Numerous surface waterbodies in Texas are classified as having high levels of fecal coliform bacteria, an indicator of fecal pollution. The presence of high numbers of fecal coliforms indicates that disease-causing microorganisms (pathogens) sometimes found in animal and human wastes may also be present. Current laboratory tests used to identify *E. coli* and other fecal coliform bacteria do not provide information on whether the source of pollution is from sewage, runoff of animal wastes, failing septic tanks, wildlife, or other sources. The sources of pollution need to be identified to implement effective pollution control strategies to improve water quality.

**Objectives**

- To develop bacterial genetic and biochemical libraries of *E. coli* bacteria isolated from known human and animal sources (fecal specimens, septic systems, domestic sewage) in the Lake Waco and Lake Belton watersheds using state-of-the-art Bacterial Source Tracking (BST) techniques.

- These *E. coli* BST libraries are necessary to identify the animal or human origin of *E. coli* bacteria isolated from water samples collected in these watersheds, thereby identifying human and animal nonpoint sources of fecal contamination.

- The libraries developed through this research will be the foundation of a statewide bacterial source tracking database and will be used by the Texas State Soil and Water Conservation Board (TSSWCB) and the Texas Commission on Environmental Quality (TCEQ) to identify sources of bacterial contamination and develop effective water quality protection strategies.

**Findings and Benefits**

- Results of this research helped identify nonpoint human and animal sources of fecal pollution impacting Lake Waco and Lake Belton and facilitate proactive development of water quality protection strategies. Wildlife was found to be a leading source of pollution, followed by cattle and human pollution.

- The most comprehensive *E. coli* culture collection and BST library in the state was developed through this and our other BST projects.

- The developed BST library is being expanded through several other current projects. The comparison of BST methodology in the Waco study and selection of most useful techniques has allowed us to reduce costs significantly for future studies.

- The project team was awarded the 2007 Texas Environmental Excellence Award, the state's highest environmental honor, for this research.