	 <i>Quadrula aurea</i> Golden Orb TPWD-Threatened ESA-Candidate
 <i>Quadrula houstonensis</i> Smooth Pimpleback TPWD-Threatened ESA-Candidate	 <i>Quadrula mitchelli</i> False Spike TPWD-Threatened	 <i>Quadrula petrina</i> Texas Pimpleback TPWD-Threatened ESA-Candidate	 <i>Truncilla cognata</i> Mexican Fawnsfoot TPWD-Threatened	 <i>Truncilla macrodon</i> Texas Fawnsfoot TPWD-Threatened ESA-Candidate

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ATM TEXAS A&M Institute of Renewable Natural Resources

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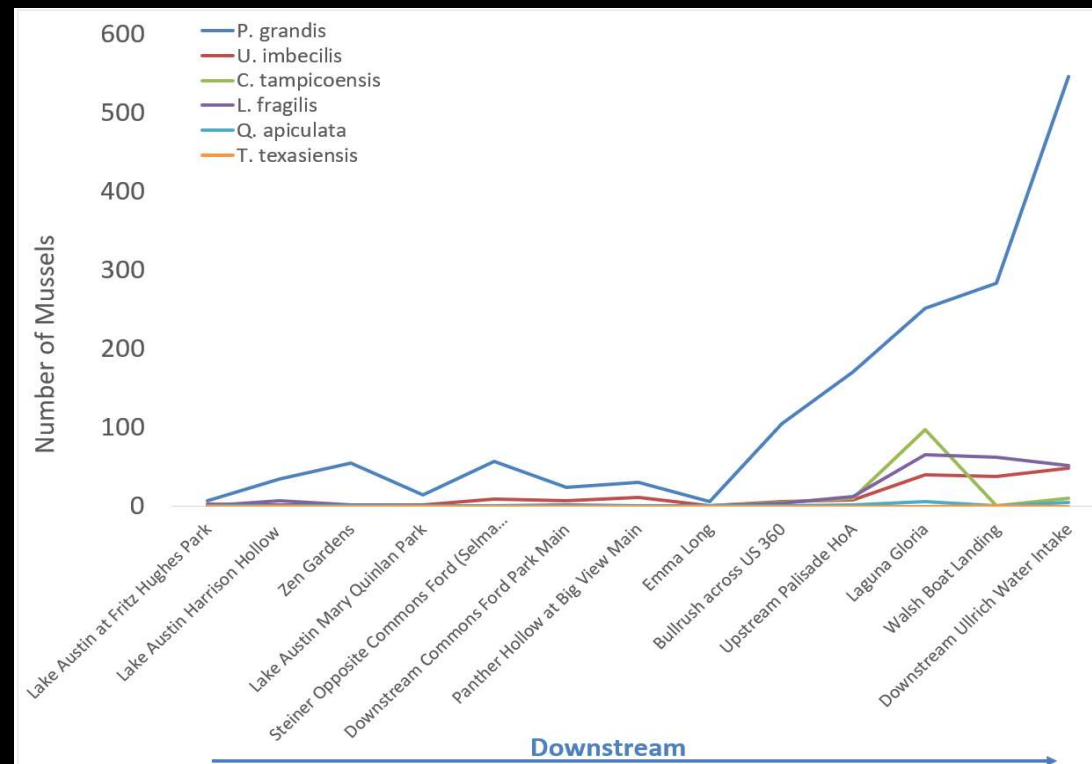
Previous WPD Unionid Research

Wastewater Effluent

- Mussels upstream of wastewater discharge on Wilbarger Creek fared much better than those downstream (growth and survivorship)

Lake Drawdowns

- Mussels in Lake Austin are more diverse and plentiful than previously thought.
- Drawdowns have negative effects on mussels.



East Travis County Unionid Study

Project Objectives

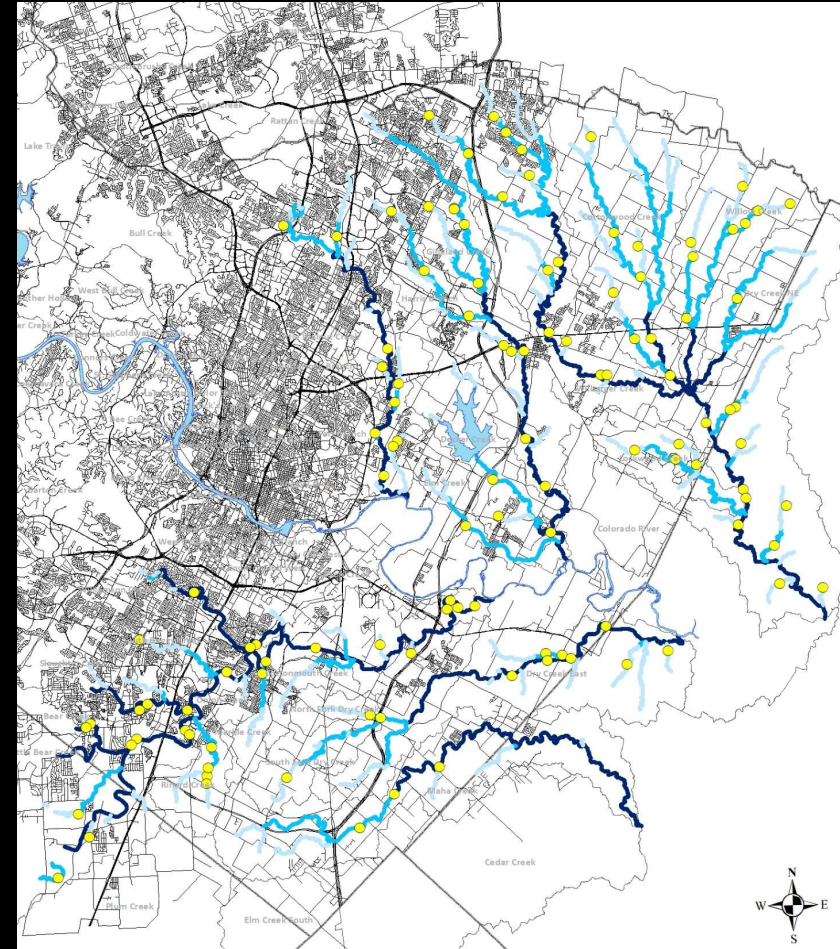
- Characterize mussel presence, species richness, catch per unit effort, diversity, and size distribution of mussels in study area.
- Identify potential relationships between physiographic data and detected mussels.

Site Selection

- Targeted creeks hydrologically connected to Colorado River downstream of Longhorn Dam.
- Creeks with 640+ acres of drainage, downstream of EA Recharge Zone.
- 130 sites randomly selected with an ultimate goal of 90 sites.
- Did not include Colorado River.



130 randomly selected sites, goal of approximately 90 sites.



Qualitative Surveys (Rather than Quantitative)

- Does not give true density
- More likely to discover larger specimens
- Less likely to miss presence entirely
- Easier study design for preliminary data gathering



Sampler used for quantitative sampling.



Qualitative searching best available habitat at a site.

Study Methodology

- Timed searched (4.5 person hours)
- Visual/tactile searches
- Mesohabitats recorded (riffle, run, pool, backwater)
- Substrate type (silt, sand, gravel, cobble, boulder)
- Live and recently dead: species, number, size



- Temperature, specific conductivity, pH, dissolved oxygen
- Search area by mesohabitat
- Data was entered into an iPad app

Importance of size class

Recruiting populations are important

- Mussels live for decades
- Presence of adults does not necessarily indicate a healthy population
- Juveniles are difficult to identify and find
- Further investigations often warranted on populations with recruitment



Central Texas Mussels (key examples)



Giant Floater (*Pyganodon grandis*)



Southern Mapleleaf (*Quadrula apiculata*)



Texas Fatmucket (*Lampsilis bracteata*)



Yellow Sandshell (*Lampsilis teres*)



Pondhorn (*Unio merus tetralasmus*)



Paper Pondshell (*Utterbackia imbecillis*)

Poll Question #3

Which isn't a common name of a Central Texas mussel?

- a. Texas Fatmucket
- b. Giant Floater
- c. Paper Pondshell
- d. Yellow Sandpaper

Preliminary Results

- 142 mesohabitats (89 sites)
- 259 live mussels encountered.
- 29 sites contained live mussels.
- 4 sites only had recently dead mussels.
- 56 sites had no recent signs of mussels.
- 13 sites showed recent recruitment of juveniles.
- More likely to be found in fine substrate.

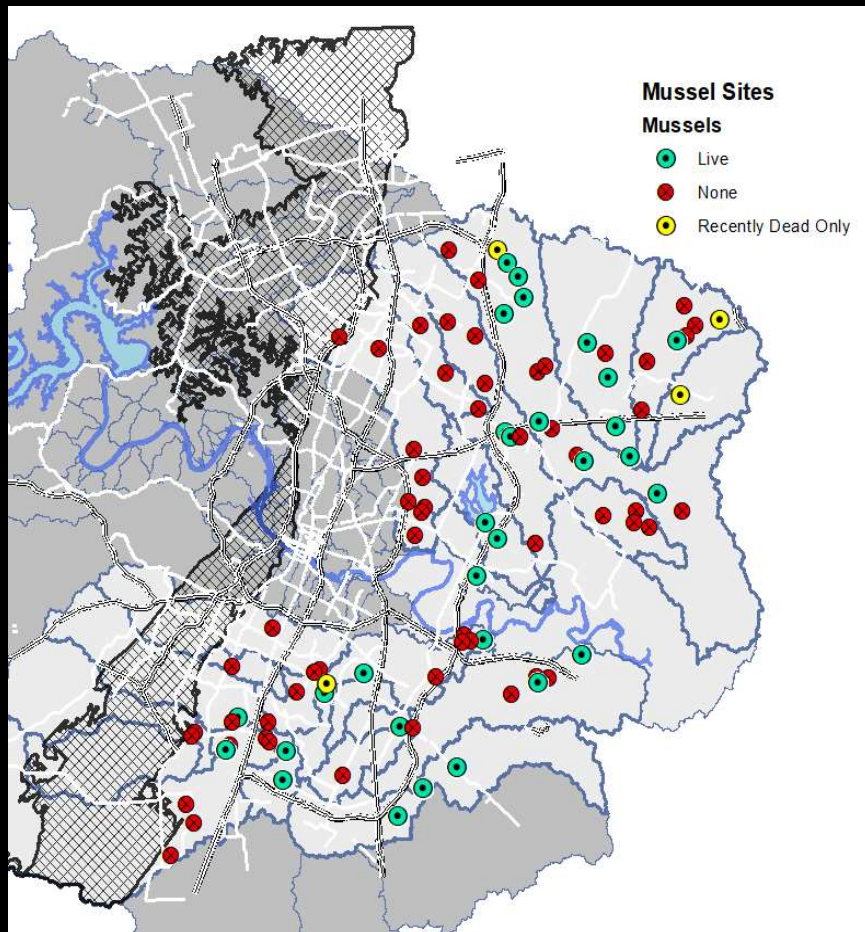


SPECIES	Bear Creek	Cottonwood Creek	Decker	Dry Creek East	Dry Creek North of Elm Creek	Gililand Creek	Harriet Branch	Malta Creek	Marble Creek	North Fork Dry Creek	Onion Creek	Richard Creek	Shafter Creek	South Fork Dry Creek	Walnut Creek	Wilbarger Creek	Williamson Creek	Willow Creek
<i>Lampsilis bracteata</i>										X					X			
<i>Lampsilis teres</i>		X								X					X			
<i>Leptodea fragilis</i>										X								
<i>Pygodon grandis</i>		X								X					X			
<i>Quadrula apiculata</i>															X			
<i>Toxolasma parvum</i>															X			
<i>Toxolasma texanense</i>	X														X		X	
<i>Unio merus tetralasmus</i>	X	X		X	X		X	X		X	X				X		X	
<i>Utterbackia imbecillis</i>	X	X			X		X			X	X	X			X			

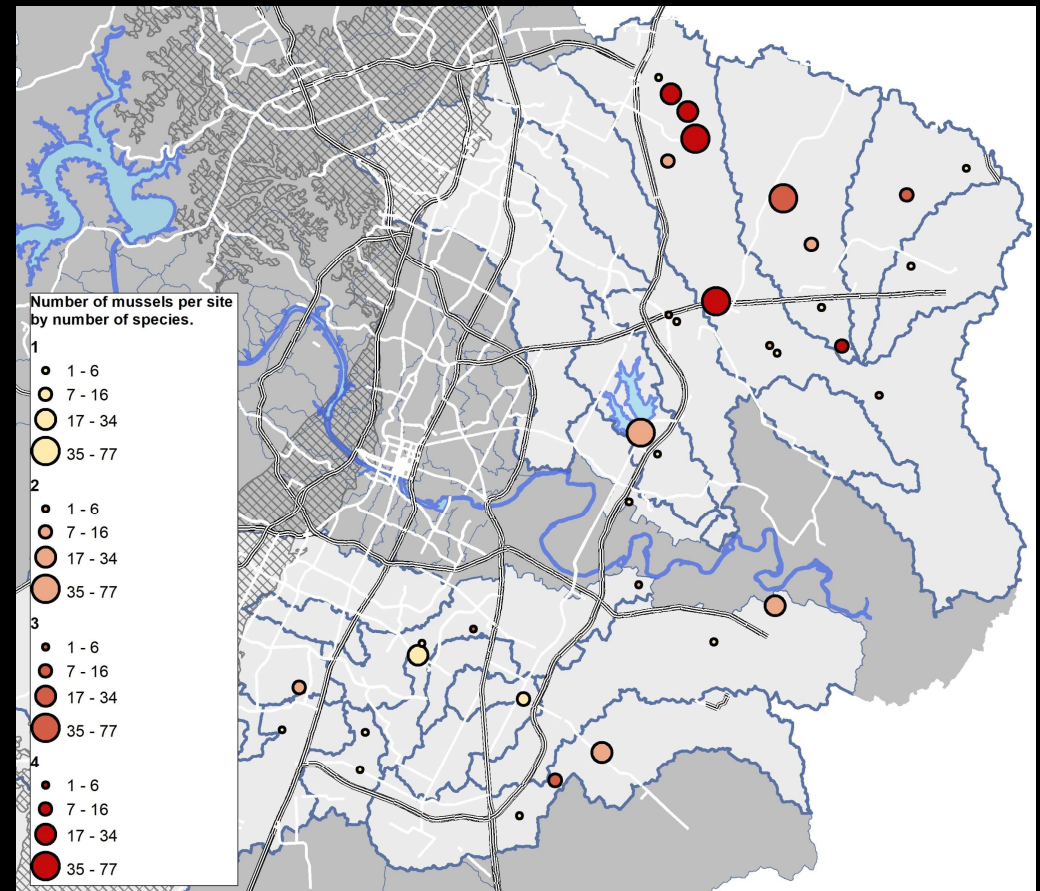
Figure #. Mussel species detected in each surveyed watershed. Detected live and very recently dead mussels are marked with an X.

- Mussels more abundant further from Longhorn Dam.
- The highest abundance and number of species found in Wilbarger Creek.
- Mussels are present in nearly all East Travis County creeks, with some larger mussel beds detected in Wilbarger, Cottonwood, and Decker.
- Overall mussels were generally low in number with patchy distributions.

Sites with Mussels



Sites containing any live or recently dead mussel



Positive mussel sites, by number of individuals and number of species.

QUESTIONS?

Special thanks to:
Ashley Seagroves (now
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Stephen Davis (LCRA)

