

FERAL HOG PROJECT ACCOMPLISHMENTS

March 2008-February 2010

INTRODUCTION

The Texas Legislature provided \$1M for feral hog abatement to the Texas Department of Agriculture for the 2008-2009 Biennium. That money was provided through a grant to Texas AgriLife Extension Services-Wildlife Services program (WS) to conduct statewide abatement projects for a 2-year period from March 1, 2008 through February 28, 2010. While the terms of the grant were to provide direct assistance to landowners, AgriLife Extension also conducts feral hog education efforts, which were tracked for the duration of the grant. AgriLife Extension established a stakeholder advisory committee to assist in prioritizing the projects. During Year 1 of the grant (March, 2008 through February, 2009), a total of 17 special projects, plus a number of isolated responses were accomplished. During Year 2 of the grant (March 2009-February 2010), a total of 18 projects were accomplished, many of these were continuations from the first year. Overall, for the two year period, 19 projects were identified and worked. Figure 1 details the counties with planned special projects. Special emphasis was given to projects where larger landowner groups were formed to assist with removal as well as to areas where cooperative funding was available. The overall goals of the projects during both years were to address specific resources in need of protection from hogs in diverse geographic areas of the State.

EXECUTIVE SUMMARY

During the 12 months covered by the first year of the grant, WS removed 24,350 feral hogs. During the second year of the project, WS removed 23,057 feral hogs for a total of 47,407 feral hogs during the grant period. Figure 2 shows a “dot density” representation of feral hog removal for Year 2 of the grant to provide an indication of the extent and intensity of the program. Prior to receiving dedicated funds for feral hog abatement, WS removed approximately 10,000 hogs annually through existing wildlife damage management activities, indicating that the additional funding allowed for the removal of 14,350 additional hogs in Year 1 and 13,057 additional feral hogs in Year 2. Direct control expenses from the grant for Year 1 were \$465,173 and for Year 2 were \$468,460. The cost per hog removed during Year 1 was \$19.10 and for Year 2 was \$20.32, or an average cost over the 2 year project of \$19.69 per hog.

Feral hog control by aerial shooting, where practical, remains the most efficient method of control. The average cost per hog taken with aerial shooting varies depending on density of hogs, but ranged from \$7.50 (in high densities) to \$40.06 (in low densities or where a small population of hogs was targeted to address a newly established population). Aerial shooting is not practical in much of East Texas or anywhere tall trees preclude effective operations. In these areas, hogs must be removed by ground methods, including trapping and shooting (including night shooting with special equipment).

Benefit:Cost ratios also vary, depending on the crop or resource being protected, the area being addressed, and the size of the problem. For some projects, such as sea turtle nest protection, it is impossible to calculate the value of the hatchlings protected. For agricultural crops, production values are more easily obtained. Examples of benefit:cost ratios include:

Peanut Protection	\$11.03:1
Rice Protection	\$7.50:1
Wheat Protection	\$3.60-\$5.40:1
Rangeland Protection	\$4.05:1 (\$0.33 per acre cost for protection)

The overall damage from feral hogs has been variously estimated anywhere from \$50 to \$500 per hog per year. Pimentel (1999) estimated the damage at \$200 per hog per year. In a pilot project prior to this grant, in Hill, Navarro, Titus, Camp, and Matagorda Counties, Agrilife Extension documented a \$1.48M reduction in feral hog damage from a 2-year removal of 3,799 feral hogs, for a reported savings of \$389.70 per hog removed. Obviously, this value would not apply to all hogs, but likely better reflects the damage associated with feral hogs in areas with intensive agriculture.

Using Pimentel's more conservative estimate of \$200 per hog as a representative value for feral hogs removed under this grant, the removal of 47,407 feral hogs saved producers \$9,481,400 for a benefit:cost ratio of \$10.15:1.

The availability of the funding from TDA increased both the visibility of feral hog projects and the demand for assistance. Outside of the grant (and not included in the feral hog take data), over \$250,000 in additional activity has been generated, including matching efforts by landowners and counties, and educational activities.

PROJECT ACCOMPLISHMENTS

The following narrative reflects the accomplishments of the specific projects. Project numbers refer to the project areas identified in Figure 1.

1. Pseudorabies Suppression in the Panhandle- Pseudorabies (PRV) is a viral infection which threatens domestic swine. There is a relatively high prevalence of PRV in feral swine and its presence not only threatens domestic swine production, but would be a barrier to domestic swine movement if it were to infect confinement herds in the panhandle. PRV can become aerosolized when environmental conditions are right, so effective protection involves high biosecurity efforts by the producers, as well as, maintaining a buffer area surrounding the hog facility. During Year 1, WS conducted feral hog removal in a 15-mile radius of two domestic swine facilities located near feral hog populations. Following control, WS could not detect any feral hogs within 5 miles of the facilities. The cost of these actions was \$40,000 and the risk of pseudorabies transfer to domestic swine was reduced to zero during this time. Following the Year 1 project, the Texas Animal Health

Commission has requested this project be institutionalized as an on-going effort and expanded to include all confinement facilities. During Year 2, WS expanded the project into Roberts and Gray Counties. However, feral hog numbers in these areas are located away from domestic swine facilities. In Year 2, only 37 hogs were removed from the 4 county area, despite intensive efforts (including 2.1 hours of helicopter aerial hunting). WS has surveyed other major swine facilities in the panhandle and has not located others with adjacent feral hog habitat. Disease management is an important effort by WS, and this grant allowed the systematic assessment of risk and the reduction of that risk in these areas.

2. Peanut, Rangeland and E. coli Protection- Peanut production has been reduced in many areas of the State due to feral hog depredations. Peanuts are very vulnerable at planting and at maturity. In Year 1, WS protected 1,571 acres of planted peanuts at a cost of \$40,400, but saved \$445,522 in harvest, for a benefit:cost ratio of 11.03:1. In Year 2, WS expanded the project to include Motley and Dickens and added rangeland and E. coli suppression to the project area. The Buck Creek watershed is seasonally affected by E. coli and bacterial source tracking indicates feral hogs are a major source of E. coli in this area. During Year 2, WS removed 2,469 hogs in the 4 county project area. Both, contract helicopter (9.4 hours) and agency owned helicopter (12.7 hours) were used along with agency owned fixed wing aircraft. While aerial hunting is an important part of this project, an amazing 456 feral hogs were removed by night shooting with infrared scopes in the immediate vicinity of the peanut fields.
3. Wheat/Pseudorabies- A wheat protection project in Baylor and Wilbarger counties was initiated in Year 1 after significant damage already had occurred to the 2008 crop. WS hog removal cost \$28,080, and increased production of the wheat by \$102,000, for a benefit:cost ratio of 3.6:1. However, production values were still low due to the initial damage, which had occurred before WS removed hogs. In Year 2, WS continued control for the protection of the 2009 crop, which provided a benefit in excess of \$500,000 (reduced second planting costs for 28,000 acres). Unfortunately, due to environmental conditions, the 2009 wheat fields did not produce a commercial crop. Producers were able to harvest wheat for seed in this area, providing some financial return for them, which may not have been viable if feral hog abatement had not occurred. Towards the end of Year 2, WS provided control for the protection of the 2010 crop. Hog densities are low in the vicinity of the wheat fields. This project also allowed WS to examine the prevalence of pseudorabies through an extensive control project. Initial prevalence rates of PRV in hogs in this area were 46%, but dropped to 20%, 17% and 13% following each subsequent removal project. In the report provided at the end of Year 1, we reported that these data indicated that control not only reduces the risk of pseudorabies, but provided insight into the epidemiology of the disease in a feral hog population. During Year 2, WS made 2 additional trips

to the project area and removed another 794 feral hogs with 24.9 hours of helicopter aerial hunting. However, PRV rates on the fifth visit were 47%, but were reduced to 22% on the sixth visit. This pattern indicates that PRV in feral hogs is an epizootic disease (cycles through the population as a series of outbreaks) rather than a chronic infection where some individuals are infected at all times. Additionally, while control can reduce the number of individuals with titers for the virus, it likely will not eliminate the disease in the wild. This type of data has never been collected before. The role of control in managing the risk to domestic swine is to reduce the number of individuals, which in turn will reduce the potential for exposure.

4. Rangeland/Pasture Protection- Rangeland and improved pastures are often damaged by feral hog feeding and rooting. In Year 1, three counties (Archer, Young and Clay) were selected to evaluate damage and the benefits of control. WS control was applied to 87,649 acres at a total cost of \$29,305, or \$0.33 per acre. A total of 594 hogs were removed. Using a conservative estimate of \$1.35 per acre in damage avoided, the benefit:cost ratio is \$4.05:1. In Year 2, Clay County received a total of 4.6 hours of helicopter aerial hunting to complete the project. A total of 140 hogs were removed. A single day project was also done in Callahan County in Year 1 to protect rangeland. The contract helicopter was scheduled to fly properties in this county coordinated by the County Extension Agent. This made the brief project more efficient. In that single day, 258 hogs were removed with 5.8 hours of aerial hunting.
5. E. coli Protection- Feral hogs are a significant source of the bacteria E. coli, which can impact food crops and water. EPA has identified numerous stream segments in Texas, which exceed the Clean Water Act standards for bacterial contamination. In Year 1, feral hogs were removed in Parker, Hamilton and Hood Counties in three separate projects. Special requests have been received for feral hog removal in the Leon River and the Brazos River (above Lake Granbury). In Year 2 the Hamilton County portion of the program continued with 317 hogs removed for the protection of the Leon River.
6. Multiple Resources Metroplex- Several smaller projects were conducted to remove feral hogs in Dallas and Denton Counties. At Lake Lewisville, 14 hogs were removed during Year 1 of the grant- the last of 70 hogs to be removed from that site. A total of 62 hogs were removed from the Grand Prairie landfill. Three hogs were removed in Lancaster where they were rooting up the golf course and chasing golfers. In Year 2, 28 hogs were removed in the Metroplex mostly for the protection of personal and public property.
7. Corn, Milo, Pasture- In Year 2 WS undertook an aggressive program to address feral hog damage in Camp, Upshur, Wood, Hopkins, Smith, Fannin and Delta Counties. In Fannin and Delta Counties, landowners formed a

cooperative and contributed a per-acre assessment to cost share helicopter aerial gunning. During the grant, WS flew 19 hours and removed 1,421 feral hogs. A follow-up flight was scheduled after the end of the grant period. In Camp, Upshur, Wood, Hopkins and Smith Counties WS used summer interns and agency trouble-shooters to remove 338 hogs on the ground and an additional 375 hogs with a helicopter. A total of 6.6 hours of aerial hunting was used in Hopkins County alone. Using this project to provide a comparison for costs, the 375 hogs removed by aerial shooting cost \$5,445 or \$14.52 per hog, while the 338 hogs removed by ground methods cost \$48,000 or \$142.01 per hog. Decisions on whether or not to aerial hunt depend on the vegetative cover, the size of the land to be treated, and the availability of aircraft and funding, but ground removal is very costly when compared to aerial shooting.

8. Brucellosis and Watershed Protection- WS initiated a combined project to address watershed damage (erosion, bacterial contamination) in Henderson, Anderson and Leon Counties. Anderson County is also an area with high brucellosis infection rates. In Year 1, WS removed 627 feral hogs including 606 via 10.1 hours of helicopter aerial hunting. In Year 2, WS removed 280 feral hogs, including 202 in 9.9 hours of helicopter aerial hunting. The difference in aerial hunting rates indicates the initial control was responsible for removing 66% of the initial population.
9. Prairie Restoration- In Limestone, Robertson and Freestone Counties, rangeland protection and restoration is important to ecological health and agricultural operations. In Year 2, two large ranches in Freestone County combined with the neighboring properties to coordinate hog control. In the other counties, WS was able to take advantage of the initial operation to work on landowners with significant problems. A total of 353 hogs were removed. Disease samples taken from the feral hogs indicate a relatively high incidence of Type A influenza in Freestone County.
10. Rangeland and Riparian Protection- In West Texas, ranchers and The Nature Conservancy (TNC) have set aside thousands of acres for protection of riparian corridors, rare plants and rangeland. Feral hogs threaten the very resources for which they have set aside the land. Ranchers and TNC have formed a cooperative, which funds (outside of the grant) one full-time feral hog specialist. Grant money was used to support this employee when working off of these properties (e.g. when gathering disease surveillance samples) as well as for aerial support. In Year 1 a total of 428 hogs were taken in Jeff Davis and Pecos Counties. In Year 2 WS removed 280 hogs from Jeff Davis County.
11. E. coli and Vegetables- In Presidio County a local vegetable production process is vulnerable to feral hog damage, as well as to E. coli contamination. WS mobilized in Year 1 to protect the project area and removed 98 feral hogs.

Localized flooding on the Rio Grande River prevented additional control and moved feral hogs. In Year 2, feral hog control resumed and an additional 34 feral hogs were removed.

12. Public Parks and E. coli- In Travis and Hays Counties, two separate resources require protection from feral hogs. Because of endangered species considerations, the City of Austin and Travis County have several areas set aside as permanent green space, some of which receive public use. Hogs also enjoy these spaces, creating damage in the parks and surrounding neighborhoods. Additionally, two drainages- Gilliland Creek and Plum Creek- have been identified as being impacted by E. coli with the belief that feral hogs are responsible for some of that contamination. In Year 1, WS removed 87 hogs with ground methods. In Year 2, WS removed 116 feral hogs in the two counties and an additional 334 feral hogs in the portion of Caldwell County associated with the headwaters of Plum Creek. While the results of the E. coli sampling are still being scrutinized, the overall level of E. coli bacteria dropped in the Plum Creek treatment by 48% compared to an adjacent non-treatment area.
13. Corn, Rice, Cattle, Native Prairie- A two-county project in Austin and Colorado Counties protected multiple resources. Corn and Rice crops were being impacted by feral hogs and cattle were being injured when competing with hogs for feed. In Year 1, WS removed 317 feral hogs in this project area, and in Year 2, WS removed 81 additional hogs. The decline in take indicates a reduction in overall populations. More importantly, corn damage was reduced significantly.
14. Public Parks-Harris County- In Year 1, Lake Houston City Park had a feral hog problem in both, remote sections of the park, as well as developed picnic areas. WS worked with the Parks personnel to place traps where they would be effective, to identify how many hogs were using an area, and to support the project at several intervals. To maximize State resources, City personnel were to inspect the traps, bait them as necessary, and remove hogs when they were captured. A total of 25 hogs were removed. No new sign has been found following the passing of Hurricane Ike.
15. Rice, Cattle Pasture and Feed- During Year 1, feral hogs were targeted in Chambers and Jefferson Counties for the protection of rice, cattle pasture and feed. However, Hurricane Ike interrupted this project. During the post-hurricane efforts to locate and rescue cattle, WS observed numerous feral hogs from their aircraft. However, the opportunities to conduct removals were extremely limited. In Year 1, WS removed only 43 feral hogs- all before the hurricane. In Year 2, WS removed 72 feral hogs. While hog numbers appear to be rebounding, damage has been limited as cattle numbers are also rebuilding in many of the affected areas.

16. Rice and Sea Turtles- Kemp Ridley's sea turtles are listed on the endangered species list and successful reproduction is one of the limiting factors. Turtle eggs are laid in nests on the beach, which feral hogs have been documented to destroy. WS was requested by the US Fish and Wildlife Service (FWS) to remove feral hogs on Matagorda Island for the protection of the turtles. Nest monitoring on the island has not identified a successful hatching since 2003. The FWS thought there were 30-40 hogs on the island. During Year 1, WS removed 393. As a result, the first successful hatch of a nest was documented following the project. In Year 2, WS removed 404 feral hogs from the island. In addition to this project, WS worked several other properties in the county for the protection of rice and other crops. Besides the island work for turtles, WS removed 417 additional feral hogs in Year 1 and 212 additional feral hogs in Year 2.
17. Milo and Corn- Grain crops are important in Victoria and Calhoun Counties and feral hog damage occurs in many of these areas. In Year 1, WS removed 600 feral hogs from these 2 counties. In Year 2, WS removed 580 feral hogs. Because we only work a fraction of these counties, it is likely that continued control is necessary before any long-term population reduction is observed.
18. Wildlife- In Duval and Jim Hogg Counties in South Texas, WS initiated a feral hog project to determine the extent to which quail were being impacted. WS worked with a private ranch/commercial quail hunting operation to remove feral hogs on one-half of the ranch, while allowing hogs to exist on the other, separate half of the ranch. The ranch was to provide quail data from their hunt program to evaluate the effectiveness of the program. WS removed 140 hogs in Year 1 on the project area and an additional 225 in the 2 counties (365 feral hogs total for Year 1). Because of the dry year however, the ranch did not commercially hunt in the Fall of 2009. In Year 2, WS removed 594 feral hogs in the 2 counties in support of wildlife protection. Results of this effort will be available at the end of winter, 2010-11. While WS was unable to quantify any benefit from the quail protection project, it was because of the lack of cooperator data. It is likely that quail nest success was enhanced, just not to the degree necessary.
19. Fencing Protection- Due to concerns regarding fever tick infestations in South Texas, WS considered the impacts of feral hogs on fencing and the potential for hogs to breach game proof fencing, allowing the movements of hogs and other wildlife that serve as potential vectors for fever ticks. In an experimental design, WS removed feral hogs on a ranch with exterior 8' game fencing, with a single 7.5 mile cross fence across the middle of the ranch. Before the project, there were 37 feral hog holes in the fence. All holes were repaired. WS removed 228 feral hogs off the ranch (on both sides of the cross fence during Year 1. After one year, the property was revisited and "new" (less than 1 year and since the control effort) holes were counted. There were 30 holes in the same 7.5 miles of fence. While this represents a 19%

reduction in holes in the fence, this level of management is not enough to prevent the spread of diseases. While some agencies are planning to utilize fencing as a mechanical barrier to wildlife movement to reduce fever tick spread, these data indicate that significant resources may be necessary to maintain the fence if feral hogs are on the affected ranches.

OUTREACH:

Final Report on Indirect Control via Educational Activities

Submitted by:
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Background:

Indirect control of feral hogs via Extension educational efforts was funded as a component of the 2008-10 feral hog abatement project. The extension of research-based information to those landowners experiencing feral hog damage and in need of abatement remains an essential step for long-term reduction in the estimated annual \$52 million agricultural impact by feral hogs statewide.

Proposal Performance Objective #4:

Utilize Extension tools to disseminate feral hog abatement information statewide. Series of county, multi-county, district and regional programming efforts will be utilized to provide landowners with information on feral hog indirect control options and procedures. These efforts will be coordinated through Extension Wildlife personnel with the full support of Wildlife Service personnel throughout the state utilizing the network of county Extension agents headquartered throughout the state.

Proposal Work Plan Objective #5:

Indirect control efforts will consist of a number of Extension methodologies utilized to extend information to Texas landowners so they can implement efficacious control efforts themselves. Measures of program success will be based on 1) monetary value of information received and Net Promoter Scores (a customer satisfaction index).

Results

During the two year project, the Co-PI and Wildlife Services personnel met with several entities to advise on feral hog management including City of Palestine officials to discuss feral hog abatement options in both urban (i.e. Palestine Hospital) as well as rural settings. The Co-PI gave an invited presentation on feral hog abatement and current project updates to AgriLife Extension District 5 Judges and Commissioners Courts during a meeting in Nacogdoches.

The Co-PI also briefed members of the Texas Feral Hog Advisory Committee on indirect control/educational efforts conducted during the Phase I Project (2006-07) and planned activities for the Phase II Project (2008-10) during the initial meeting of the group in Austin. The Co-PI briefed the Extension Incident Resource Team (IRT) for Animal Issues on the abatement project and coordinated with WS regarding the IRT and its role in disease transmission/outbreak education.

A presentation on the role of educational efforts in abating feral hog damage was made at the National Conference on Feral Hogs in St. Louis, Missouri. Invited presentations on Texas feral hog abatement was made by the Co-PI at the AKLAMISS Feral Hog Management Symposium held at Louisiana Tech University in Ruston, Louisiana and at a wildlife field day at the LSU Idlewild Research Center near Baton Rouge, Louisiana. The Co-PI also serves on the Steering Committee for the National Feral Hog Conference scheduled for 2010 in Pensacola, Florida and will present TDA project outreach impacts at that meeting in April.

Professional training presentations were made to the Texas Trappers and Fur Hunters Association, Texas Animal Control Association, Texas Chapter-Wildlife Society (2 presentations) and the Texas Surface Mine Reclamation Association.

A total of 2,483 individual contacts were made with clientele requesting feral hog abatement information by telephone, e-mail, office and site visits and publication dissemination. This does not include several thousand publications and handouts disseminated to clientele at group meetings. A total of 48 mass media contacts regarding feral hog abatement were made by the Co-PI that included interviews for radio, newspapers/magazine articles and television. Clientele also accessed information on feral hogs and their control from the AgriLife Extension feral hog website (<http://feralhog.tamu.edu>). During the abatement study, the website received a total of 49,840 unique hits with 108,447 pages accessed.

Indirect control via educational efforts included conducting 22 county/multi-county group educational programs for landowners in need of feral hog abatement information. These events were coordinated through county Extension agents. A total of 3,882 clientele attended these programs which consisted were conducted in field day and seminar formats. A total of 989 program impact surveys were collected from participating.

Survey respondents reported that pasture damage was the most frequently occurring damage type (76% of survey respondents) followed by loss of owner/employee time (37%), damage to fences, water troughs and other improvements (29%), commodity crop losses (27%), loss of land value (24%), wetland damage (22%), damage to equipment or vehicles (18%), loss of wildlife lease value and damage to food plots/feeders (16%), loss of specialty crops (15%), livestock injury, death or diseases (7%), stored commodities (3%) and personal injuries (2%).

Control methods most frequently employed by respondents included trapping and destroying (51%), owner/employee shooting (46%), use of dogs (18%), trapping and moving (16%), trapping and selling (15%), lease hunting (6%) and use of snares/aerial control (6%).

According to survey results, 98% of attendees indicated they increased their knowledge about feral hogs and their control as a result of the educational programs. The average

level of knowledge increase was 70% per survey respondent on four specific topics (feral hog biology, legal control options, efficient trapping/baiting techniques and recognizing the types and extent of hog damage). Furthermore, they indicated that they would adopt an average of 3.6 new practices each that would help them more efficiently abate feral hog damage by employing more effective control methods and strategies.

Planned adoption practices included the use of larger traps (63% or respondents), pre-baiting/monitoring traps (55%), scouting for fresh hog sign (49%), use baits with scent appeal (48%), market trapped hogs to recoup losses (43%), vary bait types between trapping locations (42%), initiate trapping whenever fresh sign appears, (36%) and wearing eyewear and gloves when field dressing hogs (21%).

Survey respondents indicated their likelihood of recommending the Texas AgriLife Extension Service as an information source on feral hog damage abatement to family, friends and colleagues was 9.0 based on a Likert Scale of 0-10. This resulted in a Net Promoter Score of 56%, which is indicative of strong clientele recognition and support of AgriLife Extension-led efforts on feral hog abatement via indirect control.

Economic losses attributable to feral hogs during the year prior to attending the programs averaged \$6,560 per respondent. Based on the information received, respondents estimated damage would decrease to an average of \$4,668 per respondent. This resulted in a total reported value that clientele placed on the information they received of \$2,120,515. The benefit to cost ratio of indirect control/outreach education activities conducted by AgriLife Extension was \$35.15 to \$1.00 for the project.

Summary:

Individual Contacts: 2,483

Mass Media Contacts: 48

Feral Hog Website Statistics: 49,840 unique hits, 108,447 pages accessed

Group Meetings: 22 (3,882 participants)

% of Group Meeting Survey Respondents Increasing Knowledge: 98%

Average Number of New Management Practices to Be Adopted: 3.6 per attendee

Net Promoter Score: 56% (Scores > 50% considered to be excellent)

Economic Value of Information Received by Program Participants: \$2,120,515

Benefit to Cost Ratio of Extension Outreach Efforts:

35.15 to 1.00 or \$35.15 return for each \$1.00 invested in outreach

Texas AgriLife Extension and the WS program remain committed to dealing with feral hog damage as funding permits. At present, population management is not practical on a large scale but damage can be managed with positive economic benefits.

Figure 1.

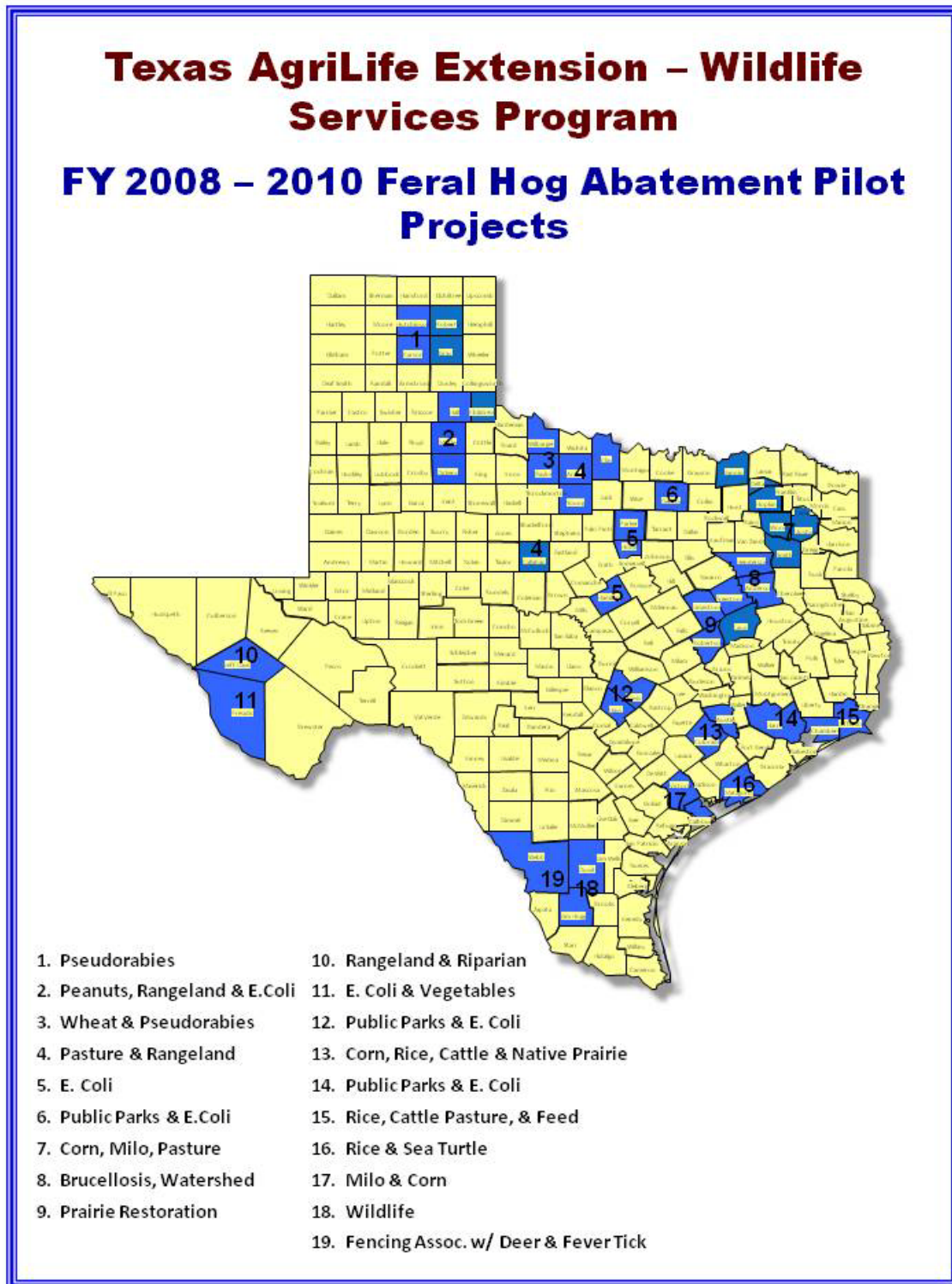


Figure 2.

