Brazos River Authority

Zebra Mussels and Endangered Species Update

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Zebra Mussels

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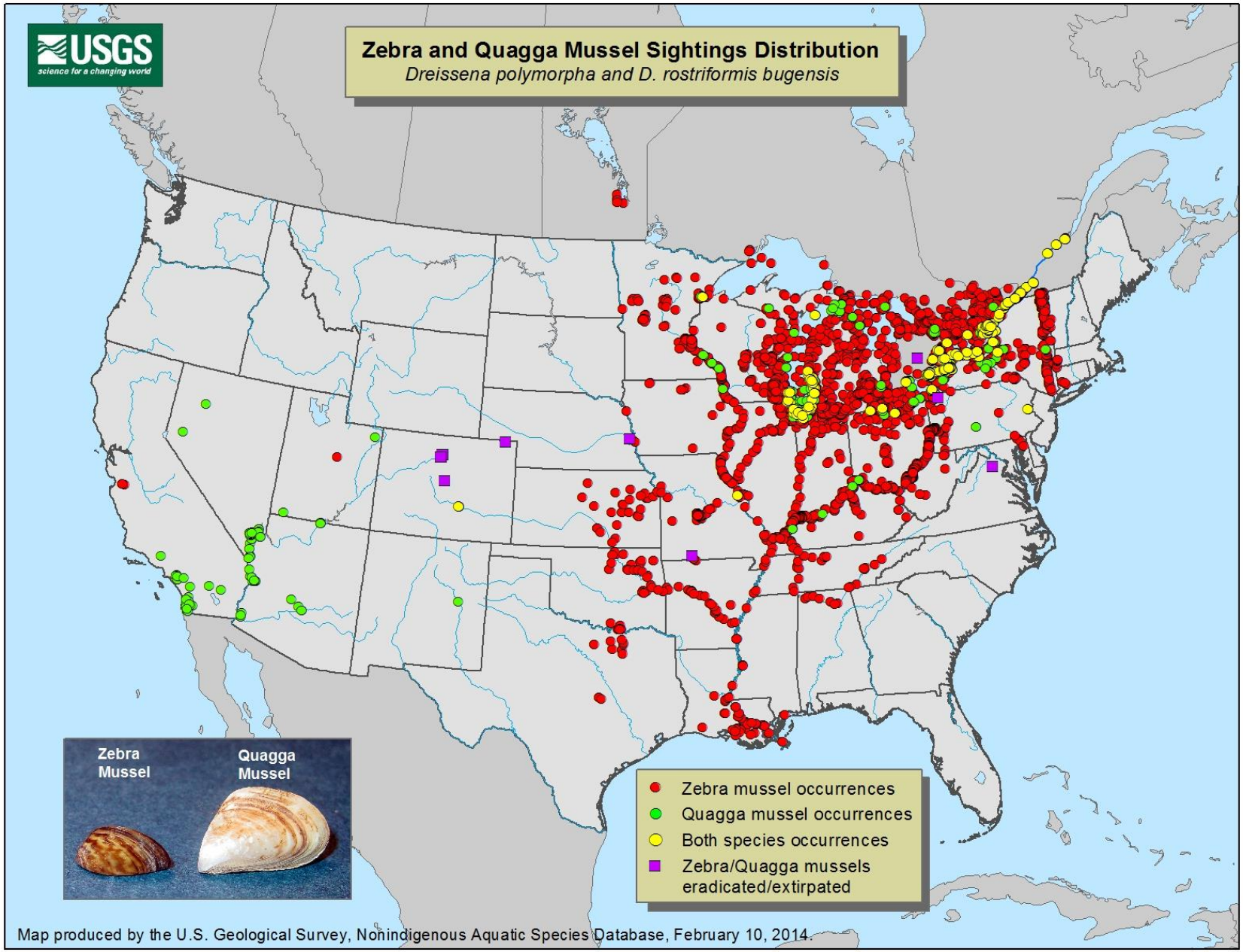

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Facilities at Risk

- Dam Gates
- Trash Racks/Intake Screens
- Pump Stations
- Water Treatment Facilities
- Instrumentation/Gages
- Fire Protection Systems

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Risk Assessment

- **Based only on historical water quality**
- **Known tolerance ranges of ZMs**
- **Not a 100% accurate assessment of risk**
- **Lake profile data may be useful for planning of new structures**

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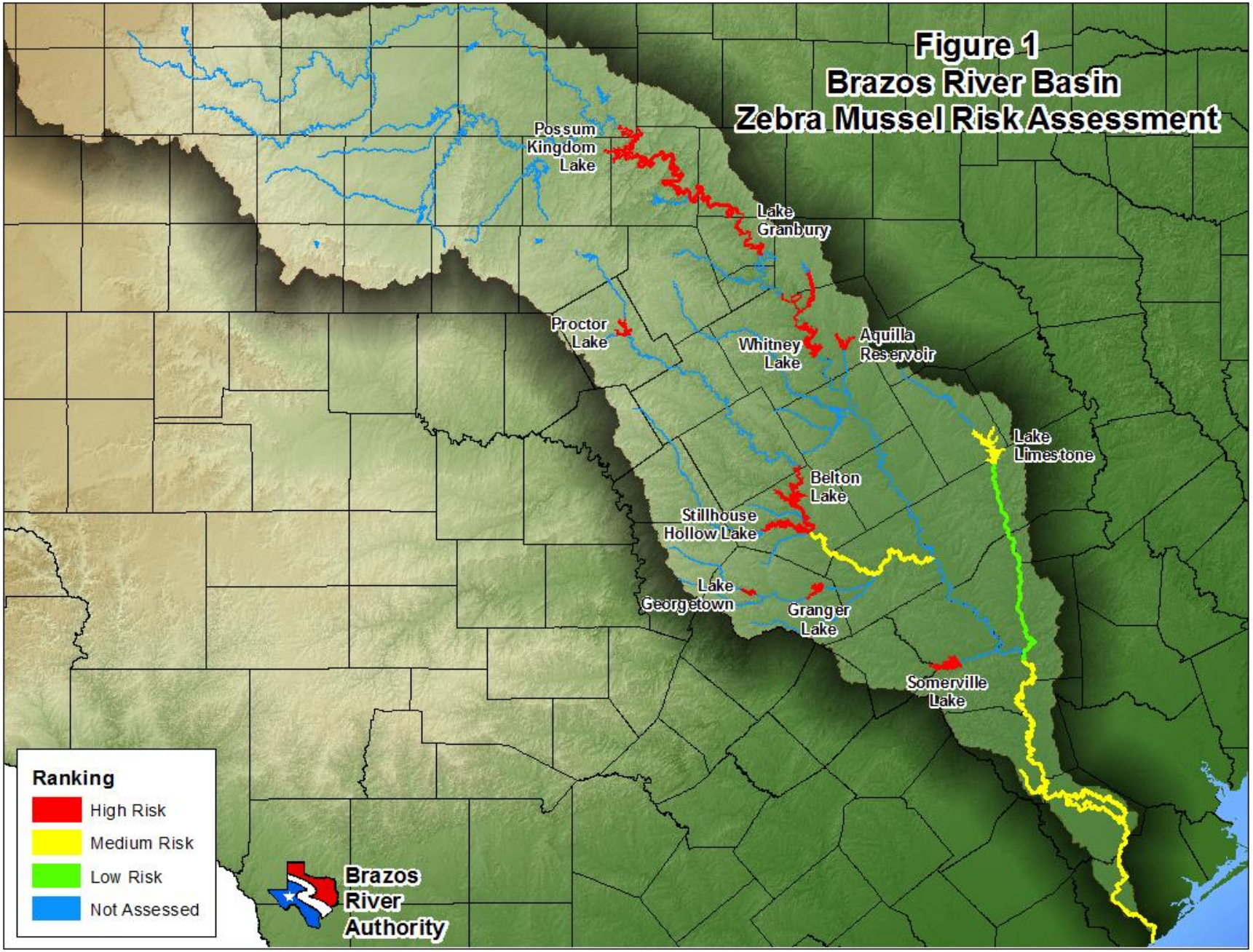

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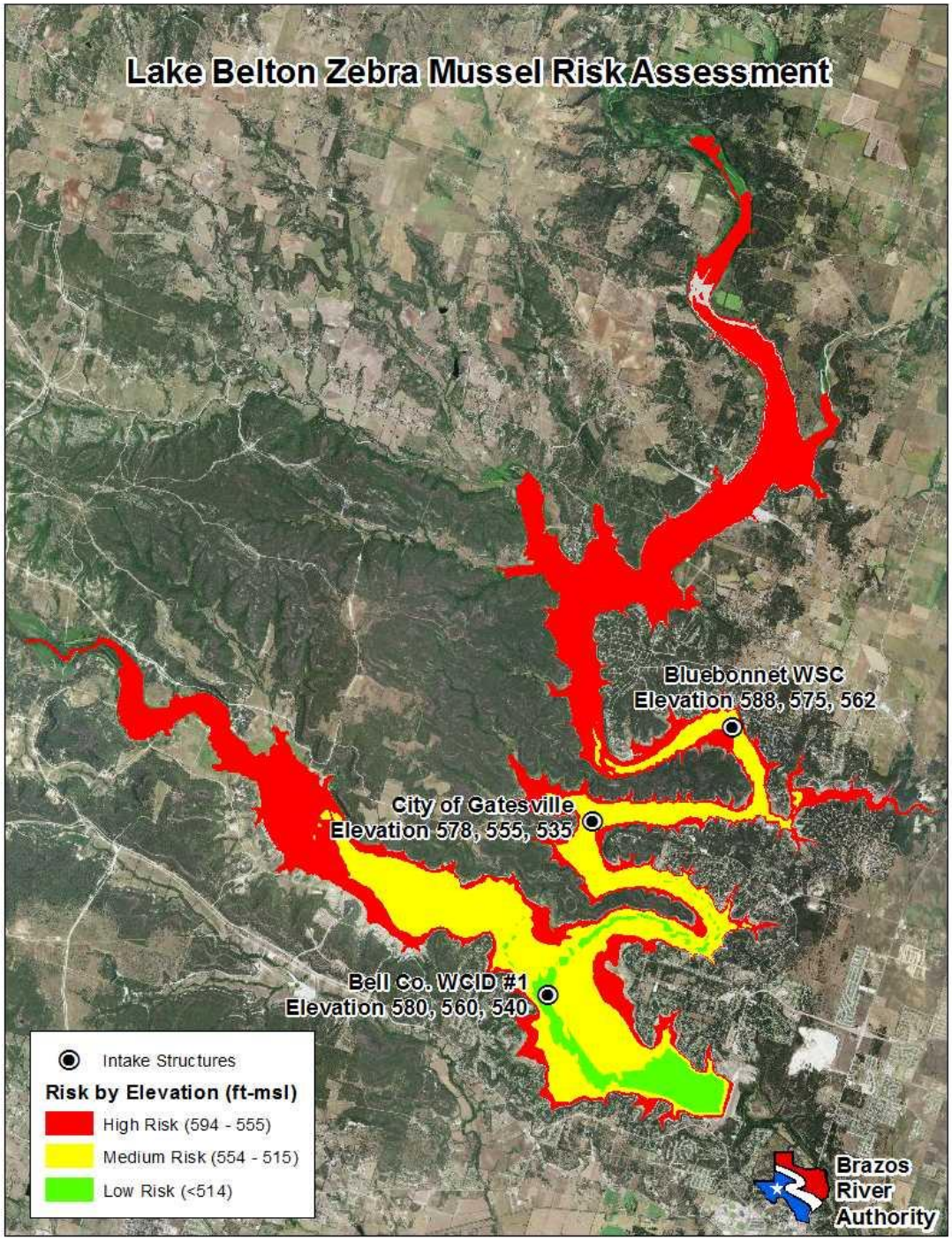

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TPWD Regulatory Drain/Dry Requirements

- **Implement at all applicable reservoirs and streams**
- **Anticipate being a state-wide regulatory requirement for all state streams and reservoirs by July 2014**

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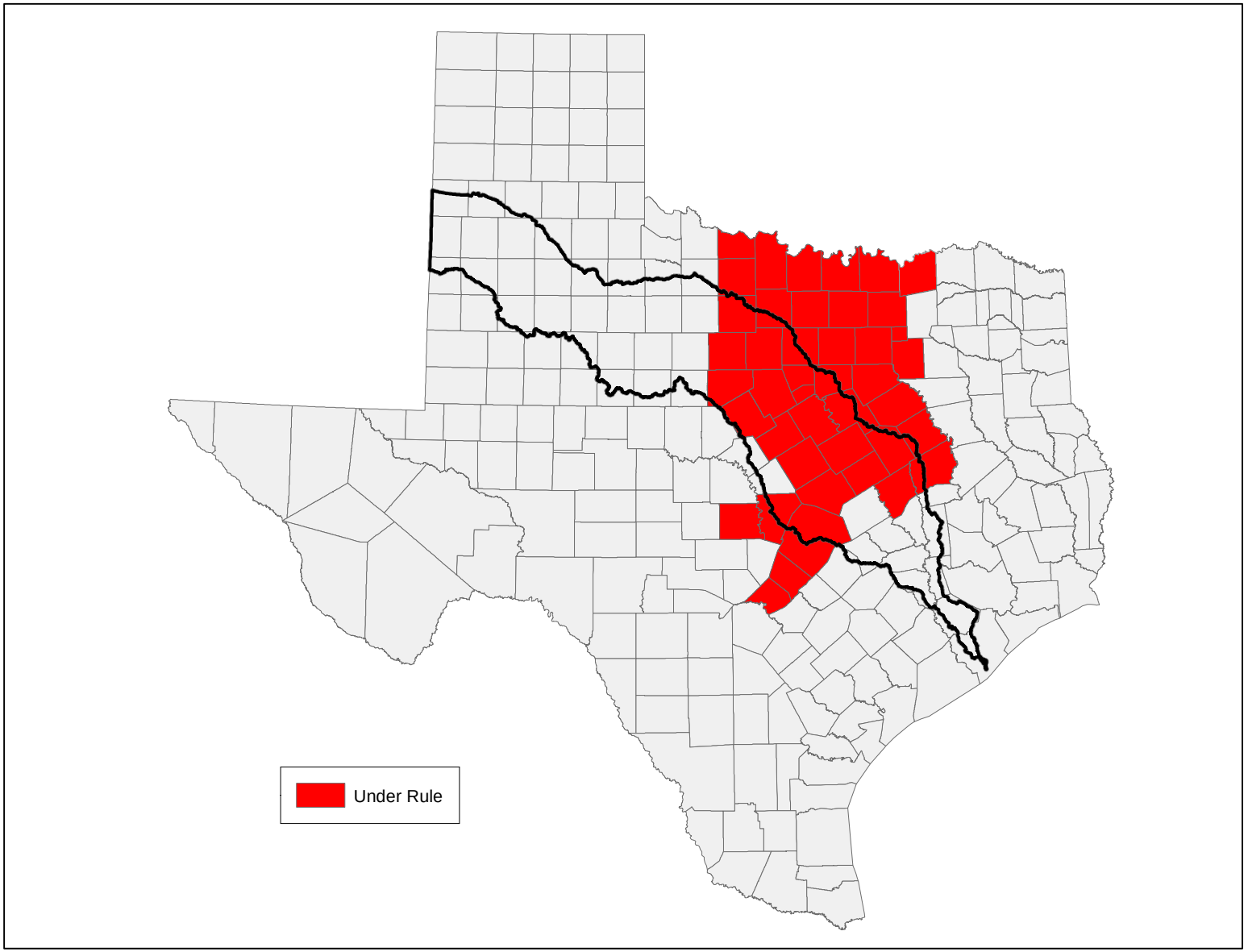
Counties Under Regulatory Drain and Dry Requirements



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Requirements of Drain/Dry

- **Step 1 – Drain at point of egress**
  - **Live wells, bilges, motors, buckets, water intake systems, any other receptacle that retains water**
- **Step 2 – Dry (Boats and Equipment)**
  - **For one week**
  - **High-pressures washer (>140°F), dry 24 hours**

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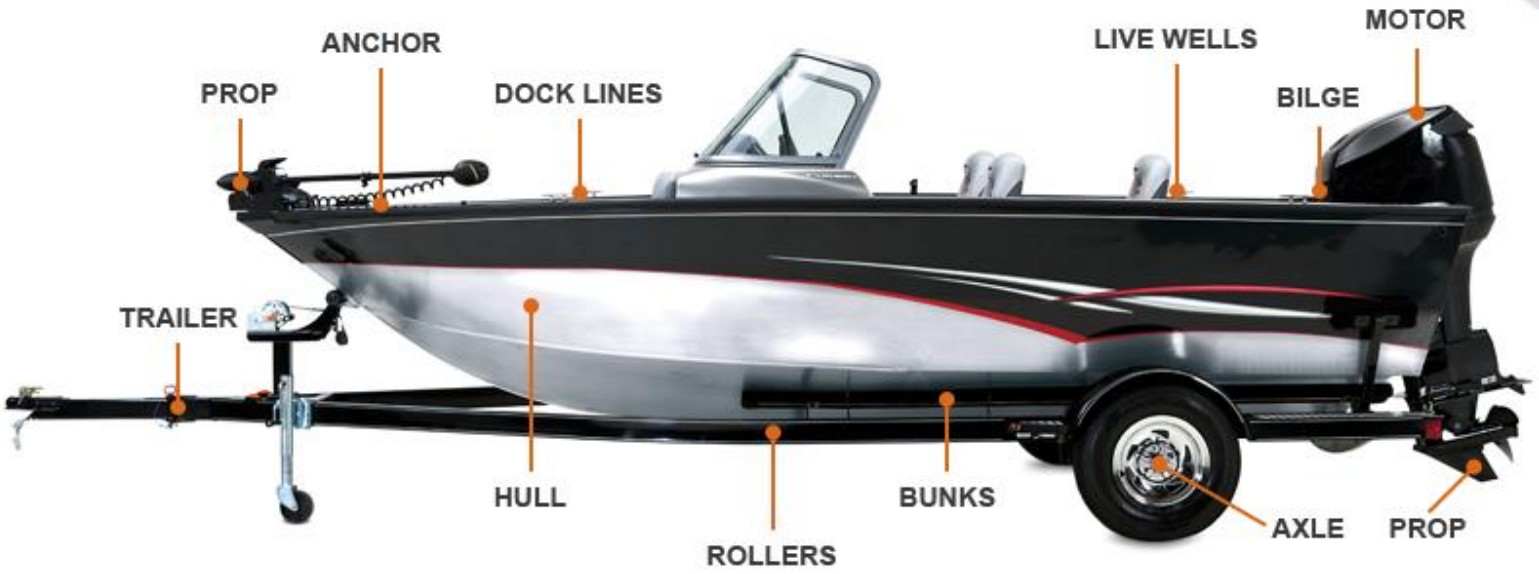
ZEBRA MUSSELS HIDE HERE

You can't always see zebra mussels because their larvae are invisible to the naked eye. They can survive for days in water trapped in a boat. The only way to be sure you're not carrying zebra mussels to another body of water is to always clean, drain and dry your boat, trailer and gear.



CLEAN

Clean your boat, trailer and gear by removing all plants, animals and foreign objects.

DRAIN

Drain all water from the boat, including the motor, bilge, livewells and bait buckets, before leaving the lake.

DRY

Dry the boat and trailer for a week or more before entering another water body. If unable to let it dry for at least a week, wash it with a high-pressure washer and hot (at least 140-degree), soapy water.

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Awareness and Monitoring

- **Recognition of zebra mussels vs. native mussels (TPWD)**
- **Divers know what to look for Annual inspection of submerged facilities**

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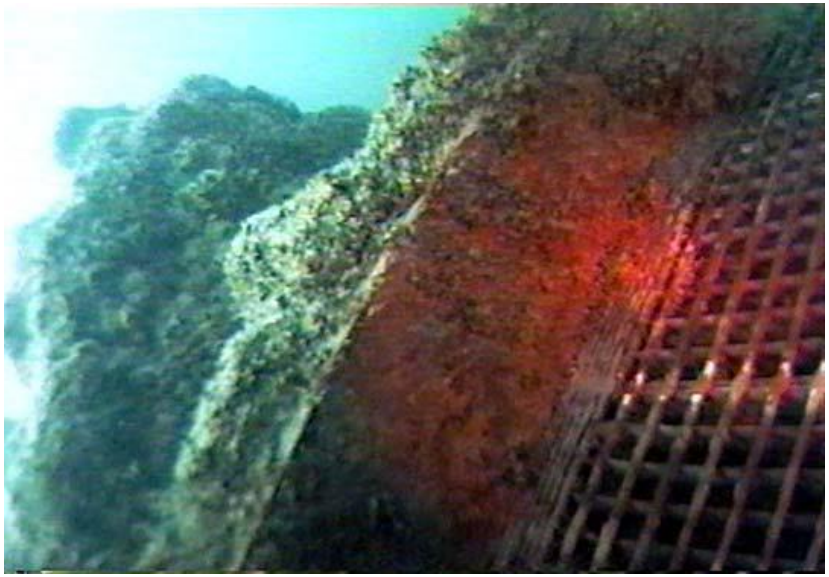
Control Measures

- **Best defense is early detection**
- **Cannot treat an entire reservoir**
- **No single strategy appropriate for all structures**
- **Numerous chemical and non-chemical measures**



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Endangered Species Update

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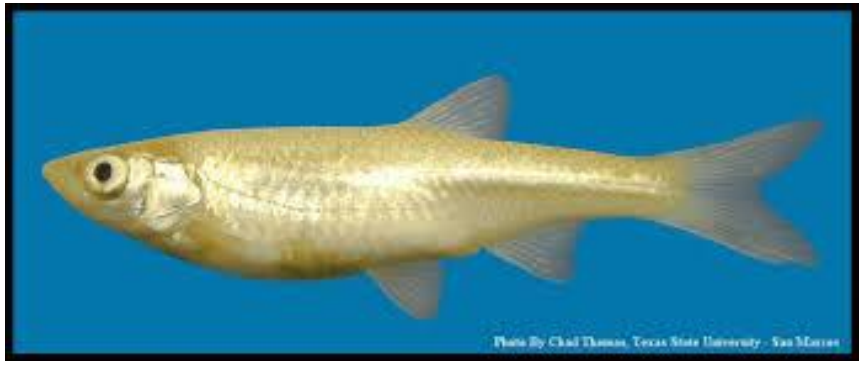
Smalleye and Sharpnose Shiners

August 2013 – USFWS proposed listing as endangered and declared critical habitat



Sharpnose shiner

Smalleye shiner

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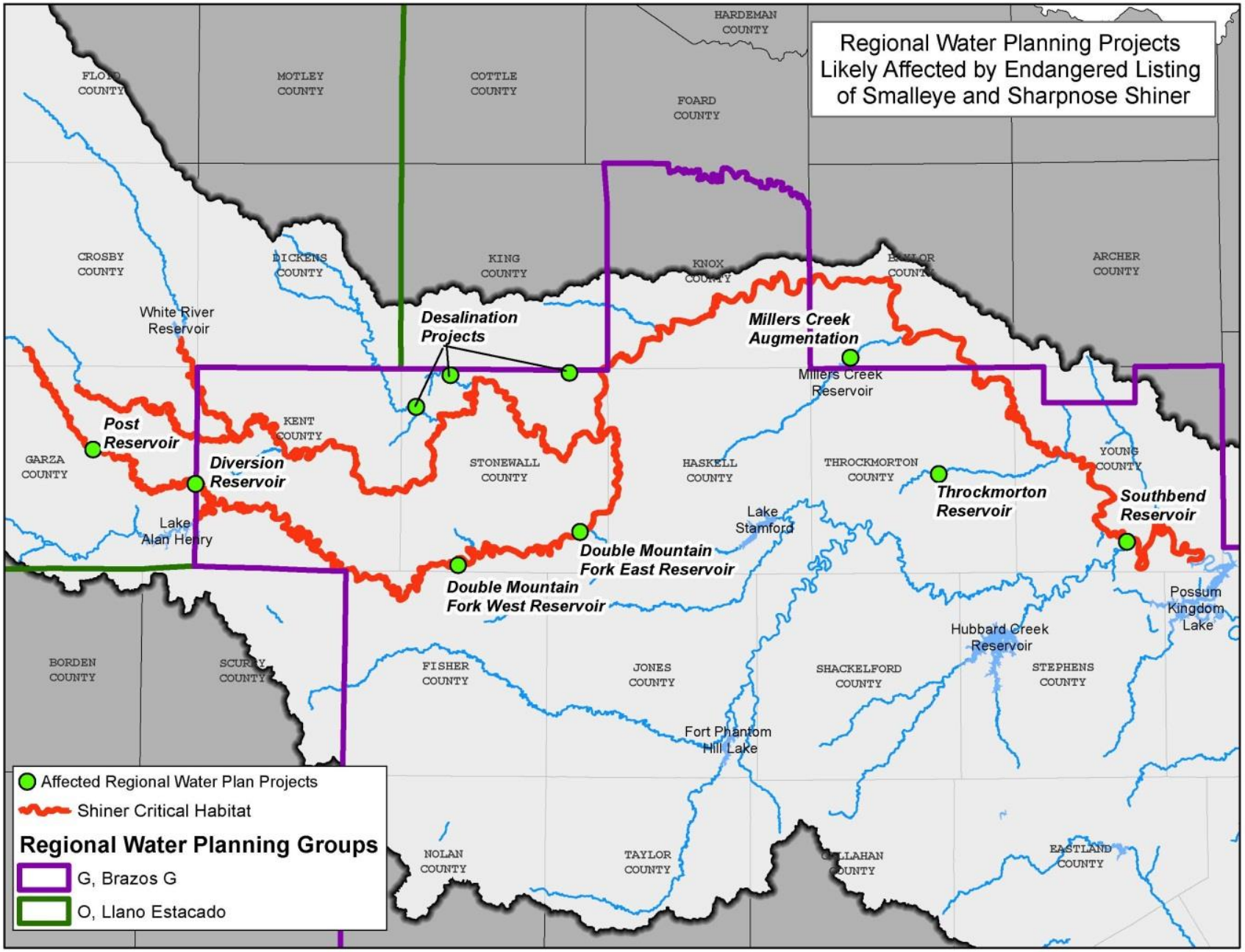

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Primary Impacting Factors

- River fragmentation
- In-channel obstructions
- Alteration to natural flow regime
- Drought
- Salt cedar encroachment
- Golden alga
- Desalination projects
- Water quality degradation

Salt cedar

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Economic Analysis Document

- **Published March 4, 2014**
- **USFWS conclusion no significant economic impacts likely to result from the designation of critical habitat**
- **Analysis appears to focus primarily on expense to USFWS**
  - **Little attention given to impact to various industries from compliance with new rules (i.e. cost for a MUD to bore under channel)**

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Salamanders

August 2012 – USFWS proposed listing 4 salamanders as endangered

- **3 of the 4 known to occur in Williamson and/or Bell Counties**

Salado Creek Salamander

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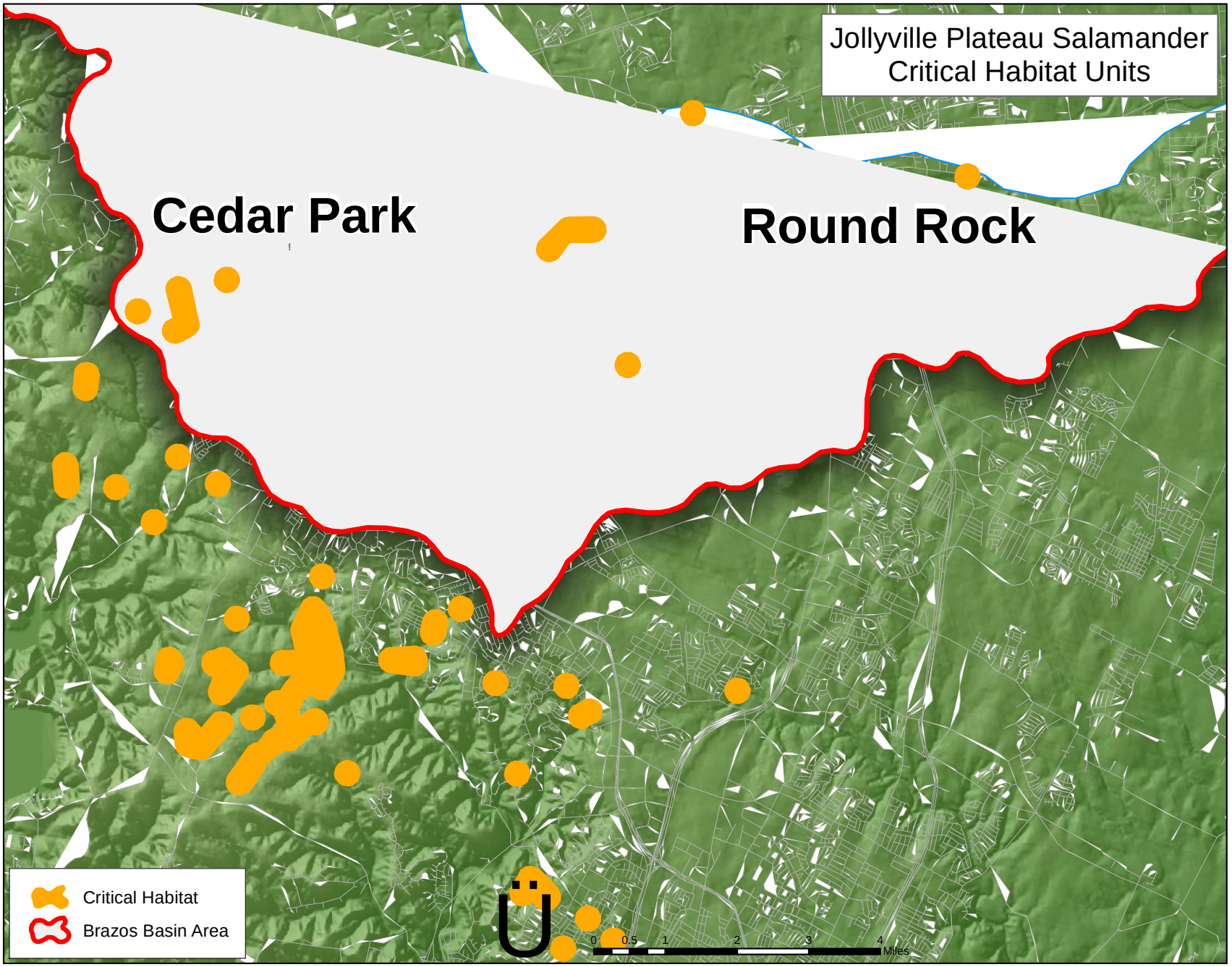

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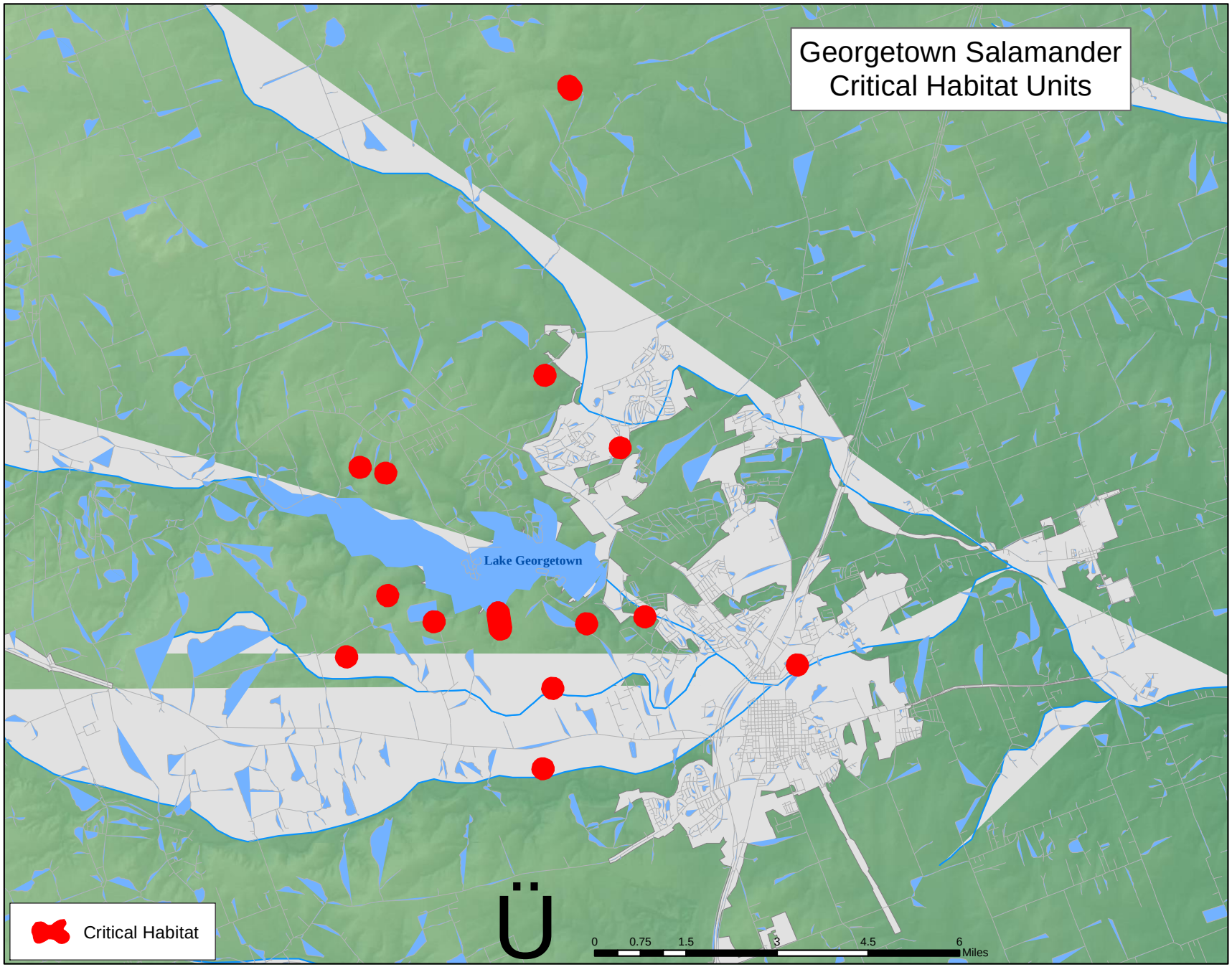

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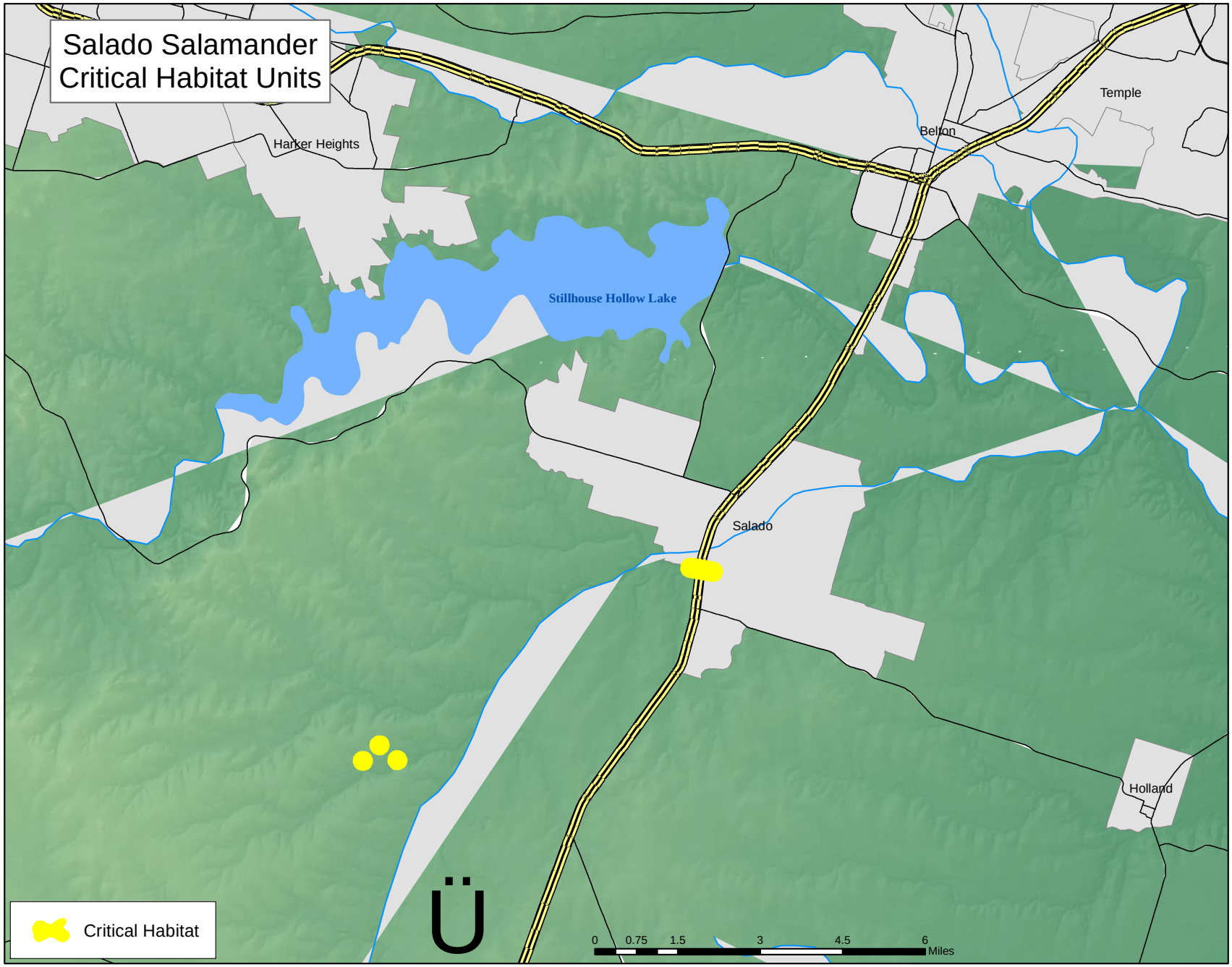
Salado Salamander Critical Habitat Units



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Economic Analysis Document

- **Published January 25, 2013**
- **USFWS conclusion no significant economic impacts likely to result from the designation of critical habitat**
- **Seems to determine only economic impact is related to the expense of Section 7 consultations and their outcomes**
- **No attention given to impacts to potential tax base and job growth (i.e. Home Depot chooses to build in Holland rather than Salado to avoid issue altogether)**

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Jollyville Plateau Salamander

- **August 2013 listed as endangered**
- **USFWS in process of developing a recovery plan**

Jollyville Plateau Salamander

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Georgetown and Salado Salamanders

- **February 2014 listed as threatened**
- **USFWS in process of developing a recovery plan**

Georgetown Salamander

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Recovery Plans

- **Will be published for public comment**
- **Expectations**
  - **Stricter water quality standards**
  - **Stricter ground water protections**
  - **Efforts to reduce habitat destruction**
  - **Application of Edwards Aquifer Rules throughout Bell and Williamson Counties**
  - **Stricter TPDES permit limits for nitrate, PAHs, conductivity and pesticides**
  - **Limits on impervious cover**
  - **Stormwater regulations for Salado and maybe livestock producers**

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What's up next?

- **Freshwater Mussels – anticipated to be evaluated in 2016**
- **Three known to occur in Brazos Basin**
  - **Texas Fawnsfoot – LPN 2**
  - **Smooth Pimpleback – LPN 8**
  - **False Spike – previously thought extinct**
    - **Found in San Gabriel River in 2012-2013**

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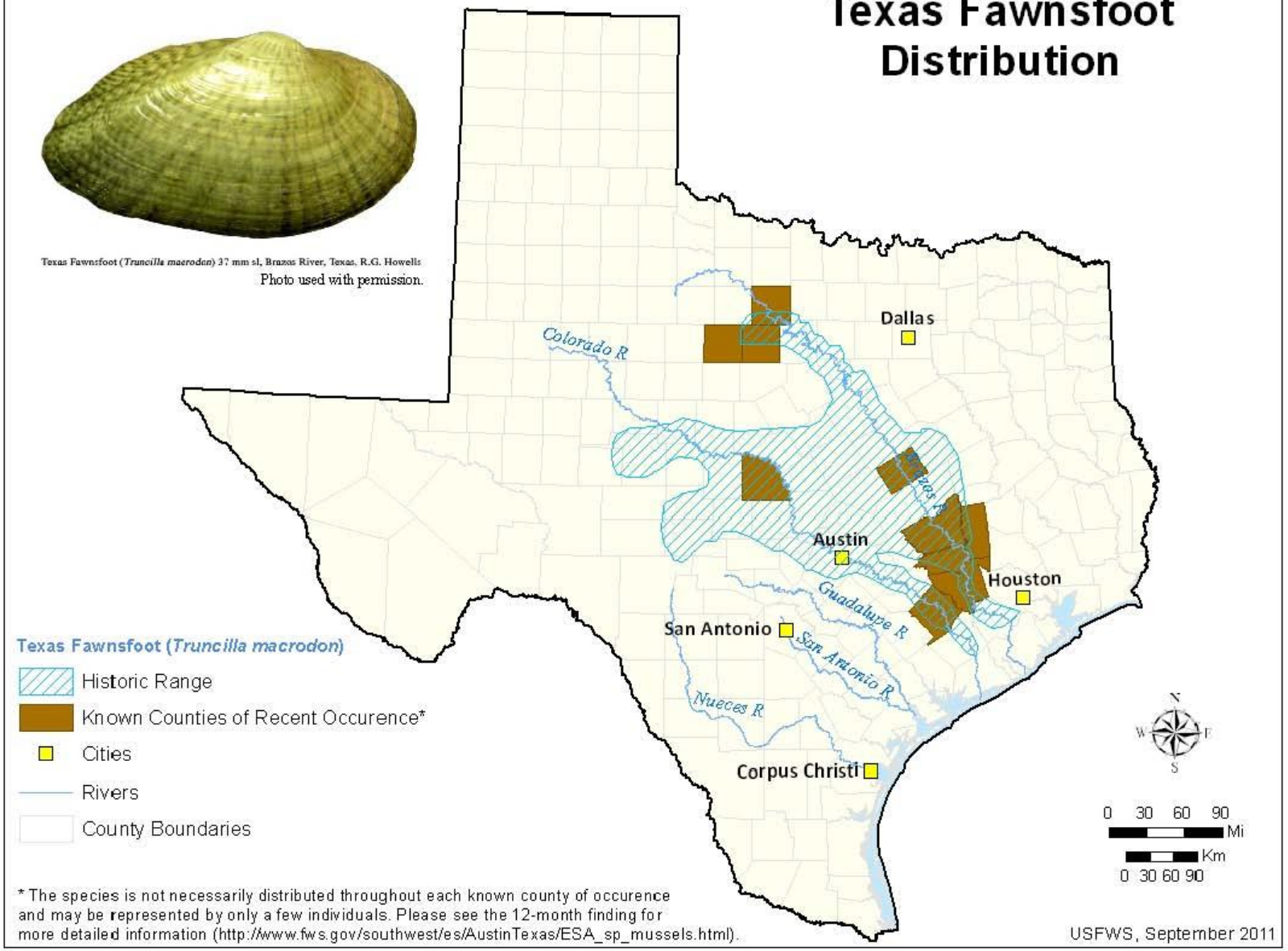
Texas Fawnsfoot Distribution

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



* 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

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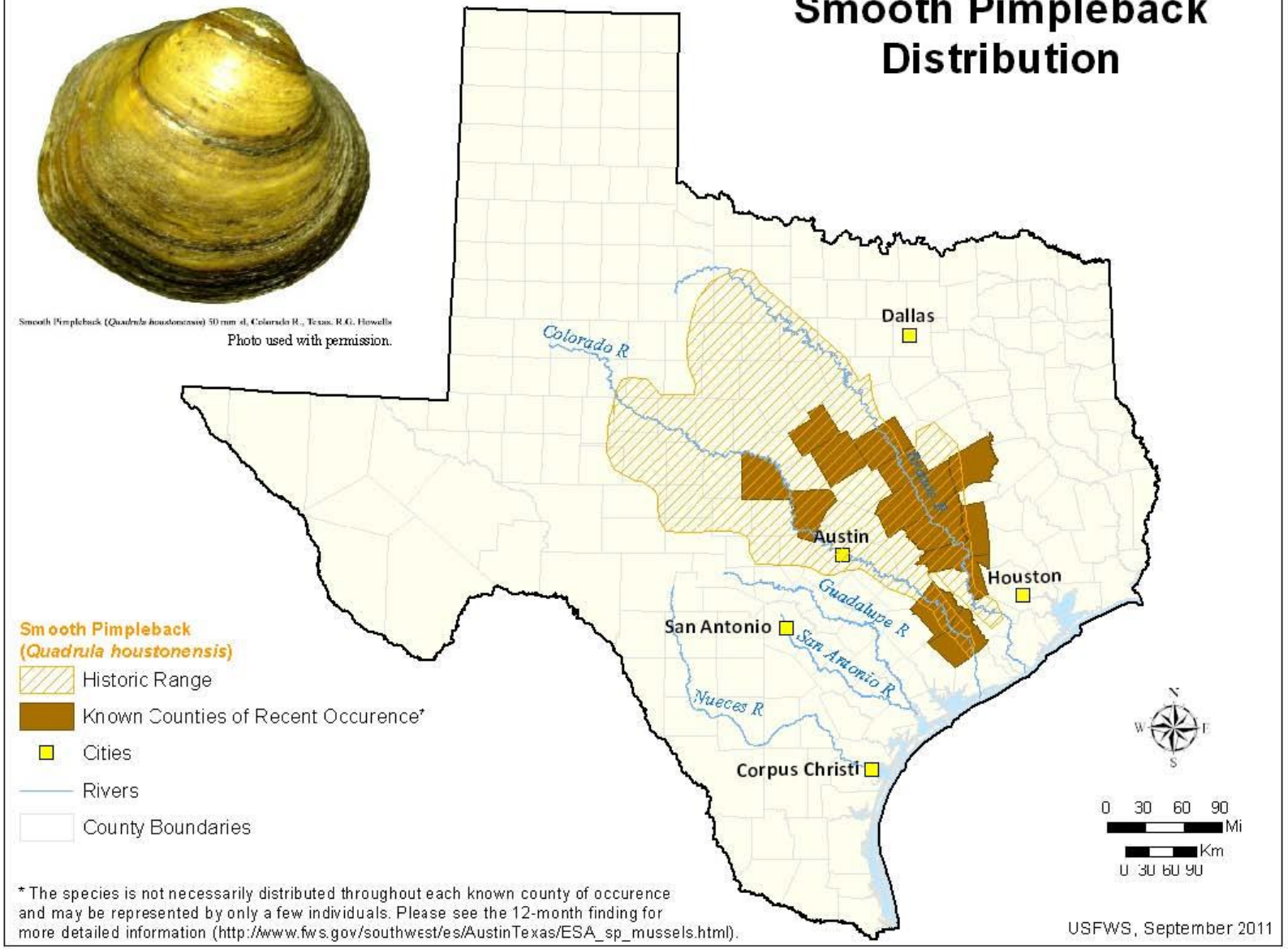
Smooth Pimpleback Distribution

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

Photo used with permission.



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