Wild Pigs in Wild Places: Controlling Pigs in the Sipsey Wilderness Area

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ABSTRACT: Wild pigs arrived on the Bankhead Ranger District in the late 1980s and '90s. They proliferated and control efforts began in the early 2000s. In 2011, intensive efforts began, centered around whole sounder removal. By 2020, pigs were controlled at low densities throughout the District except for the rugged and remote Sipsey Wilderness Area. The area is 25,810 acres and surrounding environs remained off limits until a minimum resource analysis was completed, allowing for active management. The Sipsey Pig Project was born. An interagency team was formed, comprised of United States Forest Service (USFS), Alabama Department of Conservation and Natural Resources (ADCNR), and Animal and Plant Health Inspection (APHIS) Wildlife Services personnel. Crucial funding and volunteer support was provided by several local organizations including the wilderness advocacy group. The project began in 2021, when ADCNR agreed to eliminate two special hog hunts on the District. Four technicians from the three agencies began control efforts focused primarily on trapping and whole sounder removal. Other techniques were utilized including aerial gunning and Judas pig with varying levels of success. The first year concluded with approximately 50% of the wilderness receiving control efforts and a record 421 pigs removed from the District, a three-fold increase over the previous year. The next year, 2022, saw the entirety of the wilderness receive control efforts and a marked decrease in pig densities. The initial battle is won but the war remains undecided. Initial control was achieved faster than expected, yet much work remains with four years left in the project. The Sipsey Pig Project is the most aggressive action to date undertaken against wild pigs in a USFS wilderness area east of the Mississippi River. The strategic application of management techniques combined with strong partnerships can achieve wild pig control in the remote regions of our country.

KEY WORDS: integrated pest management, invasive species, population control, *Sus scrofa*, whole sounder removal, wilderness, wild pigs

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BACKGROUND

The United States Forest Service (USFS) Bankhead Ranger District (hereafter "District") consists of approximately 180,000 acres in northwestern Alabama. Like most of the southeastern United States, the District fell victim to the "pig bomb" in the late 1980's and 1990's (VerCauteren 2020). The illegally transported and released wild pigs quickly spread and became prolific across the northern half of the District, including the 91,263-acre Black Warrior Wildlife Management Area (WMA). The District entered into an interagency agreement with United States Department of Agriculture Animal and Plant Health Inspection Wildlife Services (WS) in 2005 in an effort to control the expanding wild pig population. Integrated pest management began in earnest in 2011, when the District, WS, and Alabama Department of Conservation and Natural Resources (ADCNR) intensified control efforts centered around trapping via whole sounder removal and night shooting. Control efforts continued for the rest of the decade and by 2020, pig populations were reduced to low densities and resource damage was minimized across much of the District. However, as a congressionally designated wilderness area, the Sipsey Wilderness Area remained off limits to control efforts. Wilderness areas were created by the Wilderness Act of 1964 and are meant to be free from the influence of man (Wilderness Act 1964). Management actions can only be undertaken if the character of the wilderness is being degraded. USFS and WS technicians trapped the perimeter of the Sipsey Wilderness Area for several years with negligible results. The wilderness continued to act as a refugia for the pigs, severely degrading its unique qualities while also serving as a base for wild pigs to launch yearly assaults into the surrounding District. In 2021, action was taken to ensure the Sipsey Wilderness Area would no longer be a bastion for wild pigs.

FORMING A COLLABORATIVE PARTNERSHIP

Wilderness management requires balancing five "characters": untrammeled, natural environment, undeveloped, opportunities for solitude and primitive recreation, and other features of value (Wilderness Act 1964, Section 4[b]). Management actions to protect one character, such as the natural environment, may have a negative impact on other characters. A minimum requirements analysis determines that the action is required to preserve wilderness character, and that the action requested is the minimum required to accomplish the mission (Minimum Requirements Analysis 2024). In other words, if you can build a trail with a hand crew (the minimum) don't ask for a bulldozer (the maximum). Analysis began in January 2021. Meanwhile, the District realized this was not a project it could accomplish alone (Table 1).

The District's oldest partner in wild pig control was WS

Table 1. Partners of the Sipsey Pig Project and their roles.

Partner	Commitment
U.S. Forest Service (USFS)	Project Oversight Interagency Agreement ($40k/year) 1-2 Seasonal Technicians
USDA-APHIS-Wildlife Services (WS)	Interagency Agreement ($40k/year) Wilderness Technician (9 months/year) Supplies & Traps Aerial Gunning & UAS Assets
Alabama Department of Conservation and Natural Resources (ADCNR)	Elimination of WMA Feral Swine Hunts Wilderness Technician
Wild Alabama	Trail Clearing & Maintenance Survey123 Pig Reporting App Public Education
Local Chapter of Back Country Horsemen of America (BCHA)	Trail Clearing & Maintenance
National Wild Turkey Federation	$5k Superfund Grant
Auburn University	Summer Wildlife Student Intern

and so naturally they were contacted first. National Forests in Alabama already had an interagency agreement in place that, among other things, provided a single WS technician to trap pigs on the District for five months during the summer. WS agreed to enter into a second interagency agreement solely for control efforts in the Sipsey Wilderness. This agreement would be a 50/50 cost share agreement, totaling approximately $80,000 annually. It covered a technician's salary for nine months (no control efforts occur during deer/turkey seasons) along with necessary supplies and equipment such as bait and traps.

The project was pitched next to ADCNR. Black Warrior WMA personnel had been instrumental in the early years of pig control but had been less involved over the previous five years. Two requests were made: first to eliminate a two-week feral swine hunt on the WMA and second to assist with the project, either with personnel or financially. For the last decade, the WMA had held two different two-week feral swine hunts. These hunts were situated in early March and early September and effectively negated trapping efforts for the entirety of both months as turkey and deer season started up shortly thereafter. ADCNR agreed to eliminate the hunts. They also committed to hire a seasonal laborer that would work directly for the USFS biologist during summer months. An interagency control team had quickly developed.

The project had garnered support from two important agencies, but local organizations were equally critical to its success. Two such groups were the local wilderness advocacy group, Wild Alabama, and the local chapter of Back Country Horsemen of America (BCHA). Both groups were actively involved in the maintenance of over 50 miles of trails in the Sipsey Wilderness and witnessed firsthand the impacts and natural resource damage pigs caused. Both organizations supported the project and volunteered to assist in trail clearing to provide improved access for control efforts. Finally, the National Wild Turkey Federation provided a superfund grant of $5,000 to go towards the USFS/WS interagency agreement. We also had a longstanding agreement with Auburn University, annually hosting an Auburn wildlife intern for the summer. These interns participated in the project and assisted in control efforts.

As the collaborative partnership came to fruition, the minimum requirements analysis was submitted to the Regional Forester for approval. The analysis showed that success could only be achieved with an aggressive, integrated strategy. This included the use of multiple techniques, such as trapping, utilizing utility terrain vehicles (UTV) to insert traps, night shooting, aerial gunning, Judas pig, and unmanned aerial surveillance (UAS). In October 2021, the Regional Forester signed the minimum requirements analysis, and the Sipsey Pig Project was born.

METHODS

The Sipsey Wilderness Area is 25,810 acres and consists of steep bluffs with hemlock cove forests below and mixed hardwood pine forests on the ridgetops above. Seven trailheads led to over 50 miles of trails. Cellular service was limited, preventing the use of cellular-based traps. Removal efforts focused on whole sounder removal through trapping and were supplemented with Judas pigs and aerial gunning. Kill tallies or annual harvest have traditionally been used to measure success however this data fails to convey meaningful information about the basic social unit of pigs, sounders. Goals were created in the number of sounders removed instead of a harvest tally (though we maintained harvest information for historical comparison). For this project, it was determined that if 85% or more of a sounder was captured, it would count as a sounder eliminated from the project. A mobile application, ArcGIS Field Maps (Esri 2024), was used to enable data collection in the field, as well as enhance communication between technicians and navigation for those new to the project. The local USFS biologist oversaw and directed the interagency team, and a six-year strategy was developed. The goal for 2022 was to conduct removal efforts across half of the wilderness.

In the winter of 2022, Wild Alabama and BCHA cleared 11 miles of trail to facilitate UTV access along the existing horse trails. The interagency team consisted of four technicians. USFS, ADCNR, and WS each provided a single technician for the wilderness and all three were inexperienced. They were trained in wild pig control techniques as well as how to safely operate in a remote environment with courses such as wilderness first aid and crosscut saw certification. The fourth technician was a seasoned WS trapper who had worked on the District for several summers. His primary task was to maintain control of the pig population throughout the rest of the District while also trapping along the perimeter of the wilderness to support the project.

The three wilderness technicians were each responsible for covering 1-2 trailheads and approximately 4,000 acres. Daily hikes to check bait sites and/or trap sites averaged anywhere from 4-8 miles. Whole kernel corn, and rarely soured corn, was used for bait. UTV's were utilized to insert panel traps along ridgetops, always out of sight of any trails or high visitor use areas. It was extremely important that the character of the wilderness was preserved by leaving a minimal footprint. Panel traps were

fabricated by WS and consisted of 5-6 eight-foot panels with a guillotine-style gate. Trip wires were utilized to trigger traps as cellular and satellite cameras performed poorly in the remote and steep terrain. A single pig brig (Pig Brig Trap System with sewn-in trap cap) was hiked into remote areas that the UTV couldn't access. The Judas pig technique was utilized three times during 2022. Non-reproductive shoats were selected, collared with an iridium Vertex Lite GPS collar (Vectronic Aerospace, Coralville, Iowa) with a drop-off setting of four months. Judas pigs were released from the capture site within the wilderness or transported to the wilderness and released if captured elsewhere. Finally, an annual monitoring plan was employed to further assess the efficacy of control efforts. A random camera survey was developed through ArcGIS Pro's 'create random points' tool (Esri 2024), resulting in 15 non-baited camera sites monitored for three consecutive weeks in October/November. Technicians modified survey points by moving them to the nearest place of habitual pig activity, such as wallows, heavily used pig trails, and established creek crossings. This was done to increase the likelihood of detection during deer season when bait could not be placed on the landscape.

The goal for 2023 was to conduct removal efforts across two thirds of the wilderness. The second year saw a decrease in personnel, dropping the wilderness trapping team down to two technicians. Trapping and whole sounder removal remained centerpiece, and several additional pig brigs were purchased, ensuring the most remote areas could be accessed. As trapping efficiency and success increased an additional technique proved largely ineffective. WS conducted a single day of aerial gunning in early March, without detecting a single pig. Additionally, the GPS collar malfunctioned on its first Judas pig deployment and was never recovered. However, a year of experience and familiarity with the wilderness increased trapping effectiveness and allowed for removal efforts across the entire wilderness by the end of 2023.

A citizen science effort was initiated to allow the public to report sightings of pigs or any fresh pig sign. This reporting form was created through the ArcGIS Survey123 (Esri 2024) application and works on any mobile device. The public reports fed directly into the technicians' maps allowing them to respond rapidly to new pig sightings. Wild Alabama and BCHA aided greatly by encouraging their members to utilize the tool and promoting it to the public at large.

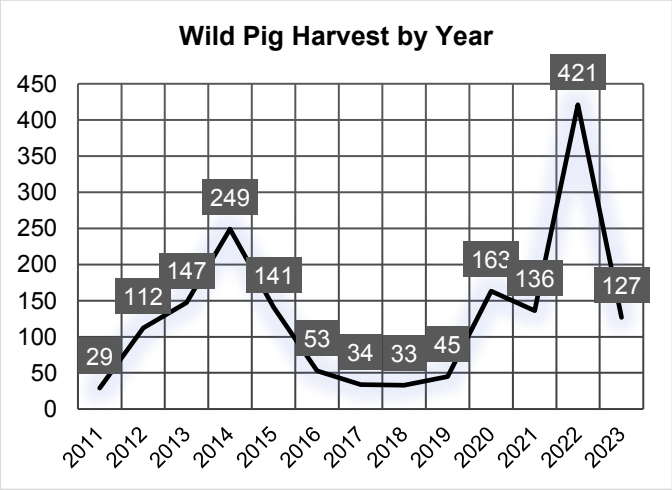

Figure 1. Annual wild pig harvest on the Bankhead Ranger District from 2011-2023.

RESULTS

Ninety-one pigs were removed from the Sipsey Wilderness Area in 2022. In total, 421 pigs were harvested from the entire District, an 169% increase from the previous harvest record in 2014 (Figure 1). Seven sounders were removed from the wilderness and an additional 19 from the rest of the Bankhead (Table 2). Cumulatively, 17 different trapping locations were utilized throughout the year, covering the eastern half of the wilderness. Average sounder size was 11 pigs, slightly above the previous two-year average of 9.5 pigs per sounder. Pigs trapped on private lands accounted for 27%, or 114, of the total harvest. After the record annual harvest, our end of year monitoring still detected a significant amount of pig activity in the wilderness. The three-week game camera survey detected five sounders, nine boars (lone boars/bachelor groups), and only one survey site with no activity (Table 3).

Three Judas pig deployments occurred during 2022 (Table 4). These deployments ranged from late May to early August. All three pigs were released in the wilderness. Pig 003 was released at a trailhead and within a matter of days had left the wilderness and returned within 1km of its original capture sight. It was recaptured in 18 days with a new sounder. Pig 004 was released into the wilderness and slipped its collar after 8 days. This was the only instance of a collar being thrown in two years and five total collar deployments. Pig 004 spent all eight days on the western half of the wilderness, providing valuable movement and habitat usage data. Its locations led to the discovery of the most successful trapping location in the wilderness. Pig 005 was captured in early August and recaptured 75 days later in the wilderness with a new sounder.

The second year of the project saw 78 wild pigs captured in the wilderness, and a total of 127 harvested throughout the District (Table 2). Seven sounders were removed from the Sipsey while only two other sounders were trapped out of the remaining District. Nearly double the number of lone boars were captured compared to sounders and average sounder size also decreased markedly from the previous year to 7, below the preceding three-year average of 10. A similar level of effort was employed in 2023, with 18 trapping locations in the wilderness and 140 bait sites throughout the Bankhead. Pigs harvested on private lands saw a significant decrease to six total pigs or 5% of the total harvest. The annual monitoring survey detected much less pig activity compared to 2022 with only one sounder, five boars (lone boars/bachelor groups), and nine survey sites with no activity (Table 3).

A single, unsuccessful Judas pig deployment occurred in May. The collar failed to send locations and was never retrieved. It is likely the collar failed to correctly re-activate after being in storage for several months. A single day of

Table 2. Wild pig harvest data from the first two years of the Sipsey Pig Project.

2022		2023	
Total Harvest	421	Total Harvest	127
Wilderness	91	Wilderness	78
Sounders Removed	19	Sounder Removed	2
Wilderness	7	Wilderness	7
Lone Boars	22	Lone Boars	17
Sex Ratio	48% / 52%	Sex Ratio	51% / 49%
Avg Sounder Size	11	Avg Sounder Size	7
Wilderness Trap Sites	17	Wilderness Trap Sites	18
District Bait Sites	159	District Bait Sites	140
Private Land Pigs	114 (27%)	Private Land Pigs	6 (5%)

Table 3. Monitoring results from a non-baited game camera survey in October/November of each year.

2022		2023	
Sounders	5	Sounders	1
Lone Boars/Bachelor Groups	9	Lone Boars/Bachelor Groups	5
Sites w/ No Activity	1	Sites w/ No Activity	9

Table 4. Three Judas pig deployments in 2022.

Pig #	Capture Date	Sex	Age Class	Weight (lbs)	Remarks	Days til Re-Capture	Remarks
003	05/20/2022	Female	Shoat	50	Captured, sounder (10)	18	Captured, sounder (6)
004	07/22/2022	Male	Shoat	--	Captured, sounder (7)	--	Slipped collar, 08/01/2022
005	08/11/2022	Female	Shoat	35	Captured, sounder (10)	75	Captured, sounder (5)

aerial gunning occurred in early March with a Bell 505 Jet RangerX or equivalent type aircraft. No pigs were observed or dispatched.

DISCUSSION

The wild pig harvest in 2022 was exceptional for the District. This increase was largely due to increased manpower, the expansion of removal efforts into the wilderness and surrounding areas, and a relatively high-density pig population due to favorable environmental conditions. In past years, only one or two technicians conducted removal efforts for 6-7 months per year. Four technicians significantly increased capacity allowing for expansion into the wilderness and the remote northwestern corner of the District. In addition to this, pig densities noticeably increased throughout 2022 in both the District and surrounding areas of the state. The previous two summers had seen above average rainfall (75.8"/2020 and 67.4"/2021; average annual rainfall of 57.7") that led to a plentiful hard mast crop in the fall of 2021 (National Centers for Environmental Information 2024). Increased resources, such as abundant hard mast, is known to lead to greater ovulation rates and increased litter sizes (VerCauteren 2020). Chinn et al. found neonate survival rates to average 44% in a typical year in South Carolina (2021). We suggest abundant food resources and a mild winter led to increased litter sizes and above average neonate survival rates, accounting for the increase in pig densities and above average sounder size (11) observed in 2022. These three factors coalesced to create the highest annual pig harvest on record.

The second year of the project saw wilderness technicians reduced to two, yet in spite of that the entirety of the wilderness received removal efforts. Experience cannot be underestimated when operating in remote areas. Two experienced technicians accomplished the same or more compared to three inexperienced technicians. As expected, the annual harvest decreased after the previous year's record harvest led to decreased pig densities. The winter of 2022-2023 had several unusually long cold snaps that may have affected recruitment as well. Throughout the year our trappers had difficulty finding pigs. Sounders proved scarce and smaller (average sounder size of 7) than in years past. Trapping lone boars is a low priority, something only done when sounders cannot be detected. Capturing 17 lone boars compared to nine sounders across the entire District was indicative of a low-density pig population across the landscape. The annual monitoring survey further confirmed what our technicians observed on the ground and what the harvest data showed - pig densities had drastically decreased from the previous year. The District defines a controlled pig population as one that is low density and creates minimal natural resource damage. Whole sounder removal has been shown to be successful (Lewis 2020),

but this is the first project to show that whole sounder removal can be successful in a remote, inaccessible area with no cellular or satellite based, "smart" traps. At the end of year two, the Sipsey Pig Project has achieved initial control.

Interestingly, it was theorized for years that the Sipsey Wilderness Area acted as a refugia for wild pigs, and the primary source population for the western half of the Black Warrior WMA. Results to date appear to support this as 61% of the total harvest in 2023 came from the wilderness. Fewer pigs were harvested from the western half of the WMA (excluding the wilderness) than from the eastern half of the WMA, something that had not occurred since integrated management began in 2011!

Like many National Forests, the District has numerous private inholdings. In 2021, partnerships with private landowners were created to conduct removal efforts on their properties, free of charge. This was done with WS technicians, another benefit of the interagency agreement was the simplified process WS has for working on private lands. We would assess private tracts to determine if both the landowner and the District would benefit from control efforts. If so, and if the landowner was willing, we would then move forward with removal efforts. We had significant success in 2021 and 2022 as over 20% of both years' annual harvest originated from private lands. The number of private tracts increased in 2023 but only 6% of total harvest came from private lands. It is surmised this was largely due to the scarcity of pigs on the landscape observed everywhere outside the wilderness. Pigs roam freely across boundaries and cooperation with adjacent landowners is vital for population control across a landscape.

ArcGIS Field Maps application was an essential tool for our multi-agency team. It proved crucial for communication, navigation, and data reporting. ArcGIS Survey123 application was used to create the public pig reporting form. This provided an additional avenue of involvement with local organizations and an opportunity for the public to take ownership in the project. These two applications integrate, allowing our technicians to see all the public reports within the Field Maps application on their mobile device.

The Sipsey Pig Project significantly reduced wild pig densities and resource damage in two years. Initial control has been achieved, but can it be maintained? Garabedian and Kilgo (2024) have shown how quickly wild pig populations bounce back in the absence of removal efforts. Four years remain, and removal efforts will continue. Priorities include refining techniques and determining the adequate amount of manpower needed. These findings will inform future management strategy and the minimum requirements to maintain a controlled pig population across the Sipsey Wilderness Area.

MANAGEMENT IMPLICATIONS

Wild and remote regions of our country can achieve population control though the strategic integration of removal techniques centered around whole sounder removal. Pig Brig traps and the Judas pig technique excelled in a remote and austere environment. After 2022, we almost exclusively switched to Pig Brigs in the wilderness. Their versatility and ability to deploy by a single person without the need of a UTV made them invaluable, and they are more than capable of removing whole sounders. Judas pigs were equally important. Not only did they quickly discover new sounders, but they also provided excellent data on home range, habitat use, and seasonal movement patterns. If you are managing pigs in a new, unfamiliar environment this data can be a game changer.

The Sipsey Pig Project is a shining example of multiple agencies, organizations, and private landowners coming together to accomplish a mission. This is not a novel idea, but one that often proves more difficult than it should be. Our public lands, our native flora and fauna, and our rare species require that we put aside minor differences, overcome obstacles, and join together for the good of the resource. This project has accomplished more than a small ranger district ever could have by itself. When we work together, successful control of wild pigs in the remote, rugged, and roadless areas of our nation can be accomplished.

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