



Getting to the Root of Disturbance

Studying the Effects of Feral Swine Rooting Behavior on Soils and Native Plant Communities on the Kerr Wildlife Management Area

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A lone feral pig captured on a game camera at the Kerr Wildlife Management Area.

Land, then, is not merely soil; it is a fountain of energy flowing through a circuit of soils, plants, and animals.

~Aldo Leopold, A Sand County Almanac, 1949

Most of us are familiar with a scene featuring upturned soil and uprooted vegetation, signs that feral pigs have been rooting here. How did feral pigs, originally native to Eurasia and northern Africa and the culprits behind this destruction, end up in the Texas Hill Country?

Domesticated pigs were brought to the mainland United States, specifically Florida, as a food source for Spanish explorers in the 1500s. The free-ranging livestock practices of the time, combined with inadequate enclosures, led to their escape and subsequently the establishment of feral pig populations. From Florida they began spreading across the southeastern United States. In the 19th and early 20th century Eurasian wild boars were introduced to America for recreational hunting purposes. These interbred with feral swine, and the resulting hybrid is what is often seen today.

Over the years, these populations have spread at an alarming rate. Feral pig populations now occupy at least 45 states with an estimated population of 5 million. Roughly 2.5 million of these feral pigs live in Texas, with documented populations in all but one county. In recent years, this expansion has increased even more rapidly due to the illegal transportation of feral pigs. This has enabled populations to spread and establish in areas far earlier than the natural rate of dispersal would have allowed.

As an invasive species, feral pigs are extremely challenging to manage for a number of reasons. One characteristic that has aided their success is their ability to rapidly reproduce. The average gestational period of a feral sow is roughly 115 days, with an average litter size of eight piglets. A healthy sow can have two litters per year in ideal conditions.

To complicate matters even more, feral pigs have few natural predators and ample unexploited habitat to occupy. Another characteristic that makes them such a successful invader is that they are a generalist species. Their ability to thrive across multiple ecosystems and utilize a wide variety of food sources

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Pig rooting soil disturbance in the Armstrong Pasture.

makes them highly adaptable. While most of their diet consists of plant matter which they obtain through rooting, they have been known to consume insects, small mammals and the eggs of ground-nesting birds.

Perhaps the most startling aspect of this invasive species is the sheer cost in damages they inflict because of their rooting behavior. Nowhere is this more apparent than in our agricultural communities. In Texas, there are roughly \$52 million in agricultural damages associated with feral pigs, annually. Texas AgriLife Extension has estimated this annual cost to be roughly \$7,500 per landowner. While these statistics are alarming, one of the less obvious consequences of this rooting behavior is a decrease in vegetation and an increase in soil runoff and erosion. The lack of vegetation allows for water to flow more directly overland, which consequently increases erosion/deposition.

The costs of this destructive behavior on agriculture are well documented, both in governmental statistics and scientific research papers. However, the effects of rooting disturbance on soils and native plant communities are not as clear, and the research on these topics is often conflicting. Feral pig rooting directly affects soil structure and mixes soil horizons, but how these changes affect features like soil nutrients and mineralization varies across different study sites. The research of the effects on native plants is a little more conclusive, but there are still huge knowledge gaps. Furthermore, the results vary considerably between different ecosystems. Few of these studies have been conducted in Texas, and as this state has a large percentage of the country's feral hogs, it could be argued that we have the most need for this type of research.

The Kerr Wildlife Management Area earned its reputation largely from its white-tailed deer research, but over the past decade there have also been a number of studies focusing on feral swine. One of the current projects is attempting to quantify how the damage associated with feral pig rooting behavior affects native vegetation and soil components in the Edwards Plateau ecoregion.

The basic premise is simple. Information is gathered from undisturbed soil and plant communities and compared to those that have undergone feral pig soil disturbance. Erosion and regrowth of plant communities on disturbed sites is monitored

to see how long it takes for them to regenerate and how they have changed in species composition. This research is particularly relevant to the soils of the Edwards Plateau ecoregion due to their shallow depth and erosion-prone nature.

Initial work began with vegetation sampling in the summers of 2016 and 2017. We randomly generated sample locations in our research pastures, while ensuring that each available soil type was represented with a sampling site. We sampled 25-meter vegetation transects oriented to the four cardinal directions. We recorded cover class estimates approximating percent bare ground, litter/organic matter, grasses, forbs and woody cover present. Data from these surveys will be used to characterize plant communities that occur in the area and will later be compared to sites that have been regenerated following feral pig disturbance.

Directly adjacent to the vegetation transects we built exclosures using cattle panels and t-posts. Soils sampled from these sites will be the comparison benchmark to soils sampled from sites of feral pig soil disturbance. Measurements from these sites include rates of soil erosion/deposition, rates of decomposition of organic matter, soil texture, rock fragment content, soil carbon and nitrogen, and soil pH. These data will provide quantitative evidence that will be used to determine how the soil changes after a feral pig soil disturbance.

Final results are still forthcoming, but they will provide some insight into how our landscapes are being changed by these invasive animals. If we have one parting thought on the subject, it's this: as a wildlife researcher it can be too easy to become enamored with the newest trending research topics and to forget that all wildlife management essentially boils down to preserving healthy habitat. That means being mindful of our plant communities and the soils upon which they depend. 🐾