

Addendum:

Freshwater mussel biodiversity survey within the Big Thicket National Preserve

State-threatened mussel species documented in BTNP:

**Fusconaia askewi* (Texas Pigtoe); **Fusconaia lananensis* (Trinangle Pigtoe); *Lampsilis satura* (Sandbank Pocketbook); *Obovaria arkansasensis* (Southern Hickorynut); *Pleurobema riddellii* (Louisiana Pigtoe); *Potamilus amphichaenus* (Texas Heelsplitter)

**F. lananensis* has limited distribution range and is only known to inhabit specific tributaries of the Neches-Angelina drainage basin including Village Creek but not in the Neches River mainstream (Howells et al., 2012).

**F. askewi* is endemic to the Sabine, Neches, and Angelina Rivers.

Study sites:

This project will primarily focus the creation of a detailed mussel species inventory list for the lower stream reaches of the Village Creek drainage basin located within the BTNP, in addition to the previously un-surveyed wetlands of the BTNP located in Orange County, TX. As time and funding allow, Pine Island and Little Pine Island Bayous and other portions of the lower units will be surveyed.

Past studies:

With the exception of the mainstream of the Neches River, the majority of sites from the most recent survey of freshwater mussels in the BTNP, completed by Ford 2015 (Unpublished), were located at easily accessible locations such as bridge crossings. Though several state-threatened mussels were detected in Ford's survey, *P. riddellii* was not reported. Additionally, only informal methods were employed in Ford's survey, so the resulting data cannot be used in a statistically sound assessment of temporal change in populations because, according to Strayer and Smith (2003), the only accurate inference that can be made from such a survey is

that of species occurrence near bridges and easy access points. However, some basic insight on the effects of the 2016 flood may be gained through comparison of site specific current vs. past species presence / absence data.

Karatayev and Burlokova (2007) attempted to survey Village Creek, but were unable to complete their work due to violent currents resulting from flooding. However, they were able to locate the state-threatened species, *P. riddellii*.

Bordelon and Harrel (2004) performed the most intensive survey of the Village Creek basin to date. The state-threatened species documented in this survey were *F. askewi*, *O. arkansasensis*, *P. riddellii*, and *L. satura*. Sites from this study will be revisited with the assistance of Bordelon (confirmed through personal communication). Relative abundance of mussel species at these sites will be compared to the 2004 inventory.

Survey design:

Sampling will be performed in multiple stages. Preliminary surveys will utilize low-cost, informal methods to survey the waters of the BTNP. Non-quantitative random timed searches, based on the methods of Metcalfe-Smith et al., 2000, will be conducted in areas where adequate beneficial habitat is located. Though this method is known to be beneficial in the location of rare species, quantitative inferences of population dynamics, such as temporal population change, cannot be established through such a design. Therefore, further probability based sampling efforts will be concentrated at sites found by our preliminary surveys to contain dense mussel populations. This multi-stage sampling will allow statistically valid inferences of population dynamics to be established (Strayer and Smith, 2003). A literary review failed to

show any such quantitative data to have been collected on mussels in the BTNP. This project will provide current baseline freshwater mussel population data which can be used for statistically credible future assessments of temporal population change.

Field transportation:

If required in the lower unit wetlands, the use of an airboat will be donated to the research team through arrangements with a private benefactor. All other forms of transportation used in this study will be provided by the researcher or research institution.

2017 Budget Description	<i>(Updated)</i>	Amount
Researchers:		
- Lead Graduate Researcher		\$6080
- Assistant Researchers		\$3600
Travel:		
- Boat and Road		\$2800
		Total \$12,480

Literature Cited (*updated*)

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