Conservation Status of Freshwater Mussels in the Guadalupe River Basin

Guadalupe River Basin
Clean Rivers Program
Steering Committee Annual Meeting
March 23, 2012

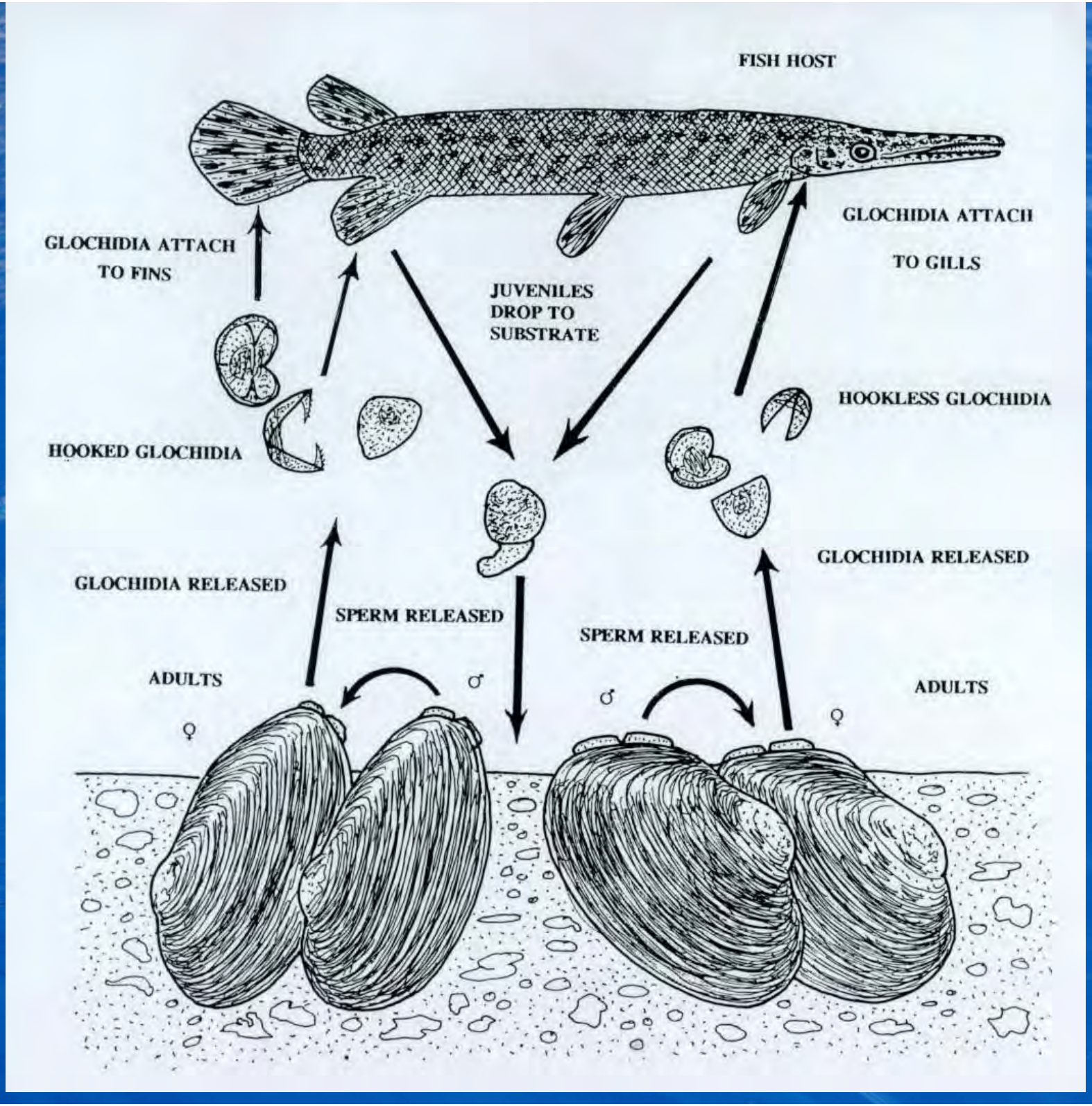
Doyle Mosier

Freshwater Mussels (Unionidae)

- Worldwide distribution with highest diversity in North America (about 300 species)
- Considered the most endangered group of organisms in North America
- 35 species are thought to have become extinct in North America during the past century
- 52 species are native to Texas
- Texas Parks and Wildlife Department have listed fifteen species as threatened
- Guadalupe River basin: about twenty species are known to occur

Life History

- Live in the sediments of rivers, streams and lakes
- Filter feeders
- Slow growth rates
- Long-lived: Some species may live 100 or more years
- Size ranges from one to twelve inches


FISH HOST
GLOCHIDIA ATTACH TO FINS
GLOCHIDIA ATTACH TO GILLS
JUVENILES DROP TO SUBSTRATE
HOOKED GLOCHIDIA
HOOKLESS GLOCHIDIA
GLOCHIDIA RELEASED
GLOCHIDIA RELEASED
SPERM RELEASED
SPERM RELEASED
ADULTS
ADULTS
♂
♀
♂
♀

Threats

- Water Quality
- Habitat modification
- Commercial exploitation
  - Buttons
  - Cultured Pearls
- Invasive Species
  - Asiatic Clam (*Corbicula spp*.)
  - Zebra Mussels (*Dreissena polymorpha*)

Conservation Status

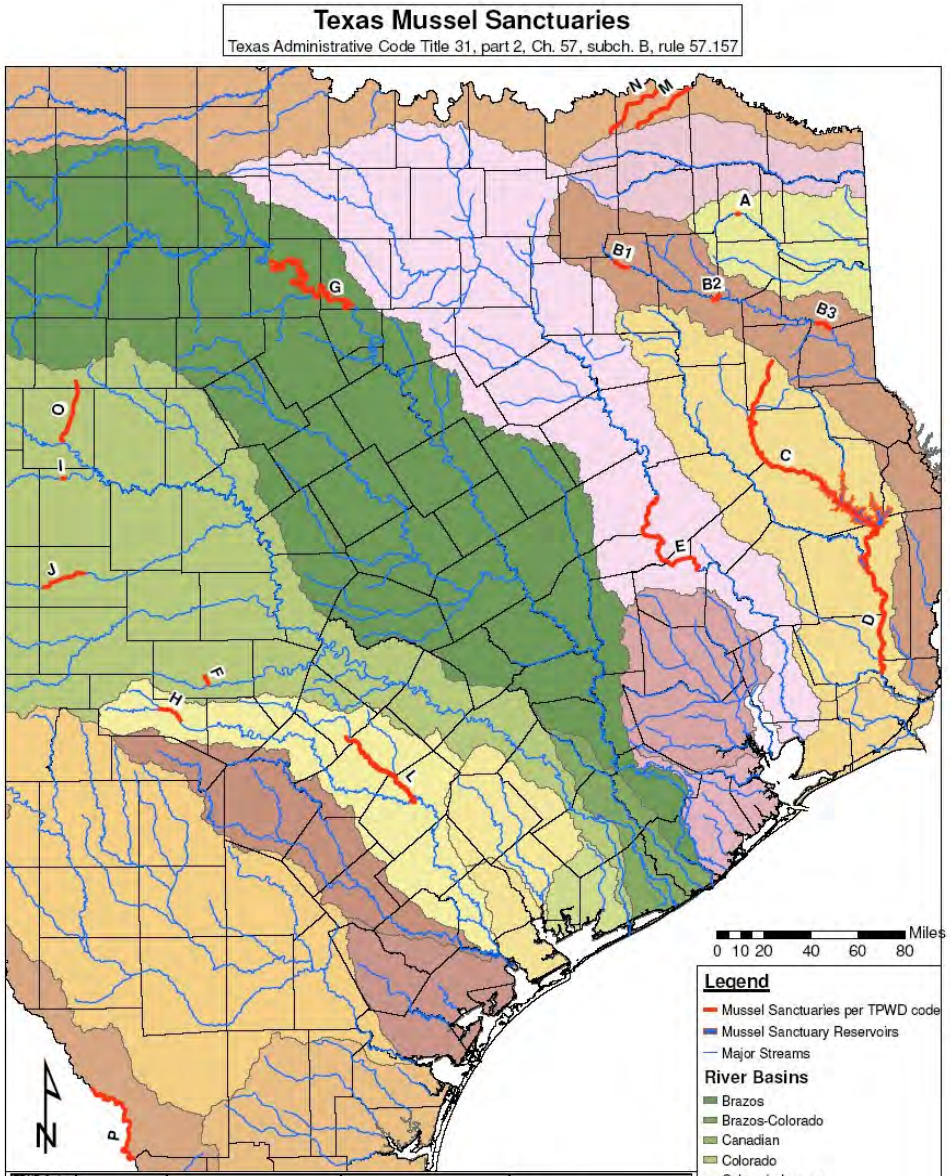
- TPWD Designated Eighteen Mussel Sanctuaries in Texas (2006)
- Guadalupe River Sanctuaries:

- Guadalupe River in Kerr Co.

  (UGRA Dam – Lake Ingram)

- San Marcos River

- Guadalupe River between Lake Wood and Gonzales



TPWD Code (subpart d.2)	Stream Name	County (ies)	Upper Boundary	Lower Boundary
A	Big Cypress Creek	Camp	Lake Bob Sandlin dam	US Highway 271
B1	Sabine River	Rains, Van Zandt	Lake Tawakoni dam	State Highway 19
B2	Sabine River	Smith, Upshur, Wood	FM 14	State Highway 155
B3	Sabine River	Harrison, Panola	State Highway 43	US Highway 59
C	Angelina River	Angelina, Cherokee, Jasper, Nacogdoches, Rusk, San Augustine, Tyler	Source in Rusk County	Confluence with Neches includes B.A. Steinhagen Res.
D	Neches River	Hardin, Jasper, Orange, Tyler	B.A. Steinhagen Res. (aka Lake B.A. Steinhagen)	Pine Island Bayou
E	Trinity River	Houston, Leon, Madison, Trinity, Walker	State Highway 7	State Highway 19
F	Live Oak Creek	Gillespie	US Highway 290	Pedernales River
G	Brazos River	Palo Pinto, Parker	Possum Kingdom Reservoir dam	FM 2580 (Tin Top roadhwy)
H	Guadalupe River	Kerr	UGRA dam (Lake Ingram assumed)	Flat Rock dam
I	Concho River	Concho	Mouth of Kickapoo Creek	US Highway 83 bridge
J	San Saba River	Menard	FM 864	US Highway 83 bridge
K	Guadalupe River	Gonzales	Wood Lake dam (aka Lake Wood)	Confluence with San Marcos River
L	San Marcos River	Hays, Guadalupe, Gonzales	Source at San Marcos Springs	Confluence with Guadalupe River
M	Pine Creek	Lamar, Red River	Source in Lamar County	Confluence with Red River
N	Sanders Creek	Fannin, Lamar	Source in Fannin County	Confluence with Red River
O	Elm Creek	Runnels, Taylor	Source in Taylor County	Elm Creek Lake dam in Ballinger
P	Rio Grande	Webb	Columbia Bridge (aka Laredo/Colombia Solidarity Bridge)	Webb/Zapata county line

Conservation Status

- 2007 - 2008: WildEarth Guardians petitioned the USFWS to list a wide array of freshwater mussels found in the southwest including nine Texas species.
- November 2009: 15 Texas Freshwater Mussels Placed on State Threatened List by TPWD
- December 2009: USFWS issued a finding that suggested listing may be warranted for the nine Texas mussels included in the 2007 and 2008 petitions and initiated a status review.
- October 2010: USFWS issued a twelve month finding that listing of five Central Texas freshwater mussel species is warranted and added them to the candidate species list; proposed rule is due by 2016.
- Under a settlement agreement, a twelve month finding for three East Texas species and three Rio Grande species was delayed until after FY 2016...

Threatened Freshwater Mussels (Bivalvia: Unionidae) of Texas

Fusconaia askewi
Texas Pigtoe
TPWD-Threatened

Fusconaia lananensis
Triangle Pigtoe
TPWD-Threatened

Lampsilis bracteata
Texas Fatmucket
TPWD-Threatened
ESA- Candidate

Lampsilis satura
Sandbank Pocketbook
TPWD-Threatened

Obovaria jacksoniana
Southern Hickorynut
TPWD-Threatened

Pleurobema riddellii
Louisiana Pigtoe
TPWD-Threatened

Popenaias popeii
Texas Hornshell
TPWD-Threatened
ESA-Candidate

Potamilus amphichaemus
Texas Heelsplitter
TPWD-Threatened

Potamilus metnecktayi
Salina Mucket
TPWD-Threatened

Quadrula aurea
Golden Orb
TPWD-Threatened
ESA-Candidate

Quadrula houstonensis
Smooth Pimpleback
TPWD-Threatened
ESA-Candidate

Quadrula mitchelli
False Spike
TPWD-Threatened

Quadrula petrina
Texas Pimpleback
TPWD-Threatened
ESA-Candidate

Truncilla cognata
Mexican Fawnsfoot
TPWD-Threatened

Truncilla macrodon
Texas Fawnsfoot
TPWD-Threatened
ESA-Candidate

Production of this poster was generously supported by the Texas Department of Transportation and Texas Parks and Wildlife. All photography and poster layout by Charles Randklev, IRNR, Texas A&M University

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Texas Fatmucket Distribution

Texas Fatmucket (*Lampsilis bracteata*) female, 58 mm sl, Guadalupe River, Texas - R.G. Howells
Photo used with permission.

Dallas
Colorado R
Brazos R
Austin
Houston
Guadalupe R
San Antonio
San Antonio R
Nueces R
Corpus Christi

Texas Fatmucket (*Lampsilis bracteata*)

- Historical Range
- Known Counties of Recent Occurence*
- Cities
- Rivers
- County Boundaries

N W E S

0 30 60 90 Mi
Km 0 30 60 90

* The species is not necessarily distributed throughout each known county of occurence and may be represented by only a few individuals. Please see the 12-month finding for more detailed information (http://www.fws.gov/southwest/es/AustinTexas/ESA_sp_mussels.html).

USFWS, September 2011

Golden Orb Distribution

Golden Orb (*Quadrula aurea*) 50 mm sl, Guadalupe R., Texas, R.G. Howells
Photo used with permission.

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USFWS, September 2011

Texas Pimpleback Distribution

Texas Pimpleback (*Quadrula petrina*) 63 mm sl, Concho R., Texas, R.G. Howells
Photo used with permission.

Colorado R
Brazos R
Guadalupe R
San Antonio R
Nueces R
Dallas
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Houston
San Antonio
Corpus Christi

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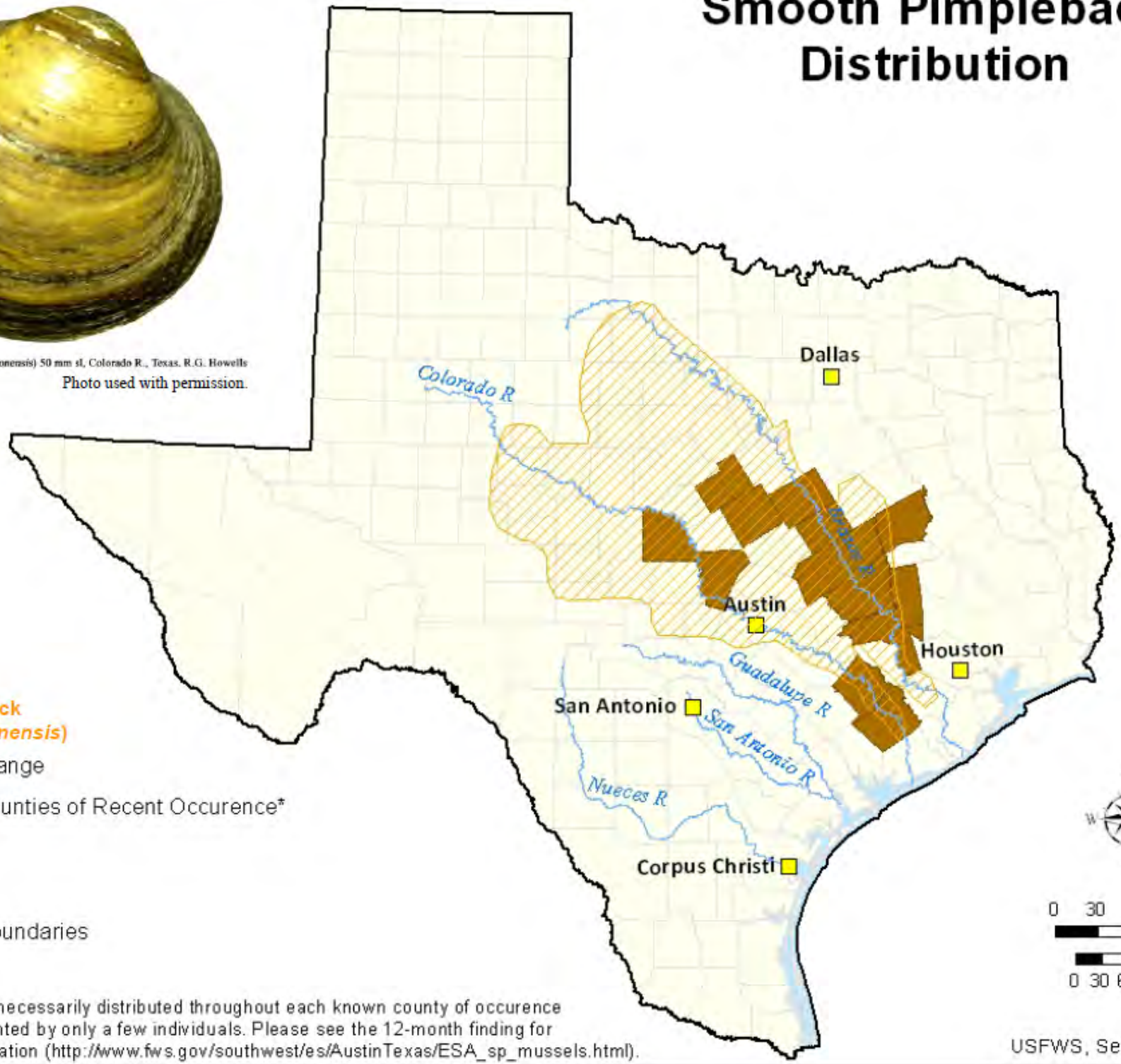
USFWS, September 2011

Smooth Pimpleback Distribution

Smooth Pimpleback (*Quadrula houstonensis*) 50 mm sl, Colorado R., Texas. R.G. Howells
Photo used with permission.



Smooth Pimpleback
(Quadrula houstonensis)

- Historic Range
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USFWS, September 2011

Texas Fawnsfoot Distribution

Texas Fawnsfoot (*Truncilla macrodon*) 37 mm sl, Brazos River, Texas, R.G. Howells
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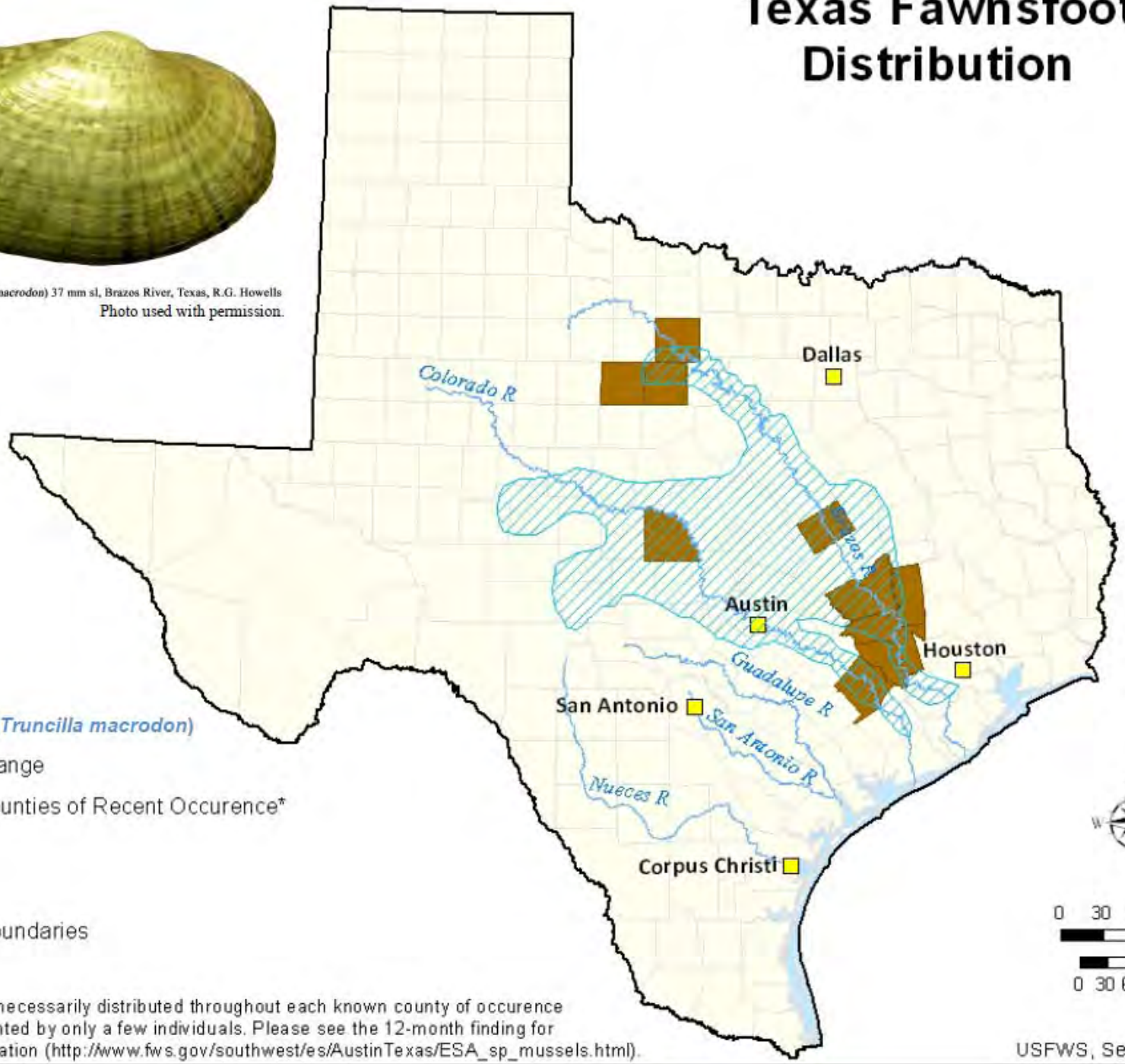

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USFWS, September 2011

Recent Developments and Research

Fish-host Identification for 5 Federal Candidate Freshwater Mussel Species in Texas. Bruce Moring (USGS), Nathan Johnson (USGS), and *Charrish Stevens (USFWS)

A Longitudinal Survey and Habitat Utilization of Freshwater Mussels in the Lower San Antonio River. Larry Larralde (San Antonio River Authority)

Freshwater Mussel Research in Central Texas: Highlights, Conservation Implications and Future Directions. *Charles R. Randklev, Matthew S. Johnson, Eric T. Tsakiris, Julie Groce and Neal Wilkins (Texas A&M University - Institute of Renewable Natural Resources)

Dam-Induced Physiochemical Effects on Freshwater Mussel Reproduction. Eric T. Tsakiris (Texas A&M University) (Proposed)

Identification of Smooth Pimpleback (*Quadrula houstonensis*) Host(s) Through DNA Sequences Obtained From Naturally Infected Fishes. *Kevin W. Conway (Texas A&M University - Texas Cooperative Wildlife Collection), Eric T. Tsakiris (Texas A&M University), Charles R. Randklev & R. Neal Wilkins (Texas A&M University - Institute of Renewable Natural Resources)

The Effect of Waste Water Treatment Plant (WWTP) Effluent on Stream Communities, Ecosystem Functioning, and Unionid Physiology; and Distribution, Abundance, and Habitat Associations of Unionids in the Rio Grande River. Trey Nobles (Texas State University at San Marcos)

Recent Developments and Research

Unexpected Diversity and Abundance in Highly Impacted Segments of the Trinity River in Dallas, Dallas County, Texas. Krejca, J., *B. Cowan, K. McDermid, (ZARA Environmental) N. Ford (University of Texas at Tyler) and S. Ligon (Texas Department of Transportation)

Long-term Changes in Unionid Assemblages in the Rio Grande, One of the World's Top 10 Rivers at Risk. Alexander Y. Karatayev (Great Lakes Center, Buffalo State College), *Thomas D. Miller (Environmental Science Center, Laredo Community College), Lyubov E. Burlakova (GLC, BSC)

Unionid Conservation Through Propagation in Texas: Preliminaries. Ben R. Bosman and Dr. David L.Rogowski (Texas Tech University) and Barrett Christie (The Dallas Zoo and Children's Aquarium at Fair Park)

UT-Tyler: Niel Ford, Lance Williams, Marsha Williams & grad students: Population Biology, Habitat Utilization, Landscape-level Processes and Geomorphology on species distributions, etc...

Recent Developments and Research

- Dr. Charles Randklev and others with the Texas A&M Institute of Renewable Natural Resources (IRNR) discovered the only known living population for *Quadrula mitchelli* (false spike) in the Guadalupe River near Gonzales in 2011.