



# ***Brazos Basin Freshwater Mussel Candidate Species Update***

***Presented by  
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# ***Freshwater Mussels Under Consideration for Federal Protection in Brazos River Basin***

Texas Fawnsfoot



Smooth Pimpleback

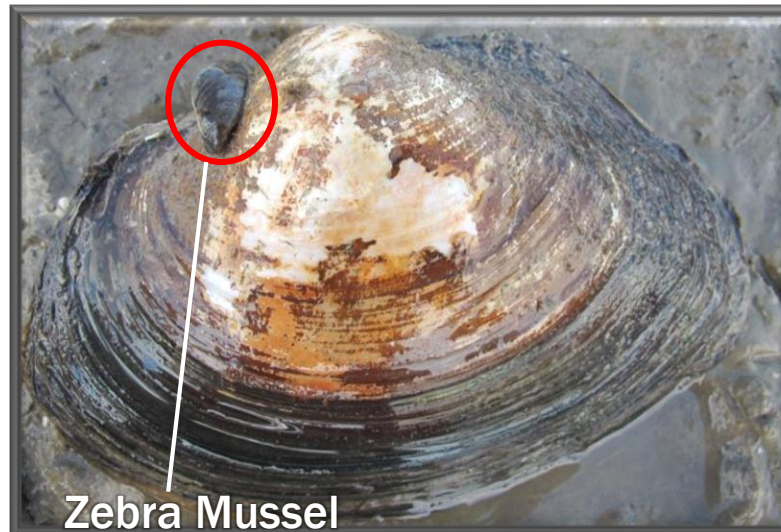


False Spike



# ***Freshwater Mussels v. Zebra Mussels***

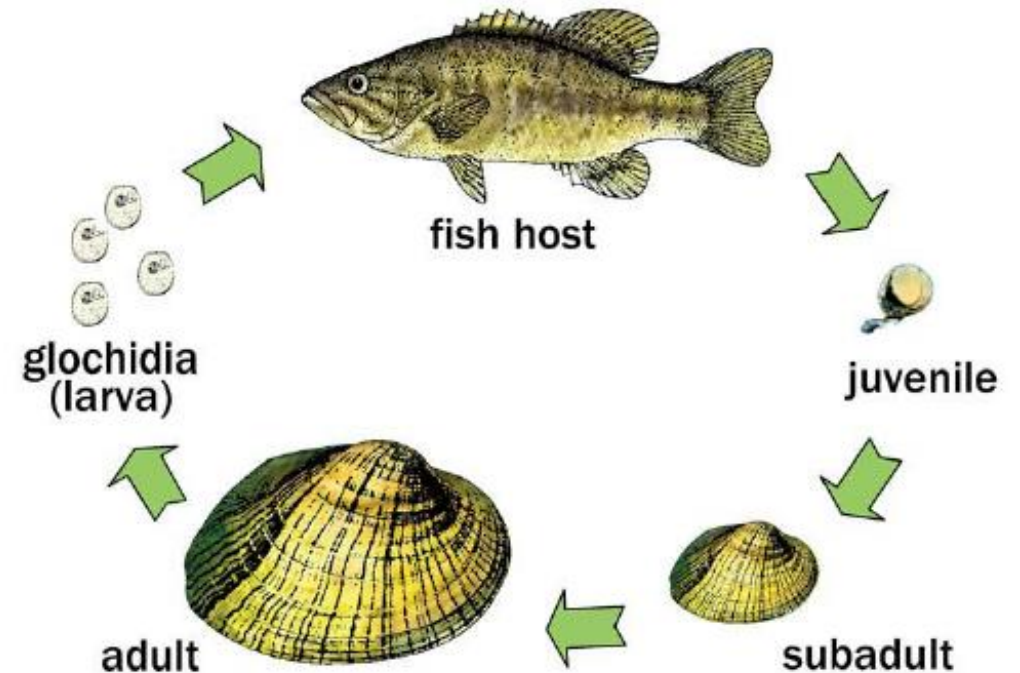
- **Freshwater Mussels**
  - Native
  - Rivers and lakes
  - Filter feeders
  - Soft Substrate
  - Riverine species dependent on fish
- **Zebra Mussels**
  - Non-native
  - Lakes, generally
  - Aggressive breeders
  - No know predators
  - Hard substrates





## *Mussel Life Cycle*

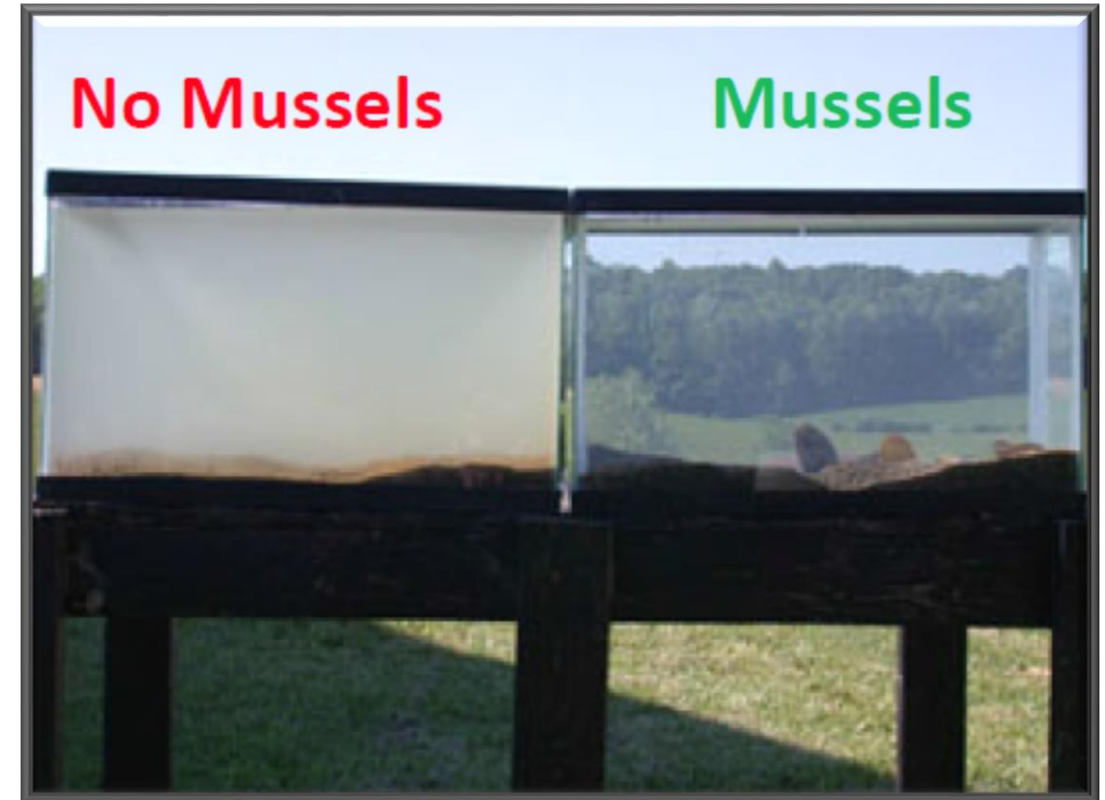
- Unique life history – parasitic juvenile stage
- Fish host unique to species
- Fish host movements affect mussel recruitment and distribution





## *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



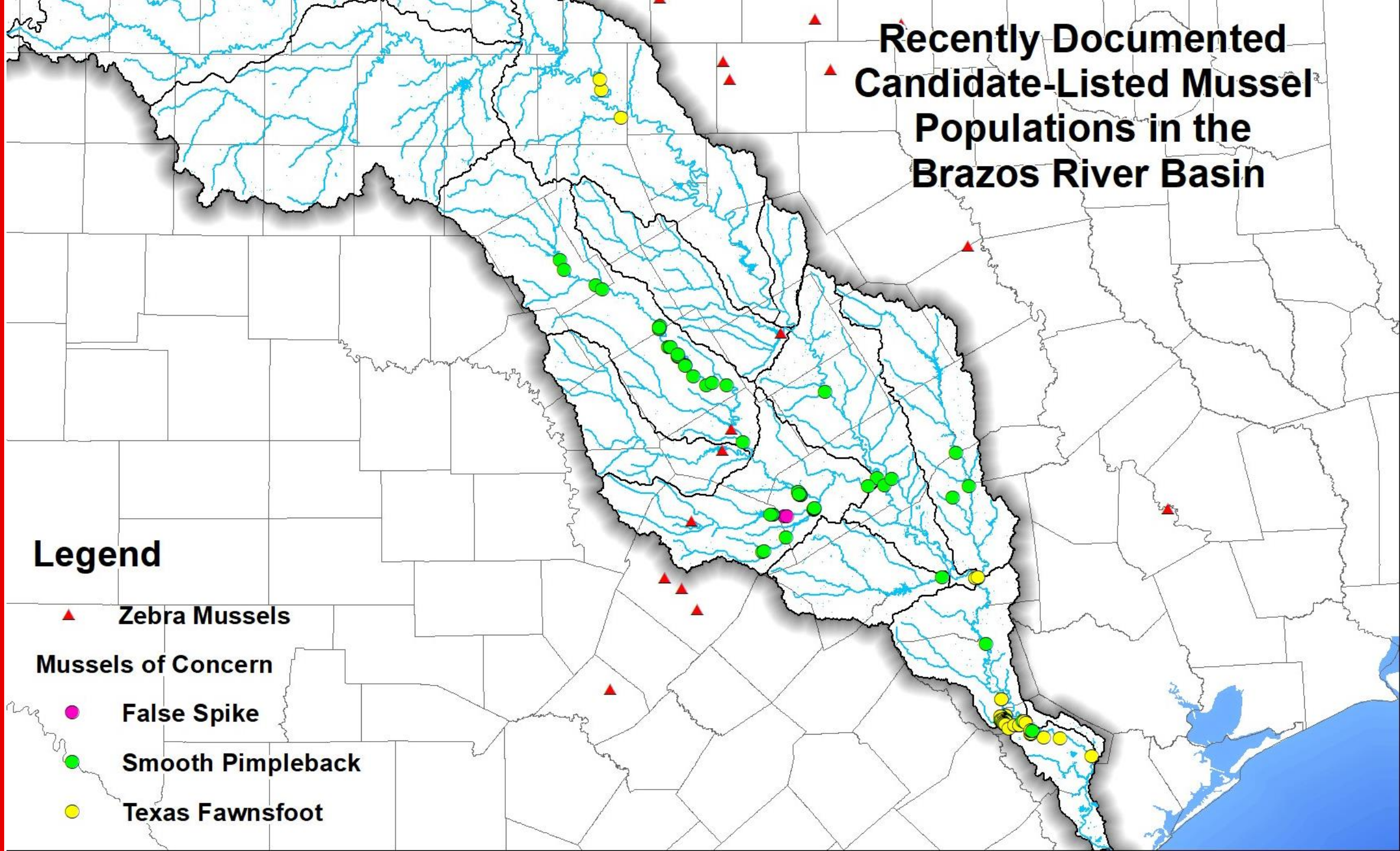
False Spike



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

