Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance On Feral Hog Management in Priority Watersheds

FINAL REPORT

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TSSWCB PROJECT #19-04

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Executive Summary

Mitigating the negative impacts associated with invasive wild pigs (*Sus scrofa*) remains one of the greatest natural resources challenges in the United States. These animals have long established themselves across Texas and pose a variety of challenges, including riparian and sedimentation damage, bacterial impairment, agricultural loss, predation, transmittal of disease and parasites, loss of native species, and environmental damage to both urban and rural environments. Between 1900 and 1990, the national population size and distribution of these animals in the United States had been relatively constant, with an estimated population of 500,000 to 2 million animals found in 18 to 21 states. Today, the National Feral Swine Mapping System program currently reports 37 states with established populations of wild pigs. Recently, populations have established even further across North America into as many as 5 Canadian provinces. In Texas, populations are currently estimated at 2-3 million head, making them the most abundant large invasive animal species found in the state. In the last several years, agricultural damages in Texas have skyrocketed to an estimated $500 annually, a nearly ten-fold increase in the span of just over 10 years (Timmons et al. 2022; McCorkle 2022). The majority (>95%) of Texas lands are privately owned, thereby placing the responsibility of wild pig control primarily on private landowners. Outreach efforts remain crucial to reducing the impacts of wild pigs on water quality, agricultural production, native species, and habitat.

Through the continuation of the *Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance on Feral Hog Management in Priority Watersheds* project, funded by U.S. Environmental Protection Agency (EPA) with Clean Water Act (CWA) §319(h) funds through the Texas State Soil and Water Conservation Board (TSSWCB), the project team consisted of personnel from the Texas A&M AgriLife Extension Service and the Texas A&M Natural Resources Institute. This team provided educational workshop programs, landowner technical assistance and online resources, increasing awareness of feral hogs and their negative impacts to water quality and the environment.

Outreach efforts and resources created throughout the project prioritized the importance of improving water quality, habitat and agricultural production as well as benefiting native species and human health. Educational resources were also focused on both direct and innovative outreach efforts developed through this project that allowed us to greatly amplify the project's goals to stakeholders within and around priority watersheds. Programming achievements included a total of 100 wild pig educational events (10 four-hour wild pig workshops, including 72 one-hour programs, 2 two-hour programs, 9 one-and-a-half hour programs, 4 online webinars, 3 educational booths and 3 technical site visits) which amassed 5,494 contact hours from 4,863 attendees. During the Covid-19 pandemic, a total 8 interactive wild pig private lands stewardship learning academies were produced to meet programming and publication goals. An additional 17 videos (including 4 webinars, two of which were published to the Meadows Center for Water Quality and the Environment YouTube page) and other educational resources supplemented conventional delivery of educational programming. NRI's wild pig YouTube content, not including WFSC wild pig YouTube content previously created, amassed 10,263 indirect educational contact hours and 292,266 views from 9/1/19 – 9/30/23. At the close of the project period, NRI's private land stewardship (PLS) academies had been taken at least 46,573 times. NRI's wild pig PLS lessons each take approximately 30 minutes to one hour to complete. Conservatively, these lessons

generated at least 23,287 hours of indirect educational contact hours alone throughout the grant cycle. Educational programming was delivered face-to-face, remotely, throughout interactive web-based outreach, and through video delivery across Texas. Collectively, NRI's adapted campaign rose to meet new educational challenges and amassed a total of 5,494 direct educational contact hours from 4,863 attendees and 33,550 indirect educational contact hours from 338,839 participants. These efforts resulted in a combined total adult education economic impact of $2,427,782.01.

Additional outreach involved the creation of resources including articles, publications, newsletters, videos, webinars and others. Resource creation was supplemented and promoted by innovative outreach methods involving various social media outlets and the Texas A&M Natural Resources Institute wild pig website and wild pig reporting system. To further extend the project message, the wild pig team produced 17 blog articles (at least 2,530 reads), 8 distance-based wild pig private lands stewardship learning academies (taken 46,573 times), 2 extension publications, 1 magazine article (at least 3,700 copies distributed), 17 videos including 4 webinars (29,771 views), 15 AgriLife Today press releases, 7 media interviews and independent as well as paid social media, website and wild pig reporting system promotions. At the start of the extension year on September 1, 2022, The Texas A&M Natural Resources Institute's wild pigs Facebook website averaged 33,827 impressions, 1,925 clicks, 1,048 engagements and 8,340 views per quarter with an average reach of 42,218 users per quarter of the project. At the close of the project, NRI's Facebook had reached a total of 364,384 users. Additionally, the wild pigs Twitter account had an average reach of 63,712 users throughout its highest quarter of the project. The Texas A&M Natural Resources Institute's wild pig website received 31,703 page views over 23,599 sessions and had attained 20,777 new users. The eXtension "Coping with Feral Hogs" website received 394,734 total page views over 575,561 total sessions with an average reach of 17,956 users throughout each quarter of the project. The stakeholder database created in the last project continued to enhance communication among members of the public and priority watershed stakeholders. A total of 56 prioritized meetings and conferences were attended by project personnel.

Through this project, at least 1,369,416 contacts were informed about the project's goals of promoting healthy watersheds through feral hog education and outreach, introduced to educational products and online resources, and educated about feral hogs and their management within priority watersheds and across the state.

As a result of attending wild pig programming, 98.2% of evaluated participants reported knowledge gained on wild pig biology, lethal control options, efficient trap/bait techniques and types/extent of hog damage. Evaluated workshop attendees indicated the knowledge they received from the program, once implemented, would result in an expected $426,075.00 reduction in feral hog damage in the upcoming year, a figure that translates to an estimated $1,704, 300.00 in reduced damages over the course of the project through direct programming alone. Participants knowledge of feral hog biology, lethal control options, efficient trap/bait techniques and types/extent of hog damage increased by 88.2%, 86.5%, 88.5%, and 73.9% respectively. Additionally, participants indicated they would adopt an average of 2.78 practices per participant.

Introduction

The adoption of a watershed-based approach for managing water quality remains a common practice among federal and state resource management agencies. All watersheds in Texas are threatened by nonpoint source (NPS) pollution, and a vital component of a watershed-based management approach involves engaging local stakeholders to become actively involved in planning and implementing water resource management and protection programs in their watershed. Due to the potential for wild pigs to deposit significant amounts of *E. coli* bacteria directly into surface water systems and cause a variety of other negative impacts to watersheds and water quality, Watershed Protection Plans (WPP) and Total Maximum Daily Loads (TMDLs) being developed today often call for the removal of wild pigs as a best management practice (e.g., Plum Creek, Leon River). Texas landowners and natural resource managers have come to rely on research-based education and resources to better apply the effective management strategies needed to successfully reduce wild pig populations.

Wild pig damages to agricultural, native species, habitat and more recently urban/suburban areas are frequently observed across the 253 of 254 Texas counties that wild pigs occupied as of September 2023. Further damage and wild pig activities are documented across the numerous watersheds within the known distribution of wild pigs in Texas. Local populations and ranges continue to expand, and analyses confirm these animals as a likely source of NPS pollution to streams. Moreover, financial losses to the agricultural community in Texas are currently estimated at $500 million on an annual basis (McCorkle 2022). Landowners spend an estimated $7 million annually on their control and/or correction of damage. However, these values are likely underestimated, as damage to suburban areas continues to not be included in agricultural damage assessments. Likewise, monetary effects of problems associated with erosion, nutrient cycling, and water quality are also not included. Additionally, bacterial source tracking efforts across Texas confirmed wild pigs to contribute *E.coli*, some of which could be pathogenic, that further degrade water quality but more importantly contribute to current bacteria impairments in Texas streams.

Wild pigs continue to cause a high level of economic, biologic, and natural resource damage as their numbers increase nationwide. This non-native invasive species is a liability to Texas waterways and ecosystems and their numerous impacts are now widely considered as a national threat. Effects of their activities impacting water resources include increased sediments loads, algae blooms, oxygen depletion, and bank erosion. In areas where high numbers of hogs are present or where animals spend a significant portion of their time in and near streams, they can be a potentially major contributor of bacteria and nutrients, which can substantially impact water quality. Resultant impacts include prolonged anoxia in water systems, altered pH levels, fish kills and disruption of aquatic species diversity, among others. In addition to the water quality issue, destruction of habitat for native wildlife, disease transmissions to humans and livestock as well as the opportunistic predation of wildlife/livestock remain key concerns among stakeholders and landowners combating the numerous negative impacts associated with wild pigs.

Through TSSWCB project 08-07, *Implementing Agriculture Nonpoint Source Components of the Plum Creek Watershed Protection Plan*, feral hogs gained considerable attention in the planning phase, resulting in an education campaign to describe techniques used by the public for feral hog removal. A full time Extension Assistant was hired to spearhead educational efforts in Travis, Hays, and Caldwell counties. Education outlets took several forms including: 56 one-on-one

technical guidance site visits; 25 face-to-face community presentations with 3,301 attendees; development of web-based reporting tools to gather information on number of feral hog sightings, hogs removed, and methods of capture; a project description tri-fold pamphlet; 10 news releases with an audience considered to be several hundred thousand people; 12 hardcopy peer-edited articles, 7 of which were translated to Spanish; over 11,115 combined internet downloads/reads of 12 peer-edited articles; 13 internet web-videos viewed over 83,000 times; 2 voice-over presentations; 2 radio interviews having a 98 county-area broadcast with the potential to be heard by 6.5 million people.

Public education and outreach regarding feral hog management measures has been successfully implemented in the Plum Creek WPP and through additional programming of the Texas A&M AgriLife Extension Service. This agency and specifically the Wildlife and Fisheries Extension Unit provided quality, relevant outreach and continuing education programs and services to the people of Texas and the demand for information related to the management of feral hogs is high among many clientele groups in Texas. However, funds to continue these programs are nearing their end or have been greatly diminished.

Through TSSWCB project 09-06*, Development of a Synergistic, Comprehensive Statewide Lone Star Healthy Streams Program,* many of the feral hog educational resources developed for the Plum Creek Watershed have been incorporated into the Lone Star Healthy Streams (LSHS) Program. The goal of the LSHS Program is the protection of Texas waterways from bacterial contamination originating from livestock operations and feral hogs. To achieve this goal, LSHS objective is the education of Texas farmers, ranchers, and landowners about proper grazing, feral hog management, and riparian area protection to reduce the levels of bacterial contamination in streams, rivers, and other water bodies. The Program's major goal is the protection of Texas waterways from bacterial contamination originating from beef cattle, dairy cattle, horses, poultry, and feral hogs. The framework for LSHS is five resource manuals that focus on bacterial runoff management for beef cattle, dairy cattle, horses, poultry, and feral hogs.

Through enhanced education regarding riparian protection and vegetation management on grazing lands, LSHS will further protect Texas waterways from sediment, nutrient, and pesticide runoff with the concomitant loss of water and topsoil. LSHS is the state's primary coordinated and comprehensive educational program to address NPS pollution and water quality impacts from livestock operations and feral hogs. This project will deliver the feral hog component of the LSHS Program in priority watersheds.

Through TSSWCB project 12-06*, Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance On Feral Hog Management in Priority Watersheds,* wild pig outreach efforts addressed the needs of Texas landowners and the public on a larger scale. This project resulted in a widespread and modernized educational campaign that incorporated outlets including social media, videos, publications, articles, distance-based/online education, media interviews, technical site visits and others in addition to conventional face-to-face programing. One full-time extension associate and 2 extension assistants were employed during the campaign. Resulting efforts included: 41 one-on-one technical guidance site visits; 170 face-to-face presentations (15 four-hour and 155 one-hour) with 10,787 attendees; 97% of evaluated participants reported knowledge gained concerning feral hog biology, legal control

options, efficient trap/bait techniques and types/extent of wild pig damage; a statewide online wild pig reporting tool with a total of 2,785 pigs sighted and 1,333 pigs removed based on 861 total reports; 25 web videos viewed 114,603 times; a wild pig Facebook page with 3,466 "Likes" reaching 7,781 unique users monthly; a wild pigs Twitter page that has 206 followers reaching 1,983 individuals monthly; 37 blog articles with 66,490 views; 94 online articles about project activities composed by outside media; 25 newspaper interviews; 21 AgriLife Communications news releases; 9 magazine articles; 1 television interview and 1 radio interview.

Based on evaluations conducted statewide program participants reported damage in the following categories: pastures 75%; fences, water troughs or other improvements 38%; owner/employee time 40%; commodity crops 29%; loss of hunting lease value, wildlife food plots/feeders 23%; wetlands 23%; loss of land value 23%; equipment/vehicles 21%; specialty crops 16%; livestock 11%; stored commodities 5%; and personal injuries 3%.

Increases in knowledge among program participants revealed the following on specific subjects (before vs. after a program) included: feral hog biology 75%; legal control options 69%; efficient trap/bait techniques 69%; types/extent of hog damage 47%. Ninety-eight percent of respondents increased their general knowledge of feral hogs and their control.

Program evaluations revealed the following practice adoptions by percentage: use larger traps 56%; pre-bait traps to encourage consistent feral swine visits 51%; scout for feral swine 49%; use baits with scent appeal 40%; market trapped feral swine to offset economic impacts 39%; set traps whenever fresh sign appears 37%; vary/change baits used in traps at different locations 34%; and use protective eyewear/gloves during field dressing as a disease precaution 16%.

Through TSSWCB project 14-12, *Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance On Feral Hog Management in Priority Watersheds,* wild pig outreach efforts continued to provide resources and education to Texas landowners and the public. Momentum gained through TSSWCB project 12-06 resulted in an expanded campaign that extended into schools, urban/suburban areas, homeowners associations, various conservation groups, and other entities statewide in addition to conventional programming. Social media, videos, publications, newsletters, articles, distance-based/online education, media interviews, technical site visits and other outlets remained integral supplementation to face-to-face program delivery. Resulting efforts included: 229 educational events including 176 one-hour, 9 one-and-a-half hour, 6 two-hour, 11 two-and-a-half hour, 24 four-hour workshops, 3 educational booth presentations, 1 poster presentation and 23 technical assistance site visits which amassed 18,914 direct contact hours from 15,610 attendees. Post program evaluations showed that 98.7% of evaluated participants reported knowledge gained concerning feral hog biology, legal control options, efficient trap/bait techniques and types/extent of feral hog damage.

A 6 video "Wild Pig Management Video Series" was created that has gained 132,975 views and counting. An additional 28 educational feral hog web videos were created which have gained 77,438 views. Other resources include NRI's new wild pig website including a statewide online feral hog reporting tool with 1,238 total reports documenting 23,733 feral hogs sighted or removed; a feral hogs Facebook page with a reach of 372,951 people that had 1,181,420 page views; a feral hogs Twitter page that has over 680 followers; a feral hogs "Community of Practice" website that

received 180,104 users, 368,336 unique page views and 402,908 total page views; 20 wild wonderings blog articles with 32,403 views; 32 NRI articles with 18,338 reads, 9 editions of the "Wild Pig Newsletter" publications which have 343 subscribers and an online reach of 6,514 readers via Facebook (also distributed by CEA's statewide); 3 wild pig distance education courses; 2 narrated wild pig education programs; 4 extension publications; 1 wild pig private lands stewardship learning module; 7 newspaper interviews; 30 AgriLife Communications news releases; 3 magazine articles, 6 TV interviews and at least 109 additional external articles and media promoting the program initiative.

The Wildlife and Fisheries Extension Unit's and later Texas A&M Natural Resources Institute's outreach and educational efforts relative to feral hog damage abatement were delivered to the public by County Extension Agents at the county, multi-county, regional and state levels with the support of project personnel via direct contact (i.e., phone, e-mail, publications, one-on-one), mass media, group meetings as applied research/result demonstrations. Based on evaluations conducted statewide program participants reported damage in the following categories: pastures 80.2%; fences, water troughs or other improvements 44.6%; owner/employee time 44.5%; commodity crops 27.6%; loss of hunting lease value, wildlife food plots/feeders 19.8%; wetlands 25.4%; loss of land value 23.5%; equipment/vehicles 18%; specialty crops 13.7%; livestock 11.3%; stored commodities 4.7%; and personal injuries 2%.

Increases in knowledge among program participants revealed the following on specific subjects (before vs. after a program) included: feral hog biology 87.8%; legal control options 83.8%; efficient trap/bait techniques 87.9%; types/extent of hog damage 74.8%. Post program evaluations showed that 98.7% of evaluated participants reported knowledge gained concerning feral hog biology, legal control options, efficient trap/bait techniques and types/extent of feral hog damage.

Program evaluations revealed the following practice adoptions by percentage: use larger traps 56.8%; pre-bait traps to encourage consistent feral swine visits 51.8%; scout for feral swine 49.2%; use baits with scent appeal 31.1%; market trapped feral swine to offset economic impacts 35.1%; set traps whenever fresh sign appears 35.8%; vary/change baits used in traps at different locations 26.1%; and use protective eyewear/gloves during field dressing as a disease precaution 19.9%.

Through TSSWCB project 19-04, *Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance on Feral Hog Management in Priority Watersheds*, innovative outreach efforts adapted to new educational challenges to continue to meet public need for watershed based wild pig programming statewide and beyond. Due to the Covid-19 pandemic, conventional face-to-face program delivery was unavailable or experienced diminished attendance for a significant portion of the project period. During this time, project initiatives shifted to the creation of interactive distance-based educational resources, and a total 8 wild pig private lands stewardship learning academies were produced to meet programming and publication goals. At the close of the project period, NRI's private land stewardship academies had been taken 46,573 times. Additionally, an adapted campaign of direct and remote programming efforts were supplemented by conventional resource production including social media promotions, videos, publications, blog articles, magazine articles, media interviews, webinars and others to further extend the core conservation message of the project initiative.

Throughout the project, a total of 100 wild pig educational events (10 four-hour wild pig workshops, including 72 one-hour programs, 2 two-hour programs, 9 one-and-a-half hour programs, 4 online webinars, 3 educational booths and 3 technical site visits) which amassed 5,494 contact hours from 4,863 attendees. It should be noted that during Covid-19, numerous wild pig workshops were delivered in addition to the ten 4-hour workshops administered directly throughout the project. However, due to the time limitations commonly instituted on remote workshops by county extension agents during Covid-19, these were generally all counted as 1-3 hour events. Video also proved highly popular as a platform to deliver wild pig educational content to the public. In the last grant cycle, the Texas A&M Natural Resources Institute's wild pig YouTube content alone garnered 10,263 indirect contact hours (428 consecutive twenty-four-hour days of watch time). The total direct and indirect educational contact hours through face-to-face, remote, webinar and video educational delivery was at least 39,044 hours.

Resource production and promotions included 17 videos (including 4 webinars), 17 NRI blog articles, 8 distance-based wild pig private lands stewardship learning academies, 2 extension publications, 1 magazine article, 15 AgriLife Today press releases, 7 media interviews and independent as well as paid social media, website and wild pig reporting system promotions. At the start of the extension year on September 1, 2022, The Texas A&M Natural Resources Institute's wild pigs Facebook website averaged 33,827 impressions, 1,925 clicks, 1,048 engagements and 8,340 views per quarter with an average reach of 42,218 users per quarter of the project. At the close of the project, NRI's Facebook had reached a total of 364,384 people during the report period. Additionally, the wild pigs Twitter account had an average reach of 63,712 users throughout its highest quarter of the project. At the end of the project period, the Texas A&M Natural Resources Institute's wild pig website received 31,703 page views over 23,599 sessions and had attained 20,777 new users. The Texas A&M Natural Resources Institute's wild pig reporting system received 267 total reports documenting 3,183 (1,819 juvenile and 1,364 adult) wild pigs sighted or removed by reporting system participants. The eXtension "Coping with Feral Hogs" website received 394,734 total page views over 575,561 total sessions with an average reach of 17,956 users throughout each quarter of the project. A total of 56 prioritized meetings and conferences were attended by project personnel.

Over the last grant cycle, the Texas A&M Natural Resources Institute's outreach and educational efforts were delivered to the public through face-to-face, web-based, webinar, video and interactive private lands stewardship academy delivery at the county, multi-county, regional and state levels with the support of NRI staff and County Extension Agents via direct contact (i.e., phone, e-mail, publications, one-on-one), mass media, group meetings, remote access and others. Based on evaluations conducted statewide, program participants reported damage in the following categories: pastures 75%; fences, water troughs or other improvements 43%; owner/employee time 44%; commodity crops 25%; loss of hunting lease value, wildlife food plots/feeders 21%; wetlands 25%; loss of land value 21%; equipment/vehicles 17%; specialty crops 14%; livestock 11%; stored commodities 6%; and personal injuries 3%.

Program participants reported increased knowledge (before vs. after a program) on the following specific subjects which included: feral hog biology 88%; legal control options 87%; efficient trap/bait techniques 89%; types/extent of hog damage 74%. Over ninety-eight percent of

respondents reported increased general knowledge of feral hogs and their control following the attendance of a Texas A&M Natural Resources Institute administered wild pig event.

Program evaluations documented the following planned practice adoptions of program participants by percentage: use larger traps 45%; pre-bait traps to encourage consistent feral swine visits 27%; scout for feral swine 48%; use baits with scent appeal 27%; market trapped feral swine to offset economic impacts 3%; set traps whenever fresh sign appears 37%; vary/change baits used in traps at different locations 25%; and use protective eyewear/gloves during field dressing as a disease precaution 17%.

Wild pig abatement remains an important educational process in Texas, and our past efforts show a track record of compounding return on the dollar invested. This project intends to continue statewide implementation, in targeted watersheds with bacteria impairments and WPPs/TMDLs, of the wild pig educational program to support and enhance current and future watershed management and protection efforts by watershed partnerships, agencies and natural resource organizations in Texas. The Texas A&M Natural Resources Institute, in partnership with the Texas State Soil and Water Conservation Board (TSSWCB), continues to meet this challenge through both conventional and innovative means, reaching large numbers of diverse audiences in Texas and beyond.

Program Development

Throughout the *Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance on Feral Hog Management in Priority Watersheds*, the project's goals centered on providing educational information and resources related to improving watershed health through the reduction of wild pig populations. The educational and technical assistance efforts of the project were facilitated through the following watershed-based activities:

- Establishing relationships with stakeholders in priority watersheds to create partnerships necessary for educational program development and implementation.
- Promoting a healthy watershed by increasing stakeholder awareness, understanding, and knowledge about feral hog biology, types and extent of feral hog damage, legal control options, and efficient trap and baiting techniques
- Developing a citizen engagement in feral hog management by providing one-to-one technical assistance site visits
- Fostering further reach of educational programming and resources through the use of online outreach techniques such as websites and the use of social media.

To carry out these goals for the project, two full-time personnel were initially employed to conduct all activities throughout the project. Since, one full time project lead, two full time project coordinators and one student worker carried out project activities.

Communication

Because establishing communication with members of the public and primary stakeholders in priority watersheds was key to the success of educational efforts, the project team designed a database derived from stakeholder data available online (Appendix A). The database was used to effectively communicate and maintain contact with the public and targeted stakeholders. Online resources such as websites and social media outlets were also used to extend the reach of project communications.

Using the database and online resources, team members were able to share workshop notices and project-related stories, as well as publications and other promotional materials developed during the project to a wide range of audiences. The database and online resources were updated and expanded as needed throughout the project to further increase outreach efforts.

In addition to emails and online outreach, project team members engaged in direct peer-to-peer outreach with critical stakeholder groups and entities from across the identified priority watersheds. Communications were established with numerous agencies and entities, including, but not limited to:

AgriLife County Extension Agents
Texas Animal Health Commission
Texas Department of Agriculture
Texas Farm Bureau
Texas Forest Service (TFS)
Texas Parks and Wildlife Department (TPWD)
Texas State Soil and Water Conservation Board
Texas Wildlife Association (TWA)
Texas Wildlife Services
USDA Natural Resources Conservation Service (NRCS)
Watershed Coordinators

Texas A&M Natural Resources Institute continued to provide these groups with information on new publications, workshop locations and dates, important news releases, etc. County Extension Agents (CEAs) were also closely involved with workshop planning and outreach.

Project personnel also routinely attended and participated in public meetings, and conferences to communicate project goals, activities, and accomplishments. Such meetings included, but were not limited to: Watershed Coordinator Roundtables; TRA Clean Rivers Program; vendor booths; steering committee meetings; Texas in-stream flow programs; Texas Grazing land Conference; Plum Creek Watershed Partnership, Geronimo and Alligator Creeks Watershed Partnership; Gilleland Creek TMDL; TSSWCB Regional Watershed Coordination Steering Committee meetings; Houston Area Bacteria Implementation Group Annual Meeting; Environmental Committee of the Friends of the River San Bernard; Copano Bay, Mission and Aransas River Watershed Meeting; Plum Creek Watershed Quarterly Meeting; Upper San Marcos River Watershed Meeting; Geronimo and Alligator Creek Watershed Quarterly Meeting; Attoyac Bayou Watershed Meeting; Double Bayou Watershed Meeting; Navasota River Watershed Meeting; Lampasas River Watershed Quarterly Meeting; Growing Green Public Meeting; Leon River

Watershed Protection Plan Steering Committee Meeting; Lower San Antonio River Watershed Meeting; Lake Granbury Watershed Meeting; Leon River Watershed Meeting; Lake Houston Watershed Meeting; San Benard River Watershed Meeting; Lake Lavon Watershed Meeting; Caldwell County Feral Hog Task Force meeting; Luling Foundation Program Planning Meeting; Williamson County Environmental Committee meeting and the Texas Section Society for Range Management Conference.

Educational Materials

Project personnel developed 2 extension publications and 8 interactive web-based private lands stewardship (PLS) learning academy publications directed toward public awareness and implementation of feral hog management techniques that also contribute to improved water quality. These PLS learning academy publications were made available online and paper copies were promoted and used as teaching tools at workshops and other educational events. The 2 extension publications are scheduled for publication in the next grant cycle. Throughout the project, preloaded flash drives containing a wide variety of wild pig resources were distributed at educational events in lieu of paper copies. This method has proven highly effective in broadening the reach of distributed resources.

The How to Use the Wild Pig Reporting Tool PLS learning academy publication was initially released in the Fall of 2019. This publication is available for use on the Texas A&M Natural Resources website (Appendix D).

The Differences Between Wild Pigs and Javelinas PLS learning academy publication was initially released in the early Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix E).

The Wild Pig Biological and Behavioral Drivers PLS learning academy publication was initially released in the early Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix F).

The Field to Table Safety Precautions for Wild Pigs PLS learning academy publication was initially released in the early Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix G).

The Exclusion Fencing for Wild Pig Management PLS learning academy publication was initially released in the Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix H).

The Interspecific Competition Between Invasive Wild Pigs and White-tailed Deer PLS learning academy publication was initially released in the Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix I).

The Wild Pigs Negatively Impact Water Quality: Implications for Land and Watershed Management PLS learning academy publication was initially released in the late Spring of 2020. This publication is available for use on the Texas A&M Natural Resources website (Appendix J).

The Wildlife Management as Agriculture Use for Property Tax Valuation in Texas PLS learning academy publication was initially released in the late Spring of 2020. This publication contains wild pig content as it relates to invasive species management for agricultural use tax exemption and is available for use on the Texas A&M Natural Resources website (Appendix K).

Two additional extension publications, "Diseases of Concern Associated with Wild Pigs" (Appendix B) and "Factors Influencing Home Range Selection and Size in Wild Pigs" (Appendix C) were drafted and underwent numerous phases of peer review during the project and are scheduled for release to the public in the next grant cycle.

These and previous publications as well as numerous other resources have been distributed and promoted during the project's educational workshops and webinars. They have also been promoted through news releases and various social media channels. Wild pig publications are available either at Coping with Feral Hogs, the AgriLife Bookstore, Scribd and via the Texas A&M Natural Resources wild pig website as well as the Texas A&M Natural Resources website.

Interactive Websites

Throughout consecutive projects, WFSC created, hosted and maintained the webpage Coping with Feral Hogs, containing all related feral hog educational resources in addition to providing external links to WFSC's social media websites. Additionally, WFSC and NRI personnel facilitated content contribution to the Feral Hogs Community of Practice website through eXtension.org. When the wild pig program migrated from WFSC to the Texas A&M Natural Resources Institute, an in house wild pig website including a wild pig reporting system was created and maintained throughout the project for all wild pig resources and program information. When NRI staff created and released its PLS learning academies, the domain https://nri.tamu.edu/learning/ was created to house this content. The information and external links provided within these websites provide stakeholders and members of the public access to relevant research-based information related to feral hogs and their management.

Additional Online Outreach Techniques

Through the use of the internet and social media outlets project team members have been able to reach additional age demographics which are not typically reached during face-to-face educational events. The Texas A&M Natural Resource Institute maintains an online presence on several social media and online informational outlets including YouTube, Facebook and Twitter. The contribution of wild pig related educational content on each of the websites allows NRI to increase the overall reach of the project related resources and content. Additionally, NRI developed and disseminated project informational materials, including flyers, news releases, workshop announcements, and other appropriate promotional publications. Local news media were also used to promote project educational events.

Hyper-linked resource document and presentations

To foster ease of access to related project materials NRI has maintained and updated a hyper-linked feral hog resource document that provides one click access to each of the online feral hog resources created by project personnel (Appendix G). The NRI Project Coordinators developed an all-inclusive feral hog Power Point presentation that was to be used during educational programming. This presentation was reviewed and approved by TSSWCB prior to its use. As

additional presentations were created, they were also reviewed and approved by TSSWCB prior to being presented.

Educational programs

A total of 100 wild pig educational events (10 four-hour wild pig workshops, including 72 one-hour programs, 2 two-hour programs, 9 one-and-a-half hour programs, 4 online webinars, 3 educational booths and 3 technical site visits) were conducted throughout the grant cycle that amassed 5,494 contact hours from 4,863 attendees. During the Covid-19 pandemic, a total 8 interactive wild pig private lands stewardship learning academies were produced in lieu of conventional programming to meet programming and publication goals. An additional 17 videos (including 4 webinars) and other educational resources supplemented conventional delivery of educational programming. NRI's wild pig YouTube content alone, not including WFSC wild pig YouTube content previously created, amassed 10,263 indirect educational contact hours and 292,266 views from 9/1/19 – 9/30/23. At the close of the project period, NRI's private land stewardship (PLS) academies had been taken at least 46,573 times. Conservatively, these lessons generated at least 23,287 hours of indirect educational contact hours throughout the grant cycle. Educational programming was delivered face-to-face, remotely, throughout interactive web-based outreach, and through video delivery across Texas. Collectively, NRI's adapted campaign rose to new educational challenges and amassed a total of 5,494 direct educational contact hours from 4,863 attendees and 33,550 indirect educational contact hours from 338,839 participants. These combined efforts resulted in 39,044 total educational contact hours, and an estimated adult education economic impact of $2,427,782.01.

Educational programs were tailored as much as possible to the watershed to convey biology, best management practices, removal techniques and laws and regulations associated with managing feral hogs. These topics were covered in adequate detail during one-hour presentations, however longer programs and four-hour workshops covered these topics in greater detail. Educational programs up to 3 hours in length were directed by project personnel while four-hour programs featured a variety of natural resource professionals.

The locations identified for these educational programs were targeted towards priority watersheds identified within the project description. However, due to the unconventional delivery of web-based and remote resources, many wild pig educational resources and programs were made available anywhere across Texas and the United States. While remotely administered and web-based programming extended across Texas and beyond, conventional programming within the statewide initiative reached over 114 Texas counties (Figure 1).

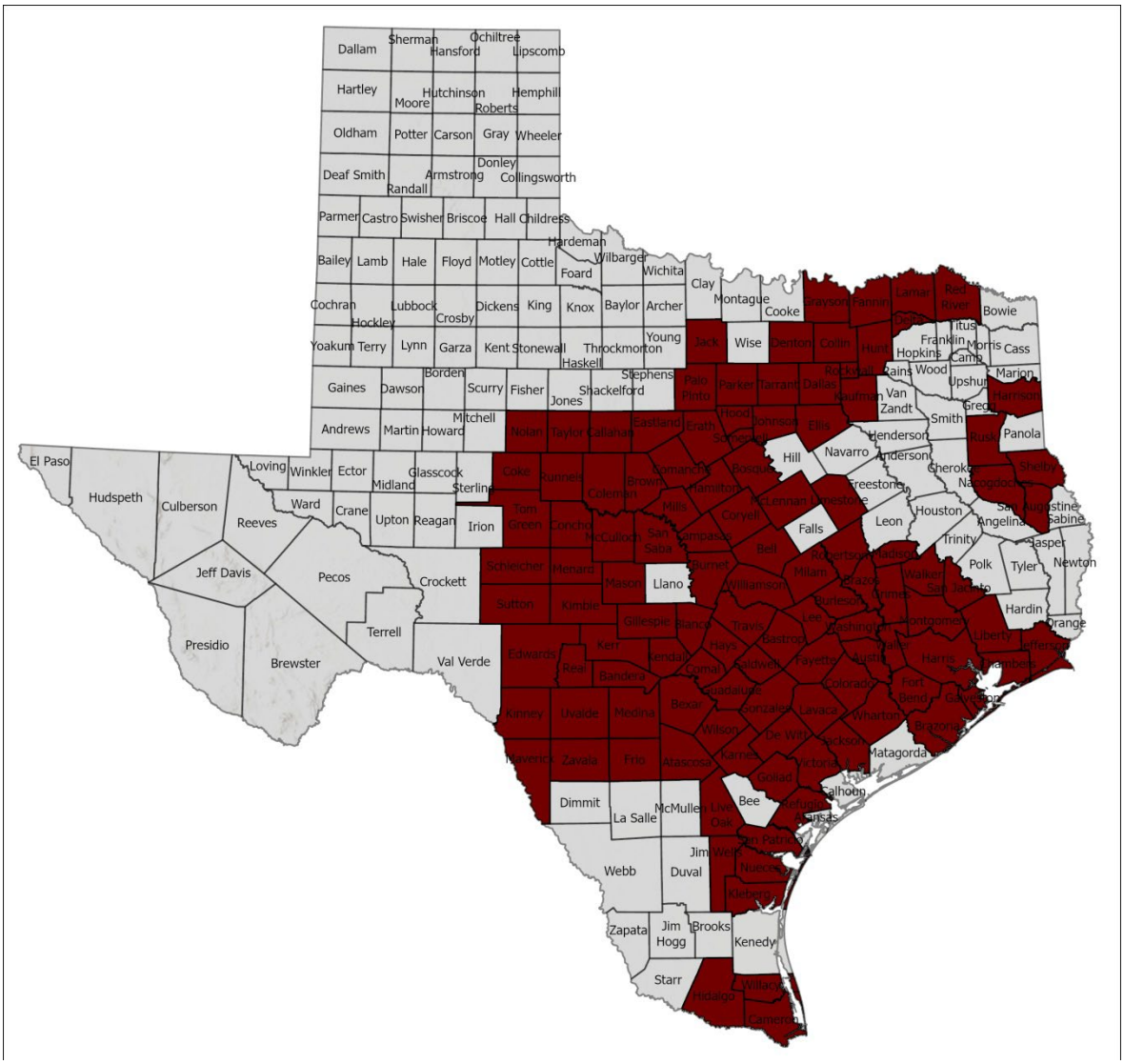

Figure 1. Visual representation of watershed-based wild pig educational events administered directly through conventional face-to-face delivery by county in Texas.

Technical Assistance Site Visits

Project team members conducted a total of 3 site visits to assist land managers in further understanding legal techniques for reducing feral hog populations. These visits were conducted prior to Covid-19, and the project has since observed diminished popularity in this educational opportunity for landowners. Future projects will enact targeted promotion of technical site visits for landowners via social media and other outlets in an effort to restore public interest. The primary goal of these site visits is to provide a property specific recommendation for abating feral hog damage grounded in research-based information and personal experience. Site visits also allowed for a more hands-on learning approach, which allow land managers to better understand and apply the concepts conveyed. An increased understanding of management techniques allows the land manager to share the information learned with their neighbors and friends, further expanding the reach of the information provided.

Webinars

In addition to the educational programs, NRI presented 4 webinars in collaboration with county extension agents and other stakeholders. Additionally, 5 webinars previously created and 2 webinars created in contract are also available on the NRI wild pig website and/or NRI YouTube Channel. An additional two other webinars were created during the report period and published by the Meadows Center for Water Quality and the Environment. Webinars were tailored to the needs of the audience, extension agent/stakeholder or county and highlighted wild pig biology and management, as well as directed participants to project resources available to help improve their wild pig management efforts. Innovative outreach including the delivery of webinars allowed for the expansion of wild pig education throughout Covid-19 to both remote and larger audiences.

News and Online Media Articles

Advertising for workshops, meetings, webinars, publications and other project resources were sent through various media outlets. A total of 15 AgriLife Today news releases were sent out through Texas A&M AgriLife Communications. Additionally, many external news releases and articles were published by a variety of print and online media outlets. A total of 7 media interviews were conducted by project staff that resulted in televised or printed news exposure to the project message. The full versions of the AgriLife Today articles, as well as examples of the types of external articles that were released in support of this project are found on page 312 of this report (Appendix O).

Technology Transfer

Websites

The Feral Hogs Community of Practice (CoP) website was also updated throughout the project with new articles, FAQs, and other online resource links. The website continued to serve as a springboard for professionals from across the United States to share their feral hog educational resources. Throughout the project the Feral Hog CoP website had 394,734 total page views over 575,561 total sessions with an average reach of 17,956 users throughout each quarter of the project.

The NRI wild pig website launched in in September of 2018. This site migrated all resources and materials from previous websites and also includes a comprehensive wild pig reporting tool. At the end of the project period, the Texas A&M Natural Resources Institute's wild pig website received 31,703 page views over 23,599 sessions and had attained 20,777 new users. The Texas A&M Natural Resources Institute's wild pig reporting system received 267 total reports documenting 3,183 (1,819 juvenile and 1,364 adult) wild pigs sighted or removed by reporting system participants.

Social Media

Consecutive projects have proven that traditional face-to-face educational programming often only reaches a specific demographic. Deployment of the Social Media Engagement model proved highly successful in previous projects, and was again utilized to increase the effectiveness of communication, information transfer, community engagement, and outreach to a wide variety of

age and gender demographics. Through the incorporation of social media outreach project resources had the opportunity to reach a much broader audience. NRI continues to evaluate which model tools should be aligned with the outreach and used social media channels (Facebook, Twitter and others) to develop and maintain a virtual community of interest related to wild pigs. The goal of the model deployment was to increase the reach and capacity of program efforts within and far beyond the project areas and to strengthen ties among stakeholders to the common objectives of the project. Google other external analytic trends were monitored to gauge audience interaction with the project's social media outreach techniques.

Facebook and Twitter accounts were continually updated with recent information and links to resources and news stories. Project personnel actively directed people to our websites, via Facebook and Twitter, and actively re-posted pertinent articles for promotion of project goals.

Feral Hogs Facebook, Twitter, Pinterest and Scoop.it accounts are active and continue to gain followers and numbers of contacts through consecutive projects. As of 9/30/23, available all time metrics for each of the social media outlets were:
Wild Wonderings Blog – 105 Articles; 399,597 Views
NRI Blog – 48 Articles; at least 20,726 Views
Feral Hog Facebook – 364,344 Total Reach; 1,213,123 Total Page Views
Feral Hog Twitter –789 Tweets; 43,344 Impressions

Wild Wonderings Blog Archive

NRI migrated to the use of its own website for blog articles in October 2018. However, 105 archived wild wonderings blog articles continued to serve as an alternative educational information outlet for our online stakeholders. Links to archived content were made available on NRI's wild pig website and were promoted via social media outlets. In the last project period, wild wonderings archived blog content garnered 9,402 reads. Throughout consecutive projects, a total of 105 articles relating to feral hogs, their impacts, and management strategies have gained 399,597 reads and counting (Appendix M).

Facebook

The Feral Hogs Facebook page was created in October 12, 2011. The Facebook page slowly and steadily gained momentum at first, steadily increasing in its popularity and reach. As various social media outlets evolved into the societal norm that we observe today, the feral hogs Facebook experienced a dramatic increase in popularity. Today, people look to social media for not just interaction, but also information. At the start of the extension year on September 1, 2022, The Texas A&M Natural Resources Institute's wild pigs Facebook website averaged 33,827 impressions, 1,925 clicks, 1,048 engagements and 8,340 views per quarter with an average reach of 42,218 users per quarter of the project. At the close of the project, NRI's Facebook had reached a total of 364,384 people during the report period. As a result of the changes in how people now seek and consume information, and also due to consecutive campaigns to maximize the reach of the project message through innovative outreach, the Feral Hogs Facebook page has amassed 1,213,123 total page views reached since its inception in 2011.

Twitter

Throughout the project, Twitter social media posts and promotions were able to achieve 4,123 impressions from 503 posts. Additionally, the wild pigs Twitter account had an average reach of 63,712 users throughout its best quarter of the project. To date, NRI's Twitter account has garnered 43,344 impressions and counting. NRI utilized Twitter analytics to track and collect data for the Feral Hogs CoP (@feralhogscop) account. NRI focused on two metrics to calculate reach via Twitter: impressions and followers. Impressions are defined as number of times users saw the tweet on Twitter. Followers are defined as the total number individual users that have subscribed to view the page's tweets.

YouTube

Wild pig educational videos continue to extend the reach of the projects educational message and benefit watershed health in Texas. Throughout the course of the project, an additional 17 videos (15 released to NRI YouTube and 2 released to the Meadows Center for Water Quality and the Environment YouTube Channel) were created that gained at least 29,771 views and counting from the NRI YouTube platform. Videos produced and released during the 19-04 project period garnered 1,779 indirect educational contact hours. However, the NRI Wild Pig YouTube Channel amassed 10,263 indirect educational contact hours within the project period from 28 total videos currently available on the channel. At the close of the project period, NRI's wild pig education YouTube channel had amassed 10,716 total hours of watch time (447 consecutive days), and 307,463 total views (Table 1).

Table 1. Texas A&M Natural Resources Institute wild pig education videos housed on the NRI YouTube Channel.

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Are Wild Pigs Safe to Eat?	https://www.youtube.com/watch?v=6qS5Cx4sL3U	8/7/2018	7,942.50	239,272	8,338.35	251,811
Low Cost DIY Bait Barrel for Wild Pigs	https://www.youtube.com/watch?v=YbpT80BtLOU	8/27/2018	395.70	15,258	426.29	16,417

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Low Cost DIY Headgate for Wild Pigs	https://www.youtube.com/watch?v=gpqjn0G94h8	8/27/2018	76.50	2,112	84.44	2,323
Conducting Wild Pig Stream Evaluations	https://www.youtube.com/watch?v=0BY7OHrmDts	10/9/2018	5.28	186	7.12	262
Wild Pig Habitat	https://www.youtube.com/watch?v=EVIHP3OgcVU	1/16/2019	7.58	1,071	9.23	1,267
Wild Pig Diet	https://www.youtube.com/watch?v=xOdxwBDCPAk	1/16/2019	4.66	423	5.71	527
Wild Pig Impacts on Agriculture	https://www.youtube.com/watch?v=FSkH3XZhmSs	1/16/2019	2.85	324	3.80	418
Wild Pig Sign	https://www.youtube.com/watch?v=j506APSfP_g	1/16/2019	2.19	172	2.67	216
Wild Pig History	https://www.youtube.com/watch?v=WtNtzZiT938	1/16/2019	2.01	230	2.59	291

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Wild Pig Impacts on Native Wildlife	https://www.youtube.com/watch?v=EcExXB3x1kw	1/16/2019	0.82	74	1.88	148
Wild Pig Impacts on Native Plant Communities	https://www.youtube.com/watch?v=VU5taRaVs64	1/16/2019	0.52	59	0.99	107
Wild Pig Reporting Tool	https://www.youtube.com/watch?v=tppEAvnItJ0	1/22/2019	0.52	32	0.76	41
Wild Pig Control and Damage Abatement	https://www.youtube.com/watch?v=Uw1l-lSHVFE	1/23/2019	3.17	274	5.82	456
Wild Pigs and Disease Concerns	https://www.youtube.com/watch?v=jgME1mSrpaA	1/23/2019	2.59	373	3.30	215
Wild Pigs and Whitetail Deer - Species in Conflict	https://www.youtube.com/watch?v=1cYO4trEeA8	1/23/2019	2.41	289	3.03	364
Wild Pigs and Water Quality	https://www.youtube.com/watch?v=hVGPgBZirso	1/23/2019	1.99	174	3.02	258

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Wild Pig Damages	https://www.youtube.com/watch?v=zx0eDjUTsoU	1/23/2019	0.70	79	1.03	116
Wild Pig Biology and Behavior	https://www.youtube.com/watch?v=_YemuX6t93E	2/4/2019	26.90	1,627	29.77	1,766
2019: Wild Pig Impacts on Ground Nesting Birds	https://www.youtube.com/watch?v=p3RWT04mi5Y	3/6/2019	5.47	466	7.88	689
Wild Pig Impacts and Abatement: Part I	https://www.youtube.com/watch?v=oMAN5-qr-A0	8/31/2020	44.40	313	44.40	313
Wild Pig Impacts and Abatement: Part II	https://www.youtube.com/watch?v=Vrwy3VkHmEw	8/31/2020	35.28	171	35.28	171
Texas A&M Natural Resources Institute Wild Pig Distance Education	https://www.youtube.com/watch?v=kqJQGcDxvn0	10/2/2020	1.53	116	1.53	116
What's the Rub: Why wild pigs rub on trees, poles and posts	https://www.youtube.com/watch?v=R0Sl-mob7NY	2/22/2021	17.62	710	17.62	710

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Update: Wild Pigs Negatively Impact Ground Nesting Birds	https://www.youtube.com/watch?v=RZ7uuN6RvPg	2/24/2021	10.60	361	10.60	361
Wild Pig Backstraps the Quick Way	https://www.youtube.com/watch?v=uozSPOpRsTU	6/1/2021	93.60	2,601	93.60	2,601
Wild Pigs and Water Sources	https://www.youtube.com/watch?v=ujGsHh5k4_Y	6/2/2021	5.08	208	5.08	208
Wild Pig Hunting vs Strategic Shooting	https://www.youtube.com/watch?v=8Cys1GgZ2Ng	6/17/2021	22.30	285	22.27	285
Wild Pig Damage in Texas	https://www.youtube.com/watch?v=HMo8Lp-LijA	6/19/2021	7.82	430	7.82	430
Wild Pig Hunting vs Strategic Shooting II	https://www.youtube.com/watch?v=yyWXbxDGkNA	6/28/2021	10.52	272	10.52	272
Feral Swine Control Pilot Program Workshop: Part III	https://www.youtube.com/watch?v=dQ1sDVREo2Q	11/10/2022	51.35	1,093	51.35	1,093

EDUCATIONAL WILD PIG VIDEOS - NRI YOUTUBE CHANNEL						
Name of Video	**Link**	**Publish Date**	**Hours Watched in Contract**	**Views in Contract**	**Hours Watched Total**	**Views Total**
Feral Swine Control Pilot Program Workshop: Part II	https://www.youtube.com/watch?v=advxYsoitNs	11/10/2022	24.40	518	24.40	518
Feral Swine Control Pilot Program Workshop: Part I	https://www.youtube.com/watch?v=KpYk7nEVgdQ	11/10/2022	17.22	520	17.22	520
Feral Swine Control Pilot Program Workshop	https://www.youtube.com/watch?v=MCvpAYc1Hiw	2/7/2023	1,418.80	21,776	1,418.80	21,776
Nighttime Lighting Systems for Wild Pigs	https://www.youtube.com/watch?v=STKDH1q4h74	3/10/2023	18.05	397	18.05	397
		Totals	**10,262.93**	**292,266**	**10,716.22**	**307,463**

Unfortunately, not all previously created wild pig educational video content migrated successfully over to the NRI YouTube platform from the WFSC YouTube channel where they were initially released. An additional 41 wild pig educational videos were created and released in previous projects that remain housed on the WFSC YouTube channel. As a result, report period data for these videos were not available at the time this report was prepared. However, to date these additional 41 videos have gained over 1,049,545 views through consecutive projects (Table 2). NRI staff are currently working to migrate the entire wild pig education YouTube video catalog to our NRI YouTube platform. To date, through consecutive projects, a total of 69 wild pig education videos continue to spread the conservation message of wild pig education and management around the clock and had received over 1,357,008 views and counting.

Table 2. Texas A&M Natural Resources Institute wild pig education videos currently housed on the WFSC YouTube channel created in previous projects.

WFSC YOUTUBE CHANNEL		
Video Name	**Link**	**Views**
Piglets nursing and eating corn	https://www.youtube.com/watch?v=fxfTA8lYALk	845
Part II: Urban Wild Pig Control	https://www.youtube.com/watch?v=kD1HTwdRsOw	2,700
Part I: Urban Wild Pig Impacts and Concerns	https://www.youtube.com/watch?v=GTJCNhKyME4	3,300
Snaring Wild Pigs: Ground Anchored Trail Set	https://www.youtube.com/watch?v=rKr5FaYcpKE	88,000
Wild Pigs and Ticks: Implications for Livestock Production, Human and Animal	https://www.youtube.com/watch?v=5Bm61SRwVWc	6,700
Can Wild Pigs Jump?	https://www.youtube.com/watch?v=NK6ysqFOt_Q	30,000
Wild Pig Trapping: Planning for Floods	https://www.youtube.com/watch?v=WBK1kVrWlaQ	1,800
Managing Wild Pigs Based on Their Food Habits	https://www.youtube.com/watch?v=Nr4NiFJypfU	4,800
Reducing Non-Target Species Interference While Trapping Wild Pigs	https://www.youtube.com/watch?v=wU3rabKNTro	1,500
Loading Wild Pigs for Transport	https://www.youtube.com/watch?v=KJ9QnAT7z-4	23,000
Fermenting Corn or Grain for Wild Pig Trapping	https://www.youtube.com/watch?v=jJOwVgNbs_I	65,000
Shooting Techniques for Wild Pigs	https://www.youtube.com/watch?v=xzIZyUmlYvY	27,000

WFSC YOUTUBE CHANNEL		
Video Name	**Link**	**Views**
How to Box Trap Wild Pigs	https://www.youtube.com/watch?v=wmlbsm0XymA	7,400
How to Snare Wild Pigs	https://www.youtube.com/watch?v=nWDf5Rc9e70	160,000
Corral Trapping Wild Pigs: A Success Story	https://www.youtube.com/watch?v=Cya55OVP9E0	9,900
How to Corral Trap Wild Pigs	https://www.youtube.com/watch?v=ewr8SmSo0cQ	10,000
Trailer - Wild Pig Management Video Series	https://www.youtube.com/watch?v=3gcK3KvhckE	4,700
Wild Pig Impacts on Reptiles and Amphibians	https://www.youtube.com/watch?v=yogGbTSwy1w	2,300
Wild Pigs and Riparian Habitats	https://www.youtube.com/watch?v=9yOR5mHJ-2Q	2,300
Selecting a Wild Pig Trapping Site	https://www.youtube.com/watch?v=yAX2lhN8vLs	1,800
Landowner Cooperatives for Wild Pig Management	https://www.youtube.com/watch?v=s-q8eTQqnfg	1,000
Understanding Wild Pig Signs	https://www.youtube.com/watch?v=Rf09uH5MklM	32,000
Understanding Wild Pig Wallowing Behavior	https://www.youtube.com/watch?v=db4tq5tzMdU	4,100
The Impacts of Temperature on Wild Pig Movements	https://www.youtube.com/watch?v=aBO7dlzq0wo	1,800

WFSC YOUTUBE CHANNEL		
Video Name	**Link**	**Views**
Wild Pig Trapping Tips: Rainfall and Wild Pigs	https://www.youtube.com/watch?v=Bbm_oZCvOBI	3,600
Identification of Deer and Feral Hog Tracks	https://www.youtube.com/watch?v=Pn3zlTeld0U	16,000
Texas Invaders: Feral Hogs	https://www.youtube.com/watch?v=m7mkGq5dPUg	9,700
Improving Feral Hog Box Trapping Efforts	https://www.youtube.com/watch?v=sJihwG7aKf4	54,000
How to Build a Figure-C Feral Hog Trap	https://www.youtube.com/watch?v=oiMiM46yIcU	324,000
How to Build a Corral Trap for Feral Hogs	https://www.youtube.com/watch?v=xu3Irm_1ivc	28,000
Strategic Shooting of Feral Hogs for Population Control	https://www.youtube.com/watch?v=8mcBK-y1tvs	5,400
Trapping Feral Hogs: Using Remote Cameras	https://www.youtube.com/watch?v=lLXBWbJIhjg	1,700
Trapping Feral Hogs: Laws and Regulations	https://www.youtube.com/watch?v=NLqxV-G_8XA	7,300
Trapping Feral Hogs: Non-target species and trigger type	https://www.youtube.com/watch?v=K4pMuPItBxw	30,000
Trapping Feral Hogs: Time of Year	https://www.youtube.com/watch?v=NyqxbB0SxSw	2,000
Trapping Feral Hogs: Corral Trap Designs	https://www.youtube.com/watch?v=LzXNDWYESd0	32,000
Trapping Feral Hogs: Gates and Baits	https://www.youtube.com/watch?v=0jO1wHCBAfY	21,000
Feral Hog Biology Basics	https://www.youtube.com/watch?v=4ZBLQnsF_IY	2,600

WFSC YOUTUBE CHANNEL		
Video Name	**Link**	**Views**
Control Technique and Regulations for Feral Hogs in Texas	https://www.youtube.com/watch?v=Cpz_rI5r1bA	11,000
Feral Hogs Impacts on Agriculture and Wildlife in Texas	https://www.youtube.com/watch?v=J71M0VAVTMQ	2,500
Exclusion Fencing for Feral Hogs around Wildlife Feeders	https://www.youtube.com/watch?v=7aAq7OxKnPk	86,000
	Total Views	**1,049,545**

Educational Program Evaluation

A feral hog program evaluation (Appendix L) was developed and disseminated to participants at all project workshops to evaluate economic impacts of educational programing, increase in knowledge, pre-post knowledge on program subjects, practice adoption and likelihood to recommend Texas A&M AgriLife Extension Service as a contact for feral hogs and their management and the net promoter score for each program.

Evaluation Response Rates

A total of 812 evaluations were completed by program attendees resulting in a response rate of 17%.

Economic Impacts of Educational Programming

Evaluated participants were asked to estimate their total economic losses due to wild pigs during the previous year. The resulting combined estimate of previous economic losses to feral hogs for all participants was $1,707,388.00. Evaluated participants were then asked to estimate their losses in the upcoming year after implementing what they learned at the feral hog educational workshop. The resulting combined estimate of upcoming economic losses was $1,291,263.00. The knowledge received by program participants resulted in an expected $416,125.00 annual reduction in damages associated with feral hogs. The combined estimated savings to landowners over the course of the 4 year project was $1,664,500.00.

Increase in Knowledge by Attending Educational Programming

Evaluated participants were asked directly if their knowledge of feral hogs and their control increased by attending an NRI administered wild pig educational program. A total of 713 participants or 98.3% indicated Yes, while 12 participants or 1.7% indicated No.

Before and After Knowledge on Program Subjects

Evaluated participants were asked to rate their knowledge of feral hog biology, legal control options, efficient trap/bait techniques and types/extent of hog damage both before and after attending the program. The numbers 1-5 were utilized with 1= no knowledge, 3= some knowledge and 5= high level of knowledge.

Participants knowledge of feral hog biology, lethal control options, efficient trap/bait techniques and types/extent of hog damage increased by 87.8%, 83.8%, 87.9% and 74.8% respectively.

Plans for Practice Adoption

Evaluated participants were provided with a list of 8 practices and asked to indicate which practices they planned to adopt in order to better manage feral hogs on their property. The practices included: A). use larger traps, B). use baits with scent appeal, C). vary/change baits at different locations, D). set traps whenever fresh sign appears, E). pre-bait traps to encourage consistent hog visits, F). scout for hog signs (tracks, wallows, rubs, hair), G). wear eyewear and gloves during field dressing and H). market trapped hogs to processors to recoup losses.

Participants indicated that they planned to adopt an average of 2.78 practices. Individually practices adopted broke out to 45.1% for A, 26.7% for B, 24.5% for C, 36.5% for D, 50.4% for E, 48.3% for F, 17.0% for G and 29.7% for H.

Likelihood to Recommend Texas A&M AgriLife Extension Service

Evaluated participants were asked to indicate the likelihood that they would recommend the Texas A&M AgriLife Extension Service to their family and friends as a contact for information on feral hogs and their control. The numbers 0 to 10 were provided with 0= not likely and 10= likely. A total 97.9% of respondents indicated they were likely to recommend Texas A&M AgriLife Extension Service to their family and friends as a contact for information on feral hogs and their control. A total of 62.4% of evaluated participants denoted a score of 10 out of 10, indicating a very high likelihood of recommending NRI administered educational programming to family and friends

Net Promoter Score

A net promoter score is used to indicate clientele loyalty. The client's response of 1-10 on the likelihood to recommend question is used to identify them as a promoter, a passive or a detractor. The overall average net promoter score for the project's educational workshops was 70.9. The maximum possible score was 100 and the minimum possible score was -100. A total of 77.2% of evaluated participants were classified as "promoters" of NRI administered educational events.

Conclusion

Through the continuation of the *Statewide Delivery of Lone Star Healthy Streams Feral Hog Component and Providing Technical Assistance on Feral Hog Management in Priority Watersheds* project, funded by U.S. Environmental Protection Agency (EPA) with Clean Water Act (CWA) §319(h) funds through the Texas State Soil and Water Conservation Board (TSSWCB), a combination of conventional direct programming efforts, adapted indirect programming initiatives, as well as broad reaching innovative outreach techniques through a variety of outlets, resulted in a successful campaign that well extended the conservation imperative of wild pig education, control and management.

During TSSWC Project 19-04, at least 1,369,416 contacts were informed about the project's goals of promoting healthy watersheds through feral hog education and outreach, introduced to educational products and online resources, and educated about feral hogs and their management within priority watersheds and across the state. Programming achievements included a total of 100 wild pig educational events across 114 Texas counties, (10 four-hour wild pig workshops, including 72 one-hour programs, 2 two-hour programs, 9 one-and-a-half hour programs, 4 online webinars, 3 educational booths and 3 technical site visits) that amassed 5,494 contact hours from 4,863 attendees. Additionally, 8 interactive wild pig private lands stewardship learning academies and 17 videos (including 4 webinars) were produced to meet programming and publication goals during Covid-19. NRI's wild pig YouTube content garnered 10,263 indirect educational contact hours and 292,266 views from 9/1/19 – 9/30/23. NRI's private land stewardship (PLS) academies were taken 46,573 times, generating at least 23,287 additional indirect educational contact hours. Collectively, NRI's adapted campaign amassed 5,494 direct educational contact hours from 4,863 attendees, as well as 33,550 indirect educational contact hours from 338,839 participants. The total direct and indirect educational contact hours through face-to-face, remote, webinar and video educational delivery was at least 39,044 hours. The campaign achieved an estimated adult education economic impact of $2,427,782.01.

Project personnel developed and distributed educational resources and programs to increase water quality by enhancing watershed education across the state in promotion of the reduction of feral hog damage in Texas. These materials were made easily accessible to the public, landowners, decision makers, and others through interactive websites and frequently promoted through various social media outlets. Conventional and paid social media, website and other promotions proved vital in extending the imperative of wild pig control and management. NRI's Facebook reached a total of 364,384 people during the report period. The wild pigs Twitter account had an average reach of 63,712 users throughout the highest quarter of the project. NRI's wild pig website received 31,703 page views over 23,599 sessions and had attained 20,777 new users. The Texas A&M Natural Resources Institute's wild pig reporting system received 267 total reports documenting 3,183 (1,819 juvenile and 1,364 adult) wild pigs sighted or removed by reporting system participants. The eXtension "Coping with Feral Hogs" website received 394,734 total page views over 575,561 total sessions with an average reach of 17,956 users throughout each quarter of the project. A total of 56 prioritized meetings and conferences were attended by project personnel.

The 98.3% increase in knowledge gained by evaluated participants showed a continued high level of effectiveness in conveying project initiatives. Participants also reported that they would adopt an average of 2.78 recommended practices to abate feral hog damage and benefit water quality as a result of the program. Evaluated participants reported a total expected reduction in economic

damages of $1,664,500.00 through the implementation of practices that they learned at the workshops over the course of the 4 year project.

Throughout a significant portion of the project period, conventional face-to-face program delivery was unavailable due to Covid-19. A pioneering aspect of the educational resources produced in TSSWCB Project 19-04 was their interactive, remotely administered, and "learn at your own pace" components that greatly benefited the delivery of the core conservation message of the campaign. As a result, the educational contact hours amassed through NRI's private lands stewardship learning academies and educational videos/webinars alone eclipsed the contact hours garnered through conventional direct delivery methods by a ratio of over 6:1. Noting this, NRI will seek to continue to produce these types of educational resources in supplementation of conventionally administered direct outreach in future projects. Outreach efforts including direct and indirect educational efforts, resource production and social media promotions remain imperative in mitigating the impacts of wild pigs on water quality, agricultural production, native species and habitat. The Texas A&M Natural Resources Institute greatly values it's partnership with the Texas State Soil and Water Conservation Board in continuing to address one of the most persistent and impactful conservation challenges in the United States today.