



Brazos Basin Freshwater Mussel Candidate Species Update

***Presented by
Tiffany Morgan***



Freshwater Mussels Under Consideration for Federal Protection in Brazos River Basin

Texas Fawnsfoot



Smooth Pimpleback



False Spike





Freshwater Mussels v. Zebra Mussels

- **Freshwater Mussels**

- Native
- Rivers and lakes
- Filter feeders
- Soft Substrate
- Riverine species dependent on fish

- **Zebra Mussels**

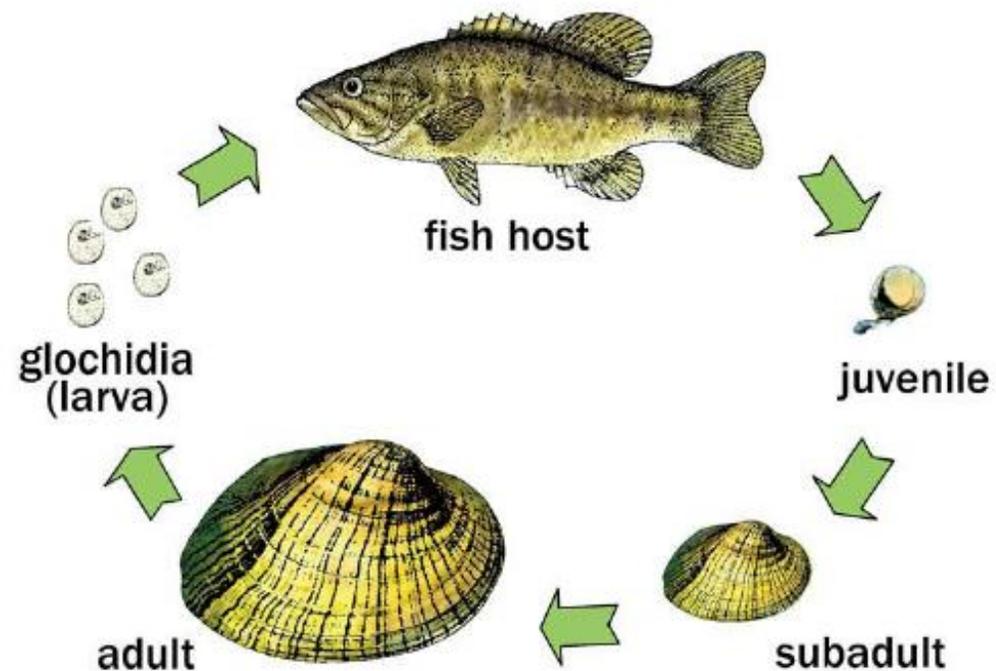
- Non-native
- Lakes, generally
- Aggressive breeders
- No know predators
- Hard substrates





Mussel Life Cycle

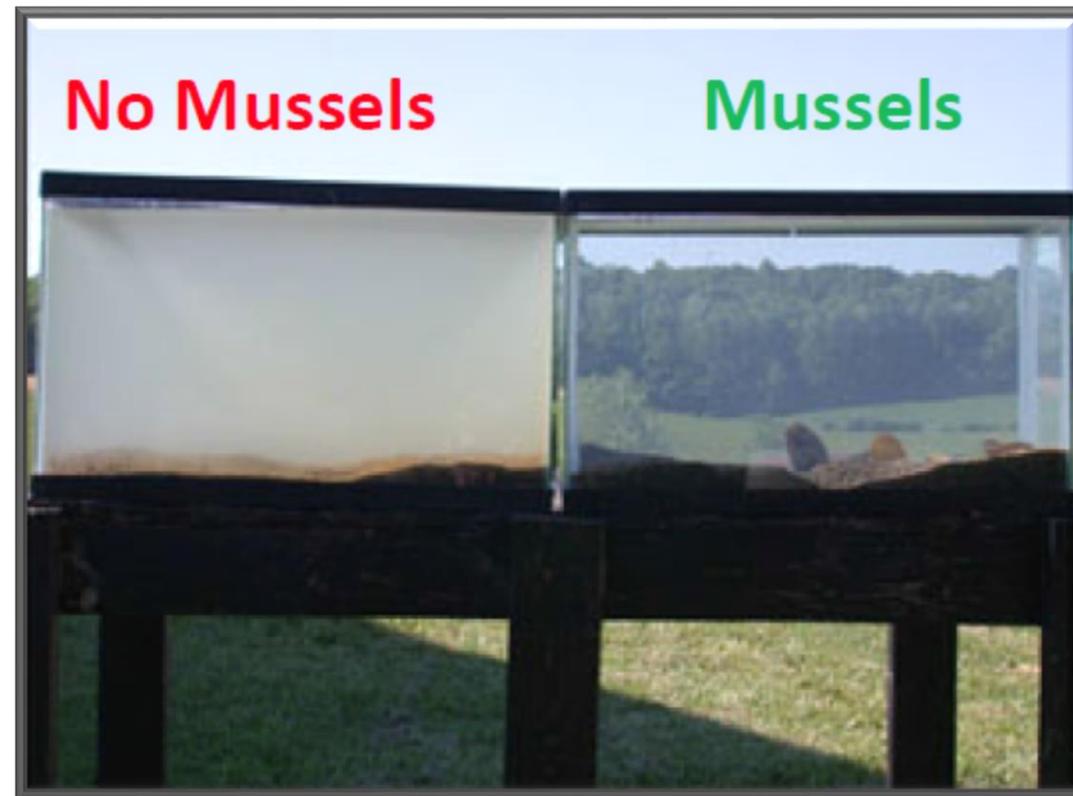
- Unique life history – parasitic juvenile stage
- Fish host unique to species
- Fish host movements affect mussel recruitment and distribution





Why mussels are important?

- **Part of the food pyramid**
 - Fish
 - Racoons
 - Humans
- **Filter feeders**
 - Ecological value
 - Economic value
- **Indicators of ecosystem health**





Recently Documented Candidate-Listed Mussel Populations in the Brazos River Basin

Legend

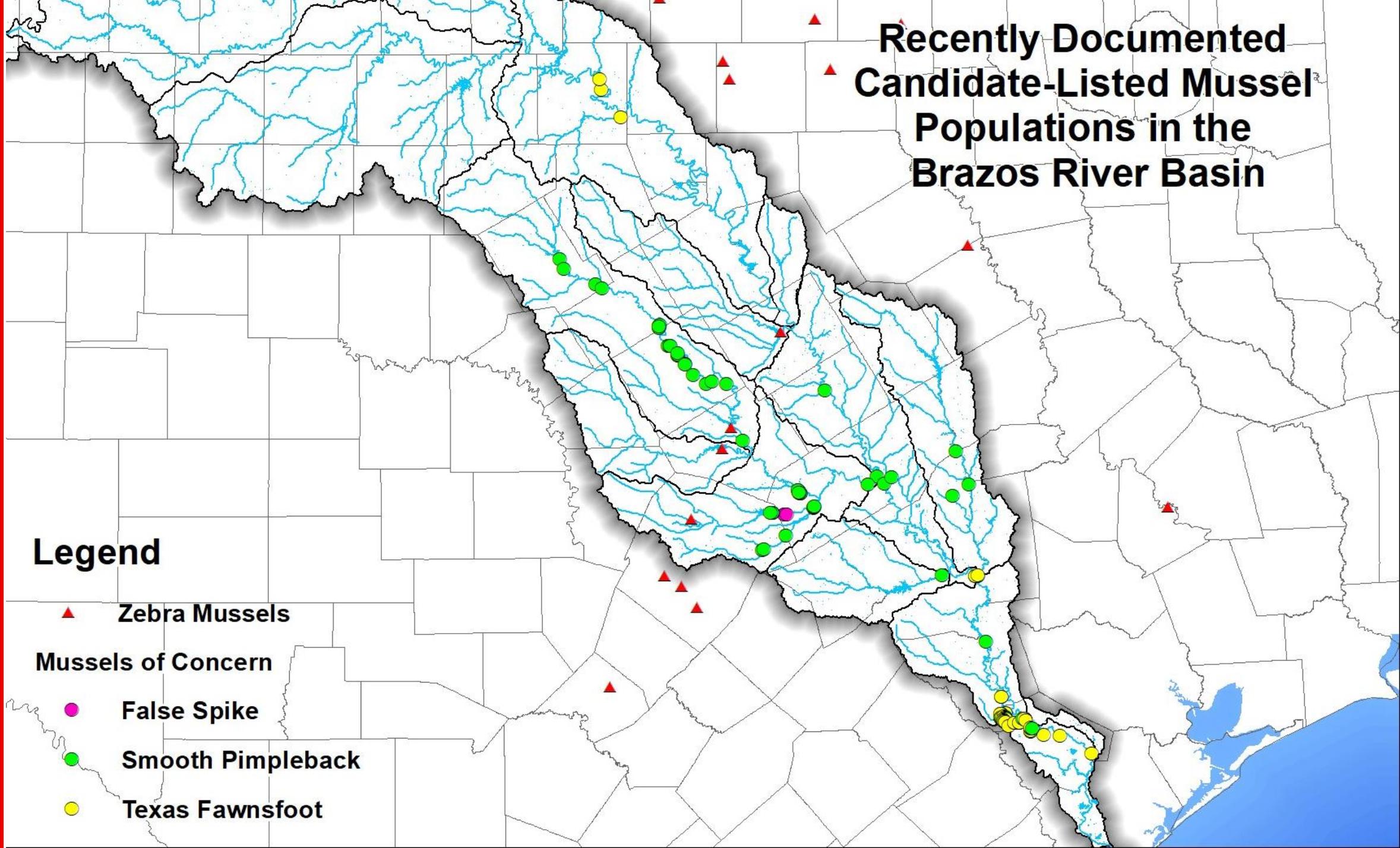
▲ Zebra Mussels

Mussels of Concern

● False Spike

● Smooth Pimpleback

● Texas Fawnsfoot





Proposal to List Schedule

- **September 2018**
 - Texas Fawnsfoot
 - False Spike
- **September 2020**
 - Smooth Pimpleback



Smooth pimpleback in Navasota River.



Why do we Care?

- **Since 1973, the Endangered Species Act (ESA) has proven to be one of the nation's strongest conservation laws**
 - Has been widely upheld in the court system
 - Never substantially defeated
- **ESA can and has affected state-based water rights and regulations in other states**
 - Can limit the traditional exercise of established water rights
 - Restrict or modify new water projects
 - Any water use that results in the direct or incidental take or harm of listed species falls within the ESA's reach
- **ESA's ability to preempt state law derives from US Constitution's Supremacy Clause**





Water Projects Impacted by ESA

- **Cappaert v. United States – 1976 – Nevada**
 - Stopped ground water pumping by private landowners
- **TVA v. Hill – 1978 - Tennessee**
 - Halted construction on dam
- **Riverside Irrigation District v. Andrews – 1983 – Nebraska**
 - Dam never built
- **Carson-Truckee Water Conservancy District v. Clark – 1984 –California**
 - ESA needs trump municipal and industrial water use
 - Changed water releases and pumping from a reservoir
- **U.S. v. Glenn-Colusa Irrigation District – 1992 – California**
 - Prohibited pumping from river from July-November of each year
- **Aransas Project v. Shaw – 2013 – Texas**
 - Prohibited TCEQ from issuing new water use permits from the Guadalupe, Blanco and San Antonio Rivers
 - Decision reversed – scientific impropriety



ESA Quagmires

- **Tri-State Water Wars – (1990 – present) - Alabama, Florida, and Georgia**
 - Too many suits to summarize briefly
- **Columbia Dam Project, Tennessee (1979 – 1999)**
 - \$83 million dam project 90% complete when two species of freshwater mussel declared endangered
 - Dam never completed and eventually removed
- **California State Water Project and Central Valley Project (2007-present) – California**
 - Too many suits to summarize briefly
 - Requires changes in pumping from rivers and deltas impacting municipalities, agriculture and industry
 - In 2011 and 2015, Supreme Court refused to limit the reach of ESA



Statements of Concern from Texas Hornshell Proposal to List

- **State Water Plan proposed reservoir and groundwater projects cited as an immediate threat**
- **Water management/release strategies will be required**
- **Improved wastewater discharge quality**
- **Sediment control strategies will be needed**



THREATS LISTED IN USFWS DOCUMENTS



Modified/Reduced Stream Flow

- **Reservoirs**
 - Controlled systems rarely mimic natural flow regimes
 - Scouring of riverbed
 - Dewatering downstream
- **Groundwater pumping**
- **Drought**
- **Climate change - further decline**





Water Quality

- **Dissolved oxygen > 3.0 mg/L***
- **Ammonia < 0.7 mg/L***
- **Salinity <0.9 ppt***
- **Water temperature**
- **WWTP discharges**
- **Contaminant spills**
- **Climate change – further decline**



* Endangered and Threatened Wildlife and Plants; Endangered Species Status for Texas Hornshell, 83 Fed. Reg. 5720 (February 9, 2018) (to be codified at 50 CFR 17).



Sedimentation

- **Smothers mussel beds**
- **Low flows encourage build up**
- **Less cleansing flows**
- **Riparian zone disruption**
- **Sand and gravel mining**





Barriers to Fish Host Movement

- **Population fragmentation and isolation**
- **Reservoirs**
- **Low-water dams**
- **Low-water crossings**
- **Pipelines**





Climate Change

- **Will exacerbate the previous four threats**





What's Been Done?

- **BRA**
 - Stream Surveys
 - Customer interaction
 - Comptroller Work Group
 - Provided Data and Public Comment to USFWS
- **Comptroller's Freshwater Mussel Stakeholder Work Group**
- **USFWS**
 - Science Meetings
 - Initial Consultation
- **River Authority Work Group**
 - GBRA – TRA
 - LCRA – SARA

