Joint Effort by TTI, Texas A&M AgriLife Helps to Protect Endangered Species From Road Projects

To be effective, toad exclusion fences need to prevent climbing and have jumpouts (pictured above) to allow toads to escape construction zones.

Unintended encounters with cars and trucks are nearly always bad news for animals. But not only do creatures face dangers on existing roads, they're often imperiled from the moment that road construction begins.

Animals of all types and sizes need to move about their habitats to forage, breed and simply exist, and that movement can sometimes involve crossing over or through a road project at any stage of completion. And if those critters hold protected status under the federal Endangered Species Act, their presence can automatically cause construction delays and increased project costs.

Operating agencies and contractors use exclusion fences to prevent those intrusions. Testing the efficacy of three toad exclusion fence (TEF) alternatives is the focus of a joint research effort involving Texas A&M AgriLife and the Texas A&M Transportation Institute (TTI). Two of the fences are from private-sector manufacturers, and the third was designed by the Texas Department of Transportation, which is funding the research. The two protected species in question are:

- the Houston toad, classified as endangered under law and the first amphibian to be listed as federally endangered on the Endangered Species Act; and
- the nonvenomous Louisiana pine snake, classified as threatened and one of the rarest snakes in North America.

The effort brings together two agencies with distinct and long-established capabilities. "AgriLife personnel are the experts on animals, so they take care of actually handling these species, and TTI researchers have the real estate and background in building test sites," says Jett McFalls, TTI assistant research scientist and lead for TTI's role in the project. "We both bring our best expertise to the project." McFalls emphasizes that the endangered snake and toad

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Right: Houston toad. Editorial credit: Chase Fountain, Texas Parks and Wildlife Magazine.

Test Pen Area at TTI's Sediment and Erosion Control Laboratory.

aren't actually used in the research. Instead, researchers use the common Gulf Coast toad and corn snakes as substitutes because they are of similar size and characteristics.

Habitats for the protected species are concentrated in several southeast Texas counties. The most serious threat facing the two is habitat loss, resulting in part from clear cutting of forest lands to accommodate agricultural use and urban expansion. The associated use of pesticides and herbicides exacerbates the problem. Completed high-traffic roads can create barriers for movement between foraging, hibernating and breeding locations, and motor vehicle encounters exacerbate the mortality rate of both species.

The AgriLife/TTI effort involves a two-phase evaluation process. In phase one, researchers used the three TEF varieties to build 18 pens at TTI's Sediment and Erosion Control Laboratory on the RELLIS campus. The snakes and toads are placed in the pens, and their activity is monitored overnight with video cameras to document their movement (successful and unsuccessful attempts to escape the pen). To work properly, the TEF must not only prevent intrusion by snakes and toads but also allow them to escape if they were already present when the fences were installed. This controlled testing was done over the summer months in 2021 and resumes this spring.

In phase two, McFalls and his colleagues installed about 1.5 miles of the three different TEFs at roadway right-of-way locations where AgriLife staff determined that the protected species are known to live. The team will monitor the sites, comparing snake and toad mortality rates with rates recorded prior to the TEF installations.

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Research findings should enable agencies to keep their construction projects on track and within budget, while at the same time meeting the requirements federal legislation passed almost half a century ago to address the interests of threatened wildlife. The act, passed in 1973, is the primary law in the United States for protecting imperiled species. Its purpose is twofold: to prevent extinction and to help species recover to a point where protections are no longer needed.

Kristina Chyn, a postdoctoral research associate who leads the AgriLife team on this effort, emphasizes the need for broader study. "There are many gaps in our understanding of how roads affect wildlife," she says. "Even roadkill, the most obvious impact of roads on wildlife, is not given much attention. As roadkill observations are a relatively cheap and easy way to collect wildlife-road impact data, robust roadkill observation networks throughout Texas, supported by community scientists and volunteers, would be a low-hanging fruit to immensely help road-wildlife research." ■

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