

# Ecological Risk Planning Tool for the DOE



Sponsored by the Texas Commission on Environmental Quality (TCEQ) and the Department of Energy (DOE), the Texas Center for Applied Technology (TCAT) teamed with West Texas A&M to develop a risk planning tool that provides the DOE with a quick and accurate assessment of the ecological risk for wildlife within a particular habitat. The model uses mathematical expressions to develop default protective concentration levels (PCLs) for ecological receptors.

## METHODOLOGY OVERVIEW

**Phase 1** TCAT developed the list of receptors, the ecological habitats supported by the site, the food webs, the feeding guilds and the measurement receptors of each feeding guild.



**Phase 2** TCAT developed a list of Chemicals of Concern (COCs), their fate, transport and toxicological profiles. The list used solid waste management groupings, Resource Conservation Recovery Act Facility Investigation Reports, risk assessments, and work plans.

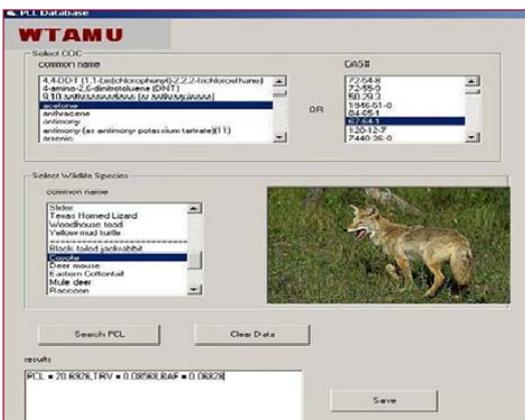


**Phase 3** TCAT developed exposure estimates for COCs experienced by indicator species in the Panhandle area of Texas. Life history parameters and default values for ingestion rates were also developed. Bioaccumulation factors for each trophic level were developed to determine total dose for persistent and bioaccumulative COCs, exposure from environmental media, food intake, and magnification between successive trophic levels.

**Phase 4** TCAT developed toxicity reference values for COCs impacting wildlife receptors. The toxicological data was classified for mortality, reproduction, growth, and population. Each result was inserted into a decision matrix to derive a No Observed Adverse Effect Level (NOAEL). PCLs were derived separately for four groups of ecological receptors: plants, reptiles/amphibians, birds, and mammals.

## DEMONSTRATION

The user chooses a habitat, a species, and a chemical. The tool then determines if a full ecological risk assessment will be needed. It is estimated that this tool will save millions of dollars by reducing the need for a full and site specific ecological risk assessment each time an alteration to land, including construction, occurs. This model was peer reviewed by the Environmental Protection Agency Region IV, the TCEQ, the Fish and Wildlife Service, Texas Parks and Wildlife, and industry experts.



## TEXAS CENTER FOR APPLIED TECHNOLOGY

There are many problems that require the careful and proper integration of applied technologies to find solutions. The Texas Center for Applied Technology (TCAT) was created to focus on these specific problems and to develop effective and efficient solutions. TCAT's core competency is the innovative application of existing technologies and advanced research to solve complex real-world problems.

TCAT's primary objective is to apply and test technologies to address targeted problems and engage basic research as required. TCAT has employees in a variety of locations with the ability to perform research that cuts across multiple technologies, disciplines, and cultures. The Center's employees are knowledgeable regarding customers' requirements and are ready to respond effectively to provide the best value for the customers' needs including expertise in technology insertion, technology assessments, and test and evaluation.

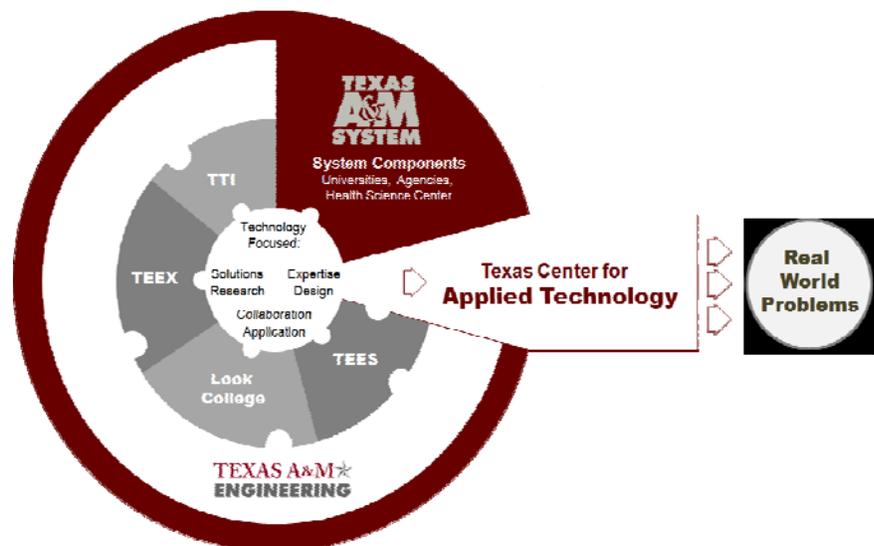
TCAT is part of the Texas A&M Engineering Experiment Station (TEES), a member of The Texas A&M University System. The A&M System is one of the largest and most comprehensive systems of higher education in the United States. Through a statewide network of eleven university campuses, seven state agencies, and a comprehensive health science center, the A&M System educates more than 120,000 students on its university campuses, conducts more than \$780 million in research, and reaches another 22 million people through service each year. TEES is an engineering research agency for the state of Texas and conducts over \$147 million in research annually. Because of the Center's position within the Texas A&M Engineering program, TCAT's expertise can easily be extended by rounding out its team with world class faculty researchers, as appropriate. TCAT is in an excellent position for collaboration not only with The Texas A&M University System components and their customers but with other universities, institutions, centers, and industry.

## TCAT'S CORE COMPETENCIES

Energy Sustainability ★ Environmental Sustainability  
Manufacturing & Systems Engineering ★ Information Technology ★ Modeling & Simulation  
Technology Insertion ★ Test & Evaluation

## TEXAS A&M ENGINEERING

Texas A&M Engineering consists of the Dwight Look College of Engineering, and three engineering agencies, including TEES: Texas A&M Transportation Institute (TTI) conducts research and professional education in all modes of transportation. The Texas A&M Engineering Extension Service (TEEX) works to develop a highly skilled and educated workforce and enhances public safety through training, continuing education, and technical assistance.



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