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The Texas Feral Swine Eradication and Control Pilot Program

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ABSTRACT: The Agriculture Improvement Act of 2018 (the 2018 Farm Bill) established the Feral Swine Eradication and Control Pilot Program. The program funded \$75M for 5 years, split evenly between the Natural Resources Conservation Service (NRCS) and the Animal and Plant Health Inspection Service (APHIS), both programs within the US Department of Agriculture. The agencies solicited joint programs from states with high densities of feral swine in two phases. In Texas, NRCS and APHIS submitted three multi-county project areas along watersheds for Phase I funding and one eradication effort along with two crop protection projects in Phase II. The eradication project was adjacent to a Phase I project area and after extensive surveillance, it was determined to be successful, the first such project in Texas. All the remaining projects were designed with a direct management effort, a self-help effort through trap loans and a damage assessment process. Landowner in-kind contributions were identified and captured to detail the effects of the program.

KEY WORDS: crop protection, damage assessment, economic benefit, Eradication and Control Program, feral swine, *Sus scrofa*, Texas, watershed protection

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INTRODUCTION

The Agriculture Improvement Act of 2018 (the 2018 Farm Bill) established the Feral Swine Eradication and Control Pilot Program. The program funded \$75M for 5 years, split evenly between the Natural Resources Conservation Service (NRCS) and the Animal and Plant Health Inspection Service (APHIS), both programs within the US Department of Agriculture. The agencies solicited joint projects from states with high densities of feral swine in two phases. In Phase I in Texas, NRCS and APHIS submitted proposals to control feral swine in three project areas roughly aligned with sections of specific watersheds. These were the Canadian River Project (consisting of Hartley, Potter and Oldham Counties), the Red River Project (Clay, Wichita, Wilbarger and Hardeman Counties) and the Upper Leon Project (consisting of Eastland, Erath and Comanche Counties). All three projects were accepted and funded. A second round of proposals was solicited and NRCS and APHIS submitted three additional projects. Phase II projects included an eradication effort in Dallam County a crop protection effort in Williamson and Milam Counties and another crop protection effort in Bee/San Patricio/Nueces counties. While Phase I and Phase II projects were designed to include all of the affected counties to make project administration and data collection efficient, the latter Phase II projects focused specifically on removing swine to protect the 2022 and 2023 crop production cycles.

The Texas projects included direct control of feral swine conducted by APHIS Wildlife Services, technical assistance and training in feral swine damage and trapping techniques, a trap loan program to allow landowners to assist themselves, damage assessments and community-level outreach. NRCS funding was provided to the Texas State Soil and Water Conservation Service (TSSWCS) through a competitive grant and TSSWCS worked with the local Soil and Water Conservation Boards to purchase

traps for the trap loan program and coordinate outreach. To coordinate trap loans and direct control, TSSWCS also contracted with the Texas Wildlife Damage Management Association, the non-federal partner in the Cooperative Texas Wildlife Services (TWS) Program, to have TWS supervised technicians deliver traps, assist landowners erect traps and to move traps among requestors.

Damage assessments for Phase I project areas was contracted by TWS with Texas A&M AgriLife Extension Service. Since these projects were designed as watershed projects, TWS requested Extension to collect data from TWS customers as well as non-customers in these counties. Damage assessment for Phase II project areas was conducted by TWS employees since these projects were designed to protect crops only.

Community-level outreach (workshops, newspaper articles, etc.) was conducted by the Texas A&M Natural Resources Institute under a grant from TSSCWB.

While funding was available beginning in FY 2019, the administrative process to fund projects took much of the year. Additionally, public health restrictions associated with the SARS-CoV-2 pandemic precluded community-wide meetings and blanket sign-up events.

METHODS

Direct control was available at no cost to landowners willing to provide access to TWS employees. Landowners could select methods available, including ground and aerial shooting, corral-style trapping and snaring. Most cooperating landowners selected all methods, though some restrictions were necessary (e.g., no aerial hunting during deer season) to meet the landowners' specific objectives. Direct control was applied as available, with helicopter gunning rotated between project areas and ground methods applied when swine populations were present. In Phase II project areas, direct control was timed specifically prior to planting and as crops matured to maximize the benefit to

protected crops.

Trap loan participants were able to request a trap either directly from the TWS technician or through the county Soil and Water Conservation Board. Traps were delivered by the Technician and assistance was provided in selecting the location and erecting the trap. All counties were supplied with cellular monitored/activated traps and landowners were provided access to the network so they could monitor pig usage during the pre-baiting stage and so that they could activate the gate. TWS Technicians also had access to the trap cell program so they could also monitor the trap usage to effectively move traps when they weren't being used. Trap loan participants in Phase I project areas were also provided up to 100 lbs. of corn at no cost for each trap loan event.

Damage assessment for Phase I projects was conducted by a team of technicians supervised by Texas A&M Department of Rangeland, Wildlife and Fisheries Management. Technicians collected information for damage related to land, livestock, crops, soils, range resources, water, and wildlife. Technicians also collected information related to feral swine removals by landowners, private control companies, and TWS. Because each of the Phase I projects had different commodities protected, damage assessments are reported cumulatively. Damage assessments for the Williamson/Milam and Bee/San Patricio/Nueces projects in Phase II were conducted by TWS employees, since these projects were specifically designed to protect crops and the extensive crop production areas within the projects led to some producers not having any damage and not being worked by TWS. Phase II data are reported separately.

RESULTS

Canadian River Project

The Canadian River Project was designed along the Canadian River in Oldham and Potter Counties and included Hartley County to the north. The project area included large ranches with rangeland damage and removing feral swine not only protected Texas landowners but reduced the risk of feral swine invasions into adjacent New Mexico. Hartley County has a mix of cropland and rangeland includes a domestic swine production facility. Control in Hartley County not only protected crops but reduced the risks of feral swine diseases to domestic swine and eliminated the pigs which could disperse into Dallam County.

Direct control was conducted beginning in FY 2020 on 36 properties totaling 1,014,557 acres. A total of 896 feral swine were removed: 12 by ground shooting (1%) and 884 (99%) through aerial shooting. An analysis of take/sq mi and take/hour of aerial shooting indicates pig populations were decreased 71% and 80% respectively during the project. Direct control costs totaled \$692,626 for four fiscal years.

A total of 21 landowner trap loans (some landowners received trap loans in multiple years) were conducted beginning in FY 2021. Trap loan participation declined over time with 14 landowners (representing 235,720 acres) participating in FY 2021, six landowners (96,310 acres) in FY 2022 and only one landowner (4,500 acres) in FY 2023. TWS Technicians were able to determine the number of feral swine at the trap site when the traps were

triggered. Of 440 swine at the trap site, 379 were captured by trap loan participants during the three years. Landowner time spent trapping was calculated at 8,249 hours which, when valued at the NRCS-established rate of \$29.64 for skilled labor is valued at \$244,500 in in-kind services. Trap loan participants removed 29.7% of the feral swine removed in this project area.

Beyond the trap loan program and aside from the community outreach project, TWS employees made 11 separate educational outreach events reaching 29 individuals.

TWS employees were able to utilize feral swine collected in this project area to investigate the relationship between feral swine and infectious prions which cause Chronic Wasting Disease (CWD). CWD has recently been discovered in mule deer and elk in this area and TWS recovered the brains and lymph nodes of nearly 100 feral swine removed in the first round of control. Researchers UT Health Houston, under a grant from the National Feral Swine Damage Management Program, were able to collect infectious prions from feral swine lymph nodes, indicating that feral swine play a role in the maintenance and distribution of prions that cause CWD.

Red River Project

The Red River Project targeted 4 counties adjacent to the Red River in the western portion of the Texas border with Oklahoma. This project was deliberately designed to complement a pilot project in Oklahoma immediately north of these four counties. The project area is comprised of a mix of cropland and rangeland. One of the counties, Wilbarger, had poor participation as the majority of the county is under single ownership. Project participation across all four counties increased significantly, from 107,605 acres in FY 2021 to 593,964 acres in FY 2023.

Direct control was conducted beginning in FY 2020 and was conducted on 196 properties totaling 661,359 acres. A total of 18,181 feral swine were removed: 1,219 by shooting (7%), 508 by trapping (3%) and 16,454 by aerial shooting (90%). An analysis of take/sq mi and take/hour of aerial shooting indicate feral swine were reduced 33% and 57% respectively during the project. The overall reduction in feral swine is indicative of the fact that many landowners did not receive the full four years of service, signing on for control late in the project. Direct control costs totaled \$1,369,526 for four fiscal years.

A total of 61 landowner trap loans were conducted beginning in FY 2021. As with the Canadian River Project, landowner participation declined over time with 33 landowners (150,450 acres) participating in FY 2021, 17 landowners (15,603 acres) in FY 2022 and 11 landowners (31,651 acres) in FY 2023. TWS Technicians were able to determine the number of feral swine at the trap site when the traps were triggered. Of 3,389 swine at the trap site, 3,028 were captured by trap loan participants during the three years. Landowner time spent trapping was calculated at 15,491 hours valued at \$459,153 in in-kind services. Trap loan participants removed 14.2% of the feral swine removed in the project.

Beyond the trap loan project and aside from the community outreach project, TWS employees made 112 separate educational outreach events reaching 601 individuals.

Upper Leon River Project

The Upper Leon River Project was selected because this stretch of the river is impacted by bacterial contamination. Two of the three counties identified (Erath and Comanche) were participating counties within the TWS program, so landowner contacts had already been made and direct control was initiated in Q4 of FY 2019.

Direct control was conducted beginning in Q4 of FY 2019 on 341 properties totaling 415,574 acres. A total of 30,976 feral swine were removed: 12,551 by shooting (40%), 3,284 by trapping (11%), 22 by snares (<1%), and 15,090 by aerial shooting (49%). An analysis of take/sq mi and take/hour of aerial shooting indicate feral swine were reduced 54% and 40% respectively during the project. Direct control costs totaled \$1,313,526 for four fiscal years.

A total of 50 landowner trap loans (some landowners received trap loans in multiple years) were conducted beginning in FY 2021. Trap loan participation declined over time with 24 landowners (representing 8,953 acres) participating in FY 2021, 13 landowners (3,167 acres) in FY 2022 and only 13 landowner (4,984 acres) in FY 2023. TWS Technicians were able to determine the number of feral swine at the trap site when the traps were triggered. Of 2,909 swine at the trap site, 2,775 feral swine were removed by trap loan participants during the three years. Landowner time spent trapping was calculated at 13,007 hours which, when valued at the NRCS-established rate of \$29.64 for skilled labor is valued at \$385,527 in in-kind services. Trap loan participants removed 8.2% of the feral swine removed in this project area.

Beyond the trap loan project and aside from the community outreach project, TWS employees made 293 separate educational outreach events reaching 573 individuals.

Dallam County Eradication Project

As an accepted project during the second phase of funding, TWS employees set out to eradicate pigs in Dallam County. Dallam County is located in the northwest corner of the Texas Panhandle and shares the State border with Oklahoma to the north and New Mexico to the west. TWS has removed feral swine in Dallam County in the past and pigs have been seen in the county since those events.

Because Phase II did not get started until just before the 2022 crops were to be planted, TWS employees worked with the local Soil and Water Conservation Board to identify areas where feral swine may remain. A total of 103.7 hours of aerial surveys were flown to identify feral swine damage and to try and locate feral swine. No feral swine were removed. TWS employees also contacted local landowners, Texas Parks and Wildlife Officials and community leaders to confirm that no feral swine remain. Because there was no interest in feral swine trap loans, the traps which were available here were put into use in the adjacent Canadian River Project area.

Adjacent feral swine control in Hartley County, as well as removal of pigs in New Mexico and Oklahoma likely eradicated the pigs that once occupied Dallam County. The total cost to assure eradication was \$100,000.

Williamson/Milam Project

The Williamson/Milam Counties Project was selected specifically to protect crops grown in the counties. Given

that Phase II projects weren't funded until FY 22, NRCS and APHIS decided that addressing the entire counties was not practical, so the focus was narrowed to cropland. Direct management and trap loans were available to protect the CY 2022 and CY 2023 crop cycles. Additionally, it should be noted that the western side of Williamson County is largely urbanized and no crop protection was conducted west of IH-35 in this county.

Direct control was initiated in spring 2022 on 27 properties totaling 52,170 acres. A total of 641 feral swine were removed: 629 by aerial shooting and 12 by corral-style trapping. An analysis of take/sq mi indicated a decline of 27% while the analysis of take/hour of aerial shooting indicated an increase of 87%. The difference may be caused by the properties worked: many of the properties flown in 2023 were not flown in 2022 thus this year was the first year of control for these new farms. Direct control costs totaled \$105,00 for the two-year period.

A total of 71 landowner trap loans were made in the two-year period to landowners who controlled 40,625 acres. In this project area, TWS Technicians were able to determine the number of feral swine at the trap site when the traps were triggered. Of 628 swine at the trap site, 574 were captured by landowners. Landowner time spent trapping was calculated at 504 hours valued at \$14,938.

Bee/San Patricio/Nueces Project

Like the Williamson/Milam Project, this project was funded in FY 2022 and was designed to protect crop areas. Unlike Williamson/Milam Counties, the cultivated areas of the counties are centralized and many farms are adjacent to other farms. Feral swine damage is largely confined to those farms adjacent to brush, range or waterways while farmers in the center of the cultivated lands do not have swine or swine damage. Control to protect crops thus was conducted on the edges of large blocks of farmland.

Direct control was initiated in spring 2022 on 93 properties totaling 156,126 acres. A total of 2,202 feral swine were removed: 2,200 by aerial shooting and 2 by ground shooting. An analysis of take/sq mi and take/hr. of aerial shooting indicated a decrease of 61% and 27%, respectively. Direct control costs totaled \$255,00 for the two-year period.

A total of 42 landowner trap loans were made in the two-year period to landowners who controlled 120,409 acres. In this project area, TWS Technicians were able to determine the number of feral swine at the trap site when the traps were triggered. Of 764 swine at the trap site, 696 were captured by landowners. Landowner time spent trapping was calculated at 1,305 hours valued at \$38,680.

Feral Swine Damage

Damage assessments for Phase I projects, as reported to TAMU technicians, indicated a \$10,111,464 decline in damage during years 2020-2022 (three calendar years) for those participants answering surveys. The inclusion of 2023 production/damage data (not available at this time) will likely increase savings to over \$12M for program participants. Utilizing just three years of savings and the total expenditures, the benefit/cost ratio is 3/1.

While the ultimate measure of success may be the dollars saved, the percentage of crops lost is another indicator

of value to crop production. People who would become TWS cooperators experienced an average of 15.13% crop loss in 2019 (the year before direct management began) which declined steadily to 8.85% in 2022. Non-cooperators experienced a similar decline, from 12.8% in 2019 to 4.7% in 2022.

The damage assessment team also interviewed non-participants in the program and for these “neighbors” feral swine damage also declined. Direct control managed between 22% and 41% of the land mass in the three Phase I project areas. While the percentage of land worked during these projects remains relatively low, the areas worked exhibited greater damage than those not worked. The damage assessment team noted “Generally, WS cooperators experienced greater damages overall from feral swine, but also saw the greatest reduction in damages over the course of the project. This may lend credence to the notion that cooperators seek out WS assistance because they are most in need.” Given that non-cooperators represent the majority of the landowners in the project areas and that even non-cooperators experienced less damage due to work on their “neighbors” it may be expected that the \$10.1M in damage averted would be much greater when examined at a landscape basis.

Damage Assessments for 2 of the Phase II projects (Williamson/Milam and Bee/San Patricio/Nueces) indicated a continual decline in damage over the two years of the project. Dollar values for crops lost to pigs declined 96% for cooperators, The number of damage incidents for cooperating producers also declined by 55% in these two project areas. Because these projects were designed strictly around crop production, and because there were only 2 years of effort, the total savings were not as great as the watershed-level Phase I project areas. TWS projects that total savings, including 2023 data not yet completely analyzed, will exceed \$1M.

The Dallam County Eradication Project surprised all participants. It was understood going into the project that pig abundance was extremely low, but the fortunate opportunity to remove these swine in the adjacent Canadian River Project area left little costs to direct removal. It needs to be noted that extensive efforts were put into assuring that swine were removed: over 100 hours of aerial surveys and ground time cost \$100,000. The actual savings are incalculable.

DISCUSSION

The Texas portion of the Feral Swine Control and Eradication was successful by any standard of measure. In areas where the focus was on watershed protection (Phase I Projects) participation varied from 22-41% of the land mass. Working these areas yielded significant benefits for landowners and natural resource managers.

Direct control for the three Phase I projects cost \$2,108,726. On a cost per pig removed basis, the Phase I projects (which ran the longest) averaged \$62.38, consistent with other reported projects (Bodenchuk, 2014). Helicopter aerial shooting expenses averaged \$1,149.97/hour, far less than the \$1,800-\$2,000/hour for contract

aerial shooting utilizing turbine helicopters. Direct control for the two Phase II projects cost \$360,000.

The measure of success should never be the number of pigs killed, but rather the damage averted. In Texas, the Phase I Pilot Projects conservatively averted in excess of \$10.1M in feral swine damage. This figure does not include CY 2023 data (not yet available) nor does it accurately estimate damage averted to non-respondents of the surveys. When final analysis is available, true damage averted will likely be in the \$13-15M range. As it stands the benefit:cost ratio for Phase I is 4.79:1.

Participation in self-help programs is important but was relatively low in this project. Trap loan participants removed 11.0% of the total number of feral swine in Phase I projects (where availability of traps was the longest), 30.9% of the total number of feral swine removed in the two Phase II project areas and 12.4% of the combined total for the statewide effort. Landowner time was an important component: Landowners contributed 38,556 hours of effort in total (36,747 in Phase I projects and 1,809 in Phase II projects) valued at \$1,142,798. Landowners who participated in the trap loans were remarkably effective removing >91% of the feral swine present at the trap when triggered.

The SARS-CoV-2 pandemic had a large effect on the delivery of the program. Initially planned before the pandemic, the necessary restrictions on meetings and face-to-face contact made it very difficult and time consuming to explain the program and sign-up landowners. In counties where TWS already had a presence, the delivery of services was almost instantaneous. In other counties, however, the percentage of land signed up remained low throughout the project.

The overall percentage of land worked within each project area is not indicative of the scope of the feral swine problem. As damage data show, cooperating landowners suffered greater damage than non-cooperating landowners, indicating that the TWS program was addressing a larger proportion of the problem than percentages would indicate. Further, in the Phase II crop protection projects, landowners in close proximity to brush had greater interest in control while those in the center of cultivation had no crop damage and no need for control. In these cases, removing pigs on 10% of the landscape, for example, may have addressed 90% of the crop damage.

LITERATURE CITED

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