

VERTEBRATE BY-CATCH OF PIPELINE TRENCHES IN THE MESCALERO-MONAHANS SHINNERY SANDS OF SOUTHEASTERN NEW MEXICO—

During construction of pipelines that connect oil wells to collection facilities, trenches are dug that can be hundreds of kilometers in length and may remain open for months causing animals that fall into these trenches to be trapped (Doody et al. 2003). An evaluation of the 792 km Eastern Gas Pipeline in southeast Australia revealed that 7,438 animals of 103 species were captured in the trench (Doody et al. 2003). From 25 August–19 September 2001, 298 reptiles of 16 species were trapped within a 302 km pipeline trench near Albuquerque, New Mexico (C. Painter, New Mexico Department of Game and Fish, personal communication). Our objective was to document the vertebrate by-catch caused by trenching for a natural gas pipeline in the Mescalero-Monahans shinnery sands ecosystem of southeastern New Mexico. The Mescalero-Monahans shinnery sands of southeast New Mexico is characterized by shinnery oak sand dunes, which include expanses of vegetated dunes with open depressions (i.e., blowouts) in a matrix of shinnery oak (*Quercus havardii*) and mixed-grasses (Leavitt and Fitzgerald 2013). Several endemic species occur in this ecosystem (Tinkham 1961, 1979, Hovore 1981, Degenhardt et al. 1996, Leavitt 2012), including the dunes sagebrush lizard (*Sceloporus arenicolus*), an endemic habitat specialist that is endangered within the state of New Mexico (Fitzgerald and Painter 2009).

During the summer of 2010, we opportunistically surveyed portions of a 65-km long trench beginning from an area south of Maljamar, New Mexico, to Artesia, New Mexico (east-end of trench line; 388212 E, 3631563 N). The trench measured 1.5 m deep and 0.7 m wide. Between 24 and 31 July 2010, we conducted six surveys on a 2-km section of the trench for approximately 45–90 min, in the afternoon (between 1400–1800 hr [$n = 3$ surveys] and between 2000–2200 hr [$n = 3$ surveys]). We removed 24 individuals of 10 vertebrate species from the trench, of which four were found dead (16.7%; Table 1). We did not find dunes sagebrush lizards in our surveys of this trench.

The section of trench surveyed was entirely within the Mescalero-Monahans shinnery sands ecosystem; the remainder of the trench extended across a transition zone into Chihuahuan desert grasslands and Chihuahuan basins and playas. Additionally, our observations provide a conservative measure of the impacts of trenching here because we conducted surveys at various times of day and were unable to account for predators removing animals from the trench. During our surveys we observed coyote (*Canis latrans*) tracks in and around the trench, and two active loggerhead shrike (*Lanius ludovicianus*) nests nearby, both of which are capable of preying on small vertebrates in the trench.

The New Mexico Department of Game and Fish (NMDGF) developed recommendations intended to mini-

mize the impact of trenching operations on native fauna (NMDGF 2003). These guidelines recommend that operators “keep trenching and back-filling crews close together”, to minimize the amount of open trenches at any given time that trenching should be conducted, and that trenches should not be left open overnight. If trenches cannot be back-filled “immediately”, escape ramps should be constructed at least every 90 m. Escape ramps can be short lateral trenches or wooden planks sloping to the surface; the slope should be less than 45° (1:1). Trenches that have been left open overnight should be inspected and animals removed prior to backfilling, especially where endangered species occur (NMDGF 2003).

The section of trench we surveyed was open for 51 days from 19 July to 7 September 2010 and no escape ramps for wildlife were constructed. However, there were four access ramps for people located at intersections with other pipelines that animals may have used to climb out of the trench. This is the first report of by-catch and deaths of vertebrates as a result of open trenches in the Mescalero-Monahans shinnery sands ecosystem of southeastern New Mexico. We recommend NMDGF seek a mechanism to inform all parties of their trenching guidelines, receive acknowledgment that the guidelines are understood, and develop regulations that are enforced. Land use practices are significant drivers of biodiversity loss (Tilman et al. 1994, Foley et al. 2005, Leavitt and Fitzgerald 2013). Acknowledgement of contributors to biodiversity loss and developing adaptation strategies to remediate this loss, including enforcement and regulation, may serve as a means to bridge this gap.

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Table 1. Vertebrates captured while surveying 2 km of an open trench in the Mescalero-Monahans Shinnery Sands of New Mexico, USA, during six visits in late July 2010.

Species	Common name	Captured	Found Dead
Reptiles			
<i>Aspidoscelis marmorata</i>	Marbled Whiptail	2	1
<i>A. sexlineata</i>	Six-lined Racerunner	4	1
<i>Phrynosoma cornutum</i>	Texas Horned Lizard	5	
<i>Tantilla nigriceps</i>	Plains black-headed Snake	1	
<i>Uta stansburiana</i>	Common Side-blotched Lizard	2	
Amphibians			
<i>Anaxyrus cognatus</i>	Great Plains Toad	3	
<i>Scaphiopus couchii</i>	Couch's Spadefoot	1	
<i>Spea bombifrons</i>	Plains Spadefoot	4	
Mammals			
<i>Geomys knoxjonesii</i>	Knox Jones' Pocket Gopher	1	1
<i>Perognathus flavus</i>	Silky Pocket Mouse	1	1