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Method-Specific Costs of Feral Swine Removal in a Large Metapopulation: The Texas Experience

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ABSTRACT: The methods used to remove feral swine include aerial shooting, trapping in large “corral” traps, drop nets, snaring, shooting in the daylight hours, and night shooting with specialized equipment. Each method has its utility as well as limitations. In areas with large connected populations, method selection may be based on the amount of land available for control, attitudes of neighbors towards control, time necessary to successfully implement control, and access to the habitat. Costs of control may be a secondary consideration. However, recognizing the relative cost of control in a metapopulation may assist managers when deciding between two or more equally appropriate methods. Texas Wildlife Services data were examined to determine the success rates and cost per animal removed by the various methods. Utility of each method and implementation strategies are also discussed.

KEY WORDS: costs, feral swine, removal, *Sus scrofa*, swine, Texas, wild pigs, Wildlife Services

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INTRODUCTION

Texas has the largest feral swine (*Sus scrofa*) population of any state in the U.S., estimated at 2.6 million animals (Timmons et al. 2012). Due to the large land area occupied by feral swine and the diversity of natural and agricultural landscapes, the number of conflicts in Texas likely exceeds any other state as well. The Texas Wildlife Services program (TWSP) conducts integrated feral swine damage management for cooperating landowners across the state. The TWSP is a cooperative venture between USDA-Animal and Plant Health Inspection Service, the State of Texas through Texas A&M AgriLife Extension Service, and the Texas Wildlife Damage Management Association. Federal authority for feral swine damage management rests with USDA-APHIS while state authority rests with the Texas A&M AgriLife Extension Service, making the program the leader in feral swine damage management in the state.

Integrated feral swine damage management includes using all legal methods for addressing damage, including technical assistance (providing landowners with information on management), demonstration projects, and direct control (direct removal of feral swine). TWSP partners with other units within Texas A&M AgriLife Extension Service to provide high quality information to landowners, where property owners are able to solve damage issues themselves. Direct control is provided where problems exceed individual landowner ability to manage them and where TWSP can partner with enough landowners to be effective. In FY 13, TWSP removed 18,712 feral hogs from about 5M acres.

Integrated damage management requires that employees assess the problem and if removal is indicated, employ one or more methods for removal. In most cases, multiple methods are used to remove feral swine in Texas. Some methods, such as shooting, aerial shooting, and hunting with dogs not only remove feral swine directly, but also reduce damage by changing the behavior of feral swine. In many cases, feral swine are considered a year-long problem and the removal of one sounder does not stop control efforts.

METHODS

Individual removal projects from FY 12 and FY 13 were examined to determine which methods were used. In most cases, multiple methods were implemented, and the WS Management Information System (MIS) does not allow separation of effort by method. In addition, TWSP employees frequently work on more than one species on a property, further complicating cost-per-method analysis. A total of 86 projects were selected based on input from TWSP District Supervisors and field employees. Seventeen (17) of the 86 projects utilized multiple methods while the remaining 69 were assigned to one method only. The total amount of effort utilized and the total take was retrieved from the MIS database. In a few cases, discussed below, daily efforts were examined to demonstrate the pattern of use on a project.

Effort was converted to expenses by taking the average total cost per employee (\$60,000 per year) and dividing by 2,080 hours to standardize cost per unit of effort (\$28.85/hr). This standardized cost includes the TWSP program average for salary and benefits, vehicle use, equipment, and administrative overhead. Agency-owned turbine helicopter operations were assigned a \$600/hr expense, which includes average pilot and gunner salary and benefits, and operations costs (fuel and oil consumption, ammunition, and supplies) as well as prorated maintenance costs. Contract piston helicopter operations were assigned the actual project billing. Agency-owned fixed wing aircraft costs were valued at \$150/hr, which includes average pilot and gunner salary and benefits, operations, and prorated maintenance costs.

RESULTS

Projects were identified for cage trapping (all corral traps), drop nets, fixed-wing aerial management, turbine helicopter (agency owned) aerial management, piston helicopter (contractor owned and operated) aerial management, snaring, daytime shooting, night shooting with night vision equipment and, for comparison, multiple methods employed. Table 1 summarizes the

Table 1. TWSP method-specific feral swine removal projects, costs, and results, FY 2012 and FY 2013.

(Source: Wildlife Services Management Information System data)

Method	Number of Projects	Total Hours	Total Dates	Estimated Cost	Total Swine Removed	Cost per Animal Removed
Corral Traps	28	952.0	640	\$27,465.20	585	\$46.95
Drop Net	1	18.0	6	\$519.30	8	\$64.91
Fixed-wing Aerial	3	256.4	53	\$39,810.00	1495	\$26.63
Turbine Helicopter Aerial	9	156.2	33	\$93,720.00	5129	\$18.27
Piston Helicopter Aerial	7	27.4	7	\$11,042.00	523	\$21.11
Snare	1	13.0	6	\$375.05	6	\$62.51
Shooting	5	30.0	9	\$865.50	31	\$27.92
Night-vision Shooting	15	278.0	112	\$8,020.30	320	\$25.06
Multiple Methods	17	1787.5	874	\$51,569.38	906	\$56.92

cost per swine removed by method.

Twenty-eight individual, swine-only projects were identified that used only corral traps for swine removal. A total of 952 hours on 640 different dates (average: about 1.5 hours per date) was employed in these projects, and 585 feral swine were removed. Total cost was estimated at \$27,465.20 for an average cost of \$46.95 per animal removed.

Only one project involving drop nets only was identified. The project utilized one net that was set up and prebaited, with deployment on 2 separate dates. A total of 18 hours on 6 separate dates was spent on this project, and 8 feral swine were removed. Total cost was estimated at \$519.30 for an average cost of \$64.91 per animal removed. It should be noted that 5 additional animals were initially captured in the net but subsequently escaped and are not calculated into the cost per animal above.

Three recurring, multiple-date projects were identified for fixed wing aerial management. A total of 256.4 hours of fixed wing aerial time was utilized on 53 dates, and 1,495 feral swine were removed. Total cost was estimated at \$39,810 for an average cost of \$26.63 per animal removed.

Nine individual swine-only projects were identified for turbine helicopter aerial management. A total of 156.2 hours of helicopter time was utilized on 33 dates, and 5,129 feral swine were removed. Total cost was estimated at \$93,720 for an average cost of \$18.27 per animal removed.

Seven individual projects were identified where cooperators paid contract, piston-powered helicopter vendors for aerial management and where WS was available to assist on the ground. Multiple properties were involved in each operation. A total of 27.4 hours was flown on 7 dates. Actual billing for these projects totaled \$11,042, and 523 swine were removed for an average cost of \$21.11 per animal.

Only one swine-only, snare-only project was identified. A total of 13 hours on 11 dates was spent removing 6 feral swine. Total cost was estimated at \$375.05 for an average cost of \$62.51 per animal removed.

Five projects were identified where daytime shooting was the only method utilized to remove feral swine. A total of 30 hours on 9 different dates was utilized, and 31 feral swine were removed. Total cost was estimated at

\$865.50 for an average cost of \$27.92 per animal removed.

Fifteen projects were identified where night-vision assisted shooting was the only method utilized for feral swine damage management. A total of 278 hours on 112 individual dates was utilized and 320 feral swine were removed. Total cost was estimated at \$8,020.30 for an average cost of \$25.06 per animal removed.

Seventeen projects were identified where feral swine were the only species managed, but where multiple methods were employed. A total of 1787.5 hours on 874 different dates was utilized and 906 feral swine were removed. Total cost was estimated at \$51,569.38 for an average cost of \$56.92 per animal removed.

DISCUSSION

These data provide a snapshot of the Texas experience and cannot necessarily be extrapolated to other areas or to newly established populations. The number of swine represented in the examples above represents only about 23% of the number of swine removed by TWSP for FYs 2012 and 2013. The balance of the swine removed by TWSP were on projects where swine were removed by multiple methods and TWSP was working on other species, thereby leveraging feral swine dollars with other activities. When combining feral swine projects with other TWSP management actions, TWSP greatly reduces the overall cost of feral swine removal.

The cost per animal for eradication efforts in low-density, isolated populations will be much more than the values presented herein. The value of these data is that they present relative costs per method in relation to other methods under a large population scenario.

While these data are useful in comparing methods of management, it must be remembered that the costs incurred are the result of several factors beyond the control of WS. Most of the landholdings on which TWSP works are too small to hold subpopulations of swine yearlong. In many cases, projects continued after the removal of the swine by one or more methods because the large metapopulation continued to threaten property. This was demonstrated multiple times in corral trapping efforts. Despite the use of cameras and significant pre-trap monitoring, almost every corral trapping effort included significant effort – and expenses – post trapping because adjacent feral swine still posed a threat to protected resources.

A few examples serve to illustrate the point:

- On one 640-acre property, the employee maintained a corral trap throughout the season, baiting it only when evidence of feral swine warranted. The employee recorded 78.3 hours in 53 visits to the property over a 12-month period. Feral swine were removed on 2/4, 2/6, 2/20, 2/25, 3/25, 4/11, 6/7, 6/26, and 1/22 the following year.
- On another 166-acre property, WS logged 76 hours in 49 visits over a 12-month period. WS removed feral swine on 3/18, 3/20, 4/15, and started a new project on 10/28, removing 6 swine in only 2 hours of effort.
- On one 13-acre property, WS logged 25.3 hours in 20 visits, setting the trap on Day 1, capturing swine on Days 2, 10, and 12, and making 8 additional visits before removing the trap.
- On yet another, 525-acre property, WS set a trap on Day 1, and checked the trap on Days 2, 4, 5, 6, 11, 13, and 14 without activating the trap trigger. The trap was activated on Day 18, and 8 swine were captured and removed on Day 19. Another swine was captured on Day 21, 2 more on Day 23, 1 more on Day 31, and 6 more on Day 32. There were never more than 8 hogs at one time visiting the trap site, but 18 were removed. Eight additional visits totaling 12 hours were spent after the removal of the last swine before the trap was removed.

Obviously, increasing the number of animals removed in one visit would decrease the cost per animal and the overall cost. In the examples above, if WS had chosen to stop the project with the capture of the first animals, we would have reduced costs but would have also missed opportunities to remove animals. Because feral swine are well established in Texas, removal is always considered temporary, and post-removal costs will likely occur.

The cost per method is affected by management decisions. Given the large populations and the need to manage aerial hunting costs, Texas WS rarely sends helicopters to low-density swine areas. The take per hour of helicopter aerial hunting (and thus the cost per animal removed) is a reflection of both the high population and the conscious decision to maximize our aerial hours by only going to high-density swine areas. As the take per hour decreases, the relative efficiency will also decrease.

Physical barriers to some methods exist. Fixed-wing aerial management is only effective in relatively open, level terrain. Helicopter aerial management is effective in more moderate terrain but is hampered by tall or very thick vegetation. The establishment of corral traps may be precluded in open, public areas where tampering with the trap is inevitable. Corral traps are often ineffective when a superabundance of food, such as ripening corn or an acorn crop, makes baited traps less attractive.

Managers need the flexibility to adapt methods to the circumstances encountered. Knowledge of relative costs per method is one component of the decision process, but by no means is it the only factor in deciding on which method or methods to utilize. These data can be used to inform, but not dictate, method selection for some managers.

LITERATURE CITED

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