ADDRESSING NONPOINT SOURCE POLLUTION FROM FAILING OSSFS THROUGH A LOCAL FINANCIAL ASSISTANCE PROGRAM IN A CENTRAL TEXAS WATERSHED

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ABSTRACT

In 2009, Texas A&M AgriLife, local stakeholders, and other state and federal partners, established the Lampasas River Watershed Partnership with assistance from a Clean Water Act §319(h) grant to address surface water quality concerns in the Lampasas River. The Partnership identified water quality issues that were of importance to the surrounding communities within the primarily rural watershed through the development of a Watershed Protection Plan. Stakeholders included concerns about contributions from failing OSSFs near the Lampasas River and its tributaries since much of the watershed is not served by a municipal wastewater system. They recommended the development of a watershed wide OSSF database and the development of a financial assistance program to repair or replace failing OSSFs. Records of OSSFs varied between counties based upon funding and resources. AgriLife developed a watershed-wide database with data from various sources to locate and identify OSSFs within the watershed. This database included datasets and permit records from each of the seven counties. In 2019, AgriLife secured funding to develop this financial assistance program for homeowners living on OSSFs. This project developed criteria and ranking to select homeowners to participate in the program. To date, the project has replaced nineteen systems that were failing. This presentation will summarize the efforts to address failing OSSFs within the Lampasas River watershed.

INTRODUCTION

The Lampasas River watershed (Figure 1) lies within the Brazos River Basin in Central Texas. The river's headwaters are in eastern Mills County, and it flows southeast for 75 miles, passing through Hamilton, Lampasas, Burnet, and Bell counties. In Bell County, the river turns northeast and is dammed five miles southwest of Belton to form Stillhouse Hollow Lake. Stillhouse Hollow Lake is the primary drinking water supply for much of the surrounding area. The watershed encompasses 798,375 acres across Mills, Hamilton, Coryell, Lampasas, Burnet, Bell, and Williamson Counties and is primarily a rural watershed with few urban centers. The cities of Lampasas and Kempner are wholly within the watershed boundaries, while the cities of Copperas Cove and Killeen are only partially in the watershed.

The Lampasas River was originally listed on the 2002 Texas 303(d) List for elevated levels of bacteria and carried forward to subsequent lists in 2004, 2006, and 2008. Elevated bacteria levels are an indicator of fecal contamination from warm- blooded animals and is a human health hazard. However, the Lampasas River was removed from the 2010 Texas 303(d) List due to lack of recently collected data.

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Prior to the river's delisting, Texas A&M AgriLife Research (AgriLife Research) and Texas State Soil and Water Conservation Board (TSSWCB) established the Lampasas River Watershed Partnership (Partnership) in November 2009 as part of a Clean Water Act (CWA) Section 319(h) Nonpoint Source (NPS) Grant Program, TSSWCB project 07-11, "Lampasas River Watershed Assessment and Protection Project". Project 07-11 updated land use, modeled water quality, and developed a watershed protection plan (WPP) to holistically address the bacteria impairment. With technical assistance from AgriLife Research and other state and federal partners, the Partnership identified water quality issues that were of importance to the surrounding communities. The WPP identified responsible parties, implementation milestones, and estimated financial costs for individual management measures and outreach and education activities. The plan WPP also described the estimated load reductions expected from full implementation of all management measures.

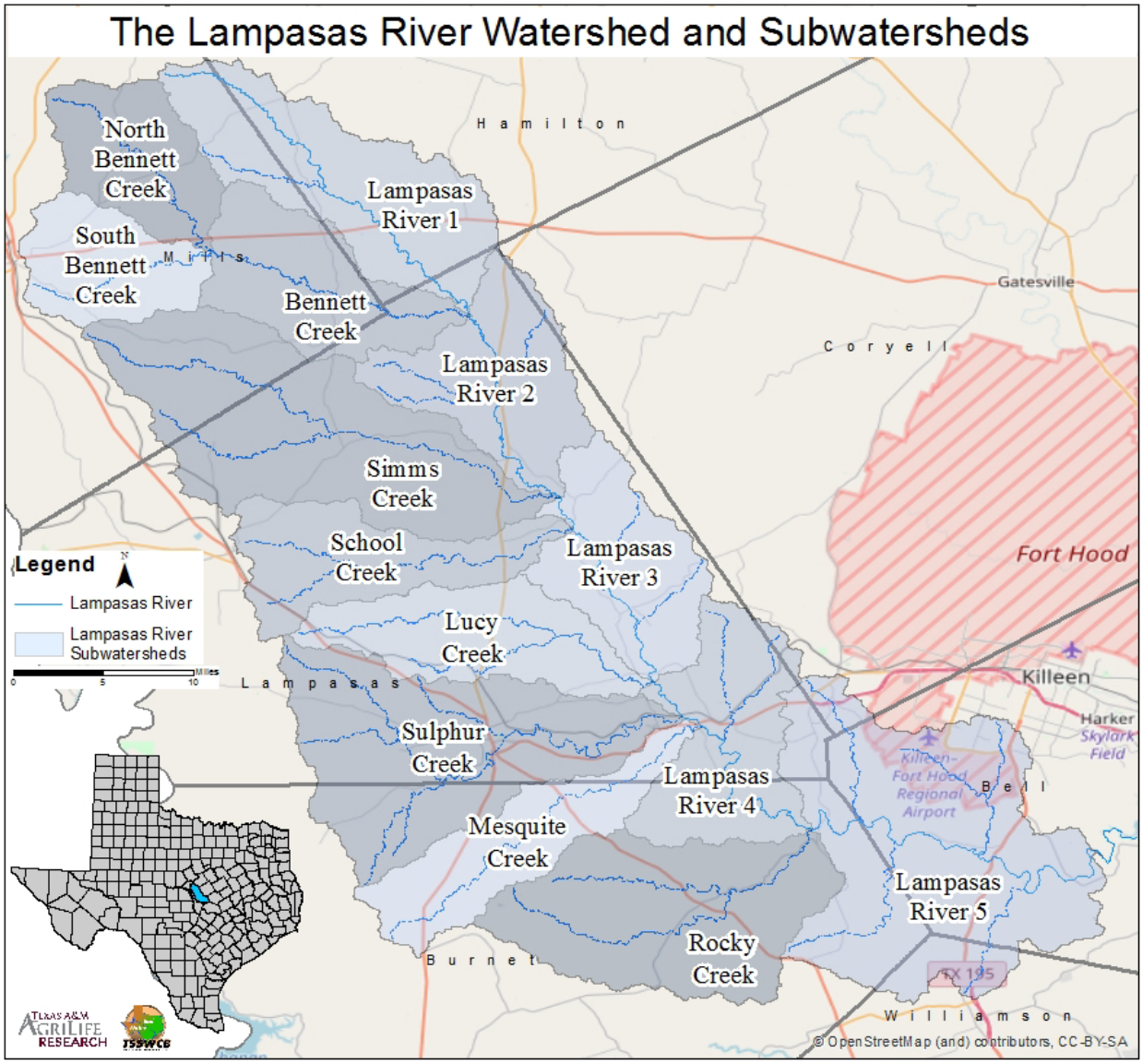

Figure 1 The Lampasas River watershed is a primarily rural watershed, located in Central Texas in the Brazos River basin.

Implementation of the Lampasas River WPP has been carried out over the last decade, including efforts to address NPS from agricultural sources through TSSWCB. Texas A&M AgriLife Extension Service (AgriLife Extension) secured funding from the Texas Commission on Environmental Quality (TCEQ) through TCEQ 17-70432 to fulfill a need that the Partnership recognized as the first step to address potential pollutant contributions from failing on-site sewage systems (OSSF), the development of a watershed wide database and inventory of OSSF systems.

While developing the WPP, stakeholders included concerns about potential contributions from failing OSSFs near the Lampasas River and its tributaries. The initial calculations used for the development of the WPP estimated that as many as 10% of systems in the watershed could be failing and that repair or replacement of those systems should be a priority during implementation.

The OSSF inventory showed several areas of high density of OSSFs, including areas near the Lampasas River and major tributaries Sulphur Creek, Clear Creek, and Reese Creek.

Through this project, AgriLife Extension coordinated with the county permitting authorities to lead efforts locally to develop OSSF inspection, repair, and replacement efforts as well as deliver educational materials and programs.

MATERIALS AND METHODS

AgriLife Extension collaborated with local OSSF authorized agents within the watershed to develop criteria to assess the need for repair or replacement of OSSFs within the watershed. Due to the pandemic, a virtual meeting was held with several authorized agents and a county commissioner via Zoom on July 30, 2020.

All local representatives indicated that although they know that failing OSSFs are an issue within the watershed, there were no concentrated areas of complaints. They suggested that processes be put into place to speed up the administrative side of the repair/replacement program once a failing system has been identified, due to the public health hazard in addition to the water quality consequences.

As a result of the meeting, project staff developed program guidelines, which included rules for General Eligibility and Needs Assessment Criteria. These eligibility requirements and criteria were also incorporated into promotional materials for the program. A program application for financial assistance for repair or replacement of OSSFs was also developed. This application was distributed to interested parties through many avenues, including the http://www.lampasasriver.org/ossf web page, U.S. Postal Service, handouts at educational programming, and through local county AgriLife Extension Agents and county OSSF permitting offices. A total of 29 applications for repair or replacement were received throughout the project period, although project staff fielded many other calls from interested stakeholders who did not meet the eligibility criteria and did not submit applications.

Of the 29 applications received, project staff conducted visual inspections on 25 systems throughout the project period. After site visits were conducted, applications were ranked by

Figure 2A-E Photos taken of failing systems during initial inspections.

priority based on the needs assessment criteria. Of the 25 inspected systems, 20 were selected to move forward with replacement through the program.

Once approved for the program, homeowners were given the option to either select their own licensed installer or request that AgriLife Extension solicit bids. Without exception, homeowners chose to select their own installer. Homeowners relied on local word of mouth recommendations from friends, lists of licensed installers compiled by the individual counties, and resources provided on the project webpage, https://lampasasriver.org/ossf/. Homeowners secured an

estimate from their chosen installer for an OSSF that both met their individual needs and those regulations set by the individual county and State of Texas. Once project staff received estimates from the selected installer, they cross referenced it with the list of licensed installers that was compiled with licensing and judgement data from the TCEQ On-Site Sewage Facilities (Septic Systems): Information for Homeowners webpage. The estimate was then submitted to Texas A&M University System (TAMUS) Purchasing Department to create a purchase requisition, collect all necessary documentation for the installer to become a TAMUS vendor, and subsequent creation of a purchase order number. After the purchase order was created, the installer was allowed to begin work on the replacement. Once the OSSF was installed and the failing system properly decommissioned, the county designated representative (DR) completed an onsite inspection of the new OSSF, prior to covering the system up with soil. The DR would then issue a License to Occupy (LTO) and file it with the county. After the county inspection process, AgriLife requested notification from the homeowner that the work had been completed to their satisfaction. Once the invoice, letter of satisfaction, and LTO were received by staff, the invoice was submitted to TAMUS Purchasing for payment directly to the installer. AgriLife Extension paid a maximum of $8,000 for each replacement, with the exception of the applicant 22-19. AgriLife Extension only paid $5,000 of this homeowner's cost as it was the last system replaced and project funds were depleted. Any costs incurred above $8,000 were the responsibility of the homeowner.

RESULTS

There are 14 sub watersheds in the Lampasas River WPP, but efforts were focused in seven of those sub watersheds. Of the 20 OSSFs replaced, 18 were in Lampasas County, and one each in Burnet and Coryell Counties. During the review of applications, program staff checked for previous filed complaints with the appropriate permitting authority. Only one of the systems had previous complaints and was facing potential fines of up to $2,000 per day due to illicit discharge. The average amount of project dollars spent per individual OSSF replacement was $7,755, and the average total cost per replacement was $9,781 (Table 1). Although the assessment criteria did not include a household financial requirement, most applicants indicated that they were not financially able to replace their failing system without this assistance. Many of them had been living with the problems long term.

The program application requested several pieces of information regarding the failing systems, including the build year of the system (Figure 3). In most cases, the homeowner either knew the exact answer or were able to make an educated guess based upon the age of the home. In some cases, the OSSF geodatabase was utilized if the homeowner was unsure. In five of the systems, the age was not able to be determined by any of the above sources, so they were marked as *1992 to illustrate installation prior to statewide OSSF permit regulations. The age of the systems replaced varied throughout the program, although most systems were originally installed between 1970 and 1990.

Of the 20 OSSFs replaced, most were conventional drainfield type systems, although there were a few cesspool systems and one home that was operating on a straight pipe to the edge of the yard (Figure 4).

Table 1 Installed systems by type, size, capacity and total costs.

App #	Installed Digester Type	Installed Tank Size/Type	Installed Treatment Capacity	Installed Effluent Disposal	Total Cost	Cost Paid by Program
21-1	Conventional	1000	240	Trench - Leaching Chambers	$9,000	$8,000
21-2	Conventional	750	180	Trench - Leaching Chambers	$6,600	$6,600
21-3	Conventional	1000	300	Trench - Leaching Chambers	$8,300	$8,000
21-5	Conventional	1000	300	Trench - Leaching Chambers	$8,000	$8,000
21-7	Conventional	1250	360	Trench - Leaching Chambers	$8,000	$8,000
21-8	Aerobic	AA500	240	Surface Irrigation	$10,400	$8,000
21-10	Aerobic	AS500L	240	Other - 1200sf area with 600' drip tubing	$16,000	$8,000
22-1	Conventional	1000	180	Trench - Leaching Chambers	$7,500	$7,500
22-2	Conventional	**Pending	**Pending	**Pending	$8,000	$8,000
22-3	Conventional	750	240	Trench - Leaching Chambers	$8,500	$8,000
22-4	Aerobic	Pro Flow 500	240	Surface Irrigation	$11,900	$8,000
22-5	Conventional	750	240	Trench - Leaching Chambers	$11,400	$8,000
22-8	Conventional	1000	180	Trench - Leaching Chambers	$8,000	$8,000
22-10	Conventional	1000	240	Trench - Leaching Chambers	$8,000	$8,000
22-11	Conventional	1000	240	Trench - Leaching Chambers	$9,200	$8,000
22-15	Aerobic	AA500-4075	240	Surface Irrigation	$9,500	$8,000
22-16	Conventional	**Pending	**Pending	**Pending	$8,000	$8,000
22-17	Aerobic	AA750	420	Surface Irrigation	$14,600	$8,000
22-18	Conventional	**Pending	**Pending	**Pending	$8,000	$8,000
22-19	Aerobic	**Pending	**Pending	**Pending	$16,720	$5,000

Installs by Type	Total	Average Cost	Total Costs	$195,620
Conventional	14	$8,321	Total Incurred by Program	$155,100
Aerobic	6	$13,187	Total Incurred by Homeowners	$40,520
**Costs per initial estimate for systems marked as pending			Average Incurred by Homeowners	$2,133

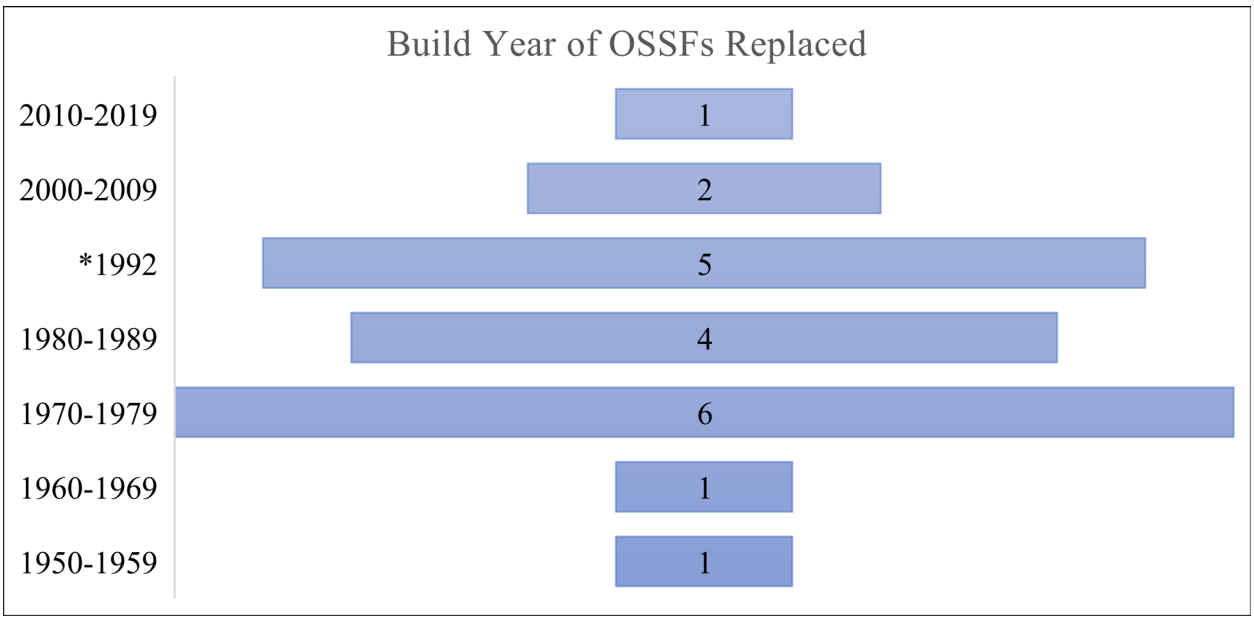

Figure 3 The distribution of OSSF build year, identified either by homeowner, or the Lampasas OSSF geodatabase.

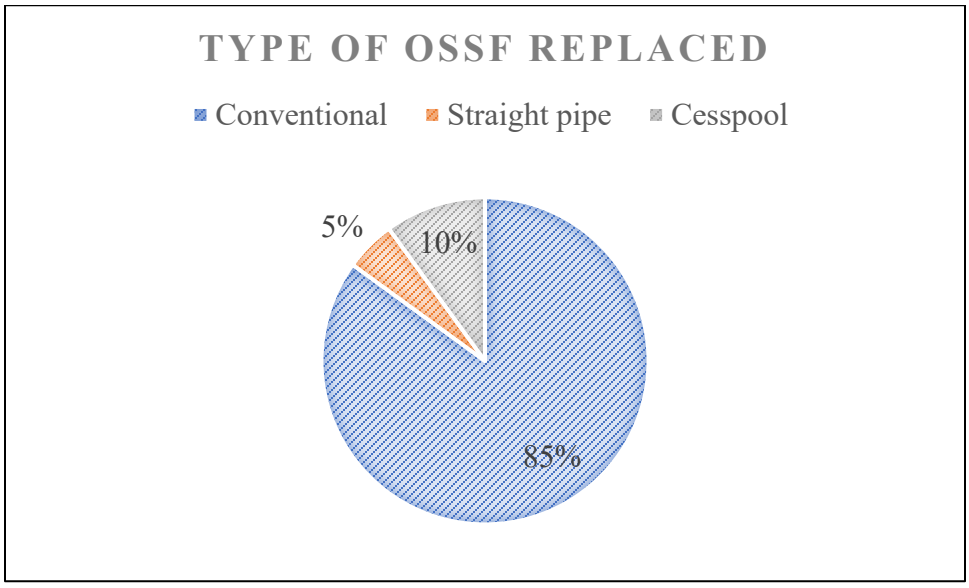

Figure 4 Distribution of types of failed systems replaced.

DISCUSSION

Developing and implementing an OSSF remediation program comes with inherent challenges that the project staff expected to meet. Doing so at the beginning and throughout the evolving global COVID - 19 pandemic added many added unexpected challenges. Although educational programs and meetings with the local permitting authorities were originally designed to be hosted as face-to-face meetings, this was not possible due to the pandemic. Project staff acted quickly to adapt existing material and develop new content to host programming online, via

Microsoft Teams or Zoom. Although face-to-face interactions are still preferred, future efforts will most likely be a hybrid of both in- person and online meetings.

Supply chain, labor shortages, and a huge construction boom were also challenges during the project. Staff worked with three different licensed installers to replace the 20 failed systems. These installers, without exception, each expressed difficulty in securing materials, including septic tanks. This, along with labor shortages and influx of new construction homes requiring OSSFs, dramatically increased the amount of time installations took, from after approval to submittal of invoices to TAMUS. Unfortunately, these problems are not forecasted to improve in the near future.

The Lampasas River OSSF project was well received by stakeholders within the watershed and especially those that received financial assistance to replace their failing systems. Programs like this provide a tangible result to WPP implementation efforts and illustrate federal tax dollars returned to the community. A total of 20 systems were replaced within the Lampasas watershed, in addition to several applicants that remain on a waiting list for future funding. The project team looks forward to implementing the next phase of OSSF replacement, expected to begin in the Fall of 2022. Additional future areas of research may include a closer examination into other contributors of system failure, such as site factors, soil limitations and changes in household use.

ACKNOWLEDGMENTS

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