

5-6865-01: Evaluating the Efficacy of Mussel Relocation in Texas with In-Situ Field Studies and the Development of a Texas Mussel Database

Background

The Texas Department of Transportation (TxDOT) is responsible for mitigating impacts to natural resources at road and bridge construction sites. For freshwater mussels, environmental assessments to ensure compliance with state (Texas Parks and Wildlife Code Title 5, Subtitle B, Chapter 68) and federal (16 U.S. Code Chapter 35) endangered species laws are conducted to determine whether sensitive species occur within the project area. If mussels are found, they are translocated to in-stream refugia to prevent or minimize impacts resulting from construction activities. However, it remains unknown whether translocation is an effective conservation tool. Another issue facing TxDOT is how to best prioritize or identify projects that require mussel surveys or relocations. Currently, information from the TPWD Texas Natural Diversity Database is used to determine whether an in-stream survey is warranted, but this database is not kept up-to-date and the information provided is often too coarse for determining whether threatened species actually occur near a proposed bridge project. As a result, TxDOT continues to expend valuable resources for surveys where state-listed mussels are not present. To address these issues, this project evaluated the efficacy of translocation using a suite of species from different locations and developed an online mussel database to be used for planning mussel surveys.

What the Researchers Did

- *Evaluated the lethal and sublethal effects of mussel translocation and post-translocation monitoring:* Translocation is used to conserve rare mussel species, yet a debate remains about its merit due to poor understanding of lethal

and sublethal effects on transported mussels. We evaluated survivorship, recovery, body condition, and total glycogen and lipids for one common and widely distributed species (*Cyclonaias pustulosus*), two rare species (*Cyclonaias petrina*; *Lampsilis bracteata*), and one species complex (*Fusconaia* sp. – *Fusconaia chunii* and *Fusconaia flava*) from the East Fork of the Trinity River and the Llano River of Texas. Resident and translocated mussels were initially monitored monthly and then quarterly for 8 months in the East Fork and 21 months in the Llano River.

- *Developed and provided a Practitioners Workshop:* This workshop demonstrated the methods and results of the translocation implementation project, including the MoTX website.
- *Finalized Mussels of Texas online database for rare and common mussel species (MoTX):* MoTX is a database of rare and common mussel species that integrates validated museum and field survey data. Taxonomic

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identification and collection meta-data were verified by recognized experts. The database and associated website provide near real-time information on the status and distribution of all mussel species in Texas along with individual species summaries and conservation range maps. Currently, the database has over 20,000 verified records, which may increase in the future through further multi-institutional collaborative support. The online database can be accessed at <http://musselsoftexas.nri.tamu.edu>. Potential users will need to register following instructions provided on the website.

What They Found

Survivorship and recovery for *C. pustulosa* and *Fusconaia sp.* were high in the East Fork, ranging from 93 to 100% and 85 to 92%, respectively. Body condition and total lipids of translocated *C. pustulosa* were initially lower than those of the resident treatments, which may have indicated a short-term impact. Body condition of the *Fusconaia sp.* did not differ between

treatments, but total glycogen and lipids were higher for the translocation treatment during the second month of monitoring, which could also indicate a short-term impact. Survivorship of *C. petrina* and *L. bracteata* in the Llano River was higher for the resident treatments, at 91% and 100%, respectively, compared to those for the translocation treatments, which were 83% and 22%. Recovery was 100% for all treatments except for the *L. bracteata* translocation treatment (69%). Declines in survivorship for *C. petrina* were mirrored by decreases in the body condition. Declines in survivorship for *L. bracteata* were due to predation by *Procyon lotor*. A large flood of 3,766 m³/s at the end of the study eliminated both study sites on the Llano River.

What This Means

Our findings indicate that translocating mussels can achieve some level of success, but the resulting sublethal effects and elevated mortality for endangered species mean that managers should be cautious about using this technique.

For More Information

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