August 2013

Revisions to the Implementation Plan for One Total Maximum Daily Load for Dissolved Oxygen in Lake O' the Pines

Segment 0403

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

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Executive Summary

Lake O' the Pines (Segment 0403) was listed on the state's 303(d) list in 2000 as impaired due to low levels of dissolved oxygen. In accordance with requirements of Section 303(d) of the federal Clean Water Act, the TCEQ adopted "One Total Maximum Daily Load for Dissolved Oxygen in Lake O' the Pines, Segment 0403" on April 12, 2006 (TCEQ 2006) and the TSSWCB approved the TMDL document on March 23, 2006. U.S. Environmental Protection Agency (EPA) approved the TMDL on June 7, 2006. To implement the TMDL, a TMDL implementation plan (I-Plan) was developed and designed to achieve the pollutant reductions identified in the TMDL by implementing practices across the Lake O' the Pines watershed (Figure 1). The I-Plan was developed through a deliberative process of the Cypress Creek Basin Clean Rivers Program/Lake O' the Pines TMDL Combined Steering Committee and was approved by TCEQ on July 9, 2008.

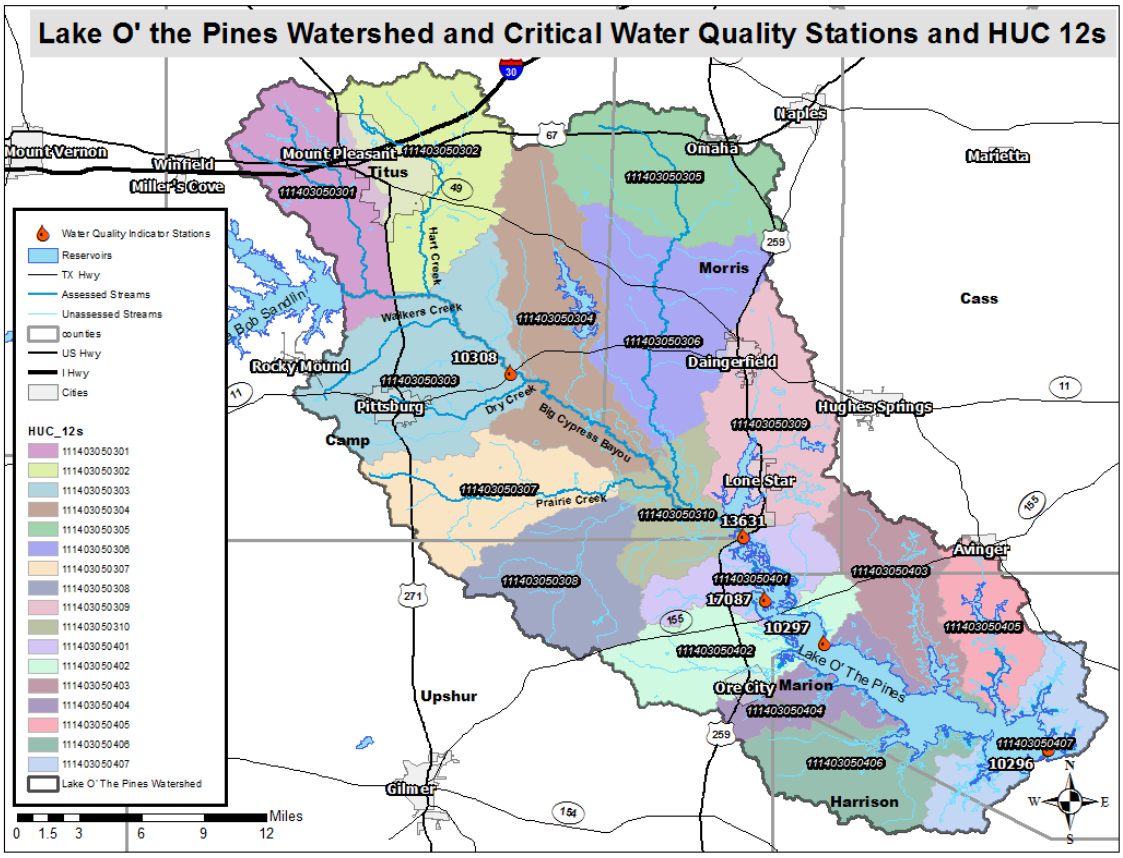

Figure 1. The Lake O' the Pines watershed below Lake Bob Sandlin

When I-Plans are developed, a set implementation time frame designates what implementation activities are planned. In the case of this I-Plan, a five year time frame was employed. Once a planned implementation period is complete, a review of implementation progress begins to document progress, determine reasons why some goals were not met, develop plans for achieving those unmet goals, and describe future implementation needs. Additional implementation should be developed and adapted based on lessons learned and additional information gathered since the previous version of the I-Plan was developed.

The TMDL determined that low dissolved oxygen concentrations in Lake O' the Pines result from *in situ* (in the lake) photosynthesis and respiration and that phosphorus is the limiting nutrient in the reservoir. Loadings of phosphorus to Lake O' the Pines from point and nonpoint sources were determined through inspection of permits, field sampling, and watershed modeling. Analyses of water quality data from the reservoir were used to determine its capacity to assimilate phosphorus loadings. Comparisons of the existing loadings to the reservoir's assimilative capacity determined that a 56% reduction in phosphorus loadings is needed to restore water quality conditions in the lake.

In the summer of 2012, TCEQ initiated the first revision of "One Total Maximum Daily Load for Dissolved Oxygen in Lake O' the Pines." Through a series of public meetings, watershed stakeholders were briefed on the I-Plan revision process, were organized into a coordination committee and working groups that were charged with determining what changes to the I-Plan are needed and developing strategies for future implementation. Through a facilitated review and revision process, stakeholders were led through discussions initially focusing on documenting I-Plan implementation and later shifting to determining needed changes to the I-Plan.

During the discussions to revise the I-Plan, it was noted that the number of water quality management plans (WQMPs) on animal feeding operations (AFO) (poultry and non-permitted dairies) in the watershed considered in the development of the TMDL were much higher than currently exist in the watershed (111 in 2006 vs 59 in 2013). Through further discussions, the potential differences in animal numbers and manure produced were considered offset by changes in production practices occurring during that time. This discrepancy led to discussions on the potential need to reevaluate the TMDL; however, stakeholder consensus was to allow implemented practices additional time to work and to collect additional data needed to support a revision to the TMDL.

Implementation progress discussions also revealed that many of the original implementation goals were not met. Reasons why goals were not met are many, and some were unavoidable. However; through adaptive management, these deficiencies were discussed and have been addressed through revisions to the I-Plan described in this document. Additionally, measures that minimize the likelihood of future failures to meet implementation goals have also been described.

I-Plan recommendations included in this revision outline revised implementation goals for the future and discuss the need for implementation tracking information to support future assessments of water quality in the watershed. Additionally, desired levels of data collection are also described that are needed to support future water quality assessments. Without completion of the additional data collection described, documenting implementation impacts to water quality will be extremely difficult or impossible.

This revised I-Plan continues to utilize an adaptive management approach and includes detailed provisions for implementing priority controls in the watershed. These provisions include a description of the controls, identification of the parties responsible for implementing the controls, a schedule for implementation, the goals associated with the control measures, and a process for tracking, evaluating, and reporting progress. A process of implementation, monitoring, analyses, adaptation, and review ensures that I-Plans will be continually updated. In this way, I-Plans provide a pragmatic and scientifically-based approach to meeting water quality goals within a reasonable time.

The implementation strategies for Lake O' the Pines specified in this I-Plan are actions developed by watershed stakeholders that they will undertake to achieve water quality standards. The implementation strategy for point sources is the limitation of discharges of total phosphorus (TP) from wastewater facilities through the implementation of the locally developed total phosphorus loading agreement and eventual modification of wastewater discharge permits. The implementation strategy for nonpoint sources consists of continued implementation of technical and financial assistance programs for agricultural producers, and county and local programs for on-site sewage facilities, marine sanitation, and education.

Activities implemented under this I-Plan will be tracked by the TCEQ through periodic reports from participating entities. The effectiveness of these implementation strategies will be documented through water quality sampling and analyses to verify that the allocations for TP specified in the TMDL are met. Progress toward meeting the implementation and water quality goals of the I-Plan will be evaluated through periodic reviews by watershed stakeholders and may be revised by watershed stakeholders based upon progress made. I-Plan tracking activities, reviews, and assessments will be published and made available to stakeholders, state leaders, and the public through existing outlets.

It should also be noted that this five year implementation period has included some of the most extreme climatic conditions that the watershed has experienced in recorded history. Wetter than normal conditions were experienced across the watershed in 2009 sending the lake elevation to 243.49 feet in November 2009 and within 2 feet of its highest recorded levels (Figure 2). Late 2010 and 2011 brought exceptionally dry conditions to the region and state. By December 2011, the lake elevation was at 223.79 feet and within 1 foot of its lowest level ever recorded. The weather extremes experienced undoubtedly influenced the impacts of

implemented management strategies on Lake O' the Pines; but how much is not known, and will remain a mystery due to limited amounts of water quality data available to use in water quality models.

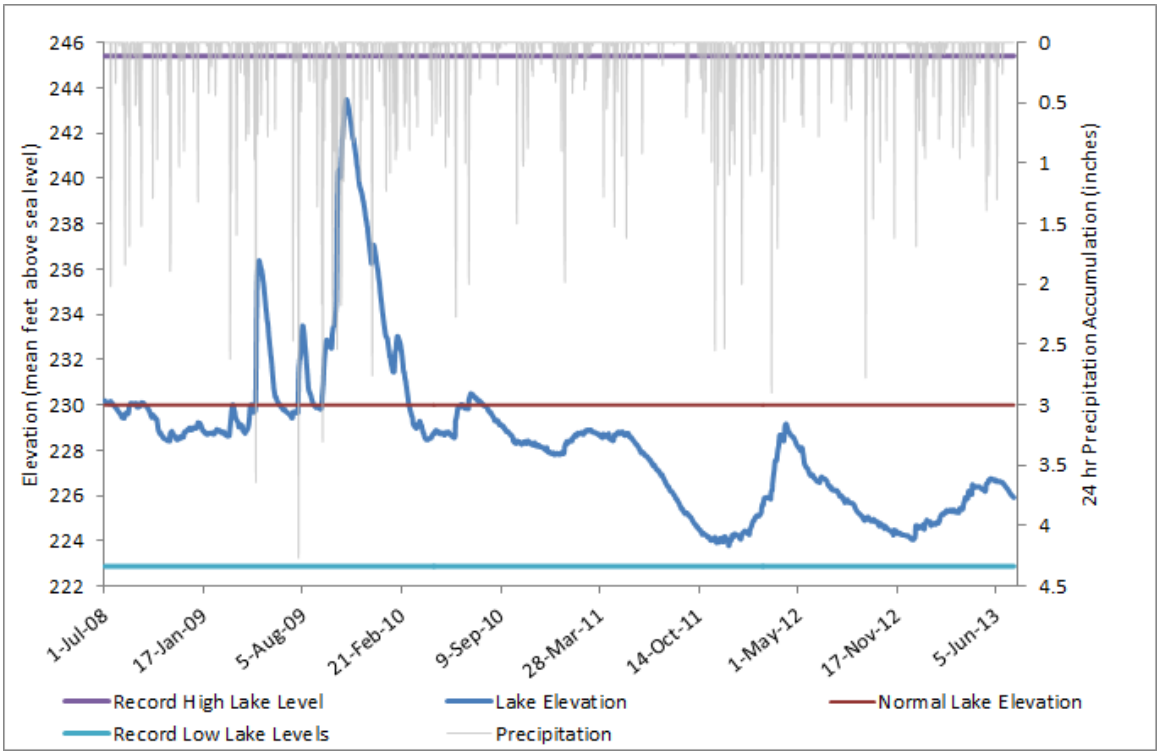

Figure 2. Lake O' the Pines lake levels and precipitation record post TMDL I-Plan development

Implementation Progress

Original implementation goals and objectives were designed and described based on a five year implementation schedule. Appendix A lists each management action, responsible parties for implementing each measure, a brief description of the performance measure, implementation goals, the current implementation status and notes on the specific measure's implementation or lack thereof. This table is current as of July 31, 2013 and includes as much implementation information as could be accessed or obtained.

In many cases, implementation did not proceed as originally planned in the I-Plan. This is not an uncommon occurrence as watershed conditions, resources available, and knowledge of a given situation change overtime. Often, these deviations from planned implementation are well warranted as a result of changing conditions; however, in other cases, progress toward the goal simply wasn't achieved or achieved as quickly as anticipated. This section describes progress made toward planned implementation and the reasons behind deviations from the plan. Additionally, Appendix A provides additional information on implementation progress in a concise, tabular format.

Control Actions

Group Permit Development and Issuance

The approved I-Plan described a group permit approach where the North East Texas Municipal Water District (NETMWD) would have been the primary permit holder and the entities in the watershed with existing permits would have been sub-permittees to NETMWD. This approach to a group permit was not seen favorably by TCEQ's permitting division due to the limited ability to pursue enforcement actions, if needed, upon an individual sub-permittee since NETMWD was the official permittee. Therefore, the originally planned group permit to address TP loads was abandoned.

Alternative to this approach, the NETMWD and the eight permittees operating in the watershed developed a "Total Phosphorous Loading Agreement" (TPLA) as a pseudo group permit (Appendix B). NETMWD administers the TPLA and each of the eight entities are parties to this agreement. This agreement essentially allows for water quality trading throughout the watershed to occur and ensures that the total wasteload allocation defined in the TMDL for TP is met.

This change in approach resulted in several of the original I-Plan goals not being directly achieved; however, the main objective of establishing a collective effort to reduce TP loading from all permitted entities in the watershed was accomplished; however, its accomplishment was slower than anticipated. Table 1 illustrates the originally planned control action, performance measures and implementation goal as well as the actual implementation status as of June 2013.

Table 1. Implementation status on point source control actions planned in the original TMDL I-Plan

Control Action	Performance Measure	Original I-Plan Goal	Implementation Status
PS1 - Establish entity responsible for group permit	Establishment of an administrator responsible for the group permit	Complete within 1 year of I-Plan approval	Not completed. A group permit was deemed inappropriate by TCEQ.
PS2.1 – Amend existing industrial permit	a) Pilgrim's Pride will submit application for permit amendment b) TCEQ will propose amended permit for public notice c) Permit amended	a) Application for amendment submitted within 1 year of I-Plan approval b) Propose amendment within 1 year of receiving application c) N/A	a) Application received by TCEQ July 9, 2009 b) TCEQ's Notice of Application and Preliminary Decision was posted Dec. 22, 2011 c) Permit Issued June 6, 2012
PS2.2 – Amend existing municipal permits	a) TCEQ will seek to recall municipal permits of entities not participating in the group permit b) TCEQ will propose amended permits for these entities	a) Recalls within 2 years of I-Plan approval b) Propose amendments within 1 year of permit recall date	Individual entity TPDES permits have been renewed by TCEQ as listed in Table 2.
PS2.3 – Issue group permit	a) Group permit administrator submits application for a group permit b) TCEQ will propose amended permit for public notice	a) Application for permit submitted within 2 years of I-Plan approval b) Propose group permit within 1 year of receiving application	TPLA developed by permittees and in place effective June 1, 2013.
PS3 – Permit implementation	Compliance with TP discharge limits in group and individual permits	In compliance with TP limits within 3 years of issuance of new and amended permits	The TPLA was signed by all parties and implemented effective June 1, 2013.

Management Measures for Nonpoint Sources

Animal Feeding Operations

Management measures for agriculture focused largely on providing technical and financial assistance through the development of water quality management plans

(WQMPs) to livestock producers operating qualifying animal feeding operations (AFOs) (dry poultry facilities and certain dairies). Goals established in the I-Plan were to certify a WQMP for each qualifying AFO based on the number of existing operations considered to be in the watershed at the time the plan was developed. As documented in the I-Plan, 105 dry poultry facilities and 6 qualifying dairies were identified yielding an overall WQMP certification goal of 111 plans. This was possibly an overestimation of the number of dry poultry facilities in the watershed at the time. Additionally, the number of AFOs in the watershed has diminished considerably since the I-Plan was developed.

The number of certified WQMPs on AFOs existing in the watershed as of July 31, 2013 stands at 59. Of these, 58 are poultry facilities and 1 is a dairy. With this reduction in the number of certified WQMPs has come a reduction in the number of animals in AFOs as well. In 2008, the eight counties that contain the Lake O' the Pines watershed housed as many as 28,746,331 poultry while the same counties only had 21,021,601 poultry in 2013. While this represents a decline, it should be noted that these numbers denote a specific point in time and are constantly changing. Market changes are also influencing the number of animals present in these facilities. For example, bigger birds are being grown which takes a longer growth cycle per flock with fewer total birds being produced each year. Regional production data from this timeframe shows a 20.2% increase in average bird weight which somewhat offsets the reduction in potential birds produced within the watershed. However, it should be noted that bird numbers and their weights are not specific to the Lake O' the Pines watershed and could vary considerably. Additionally, the litter produced within the watershed is not necessarily land applied within the watershed.

Several key factors were likely drivers of this change during the implementation period. The Pilgrim's Pride Corporation (PPC) declared bankruptcy, was bought out by another company and consolidated many of their operations. Many individual producers have also gone out of business or simply sold out. In some cases, operations have been shuttered while others have been combined forming larger operations. In general, dairies have followed a similar trend with farms closing down or moving locations. This follows a general trend in the dairy industry of farms relocating to the Texas Panhandle and surrounding areas. Additionally, the economy in general has suffered one of the worst down turns in recent years and has yet to fully recover. Each of these factors has contributed to the declining number of certified WQMPs in the watershed.

Non-Animal Feeding Operations

Despite not being listed in the I-Plan as a specific management objective, WQMPs were also developed and certified on non-AFO operations. These mostly included grazing livestock operations, but also include lands managed for timber production. In total, 35 non-AFO WQMPs are certified in the watershed as of July 31, 2013.

While specific information on the practices that these WQMPs include and the subsequent pollutant loading reductions that they achieve are not available, they undoubtedly provide downstream water quality benefits. WQMPs are designed to improve resource management and utilization and thus improve the water holding and filtering capacity of the land resource. To achieve these improvements though, practices must be installed, operated and maintained properly. Before financial assistance for a WQMP is provided, an inspection is performed to ensure that practices were installed properly. Periodic WQMP status reviews are also required to document proper operation and maintenance.

Adding the 35 WQMPs for non-AFO related operations to those certified on AFOs, a total of 93 certified WQMPs currently exist in the watershed. A big push to develop and certify WQMPs in the watershed began when the lake was first listed as impaired in 2000. Since then, 72 of the currently certified WQMPs were developed. The bulk of these WQMPs were developed on dry poultry farms which were required to have certified WQMPs in place by 2008. The remainder of the WQMPs were developed for volunteering producers who requested technical and financial assistance from their local SWCD. Over the years, WQMP development numbers have declined as the number of volunteering producers decreases. As a result, only 9 new WQMPs have been certified since the I-Plan was approved.

Table 2 summarizes practices implemented through the TSSWCB's WQMP Program in the Lake O' the Pines watershed and separates implementation by 12 digit hydrologic unit codes (HUCs), or smaller sub-watersheds of the lake's larger watershed. It lists the number of certified WQMPs in each HUC, practices and their coverage within each HUC as well as the total number of acres under certified WQMPs. Figures 3 and 4 illustrate the distribution of all WQMPs and poultry facility only WQMPs across the watershed.

Table 2. Certified TSSWCB WQMPs in the Lake O' the Pines Watershed

HUC 12	Total Number WQMPs	AFO – Poultry	AFO – Dairy	Total Acreage under WQMP	391 Riparian Forest Buffer (acres)	393 Filter Strip(acres)	528 Prescribed Grazing (acres)	633 Waste Utilization (acres)	645 Upland Wildlife Habitat Mgmt (acres)	Estimated Litter Produced Annually (tons)	Planned Litter Allowable To Be Utilized On-Site (tons)	Estimated Effluent Produced Annually (acre-inches)	Maximum Effluent Allowable for On-Site Application (acre-inches)
111403050407	2	1	0	125	0	21	68	78	26	600	47	0	0
111403050405	2	0	0	73	3.2	0	51.5	0	66.1	0	0	0	0
111403050304	12	12	0	1365.1	12	126.2	944.5	448.6	133.2	9489	1485	0	0
111403050306	9	2	0	3273.2	61.6	205.3	1435.2	919.7	1702.5	819	1588	0	0
111403050307	19	13	1	1876	59.2	56	902.7	264.3	400.5	8737	614	33.1	34
111403050308	2	1	0	171	14	0	0	0	108	439	0	0	0
111403050309	3	1	0	227	7.1	0	53	0	111	180	0	0	0
111403050302	3	1	0	393.5	43	9	262.5	216	7	564	261	0	0

HUC 12	Total Number WQMPs	AFO – Poultry	AFO – Dairy	Total Acreage under WQMP	391 Riparian Forest Buffer (acres)	393 Filter Strip(acres)	528 Prescribed Grazing (acres)	633 Waste Utilization (acres)	645 Upland Wildlife Habitat Mgmt (acres)	Estimated Litter Produced Annually (tons)	Planned Litter Allowable To Be Utilized On-Site (tons)	Estimated Effluent Produced Annually (acre-inches)	Maximum Effluent Allowable for On-Site Application (acre-inches)
111403050310	2	1	0	70	0	0	15	0	41	490	0	0	0
Total	93	58	1	12332.5	268.4	881.1	6652.6	3553	3128.8	39308	9220.2	33.1	34

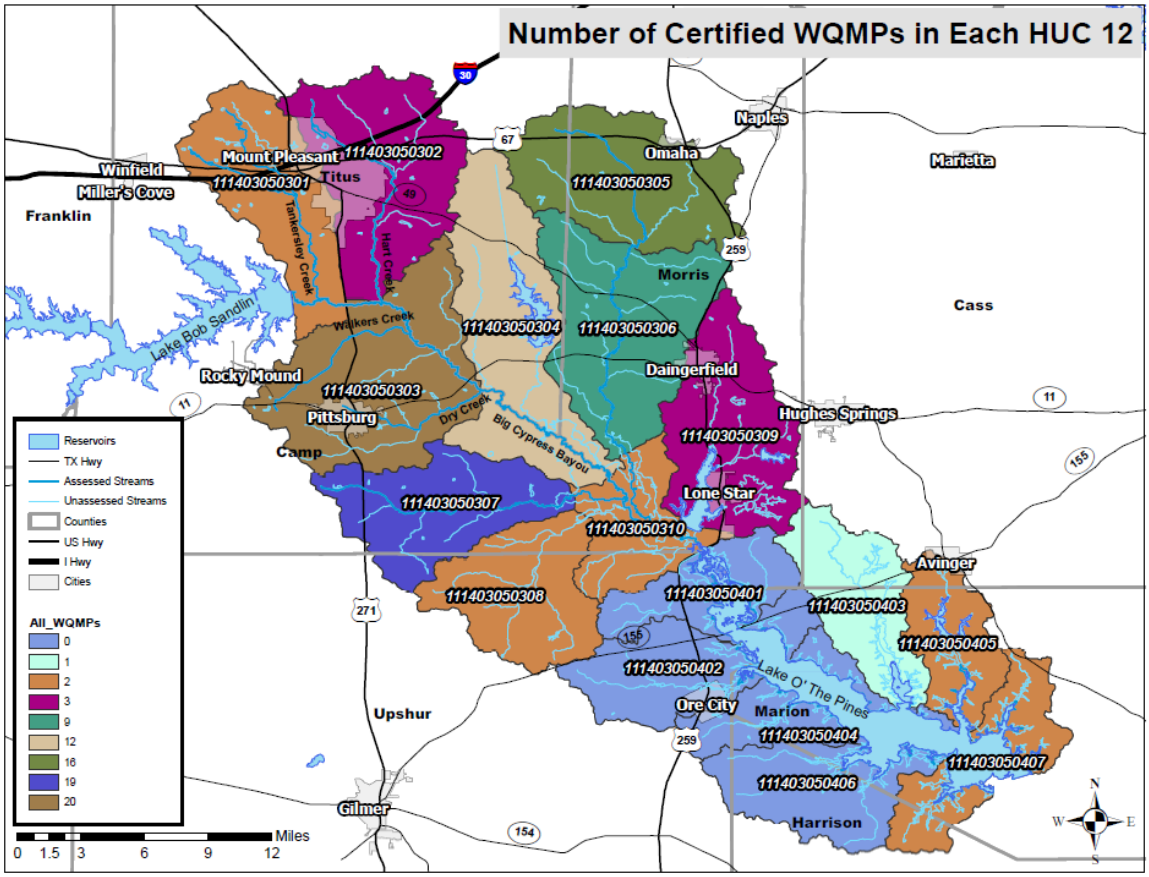

Figure 3. Distribution of All Certified WQMPs in the Lake O' the Pines watershed

WQMP Status Reviews

The WQMP status review goal established in the I-Plan was for 25 percent of certified WQMPs to be reviewed annually. While the numeric goal for annual reviews varies depending on the current number of certified WQMPs, the number of status reviews performed during the four full calendar years since implementation began fell short of the 25 percent goal each year. Reasons for why a sufficient number of reviews were not performed aren't clear, but the volume of status reviews have increased in 2013 and TSSWCB plans to conduct annual reviews on at least 25 percent of the certified plans annually.

Permitted Animal Feeding Operations

The presence of permitted AFOs in the watershed has followed a trend similar to the non-permitted AFOs. When the I-Plan was developed, a total of four permitted AFOs were present in the watershed; as of this revision's writing, only one permitted AFO is operating in the watershed. According to TCEQ's records, the permit is current and there are no pending enforcement actions on this facility.

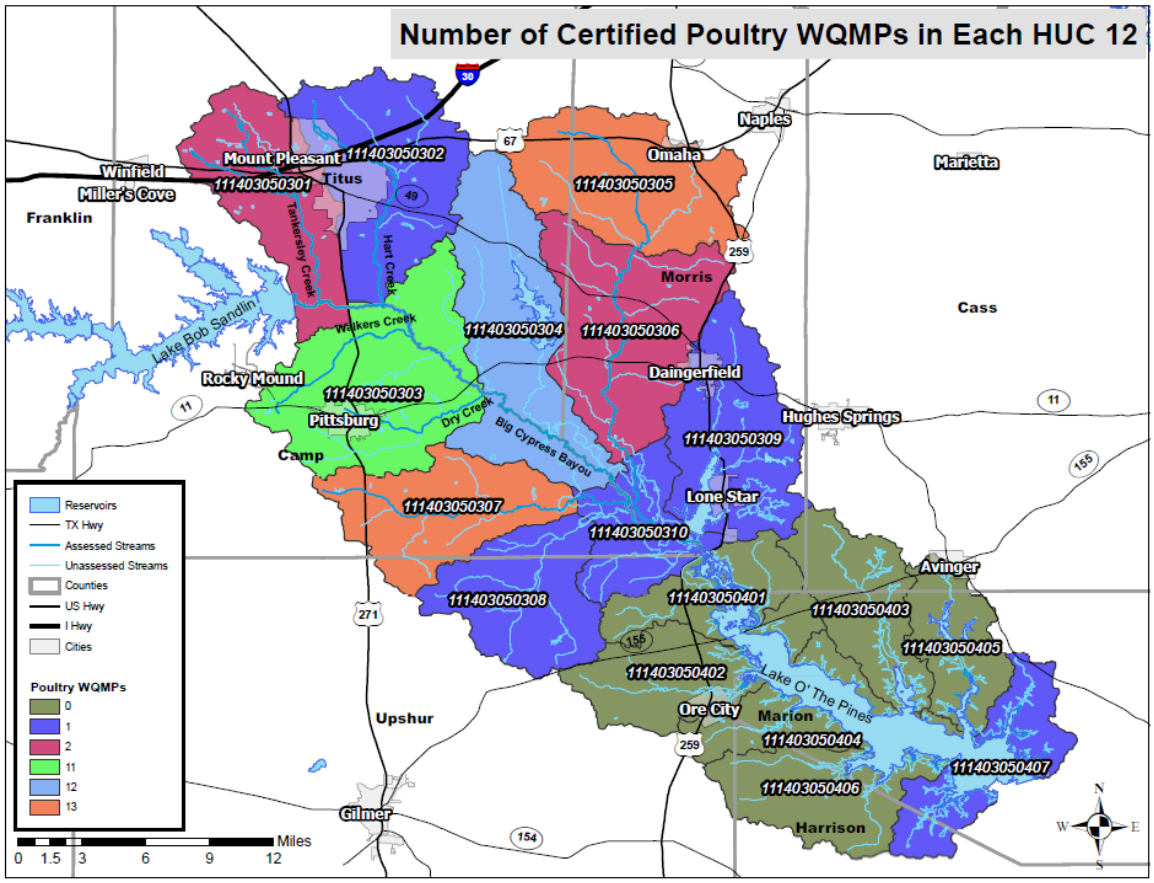

Figure 4. Distribution of Certified Poultry WQMPs in the Lake O' the Pines watershed

Financial Assistance

Practices installed with technical and financial assistance provided through the EQIP and WQMP programs have long been implemented in the Lake O' the Pines watershed and have been adopted by a number of producers. The combined level of funding assistance provided to producers through NRCS and TSSWCB programs at the county level for the last five years available illustrates the level of funding that has been available to producers. It should be noted that not all of these funds were allocated within the watershed, so these numbers presented in Table 3 are not representative of watershed specific support.

Table 3. Financial assistance summary for NRCS and TSSWCB programs: 2008 - 2013

	NRCS CSP and EQIP			TSSWCB WQMP
Year	Number of Practices	Units to be Implemented	Funding Paid	Funding Available
2008	161	9,555	$404,415	N/A
2009	97	4,936	$289,338	$52,616
2010	101	9,514	$404,259	$52,616
2011	159	12,430	$512,726	$58,947
2012	193	24,018	$434,845	$59,325
2013	N/A	N/A	N/A	$59,325
Total	711	60,453	$2,045,583	$282,829

Agricultural BMP Evaluations

Evaluations to assess the effectiveness of best management practices (BMPs) on agricultural lands were conducted by NETMWD with assistance from HDR Engineering, Inc. and the Center for Research in Water Resources through the *Assessment and Mitigation of Agricultural and Other Nonpoint Source Activities in the Cypress Creek Basin* which was funded by TSSWCB (Project 04-14) through a Clean Water Act, Section 319(h) Nonpoint Source Grant from EPA. Through this project, nutrient and sediment loading data was obtained from agricultural fields that are representative of typical operations across the watershed. The project began in 2004 with the selection of 12 monitoring sites and subsequent instrument installation. Data collection spanned the November 2005 – July 2007 time frame and yielded a total of only 60 water samples. Data actually collected was much less than anticipated and limited the results of analyses performed. Findings did corroborate earlier work that suggested disturbed sites can contribute significant amounts of nonpoint source pollutants downstream into the watershed as compared to undisturbed sites. However, the lack of data available from all sites for monitored events prevented direct comparisons between treatments from being made.

Extreme weather conditions and the scattered distribution of selected monitoring sites across the watershed both factored into the limited data set.

Forestry BMP Evaluations and Technical Assistance

Through a federal Clean Water Act Section 319(h) Nonpoint Source Grant from the TSSWCB (Project 08-03), TFS evaluated voluntary implementation of forestry BMPs in East Texas. The most recent round of implementation monitoring concluded that on the sites monitored in the Cypress Creek Basin, overall BMP implementation was 90.2%; however, BMP implementation in the Cypress Creek Basin upstream of the Lake O' the Pines Dam, this percentage drops to 74.0%. The report concluded that overall BMP implementation in the study area reached an all-time high at 94.1% and that BMP implementation was statistically higher when the landowner was familiar with BMPs and the logging contractor had attended formal BMP training. Additionally, continued improvements from previous rounds of implementation monitoring included a decrease in the number of significant risks to water quality. This evaluation does include areas outside of the Lake O' the Pines watershed; however; results can be considered largely applicable to the watershed area. The 2011 report entitled "Voluntary Implementation of Forestry Best Management Practices in East Texas" is available at: <http://texasforestservice.tamu.edu/uploadedFiles/FRD/Best_Management_Practices/RD%208%20BMP%20Implementation%20Report%20-%20website%20-%20Revisions.pdf>.

Also through Clean Water Act Section 319(h) Nonpoint Source Grants from the TSSWCB (Project 05-04), TFS evaluated the effectiveness of silvicultural BMPs on sites under intensive forest management. Surface water quality monitoring and biological community data were collected above and below the forestry operation, as well as before and after treatment.

Results from this evaluation found that properly installed forestry BMPs can have considerable impacts on downstream water quality. Comparing erosion volume and sediment production rates from areas with and without adequate BMP implementation illustrated considerably lower pollutant loadings when BMPs were implemented. Additionally, the implementation of streamside management zones alone was found to reduce soil erosion by 23% and stream sedimentation by 45% when evaluating a broad range of available data. These findings imply that in stream TP reductions would also be realized from the proper implementation of forestry BMPs that reduce stream sedimentation. The complete findings of this project are available on line at: <http://www.tsswcb.texas.gov/files/docs/nps-319/projects/08-03-FR-TFSEDU-01-10-12.pdf>.

Technical assistance was also provided by TFS in and around the watershed through the previously described programs. Between December 2008 and February 2012, TFS conducted 16 BMP workshops across East Texas for loggers, foresters, and TFS field personnel reaching over 500 people; coordinated 9 SFI sponsored landowner workshops reaching over 900 people; developed a new logger BMP training workshop focusing on forest roads and an online BMP refresher training course. Additionally, they published and mailed 13 issues of the *Texas Water Source* newsletter to 1,830 landowners in the Caddo Lake, Lake O' the Pines, and Orange County watersheds; published and mailed 13 issues of the *For-*

est Stewardship Briefings newsletter to 1,650 natural resources-related professionals throughout Texas; published numerous BMP articles in county forest landowner newsletters, the Texas Forestry Association newspaper, the Texas Logging Council magazine, and newspapers.

This level of implementation and BMP implementation evaluation met the goals outlined in the I-Plan.

OSSF Program Administration and Financial Assistance

The administration of OSSF permits and response to complaints on failing OSSFs was completed as needed. New permits are only administered when requested and as a result, the defined goal of 607 permits administered per year was not met. Similarly, complaints on OSSFs are received periodically when someone is compelled to complain about a system. When the complaint is received, it is dealt with as appropriate. During the implementation period, an annual average of 146 complaints were addressed in the counties that the Lake O' the Pines watershed lies within. This likely overestimates the actual number of complaints within the watershed.

Financial assistance provided to address OSSF failures did not meet defined goals of providing funds for 40 system replacements per year in the first three years of implementation. Continued receipt of Supplemental Environmental Program funds was anticipated as the source of financial assistance; however, the volume of funds received was less than anticipated. In total, 42 systems were installed to replace or repair existing systems.

Marine Sanitation Permitting and Administration

The marine sanitation device (MSD) permitting and permit administration goals included in the I-Plan were not met. When the program was initiated, a considerable effort to permit boats with MSDs was made; however, numerous 'hardship' permits were granted that effectively allowed improper disposal of septage into the lake. Follow up inspections of permitted vessels were not carried out either and reasonable means for boats to empty their MSDs were not established and made available to permitted boat owners. These items combined to produce an ineffective MSD permitting program.

In response, NETMWD is currently revising the program and will repermit all vessels with MSDs, establish a strategy for providing MSD cleanout options and develop an enforcement strategy to ensure proper operation and maintenance of MSDs.

Land Application Permits

Permits for the land application of produced sludges (sewage or treatment plant sludge) have been administered as appropriate. A goal of administering three permits per year was established and as of July 31, 2013, five such permits exist in the watershed. Two are for class B sewage sludge produced by wastewater treatment plants (WWTPs), two are for domestic septage and one is for potable

water treatment plant sludge application. All permits are current and information obtained from TCEQ regarding these permits did not indicate the status of recent inspections.

Education and Outreach

Goals for education and outreach included in the I-Plan encompassed a variety of topics. Master Gardener and Master Naturalist programming generally covered educational needs of residential lawn and gardeners and met planned delivery goals. Agricultural producers have the opportunity to attend a variety of seminars and educational programs annually. On average, seven separate programs are offered each year and cover topics including proper pesticide application, nutrient and forage management and livestock health. Education and outreach regarding OSSFs has been less than anticipated. The planned three workshops per year quickly saturate the market for OSSF education. In total, four programs have been held. Forestry education has easily met its goals of quarterly newsletter delivery. Additionally, TFS has produced and delivered other educational materials across the East Texas forestry region.

Implementation Summary

Overall implementation of activities included in the I-Plan has not met established goals, but progress has been made. Changes in personnel, programmatic hurdles and changing economic climates have all factored into implementation deficiencies experienced. An assessment of implementation progress has shown that some of the established goals in the I-Plan were overly ambitious and others were based on flawed information. Through this I-Plan revision, implementation goals were revised to be more appropriate and realistic while still being strong enough to achieve the loading reductions needed to meet the TMDL.

Implementation Strategy for the Revised I-Plan

The described implementation strategy describes the actions that stakeholders in the watershed will undertake based on discussions held during the I-Plan revision process to achieve water quality standards in Lake O' the Pines. The strategy specifies the actions believed to be necessary to meet the pollutant load allocations assigned to point sources and nonpoint sources identified in the TMDL. The specific actions were selected based on lessons learned from the previous five years of implementation activities, likelihood of implementation feasibility and success, and the perceived potential benefits to water quality that could be realized from implementing these measures.

The implementation strategy for point sources remains as the limitation of the discharge of TP from wastewater facilities identified in the TMDL. A modification of their existing wastewater discharge permits was originally planned; however, a group loading agreement was developed and has been implemented to meet this control action.

The implementation strategy for nonpoint sources includes continued implementation of technical and financial assistance programs for agricultural producers, and existing state, county and local programs for forestry, on-site sewage systems, marine sanitation, land application, and education. Revisions to the implementation goals, refinements to programs and the delivery of additional technical and financial assistance have all been included as well.

The TCEQ and the TSSWCB will track implementation activities through periodic performance measure reports from participating entities. The effectiveness of these implementation activities will be documented through water quality sampling and analyses to verify that the allocations for TP specified in the TMDL are met and that dissolved oxygen levels are responding as expected. Progress toward meeting the goals of the I-Plan will be evaluated through periodic reviews by watershed stakeholders. The watershed stakeholders may revise the I-Plan based upon these reviews and other pertinent information available. The results of the I-Plan tracking activities, reviews, and assessments will be published and made available to the public through existing state and local informational materials and outlets.

Adaptive Implementation

This revised I-Plan continues to be centered around, and will be implemented using adaptive management concepts and assessment protocols. The adaptive management approach to implementing TMDLs was first presented in the congressionally authorized report of the National Research Council (NRC) in 2001, which assessed the scientific basis for the nation's TMDL program. The NRC committee concluded that "uncertainty in TMDL forecasts was/is often large, with the consequence that implementation actions for water quality improvement

might be ineffective and therefore wasteful of resources" (Reckhow, 2007). The NRC committee recommended adaptive management as a way to both begin addressing water quality problems while continuing to conduct scientific assessments designed to reduce these uncertainties. Adaptive management is described as a "learning while doing" approach.

Adaptive management is a cyclical process in which priority controls for water quality improvement are initially identified and implemented. Priority controls are those which have a relatively high level of certainty in their benefits to water quality, relatively low costs, and are otherwise consistent with appropriate management practices in the watershed. Priority controls may be sufficient to resolve the water quality impairment, or, in more challenging situations, may only be sufficient to "move the watershed's water quality in the direction of reducing pollutant loads" (Shabman, L., et al, 2007). The degree of effectiveness of priority controls depends upon the level of certainty regarding understanding of watershed processes, the magnitude of the water quality problems, and other factors.

The adaptive management approach specifies that water quality control measures be periodically assessed for their achievement of interim and final water quality goals. The final water quality goal of a TMDL is attainment of the water quality standard. Interim water quality goals are a series of water quality-based milestones that together form a progression toward meeting the water quality standards. If periodic assessments find that water quality goals are not being achieved, additional control measures may be required. These additional control measures may require further evaluation prior to being deployed in the watershed. These evaluations are to be included in the on-going assessments designed to improve our overall understanding of the watershed.

Revised Control Actions for Point Source Dischargers

The TMDL for dissolved oxygen in Lake O' the Pines specifies a wasteload allocation of 59,500 lb-TP/year (27,000 kg-TP/year) for point source discharges. The TMDL further identifies eight point-source dischargers in the watershed that contribute significant amounts of TP to the reservoir and thus contribute to the low dissolved oxygen levels which have been observed. The control actions described in this I-Plan have been revised to meet the wasteload allocations specified in the approved TMDL.

Original discussions among stakeholders in the watershed determined that a watershed-based permitting approach would best meet TP reduction needs for the watershed. Guidance on watershed-based permitting has been provided by the EPA; however, TCEQ declined to approve this type of permit for the Lake O' the Pines watershed. A preference for individual permits under TCEQ's Texas Pollution Discharge Elimination System (TPDES) was maintained as enforcement could more easily be enacted.

To accomplish the TP reduction goal identified in the TMDL without a true watershed-based permitting approach, stakeholders developed the TPLA. Under this revised approach, PPC, and the cities of Daingerfield, Mount Pleasant, Lone Star, Omaha, Ore City and Pittsburg have established and entered into an agreement that sets forth an approach to cost effectively control TP loadings from their respective permitted discharges to the Lake O' the Pines watershed. The complete text of the TPLA is appended to this I-Plan in Appendix B.

Pilgrim's owns and operates the WWTP that is responsible for removing TP from WWTP discharge for all permitted dischargers that are parties to the TPLA. The Pilgrim's WWTP has been equipped with the needed equipment to reduce TP loadings and is conducting a major WWTP upgrade at the cost of $9 million to improve operational efficiency and further reduce phosphorus to below required levels. Additionally, the Pilgrim's WWTP is continually staffed to ensure its proper functioning.

To ensure that this agreement is carried out, the NETMWD will manage this agreement and conduct monitoring to track the implementation of this approach. NETMWD will track TP loadings as reported by each entity, will determine when additional TP loading reductions are needed, will conduct spot checks on TP loadings and will report on the effectiveness of TP loading reductions.

Each entity that owns and/or operates a permitted discharge (Table 4) in the watershed will retain their individual TPDES permit from the State for their respective discharge and is solely responsible for operating this facility in compliance with its respective TPDES permit. Additionally, each entity will be responsible for meeting TP load limits defined in Table 5 (this table is also Table 3 in the approved TMDL I-Plan).

In light of the implemented TPLA and its inclusion in this revision to the I-Plan, TCEQ's Water Quality Division intends to perform permit amendments once the I-Plan revision has been completed for each of the TPDES permitted entities that are parties to the agreement. Within these amendments, TCEQ plans to require self-reported monitoring and reporting as described in the TPLA. Additionally the state's water quality management plan (different than TSSWCB's WQMPs) must be revised to include the changes made to the I-Plan before these permit revisions will be initiated. The initiated revisions should also rectify the pending status of Mount Pleasant's and Ore City's permits.

Table 4. TPDES permitted entities that are parties to the Total Phosphorus Load Agreement

Permit Holder	Permit Number	Last Permit Renewal Date	Permit Holder	Permit Number	Last Permit Renewal Date
Pilgrim's Pride Corporation	03017-000	May 25, 2012	City of Daingerfield	10499-001	Feb. 03, 2011
City of Mount Pleasant	10575-004	Pending	City of Lone Star	14365-001	Dec. 28, 2010
City of Pittsburg - Sparks Branch	10250-001	Feb. 03, 2011	City of Ore City	14389-001	Pending
City of Pittsburg - Dry Creek	10250-002	Feb. 03, 2011	City of Omaha	10239-001	June 16, 2011

Through the TPLA, each permitted entity agreed to limit its respective monthly total phosphorous discharge to not more than 10 percent of its annual TP allocation as defined in Table 5. Should an entity exceed its total phosphorous load allocation, that entity will be required to pay NETMWD at an initially established rate of $3/lb of total phosphorous that was discharged over their allowable load. NETMWD will calculate the pounds of total phosphorous removed on behalf of each permittee on a semi-annual basis and each city shall remit payment for these treatment costs. The payment rate will be adjusted semi-annually to reflect the real cost of removing each pound of Total Phosphorous as reported by Pilgrim's Pride.

Monies received from the permittees for total phosphorous load payments will be used by NETMWD to support Clean Rivers Program water quality monitoring across the watershed (see WQM2) as well as periodic monitoring of the permitted entity's discharge waters. A more detailed description of the TPDES permittee monitoring approach is included later in Revised Control Action PS 2. NETMWD will provide annual monitoring reports to the permittees.

The TPLA agreement was signed by all parties and went into effect on June 1, 2013.

Table 5. Loading Allocations for Point Source Dischargers in the Lake O' the Pines Watershed

Permit	Permit No.	Permitted Flow	Total Phosphorus	Total Phosphorus, Existing		Total Phosphorus, Allocation (Load Limit)	
		MGD	mg/l	lb/yr	kg/yr	lb/yr	kg/yr
Pilgrim's Pride Corporation	03017-000	3.00	13.23	121,000	54,900	53,200	24,000
City of Mount Pleasant	10575-004	2.91	0.56	5,000	2,300	2,180	1,000
City of Pittsburg – Sparks Branch	10250-001	2.00	0.664	4,000	1,800	1,780	800
City of Dainger-field	10499-001	0.70	0.54	1,100	500	510	200
City of Lone Star	14365-001	0.44	0.769	1,000	500	450	200
City of Ore City	14389-001	0.22	3.5	2,300	1,000	1,000	400
City of Omaha	10239-001	0.20	0.98	600	300	260	100
City of Pittsburg –Dry Creek	10250-002	0.20	2.14	1,300	600	570	300
Total		9.67	--	136,300	61,900	59,950	27,000

Control Action PS 1 – Implement the "Total Phosphorus Load Agreement"

Each of the eight point source dischargers identified in the TMDL for Lake O' the Pines, chose to participate in the TP load agreement and will implement the agreement as planned. Specific implementation activities outlined for each TPDES permittee within this agreement include:

PS 1-a) Pilgrim's Pride will own and operate the WWTP responsible for the removal of TP to ensure that the pollutant load allocation identified in the TMDL is met.

PS 1-b) The cities will own and operate their respective WWTPs in compliance with their respective TPDES permits.

PS 1-c) The cities will report total phosphorous loadings to Pilgrim's Pride and NETMWD on a monthly basis.

PS 1-d) NETMWD will monitor total phosphorous loads produced by each permittee and will notify Pilgrim's Pride of needed reductions.

PS 1-e) Should an entity exceed its allowable TP load as defined in Table 4 of the TMDL I-Plan, that entity will remit a payment to NETMWD to offset the cost of the additional TP reduction. This payment schedule is initially set at $3/lb of TP removed, but will be adjusted based on the actual cost of removal as incurred by Pilgrim's Pride.

Control Action PS 2 – TPDES Total Phosphorus Load Monitoring and Reporting

Through the TPLA, the participating entities determined and agreed to an approach to monitoring TP load discharges from their respective WWTPs. Each entity will self-report discharge data to Pilgrim's Pride and to NETMWD for TP load calculations. Additionally, NETMWD will conduct spot checks to verify the reasonableness of self-reported TP loads from each TPDES permittee. During the I-Plan revision process, work group members discussed the difficulty in determining a truly representative measure of annual TP loading from TPDES permitted outfalls using a grab sampling approach. As a result, a goal has been set to work to secure needed resources to enable the periodic collection of more intensive data that will illustrate intra and inter-daily variations in WWTP flow rates and TP concentrations.

Annual reports on TP loading and loading reductions made will be developed and distributed to the entities participating in the agreement. Specific implementation activities outlined for each entity within this agreement include:

PS 2-a) Each entity will monitor its respective TP loading in accordance with the self-reported monitoring frequency described in their individual TPDES permit and will provide a monthly report on monthly average TP loading to Pilgrim's Pride and NETMWD.

PS 2-b) Each entity will limit its respective monthly TP discharges to not more than 10 percent of their respective annual load allocation as defined in Table 5 of the TMDL I-Plan. If this load is exceeded, it will trigger an increased TP load reduction at the Pilgrim's Pride WWTP.

PS 2-c) Pilgrim's Pride will develop annual reports that summarize TP loadings for each calendar year. These reports will be delivered to NETMWD and each city on or before January 31st of each year.

PS 2-d) NETMWD is responsible for maintaining an aggregate database of all TP loading data submitted by each entity and will track needed TP load reductions to meet the annual load allocation.

PS 2-e) NETMWD will perform monthly sampling (phosphorus concentrations and flow rate) of discharge from permitted entities to verify the reasonableness of self-reported total phosphorous loads; should a discrepancy between self-reported data and NETMWD verification data occur, NETMWD will increase its monitoring frequency to determine if the discrepancy is an anomaly or if the loading is actually exceeding the allowable limit. NETMWD will inform the permittee of the findings and will call for an increased TP reduction at the Pilgrim's Pride WWTP if necessary

PS 2-f) NETMWD will work to secure additional resources to allow for periodic intensive monitoring that yields a flow-weighted composite TP loading from each TPDES permitted outfall.

Control Action PS 3 – TPDES Permit Administration

Through the TPLA, each of the participating entities will retain their individual TPDES permits issued from and administered by TCEQ. Each individual permit describes operation specific requirements that the permittee must meet. Upon the next permit renewal, the revised permit will include phosphorus monitoring and reporting requirements. TCEQ will continue to administer these permits and perform facility inspections as required by approved permits.

Implementation activities for this task include:

PS 3-a) TCEQ administers TPDES permits as appropriate through permit revisions every five years

PS 3-b) TCEQ will include phosphorus monitoring and reporting requirements via staff initiated amendment

PS 3-c) TCEQ administers TPDES permits by performing facility inspections as required

Revised Management Measures for Nonpoint Sources

The TMDL for dissolved oxygen in Lake O' the Pines specifies a load allocation of 92,600 lb-TP/year (42,000 kg-TP/year) for anthropogenic nonpoint sources from the watershed. The TMDL identifies the subcategories of nonpoint source pollution believed to contribute TP to the reservoir. The TCEQ and the TSSWCB expect that the management measures for nonpoint sources described in this I-Plan will be sufficient to meet the load allocations specified in the approved TMDL.

Management Measures for Agriculture

Despite the relatively small estimated contribution of TP loading from nonpoint sources as compared to point sources, watershed stakeholders realize the importance of proper land management and the positive water quality benefits that it has. The purpose of this management measure is to mitigate potential adverse water quality impacts derived from agricultural lands. Management measures implemented at agricultural operations will include operation-specific conservation plans or water quality management plans (WQMPs), technical and financial assistance, and education. The focus of implemented measures will be to reduce the potential for loading of nutrients and organic material from these lands to the stream.

Watershed stakeholders continue to support the implementation of best management practices in the watershed and are further supported by available technical and financial assistance programs from state and federal agencies.

Implementing Agencies for Agricultural Measures

The governmental agencies listed below will be responsible for working with producers to implement management measures aimed at reducing nonpoint source loadings from agricultural operations. Their duties and activities related to this I-Plan are described in the following sections.

Texas State Soil and Water Conservation Board

The TSSWCB is the lead agency in Texas responsible for planning, implementing and managing programs and practices for preventing and abating agricultural and silvicultural (forestry-related) nonpoint source pollution (Texas Agriculture Code §201.026). In accordance with this responsibility, the TSSWCB administers a certified Water Quality Management Plan (WQMP) Program that provides, through local soil and water conservation districts (SWCDs), for the development, implementation, and monitoring of individual WQMPs for agricultural and silvicultural lands. Each WQMP is developed, maintained, and implemented under rules and criteria adopted by the TSSWCB. A WQMP achieves a level of pollution prevention or abatement consistent with the state's water quality standards.

A WQMP is a site-specific plan designed to assist landowners in managing nonpoint source pollution from agricultural and silvicultural activities. WQMPs are traditional conservation plans based on the criteria outlined in the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) Field Office Technical Guide (FOTG). The FOTG is the best available technology and is tailored to meet local needs.

A WQMP includes appropriate land treatment practices, production practices, management measures, technologies, or combinations thereof. WQMPs are developed in cooperation with the landowner with assistance from the NRCS and approved by the local SWCD and are certified by the TSSWCB. This approach to preventing and abating nonpoint source pollution uses a voluntary approach while affording the landowner a mechanism for compliance with the state's water quality standards.

The TSSWCB regularly performs status reviews on WQMPs to ensure that the producer is implementing the measures prescribed in the WQMP. The TSSWCB administers technical and financial assistance programs to assist producers in implementing their WQMPs. Several essential practices from the NRCS FOTG included in a WQMP are of specific applicability to the phosphorus reduction goals of this TMDL and I-Plan. These include nutrient management, animal waste utilization, composting facilities and waste storage facilities.

Nutrient management is a practice that involves managing the amount, placement and timing of plant nutrients to obtain optimum yields and minimize the risk of surface and groundwater pollution. This practice aims to supply plant nutrients for optimum crop yield and to quickly establish ground cover in treated areas while improving the biological and chemical conditions of the soil and reducing pollution potential. This practice is applicable to all lands where plant nutrients are applied.

Animal waste utilization refers to the application of animal wastes on landscapes in an environmentally acceptable manner which ultimately improves the land resource. Implementing this practice yields improvements in soil structure and fertility while protecting water quality. This practice is appropriate where animal wastes such as those from dairy or poultry operations are available for land application.

Composting facilities are installed to biologically stabilize waste organic material. Composting organic material reduces pollution potential to nearby surface and groundwater resources. This practice is appropriate where organic animal waste is generated and is a part of planned agricultural waste management system.

Waste storage facilities impound and hold animal wastes until they can be appropriately utilized. This practice reduces pollution potential from stored wastes and is often an integral component of agricultural waste management systems.

The TSSWCB, in collaboration with NRCS and the SWCDs listed in Table 4, will continue to provide technical assistance to landowners in developing and implementing WQMPs. TSSWCB will develop WQMPs on animal feeding operations (AFOs) in the watershed as well as on livestock operations in the Lake O' the Pines watershed where planning assistance has been requested through the SWCD. TSSWCB will annually perform status reviews on at least 25% of all WQMPs in the watershed. Commercial broiler operations (poultry) are required to obtain and maintain a WQMP prior to the beginning of operations at the facility.

Since the beginning of the TSSWCB WQMP Program in 1995, financial assistance (state general revenue) has been allocated to SWCDs across the state and obligated by the SWCDs to individual producers. The Lake O' the Pines watershed is considered as a WQMP priority area due to its impaired waterbody status and producers in this area may seek financial assistance from TSSWCB to implement specific BMPs prescribed in a WQMP through this priority area.

Soil and Water Conservation Districts

SWCDs, like counties or school districts, are subdivisions of state government. SWCDs are administered by a board of five directors who are elected by their fellow landowners. There are 216 individual SWCDs organized in Texas. Through decades old agreements, SWCDs offer agricultural landowners and operators technical assistance through a partnership with the NRCS and the TSSWCB. It is through this conservation partnership that local SWCDs are able to furnish technical assistance to farmers and ranchers in the preparation of a complete soil and water conservation plan to meet each land unit's specific capabilities and needs. Table 6 shows the SWCDs that are active in the Lake O' the Pines watershed.

Table 6. SWCDs in the Lake O' the Pines Watershed

SWCD	Counties within SWCD
Harrison County SWCD #412	Harrison
Upshur-Gregg SWCD #417	Upshur, Gregg
Sulphur-Cypress SWCD #419	Franklin, Titus, Morris, Camp
Marion-Cass SWCD #433	Cass, Marion

USDA Natural Resources Conservation Service

The NRCS is a federal agency that works hand-in-hand with Texans to improve and protect their soil, water and other natural resources. For decades, private landowners have voluntarily worked with NRCS specialists to prevent erosion, improve water quality, and promote sustainable agriculture.

The NRCS provides conservation planning and technical assistance to landowners, groups, and units of government to develop and implement conservation

plans that protect, conserve, and enhance their natural resources. When providing assistance, NRCS focuses on the sound use and management of soil, water, air, plant, and animal resources. NRCS helps customers manage their resources in a way that prevents resource degradation, ensures sustainability, allows for productivity, and respects the customers' needs. Conservation planning can make improvements to livestock operations, crop production, soil quality, water quality, and pastureland, forestland, and wildlife habitats. The NRCS also integrates ecological and economic considerations in order to address private and public concerns.

The NRCS administers numerous Farm Bill Programs authorized by the U.S. Congress that provide financial assistance for many conservation activities:

- Conservation Innovation Grants (CIG)
- Conservation Reserve Program (CRP) administered by USDA Farm Service Agency
- Environmental Quality Incentives Program (EQIP)
- National Water Quality Initiative (NWQI)
- Regional Conservation Partnership Program (RCPP)

EQIP and other programs were reauthorized in the Agriculture Act of 2014 (Farm Bill) to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. People engaged in agricultural or livestock production on eligible land may participate in EQIP. EQIP offers financial and technical assistance to eligible participants for installation or implementation of structural and management practices on eligible agricultural land.

EQIP also provides incentive and financial assistance payments to implement conservation practices. EQIP activities are carried out according to a plan of operations developed in conjunction with the producer that identifies the appropriate conservation practice(s) to address resource concerns. All practices are subject to NRCS technical standards described in the FOTG and adapted for local conditions. The local SWCD approves the plan.

Local Work Groups provide recommendations to NRCS on allocating EQIP county base funds and on resource concerns for other USDA Farm Bill programs. Adams and Cow Bayou stakeholders are encouraged to participate in the Local Work Group in order to promote the goals of this I-Plan Management Measure as compatible with the resource concerns and conservation priorities for EQIP.

National Water Quality Initiative

NRCS offers financial and technical assistance to farmers, ranchers and forest landowners interested in improving water quality and aquatic habitats in priority watersheds with impaired streams. NRCS will help producers implement conservation and management practices through a systems approach to control and trap nutrient, sediment and manure runoff. Qualified producers will receive as-

sistance for installing conservation practices such as cover crops, waste storage facility, pasture planting and tree planting.

In 2013, NRCS identified 5 priority watersheds (Table 7 & Figure 5) within the larger Lake O' the Pines watershed through the help of local partnerships and state and federal water quality agencies. NRCS will continue working with their partners in this initiative including the Upshur-Gregg and Sulphur-Cypress Conservation Districts, the Texas State Soil & Water Conservation Board and the EPA. Further, NRCS will coordinate with local, state and federal agencies, conservation districts, nongovernmental organizations and others to implement this initiative. This strategic approach will leverage funds and provide streamlined assistance to help individual agricultural producers take needed actions to reduce the flow of sediment, nutrients and other runoff into impaired waterways.

In this funding cycle, a total of $704,000 in financial assistance will be made available to producers in these priority watersheds.

Table 7. NWQI Priority Subwatersheds in the Lake O' the Pines Watershed

Watershed Name	Counties the Watershed Lies In	Watershed Size	Hydrologic Unit Code
Walkers Creek – Big Cypress Creek	Camp, Titus	37,976 ac.	111403050303
Kitchen Branch – Prairie Creek	Camp, Upshur	24,393 ac.	1114030350307
West Greasy Creek	Camp, Upshur	22,732 ac.	111403050308
Little Boggy Creek	Morris, Titus	29,481 ac.	111403050305
Whitmore Branch – Boggy Creek	Morris, Titus	33,600 ac.	111403050306

Monitoring to document the impacts of conservation and management practices implemented through the NWQI program on instream water quality will also be a focus. Along with NRCS, EPA and TSSWCB are committed to supporting the collection of water quality data sufficient to illustrate these impacts. Specifics of the planned monitoring approach are not yet available, but the intent of the program is to produce water quality data that demonstrates the effectiveness of implemented practices at the field, farm and small sub-watershed scale.

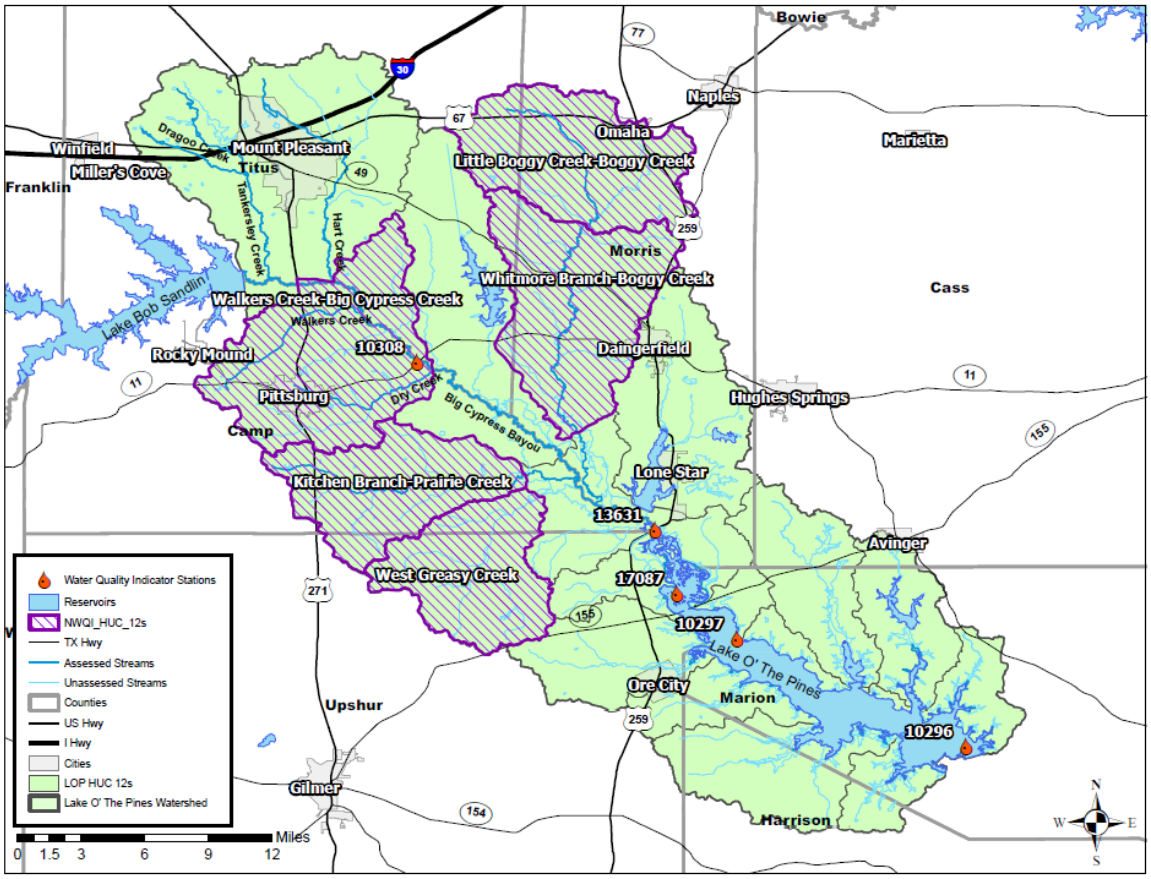

Figure 5. National Water Quality Initiative Priority Watersheds

Texas A&M AgriLife Extension Service

AgriLife Extension, an agency of the Texas A&M University System, provides quality, relevant, outreach and continuing education programs and services to Texans. AgriLife Extension serves every county in Texas; its information is provided by scientists and researchers at Texas A&M and other universities, and is made practical and relevant by Extension educators or agents who work in each county. AgriLife Extension continually assesses and responds to educational needs identified by community residents, advisory committee members, volunteers, stakeholder groups, and representatives of organizations and agencies. Extension education encompasses the broad areas of agriculture and natural resources, community economic development, family and consumer sciences, and youth development programs such as 4-H. Among other goals and priority objectives pursued by AgriLife Extension, the following relate to agriculture and natural resources.

- Consumers, homeowners, agricultural producers, communities, and irrigation districts understand and adopt best management practices to protect water quality and enhance conservation so water supplies will meet future water needs in Texas that are essential for expanding agricultural growth, jobs, and the economy in both rural and urban areas.

- Landowners, professional ecosystem managers, community planners, and other interest groups become more knowledgeable, make informed decisions, and adopt best management practices that insure the proper management of rural and urban natural ecosystem resources (rangeland and forestry, etc.) through stewardship education in order to support the biological, sociological, and economic sustainability of those resources.
- Advance the planning and management of natural resource-based recreation opportunities in Texas.

Management Measure AG 1 – Agricultural Operations

Animal feeding operations (AFOs) are agricultural enterprises where animals are kept and raised in confinement. AFOs produce manure that, when improperly managed, can pose a risk to water quality. The TSSWCB, NRCS, AgriLife Extension, TCEQ, and other state and federal agencies are committed to a comprehensive approach to ensure that manure and wastewater from AFOs are properly managed. This approach includes a comprehensive suite of voluntary programs and regulatory programs to ensure that AFOs establish appropriate site-specific nutrient management practices that will protect water quality.

Management Measure AG 1.1 - TSSWCB WQMP Program for Poultry Farms

Several essential practices from the NRCS FOTG included in a WQMP are of specific applicability to the phosphorus allocations of this TMDL. Nutrient management must be outlined if nutrients, such as commercial fertilizer, are applied. If an animal feeding operation is involved, such as a dairy or poultry operation, an animal waste management system will be a component of the WQMP. Waste utilization will be taken into account when agricultural wastes like poultry litter or dairy manure are land applied. All commercial dry poultry facilities in Texas must operate in accordance with a WQMP certified by the TSSWCB (Texas Water Code §26.302).

The TSSWCB, in collaboration with the NRCS and the local SWCDs, will continue to provide technical assistance to landowners in developing and implementing WQMPs. The performance measures for AG 1.1 are:

AG 1.1-a) Develop and implement WQMPs on 100% of poultry operations in the watershed.

AG 1.1-b) Develop and implement WQMPs on cooperating, non-permitted dairies in the watershed.

AG 1.1-c) Annually perform status reviews on at least 25% of all WQMPs in the watershed.

The existing TSSWCB WQMP Program is funded through state appropriations. It is not anticipated that any new sources of funding will be required to implement this management measure.

Management Measure AG 1.2 - TCEQ Agriculture Permits and Authorizations

The TCEQ administers permits for Concentrated Animal Feeding Operations (CAFOs) and authorizations by rule for non-permitted animal feeding operations under rules in Chapter 321 of Title 30 of the Texas Administrative Code (TAC). Table 8 summarizes the TCEQ's program related to CAFOs and AFOs program in the Lake O' the Pines watershed.

AFOs that meet the definition of a CAFO, except dry poultry facilities (TAC, Chapter 321.33(f)), are required to obtain a permit from the TCEQ. The permit establishes requirements for control facilities, nutrient management plans, buffers, sampling, record-keeping, and reporting. The TCEQ performs regular inspections to ensure compliance with the provisions of the permits. These are inclusive of dairies of a certain size or larger and wet poultry facilities such as laying facilities.

Table 8. TCEQ Program Summary of AFOs in the Lake O' the Pines Watershed

County	Permitted CAFO	Non-Permitted AFO	Total
Camp	0	1	1
TOTAL	0	1	1

AFOs, which do not meet the definition of a CAFO and that do not obtain a certified WQMP from the TSSWCB, may operate as facilities authorized under TCEQ rules. These rules, which are not permits, specify requirements for control structures, operation and maintenance, land application, soil testing, nutrient utilization plans, record keeping, and inspections. The TCEQ inspects authorized AFO facilities to ensure compliance with state rules. The TCEQ, in collaboration with the TSSWCB and the NRCS, provides technical assistance to individual operators of AFOs within its jurisdiction as needed. The TCEQ will inspect all permitted CAFOs and all authorized AFOs annually. The TCEQ program for AFOs is funded through existing state appropriations and continuing federal grants. The TCEQ does not anticipate that any new sources of funding will be required to implement these activities. The performance measure for AG 1.2 is annual inspections by the TCEQ of all CAFOs and authorized AFOs in the watershed.

Performance measures for AG 1.2 are:

AG 1.2-a) TCEQ administers permits for CAFOs in the watershed as appropriate

AG 1.2-b) TCEQ authorizes AFOs not meeting CAFO criteria and not opting to implement a WQMP

AG 1.2-c) TCEQ performs regular compliance inspections of permitted CAFOs and authorized AFOs in the watershed

Management Measure AG 1.3 – Voluntary Conservation Practice Implementation

Voluntary conservation practice planning and implementation is an important process for ensuring that agricultural and silvicultural lands are managed in a way that supports both the producer's management goals and objectives while promoting improved pollution abatement potential and is also one that is widely adopted across the watershed. Technical and financial assistance is available to producers from NRCS through many of their conservation programs and TSSWCB through WQMPs. Regardless of the technical service provider or the program they choose to participate in, the goals and objectives of the developed plan are to promote sustainable resource utilization that enhances the producers operation while simultaneously producing improvements in the quality of water produced from the managed area.

Performance measures for AG 1.3 are:

AG 1.3-a) NRCS and TSSWCB continue to administer technical and financial assistance program to volunteering landowners in the watershed as appropriate

Management Measure AG 2 - Financial Assistance

TSSWCB and NRCS will continue to provide appropriate levels of financial assistance to agricultural producers that will facilitate the implementation of BMPs through their WQMP and EQIP programs in the Lake O' the Pines watershed.

Since the beginning of the TSSWCB WQMP Program in 1995, financial assistance has been obligated by SWCDs to producers within the Big Cypress Creek Basin to assist them in implementing the BMPs prescribed in their WQMPs. Between the years 2009 through 2013, between $52,616 and $59,325 in state appropriations were allocated annually by the TSSWCB to Sulphur-Cypress SWCD #419, Upshur-Gregg SWCD #417, and Marion-Cass SWCD #433. These SWCDs also include areas outside of the Lake O' the Pines watershed.

The USDA NRCS EQIP State Resource Concern for Water Quality/Air Quality for AFO-CAFO Poultry is directed toward protection of streams affected by runoff from poultry operations. Eligible practices include nutrient management, waste storage facility, filter strips, field border, riparian forest buffer, pasture and hayland planting, and range planting. Poultry operations within a watershed listed for bacteria or dissolved oxygen on the 303(d) List (such as Lake O' the Pines) would receive a higher ranking for funding. More information on the EQIP program may be found at: <www.tx.nrcs.usda.gov/programs/EQIP/index.html>.

In 2013, NRCS identified 5 priority watersheds (Table 6) within the larger Lake O' the Pines watershed where financial and technical assistance will be focused. This strategic approach will leverage funds and provide streamlined assistance to help individual agricultural producers take needed actions to reduce the flow of sediment, nutrients and other runoff into impaired waterways. A variety of practices will be offered through this program and will focus on the reduction of potential pollutants to nearby impaired streams by working to retain these potential pollutants on the landscape.

In this funding cycle, a total of $704,000 in financial assistance will be made available to producers in these priority watersheds.

Performance measures for AG-2 are:

- AG 2-a) Assistance provided through the TSSWCB WQMP Program as requested and available
- AG 2-b) Assistance provided through the NRCS EQIP Program as requested and available
- AG 2-c) Assistance provided through the NRCS NWQI Program as requested and available

Management Measures for Forestry Operations

The Texas A&M Forest Service (TFS), an integral part of The Texas A&M University System, is mandated to assume direction of all forest interests and all matters pertaining to forestry within Texas. TFS administers a BMP program focused on minimizing threats to water quality from forestry activities. The program educates landowners, loggers, and foresters about the threats to water quality and provides technical assistance on how to minimize those threats using non-regulatory forestry BMPs.

Forestry BMPs are a set of guidelines that involve the application of conservation practices that effectively prevent or minimize the amount of nonpoint source pollution generated during forestry operations. TFS, in collaboration with the TSSWCB and the Texas Forestry Association, publishes a handbook of *Texas Forestry BMPs*. The handbook includes guidelines relating to planning, road construction, and maintenance, harvesting operations, locations of landings, skid trails, drainage, treatment of wastes and chemicals and the protection of stream courses. The handbook is available at: <http://txforestservice.tamu.edu/uploadedFiles/Sustainable/bmp/bmpbookindd.pdf>.

TFS monitors BMP implementation throughout the state. Every three years, TFS publishes a report, *Voluntary Implementation of Forestry Best Management Practices in East Texas,* which describes the level at which BMPs are being implemented. The reports are available on the TFS Web site at <http://texasforestservice.tamu.edu/main/article.aspx?id=15307>.

Management Measure FO 1 - BMP Evaluations

TFS will continue to evaluate the effectiveness and adoption of forestry BMPs to improve the quality of water produced by managed forest lands across the East Texas logging area. TFS is currently performing a project to evaluate silvicultural BMP effectiveness across East Texas. Within this evaluation, it is anticipated that 5 randomly selected evaluation sites will be in the Lake O' the Pines watershed. Monitoring is scheduled to be completed by August 2014 and the project report will follow sometime afterward. TFS will also continue to seek funding for future BMP evaluations.

Performance measures for FO-1 are:

- FO 1-a) Continue silviculture BMP evaluations as resources allow
- FO 1-b) Complete and distribute BMP evaluation reports that illustrate BMP pollutant removal efficiencies

Management Measure FO 2 - Technical Assistance

TFS will continue to provide technical assistance and educational information to landowners, loggers, and foresters by conducting BMP training workshops and distributing periodic newsletters industry wide. Workshops provide attendees with practical information regarding the proper application of best management practices. The TFS conducts three BMP training workshops per year at sites throughout East Texas.

TFS personnel provide technical assistance to numerous individual forest landowners through phone conversations, email, and site visits. Forest stewardship plans are developed for landowners and include relevant, site-specific information regarding the protection of water quality through the use of forestry BMPs. Several voluntary certification programs designed to encourage sustainable forest management and BMPs, are also promoted to forest landowners; these include the Tree Farm Program and the Sustainable Forestry Initiative.

The technical assistance project includes areas outside of the Lake O' the Pines watershed. The performance measure for FO2 is training workshops conducted by TFS three times yearly.

Performance measures for FO-2 are:

- FO 2-a) Continue to deliver technical assistance industry wide through workshops and other avenues as appropriate
- FO 2-b) Continue to develop and distribute general educational materials to target audiences across the Texas forestry industry

Management Measures for Feral Hogs

Feral hogs have been identified as significant contributors of pollutants to water bodies across the state. As feral hogs congregate around water sources to drink and wallow, this concentration of high numbers of feral hogs in small riparian areas

poses a threat to water quality. Fecal matter deposited directly in streams by feral hogs contributes bacteria and nutrients, polluting the state's water bodies. In addition, extensive rooting activities of groups of feral hogs can cause extreme erosion and soil loss. The destructive habits of feral hogs cause an estimated $52 million worth of agricultural crop and property damage each year in Texas.

Management Measure FH 1 – Education and Outreach

The impacts of feral hogs in the watershed are well known by watershed stakeholders; however, practical solutions to effectively reduce their numbers and adverse impacts in the watershed are limited. In discussing this issue, watershed stakeholders felt that raising awareness about the detriments feral hogs are having on the watershed and their potential impacts on water quality were the biggest needs. As such, it was recommended that periodic feral hog education programs that discuss control techniques and provide informational resources to landowners be conducted across the area. It is thought that delivery of expanded education on the problem and potential solutions will lead to additional action to remove hogs through coordinated trapping efforts, perhaps supported at the county level or by agencies operating in the watershed when funds are available.

The performance measure for FH-1 is:

FH 1-a) Work with local entities through existing outlets to periodically deliver educational programming to interested parties on feral hog biology, control tactics, damage statistics and other relevant topics as appropriate

Management Measures for On-Site Sewage Facilities

On-site sewage facilities (OSSF) treat sewage from homes and businesses that are not connected to a centralized WWTP. Nearly one in four households in the United States depends on OSSF to treat wastewater. It is estimated that 40% of new development in the United States will utilize OSSF. EPA concluded in its 1997 Report to Congress that "adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." In far too many cases, however, OSSFs are installed and largely forgotten - until problems arise. The U.S. Bureau of the Census has indicated that at least 10% of on-site systems have stopped working, and some communities report failure rates as high as 70%. Failing OSSFs can be a significant source of pathogens and nutrients to surface and ground waters.

The difference between failure and success is the implementation of an effective wastewater management program. Such a program, if properly executed, can protect public health, preserve valuable water resources, and maintain economic vitality in a community. Almost all OSSFs in Texas must have a permit prior to any construction, installation, repair, extension, or other alteration. Any work on an OSSF must be handled by a licensed installer or directly by the homeowner. If

someone is paid for any part of the process, that person must be licensed by the state.

In most areas of the state, local authorities have taken on the responsibility for ensuring that OSSFs in their areas comply with all state requirements. Many local governments are authorized agents (AAs) of the TCEQ for administering the OSSF Program. Many times, an AA has a designated representative (DR) to assist it with its responsibilities, which include reviewing plans for constructing, altering, extending, or repairing each OSSF; issuing permits; and inspecting system installation.

Authorized agents and designated representatives also respond to complaints to ensure that an OSSF meets minimum standards. If problems are found, the system owner normally has 30 days in which to make substantial progress on remedying the situation. After that, the AA can file a criminal complaint with the local Justice of the Peace.

There are eight AAs in the seven counties located within the Lake O' the Pines watershed. In 2009, Titus County took over from Titus Freshwater Supply District. In addition, the Northeast Texas Municipal Water District is the DR and permitting authority for OSSFs in Marion, Morris, and Cass Counties. NETMWD permits all OSSF in these counties except those on tracts of land 10 acres or more, and those inside certain city limits. The NETMWD also handles all complaints about OSSF in these three counties, and has six employees on staff for this purpose.

DRs from within the TCEQ Region 5 area meet quarterly. This forum provides input for new rules and regulations and clarifications by the TCEQ staff attending the meetings. This group began meeting in 2003, and is a valuable tool for those working in the OSSF program.

Management Measure OSSF 1 - OSSF Program Administration

AAs and DRs in the Lake O' the Pines watershed will continue to implement the OSSF program in accordance with state rules. Table 9 summarizes OSSF program activities in these counties for the years 2006-2012 as determined from monthly reports submitted to the TCEQ by the authorized agents in these counties. This information includes activities throughout each of these counties and therefore includes areas outside of the Lake O' the Pines watershed. During the seven year period between 2006 and 2012 there was an estimated 1,017 complaint investigations which ultimately lead to repair or replacement of systems in these counties which results in an annual average of 145 potential systems. During this time period there was a drop in the number of new applications, probably due to the reduced housing market due to the economy, there was a total of 4,138 applications in counties of the watershed, resulting in an average of 591 per year. These numbers are for the entire county and include systems that are located out of the watershed.

Table 9. OSSF Program Activity for 2006-2012 from TCEQ OARS Database

Authorized Agent	Applications	Complaint Investigations	Court Cases Filed
Camp County	239	6	13
Cass County	220	23	2
Harrison County	1794	626	2446
Marion County	197	37	6
Morris County	79	1	3
Titus County/ FWSD	408	226	127
Upshur County	1111	98	25
Total	4138	1017	2622
Annual Average	591	145	375

Discussions with watershed stakeholders indicated that it is difficult to determine from how many applications are for new systems and how many are for system replacements. The OSSF work group would like to look into securing funds to collect data that will help estimate the total number of systems for the watershed. This will enable a comparison to be made between the estimated and documented systems and may also help to identify older OSSFs in the watershed. This information combined could be used to direct OSSF inspection efforts should funding be available.

The existing OSSF program is funded through existing local, state, and federal sources. It is not anticipated that any new funding will be required to implement this management measure. The AAs, in collaboration with the TCEQ, provide technical assistance to individual homeowners on an "as needed" basis. The performance measure for OSSF1 is the administration of all new permits and complaint investigations received annually. During the 2006 to 2012 time period, an average of 591 permits were administered and 146 complaints were investigated annually. Upshur County had 1,111 applications due to new growth with new subdivisions in the county. The Harrison County DR explained that the county had a large amount of court cases due to a new rule enacted in 2009 that the homeowner must have a licensed service professional conduct needed maintenance or that they must take a required class on OSSF maintenance and operation. If homeowners were delinquent on this requirement, the county took them to court. This led to the high numbers of court cases in the county during the 2006-2012 period. In 2009 there were 493 cases, 738 in 2010 and 460 in 2011. In total, Harrison County had a 2,446 total court cases in this time period. The rule changed again in 2012 and thus reduced these requirements resulting in only 108 cases. This should result in a lower average of court cases moving forward.

Performance measures for OSSF-1 are:

OSSF 1-a) AAs and DRs continue to administer OSSF permits in the watershed as appropriate

OSSF 1-b) AAs and DRs continue to respond to OSSF related complaints and work with OSSF owners to bring failing systems into compliance

OSSF 1-c) NETMWD and other DRs work to secure funding to estimate OSSF density and distribution in the watershed

Management Measure OSSF 2 - OSSF Financial Assistance

NETMWD began as a third party administrator for the Supplemental Enhancement Program (SEP) with TCEQ in September of 2001. In September 2004, NETMWD received $200,000 from the SEP program and began a project that provided support for replacing failing OSSFs. With these funds, 42 failing OSSFs were replaced. These funds were made available through penalties assessed for violations of Texas environmental laws. The SEP program only receives funds when an enforcement action has taken place, thus are not reliable funds.

The SEP program was developed as an approach to resolve enforcement actions and improving environmental quality in Texas. The SEP policy provides an alternative to payment of the full amount of an administrative penalty. It allows respondents in an enforcement action to use the money for a project that prevents pollution, reduces the amount of pollution reaching the environment, enhances the quality of the environment, or contributes to public awareness of environmental matters.

In 2009 when TCEQ changed rules for third party administrators to allow cities to create and manage SEPs, NETMWD allowed their third party status to lapse. NETMWD is currently in the process of getting reinstated as a third party administrator for SEP funds. Additionally, the Lake O' the Pines watershed is currently covered by the statewide Wastewater Treatment Assistance program administered by the Texas Association of Resource Conservation and Development Areas, Inc. (RC&D) to repair or replace failing or inadequately designed on-site wastewater treatment systems for low-income households. To qualify as a low-income household, annual income for the household must be at or below the 80 percent median income level for households in the county where they live.

Performance measures for OSSF-2 are:

OSSF 2-a) Funding entities work to secure funding to repair or replace failing OSSFs as appropriate

OSSF 2-b) As funding is available, administer available funding to repair or replace failing OSSFs across the watershed

Management Measures for Marine Sanitation

The Marine Sanitation Device (MSD) program on Lake O' the Pines was enacted in July 2001, when the NETMWD passed resolution #01-03. Title 30, Chapter 321 Subchapter A of the Texas Administrative Code and applicable rules of the TCEQ allow for local enforcement of Boat Sewage Disposal rules. The resolution prohibits the discharge of waste or sewage from toilet facilities on boats and requires boats with toilet facilities to have an approved marine sanitation device.

During the I-Plan revision process, discussions with watershed landowner indicated that the established permitting system was not doing enough to ensure that black water produced by houseboats is properly disposed of. Water sampling conducted by NETMWD at various places on Lake O' the Pines including public swimming beaches, marinas, and open water sites periodically confirms the presence of fecal indicator bacteria.

In response to landowner concerns and sampling results, NETMWD is working to amend the MSD inspection, permitting, and enforcement approach for Lake O' the Pines. As of 2013, NETMWD is in the process of revising the MSD program. NETMWD is actively working with stakeholders directly impacted by this program to further solidify the permitting process, renew all permitted houseboats, permit any currently unpermitted houseboats, and develop a strategy for ensuring that permit holders have a readily available means for disposing of their produced black water.

NETMWD continues to take water samples at various designated places on Lake O' the Pines, public swimming beaches, marinas, and open water sites for comparison and identification of water quality issues.

Management Measure MS 1- Marine Sanitation Device Permitting

NETMWD has requested updated lists of houseboat owners from Lake O' the Pines marina owners and is in the process of updating their recorded number of houseboats on the lake. Once acquired, NETMWD will actively work to educate boat owners and the public on permit requirements and the water quality benefits of implementing these requirements. NETMWD will also work with these boat owners to establish new permits for each vessel. Prior to receipt of a new permit, each vessel will be inspected to ensure that their MSD is properly functioning and secured by lock to disallow the discharge of septage to the lake. It is anticipated that all house boats will be certified and have a sticker that will certify the boat for 2 years at a cost of $25 with a MSD or those with a holding tank pump out certification will need to be certified annually at a cost of $40. After the 5th day past the sticker certification date the boat's permit is invalid.

NETMWD will work with USACE law enforcement personnel at Lake O' the Pines to enforce the MSD permit requirement. If an expired permit, non-permitted vessel, or improper disposal of black water is found, USACE will contact NETMWD who will then work with the boat owner to resolve the violation. If the vessel is not brought into compliance in a timely fashion, NETMWD will be responsible for ticketing and enforcement. Permit renewals will be conducted bi-annually and each boat will be inspected prior to reissuance of a permit.

In addition to permitting, NETMWD is currently working with marina owners at the lake to devise a strategy to make septage pumping services readily available to houseboat owners at each of the three marinas where houseboats are kept. The

details of this plan are not defined at this point but will be established by September 2013.

This program is funded by NETMWD and it is not anticipated that any new funding will be required to implement this management measure. NETMWD provides technical assistance to individual boat owners on an "as needed" basis. The performance measure for MS1 is the issuance of permits for new vessels and administration of existing permits.

Performance measures for MS-1 are:

- MS 1-a) NETMWD will complete the revision of the MSD program for Lake O' the Pines
- MS 1-b) NETMWD will inspect and repermit all vessels on Lake O' the Pines with compliant MSDs and will work with owners of vessels with non-compliant MSDs to bring them into operation prior to permitting
- MS 1-c) NETMWD will work with Lake O' the Pines marina owners to establish a septage disposal strategy enabling MSDs to be periodically pumped
- MS 1-d) NETMWD will work with USACE to enforce MSD permit compliance

Management Measures for Land Application Sites

Sewage sludge (the residue generated during treatment of domestic sewage), domestic septage (residues from OSSFs), and other wastes may be applied to the land for beneficial purposes if authorized by the TCEQ. These materials can improve the chemical and physical properties of soils because they contain nutrients and trace elements important for plant growth. Title 30, Chapter 312 of the Texas Administrative Code establishes standards for the final use or disposal of these materials. The rules establish management requirements for limiting chemical concentrations, pathogen densities, and vector attraction as well as requirements for the frequency of monitoring, record keeping, and reporting. Depending on the nature of the material, authorization from the TCEQ to apply sewage sludge or domestic septage to land is in the form of a permit, registration, or notification.

Management Measure LA 1 - Land Application Permitting and Registration

There are five land application sites in the Lake O' the Pines watershed as identified in Table 10. The TCEQ administers the permits and registrations and performs regular inspections to ensure compliance with the provisions of the permits. The TCEQ program for permitting land application sites is funded through existing state appropriations and federal grants. The TCEQ does not anticipate that any new funding will be required to implement this management measure. The TCEQ provides technical assistance to individual operators of sludge application sites as needed. The performance measure for LA1 is administration of land application permits.

Table 10. Land Application Sites in the Lake O' the Pines Watershed

Permittee	Permit/Registration Number	Permit Type	County
Terra Renewal Services	WQ0004943000	Class B Sewage Sludge	Morris
Terra Renewal Services	WQ0004947000	Class B Sewage Sludge	Morris
North East Texas Municipal Water	730087	Water Treatment Plant	Harrison
Richard Mauk	710357	Domestic Sep-	Upshur
Nick France	710302	Domestic Sep-	Camp

Performance measures for LA-1 are:

LA 1-a) TCEQ will administer land application permits as appropriate

LA 1-b) TCEQ will perform land application permit inspections in accordance with individual permit guidelines and ensure that sites are operated in accordance with their permits

Watershed Educational Activities

The intent of educational outreach activities for the Lake O' the Pines watershed is the promotion of efficient and wise use of phosphorus within the watershed. The stakeholders continue to believe that education is the most critical tool in achieving water quality goals in this watershed. The target audience of the educational activities includes (but is not limited to) commercial providers of phosphorus, homeowners who fertilize their lawns and gardens, agricultural producers, forestry operators, and homeowners with OSSFs. Opportunities for improvement in the utilization of phosphorus exist in each of these groups with education having a significant effect on the degree of implementation of best management practices. The intent is to utilize existing programs and governmental entities to the maximum extent practical. Implementation will include at least the following:

1) disseminating educational materials through mass communications like Internet sites, fliers, newsletters, magazines, memos, reports

2) conducting conferences focused on education to achieve changes in habits

3) communicating person-to-person (e.g., site visits and telephone calls)

Specific programs for target audiences and entities that will implement these programs in the Lake O' the Pines watershed are described in the following Management Measures.

Management Measure ED 1 - Education for Commercial Phosphorus Providers

As part of the educational outreach, an annual effort shall be made to identify all of the providers that sell phosphorus within the watershed. At least annually, an outreach effort will be made to raise the awareness within the commercial providers as to the effect of phosphorus applications within the watershed and the need to efficiently and appropriately use phosphorus. The customer base of the commercial providers could include golf courses, hayfields, lawns, and growing crops. The annual workshops have been hosted by the NETMWD and the Titus County Extension Office that conduct a commercial and non-commercial continuing education workshop each summer in Mount Pleasant. Titus County also conducts a Pesticide Seminar in January each year.

Management Measure ED 2 - Education for Homeowners Who Fertilize Lawns and Gardens

Residential property owners will be provided information on methods that avoid excessive fertilization of yards and gardens. Existing programs through the Texas A&M AgriLife Extension Service and others will be utilized to increase awareness of the phosphorus concern within the watershed and appropriate control measures.

The Master Gardener Program is a volunteer program designed to increase the availability of horticultural information to residents and improve the quality of life through horticultural projects. Offered by AgriLife Extension, program objectives are implemented through the training and working with local volunteers, known as Master Gardeners, who aid Extension by conducting school garden projects, answering telephone requests for horticultural information, establishing and maintaining demonstration gardens, working with special audiences in the community, designing and implementing community improvement projects, and coordinating Master Gardener projects. The Cypress Basin Master Gardener Chapter is managed by the Titus County Extension Office.

The administration of the Master Gardener program requires AgriLife Extension to recruit participants, conduct training for volunteers, certify and re-certify Master Gardeners, develop volunteer activities and projects, track volunteer service, and recognize Master Gardeners for volunteer service and leadership.

Trainees must receive a minimum of 50 hours of instruction, pass an examination, and volunteer a minimum of 50 hours of service to earn the title of "Texas Master Gardener." In order to retain the Texas Master Gardener title, individuals are required each year to participate in a minimum of 6 hours of recertification training and provide an additional 12 hours of volunteer service through the local Extension office. Documentation requirements and validation of training and

volunteer service hours for recertification are under the purview of the County Extension Agent or an individual designated by the agent.

The Titus and Camp County Extension offices collaborate on the Master Gardener program in the Lake O' the Pines watershed with participants from Titus, Franklin, Camp, and Marion Counties. They conduct one training program for approximately 20 new program participants and an equal number of returning participants each year. AgriLife Extension will track Master Gardener participation in training programs and advise Master Gardeners to contribute volunteer hours that support this management measure. The Master Gardener program is funded by AgriLife Extension.

The Texas Master Naturalist Program is a joint program between Texas AgriLife Extension Service and the Texas Parks and Wildlife Department and the Cypress Basin Chapter is managed by the Marion County AgriLife Extension Office. The mission of the Master Naturalist program is: "To develop a corps of well-informed volunteers to provide education, outreach, and volunteer service dedicated to the beneficial management of natural resources and natural areas within their communities for the great State of Texas".

- Texas Master Naturalists go through an approved training program with at least 40 hours of combined field and classroom instruction, plus 8 hours of approved advanced training
- Donates 40 hours of volunteer service back to the state and community. Trainees can complete their 40 hours of volunteer service and 8 hours of advanced training within a year after their initial training.
- Completes another 8 hours of advanced training and donates 40 hours of volunteer service every year after the first one.

The local Cypress Basin Master Naturalist program is managed by AgriLife Extension and funded through the costs of the training program. This program is expected to continue with one class per year being anticipated.

Management Measure ED 3 - Education for Agricultural Producers

Agricultural producers are an important part of the economy in this watershed. Use of phosphorus is an essential part of the production. Educational outreach by local SWCDs, water districts, industry associations, and others will be part of this implementation. Educational topics include phosphorus loadings and ways to reduce loading. For example, proper tillage practices that reduce erosion as well as phosphorus. These programs are ongoing and pending continued funding availability will continue into the future.

AgriLife Extension will continue to host producer education activities, including field days and demonstrations, that promote understanding and adoption of best management practices among agricultural producers, ensure agricultural producers can maintain certifications (of WQMPs) by providing compliance

assistance, and support the profitability of agricultural enterprises by promoting awareness of federal and state financial assistance pro-grams to assist with adoption of effective technologies and best management practices. The TSSWCB and NRCS will support Extension outreach and education initiatives in the Lake O' the Pines watershed.

Management Measure ED 3.1 – CEU Seminars

The Camp and Titus County Extension offices jointly sponsor an annual Northeast Texas Pesticide Seminar and Licensing School in January. Attendance at the seminar allows attendees to earn Continuing Education Credits towards the maintenance of their pesticide applicators license issued by the Texas Department of Agriculture. These are one-day events with up to 200 persons in attendance. A range of topics is presented at these seminars, including water quality, nutrient management, and soil tests. AgriLife Extension will incorporate appropriate themes and topics from this I-Plan into these seminars.

Management Measure ED 3.2 - Educational Programs

AgriLife Extension co-sponsors ongoing educational programs with the Texas Farm Bureau and others across the watershed on a variety of issues. These are evening or luncheon events with up to 70 people in attendance. One of the objectives of these meetings and county Ag Field Days are to update local agricultural producers on relevant research. A range of topics are presented at these programs including water quality and managing forages to avoid the buildup of phosphorus in soil, streamside management zones, invasive species, home landscape, water conservation, rainwater harvesting and organic fertilizers. Several education programs have been conducted in the schools and with 4-H clubs to children, including the rainfall simulator and water quality. Titus County conducts a training to the County Commissioners that includes water issues. Approximately six of these educational programs are presented each year in the Lake O' the Pines watershed. AgriLife Extension will incorporate appropriate themes and topics from this I-Plan into these educational programs.

Management Measure ED 4 - Education for Homeowners with OSSFs

Rural residences have the potential to generate phosphorus loadings to the Lake O' the Pines due to malfunctioning OSSFs. It is therefore important that rural residences have fully functional OSSFs. An educational outreach program for homeowners with OSSFs will be initiated by NETMWD. If possible NETMWD would like to initiate public educational workshops in cooperation with the OSSF educational programs of AgriLife Extension. Harrison County required all homeowners who selected to maintain their own system instead of having a contract with a licensed professional to attend a training at the cost of $40 on the operation and maintenance of systems during 2009-2012.

As part of the educational outreach, forums will be held to educate the public on the need and value of a properly working OSSF. These forums will be sponsored by the NETMWD if funding becomes available. A biannual newsletter will also be developed for reaching those rural residents that fail to come to the OSSF educa-

tional meetings. The newsletter will encompass the educational information given at the area meetings as well as information on new technology in the on-site industry.

Within the watershed, designated representatives will work to educate the property owners on the proper ways to manage the phosphorus generated from these OSSF activities and other waste generated from residential activities currently on an as needed basis. The NETMWD will continue to conduct a workshop every two years, as newly elected county officials and staff begin their duty. If funding becomes available to conduct the workshops or forums in partnership with AgriLife Extension for the public they would be conducted as needed.

Management Measure ED 5 - Education for Forestry Operations

Educational outreach programs are an integral part of the state forestry program. New and innovative technology transfer vehicles such as commercials, highway billboards, and hands-on interactive displays educate and encourage project participation. Local media are used to promote project tasks. Forestry seminars, held throughout East Texas and major metropolitan areas, provide information to forest landowners on sustainable forestry, including ways to protect soil and water resources. TFS produces a quarterly silvicultural newsletter to promote various BMPs to landowners and natural resource professionals.

This increases communication, maintaining frequent, periodic technology transfer between natural resource professionals and forest landowners. Another innovative opportunity to promote BMPs to the public is through the annual Teachers Conservation Institute, a week-long environmental education session for teachers. This program can have a tremendous impact when teachers take what they learn back to their classrooms. The TSSWCB supports TFS education programs through Clean Water Act Section 319(h) grants. The costs of this educational program were discussed previously under the Forestry Operations management measures. The project includes areas outside of the Lake O' The Pines watershed.

Watershed Management Support Activities

To promote a better understanding of the Lake O' the Pines watershed and the water quality stressors within the watershed; a suite of watershed management support activities has been included in the TMDL I-Plan. Based on discussions with watershed stakeholders, several of these activities are considered to be premature and should not be implemented for several years. Appendix C of this Revised I-Plan illustrates an expected timeline for implementing I-Plan activities over the next five year implementation period.

Revised Management Measure WMS 1 – Update SWAT Model

The Soil and Water Assessment Tool (SWAT) was used to evaluate TP loadings into Lake O' the Pines and supported the development of the TMDL. The same model can also be used to evaluate the impacts of TMDL implementation provided that sufficient data is available. Monitoring results from the Big Cypress Creek

routine monitoring stations and results of "edge of field" can and will be used to refine and validate the existing SWAT models developed during the TMDL studies when appropriate.

Once refined, these models can be used to predict the water quality consequences of changes in land use, or to evaluate shorter term responses during climatic extremes. The SWAT model can be used to evaluate other conditions on the watershed not related to agricultural or waste treatment BMP strategies that may influence nutrient loads, such as abnormal hydroclimatology or land use changes. It will also allow extrapolation to conditions different from those encountered during the TMDL studies, and provide an economical means of evaluating alternative load reduction strategies or assessing nutrient loading levels under varying future watershed conditions. This may play a role in interpreting seasonal changes in monitoring results, and in distinguishing trends or fluctuations affected by cycles of wet and dry climate from actual reductions in nutrient loading from point and nonpoint sources.

The long-term goal of watershed stakeholders is to re-run the SWAT model at some point; however, it is considered premature for several reasons. Stakeholders feel that it is still too early in the implementation phase to warrant rerunning the SWAT model for the Lake O' the Pines watershed. At least five more years of implementation is considered needed before additional modeling is appropriate. This will allow for the TPLA to be fully implemented and subsequent TP reductions to be fully realized. Additionally, water quality data collection has been insufficient to support rerunning the SWAT model for the watershed. As noted in the final report for the *Assessment and Mitigation of Agricultural and Other Nonpoint Source Activities in the Cypress Creek Basin* (TSSWCB Project 04-14), the data collected through that project was intended to be used to update the SWAT model for the watershed; however, the limited amount of data did nothing to improve the pollutant loading prediction capabilities of the model. Thus collecting additional water quality monitoring data is necessary to improve on the existing watershed model. Additionally, limited information on specific practices implemented to reduce potential pollutant loading from nonpoint sources further diminish the utility of rerunning the model.

Revised Management Measure WMS 2 – Update Water Quality Model

The QUALTX model developed during the TMDL studies to relate nutrient loading to the lake to its metabolic activity can be used, like the SWAT model, to evaluate and interpret lake water chemistry data collected under varying hydroclimatological conditions. Model capabilities have advanced considerably since the original QUALTX model was developed for the lake and numerous model options exist that can be used to simulate the lake's response to changes in upstream water quality as well as in-lake nutrient cycling processes which circulate nutrients from the sediment into the water column.

At the time of this revision, watershed stakeholders feel that sufficient practice implementation has not yet occurred to warrant the development of an updated

or new in-lake water quality model. At least five more years of implementation is considered needed before additional modeling should be considered. This will allow the TPLA to be fully implemented and subsequent TP reductions to be fully realized. At that point, it may be pertinent to evaluate the lake's response to TP reductions with a selected model.

In order to update the water quality model for nutrient loadings to the lake, additional water quality and hydrologic data are needed. While improvements in the quantity and quality of hydrologic data were made through the addition of a USGS gaging station in the watershed, additional water quality data collection planned in the original I-Plan did not occur. Funding was sought to greatly expand the spatial and temporal coverage of routine water quality monitoring in the watershed as well as monitoring focused on storm flow events but was not secured. As a result, water quality data was limited to routine data collected through the TCEQ Clean Rivers Program (CRP).

The need to update the water quality model will be reconsidered during the next I-Plan revision but it will require additional water quality data in the streams feeding the lake to be collected to be successful.

Revised Management Measure WMS 3 – Sediment Study

The USGS recently completed a study evaluating TP concentrations in sediments in the Caddo Lake watershed. The study sampled 51 sites, 9 of which were in the Lake O' the Pines watershed. The results of the study found TP concentrations to range from 12.6 to 6,850 mg/kg with an average concentration of 326 mg/kg and a median concentration of 154 mg/kg. Due to phosphorous' strong affinity to bind to soils, levels detected in soils are typically reflective of phosphorus loadings found in surface runoff. As sediment is transported in stream flow to the lake, TP in the sediments of Lake O' the Pines may build up and influence the ability to achieve the dissolved oxygen criteria in the reservoir. The role of TP in sediments may need to be further evaluated for Lake O' the Pines depending upon the results of the initial implementation, tracking and monitoring programs described in this plan.

Watershed stakeholders felt that at this point, it is too early to determine the need for additional evaluation of TP in lake sediments due to implementation delays and unprecedented drought experienced in the first 5 implementation years. Additionally, the need for additional water quality data collected instream is of greater need and should receive funding first if available.

The need to update the sediment study will be considered during the next I-Plan revision.

Revised Management Measure WMS 4 – Re-evaluate Water Quality Standards

Lake O' the Pines, in common with other shallow reservoirs, is characterized by a zone of transition from the lotic conditions of its largest tributary, Big Cypress

Creek, to the open water lentic environment of the lower lake (Lind, 2002). This reach is commonly the site of maximum sediment accumulation, with high rates of microbial metabolism as newly delivered nutrients and organic materials are rapidly utilized for primary and secondary production. The zone typically exhibits extensive rooted plant biomass where sediments are suitable and shallow water prevalent, as is the case in most of east Texas. Because the transition zone is an area of high biological activity, it is not uncommon that summer microbial production and respiration results in substantial change in dissolved oxygen concentration over a diel (24 hour) cycle. Dissolved oxygen conditions may also be affected by the presence of dense stands of rooted vegetation. In addition to the production and consumption of dissolved oxygen by the rooted plants themselves, the metabolism of the attached biofilm community (e.g., algae, other protozoa, bacteria, rotifers, ostracods, annelids), together with the impairment to mixing and physical reaeration in dense plant beds, may impact the dissolved oxygen budget locally and result in violations of segment water quality standards.

Changes in climatic conditions have also resulted in variations in the hydrological conditions of this transitional zone of the lake. Since the I-Plan was originally developed, erratic weather conditions have gripped the lake's watershed with a brief "normal period" followed by an extremely wet then extremely dry period. In these times of extremes, in-lake conditions often change rapidly and can have stark impacts on water quality, especially in the transitional zone of the lake. As a result of these extremely variable conditions, modifications to the water quality standards for this portion of the lake or the establishment of a new waterbody segment may be pertinent to account for these frequently occurring extremes.

Performance measures for WMS 4 are:

WMS 4-a) NETMWD will continue discussions with TCEQ and watershed stakeholders annually during Clean Rivers Program meetings on the need to re-evaluate water quality standards and assessments for Lake O' the Pines

Implementation Tracking

This I-Plan includes provisions to track the progress of the plan using both implementation and water quality milestones and indicators. These terms are further defined as:

- **Implementation Milestones** – Measures of administrative actions undertaken to effect an improvement in water quality.

- **Water Quality Indicators** – Measure of water quality conditions for comparison to pre-existing conditions, constituent loadings, water quality standards, or other appropriate measure.

Implementation Milestones

Implementation tracking provides information that can be used to determine if progress is being made toward meeting goals of the TMDL. Tracking also allows stakeholders to evaluate actions taken, identify those which may not be working, and make any changes that may be necessary to get the plan back on target. Schedules of implementation activities and milestones for this revised I-Plan are included in Appendix C.

Water Quality Monitoring and Indicators

Monitoring water quality at various points in the watershed provides data that aids in evaluating the effectiveness of implemented components of the TMDL I-Plan. Discussions amongst stakeholders focused on two common themes: monitoring individual practice effectiveness (primarily TPLA verification monitoring) and monitoring overall water quality in the Big Cypress Creek and Lake O' the Pines. Without sufficient water quality and practice effectiveness data, evaluating the overall success of plan implementation and subsequent improvements in water quality cannot be determined. Collecting this data has been deemed a critical need by the stakeholders.

TPLA Monitoring

To evaluate the effectiveness of the TPLA, discharge volume and TP concentrations will be monitored on an incremental basis. Each permitted entity is tasked with reporting average monthly discharge rates and TP concentrations to NETMWD. Additionally, NETMWD will conduct verification monitoring to evaluate the reasonableness of data reported by each entity. This will be accomplished by conducting monthly spot sampling. Each sampling event will be conducted unannounced and at random intervals. To conduct this monitoring, NETMWD will utilize a portable colorimeter in the field capable of detected TP levels in the 0.06 to 3.4 mg/L range. Should field testing yield TP levels at the maximum detectable range, a grab sample will be collected and sent to a designated lab for further analysis. Discharge rates of the WWTP will be determined by measuring flow volumes upstream and downstream of the WWTP discharge.

In the event that a discrepancy in NETMWD collected and permittee reported data is found, NETMWD will increase its sampling frequency to determine if the discrepancy is real or an anomaly.

Resources will also be sought by NETMWD to periodically deploy an automated device to collect flow-weighted average TP concentration data. This approach will better illustrate average total daily loading and provide insight into loading variations that self-reported and NETMWD verification monitoring may miss. Additionally, this data will prove useful in future loading estimates and watershed modeling evaluations.

Clean Rivers Program Monitoring

When the I-Plan was first developed, instream water quality monitoring was limited to the monitoring conducted NETMWD under the TCEQ Clean Rivers Program (CRP). This monitoring included quarterly sampling at five monitoring stations: 4 in Lake O' the Pines and 1 on Big Cypress Creek. Sampling at each of these stations consisted of the typical routine water quality parameters (dissolved oxygen, temperature, specific conductance, pH, total suspended solids) as well as chlorophyll-a and nutrient parameters which include total organic carbon, nitrate, nitrite, ammonia, total Kjeldahl nitrogen, and TP.

Beginning in September 2009, monitoring was increased to eight sampling events per year at two monitoring stations on Big Cypress Creek (Figures 1 and 6) while the three monitoring stations in Lake O' the Pines continued to be monitored four times annually (Table 11). The suite of parameters collected remained the same and this sampling regime will continue indefinitely pending continued funding support from TCEQ. While this is a marked improvement from typical quarterly sampling, this sampling approach has not provided the level of detailed data described in the original I-Plan nor has it provided data sufficient for a detailed assessment of the implementation's impacts. Funding limitations in the state's monitoring program have limited monitoring expansion to the levels described in the I-Plan.

NETMWD plans to continue this data collection strategy at the five sites currently being monitored in the watershed under the CRP program and is seeking funding to expand this to monthly monitoring. Funding availability from the state and other sources will largely dictate what level of funding will be continued. It should be noted that this data collection is critical for assessing water quality and determining plan implementation effectiveness. Therefore, additional funding to support expanded water quality monitoring in the watershed is considered a critical need by watershed stakeholders.

Table 11. Lake O' The Pines watershed monitoring stations

TCEQ Station ID	Station Location Description	Monitoring Frequency
10296	Lake O' The Pines Mid-Lake near dam	4 events/yr.
10297	Lake O' The Pines in River Channel near NETMWD Intake	4 events/yr.
17087	Lake O' The Pines N of SH 155 Marker	4 events/yr.
10308	Big Cypress Creek at SH 11	8 events/yr.
13631	Big Cypress Creek at US 259	8 events/yr.
10310	Big Cypress Creek at US 271	4 events/yr.

Streamflow Monitoring

USGS gage 07344500 co-located with TCEQ Station 10308 at the SH 11 crossing of Big Cypress Creek near Pittsburg was upgraded to a full range gage in March 2008 to provide the hydrologic data needed to calculate inflows to Lake O' the Pines. Additionally, Station 10308 provides direct information on the two largest point sources of nutrients in the watershed and several subwatersheds that are known to contribute significant NPS nutrient loads to Big Cypress Creek thus allowing for continued evaluation of nutrient loading into Big Cypress Creek. This continuous flow record greatly improves the data available for future water quality modeling purposes.

NETMWD funds the operation and maintenance of this gage and plans to operate this gage in perpetuity.

National Water Quality Initiative Monitoring

On-farm conservation and management practices will be implemented in select subwatersheds with the larger Lake O' the Pines watershed through the NWQI program and provides an opportunity to collect water quality data that documents the water quality impacts of practice implementation. NRCS, EPA and TSSWCB are all committed to supporting data collection to illustrate these impacts. Specifics of a monitoring plan are not available, but are in the works.

Data collected through this effort will provide useful data to support improved watershed modeling discussed earlier. Future updates to the SWAT model will benefit from this data as it will provide additional information to calibrate and validate the model against. Once this is done, the SWAT model will be able to better extend nutrient and sediment loading reductions to the entire watershed.

Water Quality Indicators

The TCEQ and stakeholders will evaluate two key parameters to determine progress toward attaining the standard for high aquatic life use in Lake O' the Pines. Phosphorus and dissolved oxygen levels, both in-stream and in the lake, will be evaluated to determine changes in loadings over time to Lake O' the Pines and assess its ability to meet applicable surface water quality standards.

Phosphorus Loadings

Water quality monitoring will be conducted to determine TP loadings to Lake O' the Pines. The TMDL studies determined that about 80% of the water and 90% of the phosphorus was entering Lake O' the Pines through Big Cypress Creek; monitoring that tributary alone shall be sufficient to track the progress of TMDL implementation.

Tracking TP loads will require a relatively intensive program of water sampling and analysis to obtain sufficient data to estimate annual loads. Funding is currently the limiting factor in the ability to collect sufficient data to fully understand annual TP loadings. As such, funding will be sought by NETMWD and other watershed stakeholders as appropriate.

Should funding be secured, the monitoring approach will assure that information is available to detect and address potential change in phosphorus loading, the role of that element during changing lake conditions, to provide information necessary for future updates to the SWAT models and for the context in which to analyze phosphorus monitoring data. To accomplish this, water samples will be analyzed for the nitrogen series, total organic carbon, total dissolved solids, total suspended solids, and chlorophyll-a. The primary location for monitoring nutrient concentrations will be the existing TCEQ monitoring station (13631) at the US 259 bridge that crosses the transition zone between Big Cypress Creek and Lake O' the Pines. This site marks the division between Segments 0403 (Lake O' the Pines) and 0404 (Big Cypress Creek). The second station monitored is TCEQ Station 10308, co-located at the SH 11 crossing of Big Cypress Creek near Pittsburg with USGS stream gage 07344500. This site has been recording continuous flow data since March 2008 when NETMWD provided funds to upgrade this station to discharge gage. NETMWD also provides approximately $7,150 annually to USGS for the continued operation and maintenance of this gage which now provides the hydrologic data needed to calculate inflows to Lake O' the Pines and provides direct information on the two largest point sources of nutrients in the watershed, several subwatersheds that are known to contribute significant NPS nutrient loads to Big Cypress Creek, and allows continued evaluation of nutrient assimilation in the Big Cypress Creek floodplain. These monitoring locations are illustrated in Figure 1 and Figure 6.

A plan for sampling stations 13631 and 10308 to allow verification of the loadings of TP to Lake O' the Pines has been developed; however, funding limitations have prevented it from being implemented. Funding will continue to be sought for this plan as it will provide critical water quality data for future modeling purposes.

This plan focuses data collection during various flow regimes. When flow in Big Cypress Creek at USGS Station 07344500 is less than 100 cubic feet per second (cfs) (the 60th percentile flow), water samples will be collected and analyzed monthly using CRP monitoring protocols. During periods when flow in Big Cypress Creek is greater than 100 cfs, water samples will be collected and analyzed weekly. At flows greater than 1,000 cfs (the 93rd percentile flow) Big Cypress Creek will be sampled daily unless a discrete storm event is being monitored. Up to two discrete storm events per year will be monitored to the extent possible. Three to five samples will be collected on the rising limb of the storm runoff, and a similar number will be collected on the falling limb, timed appropriately based on typical recession curves for Big Cypress Creek.

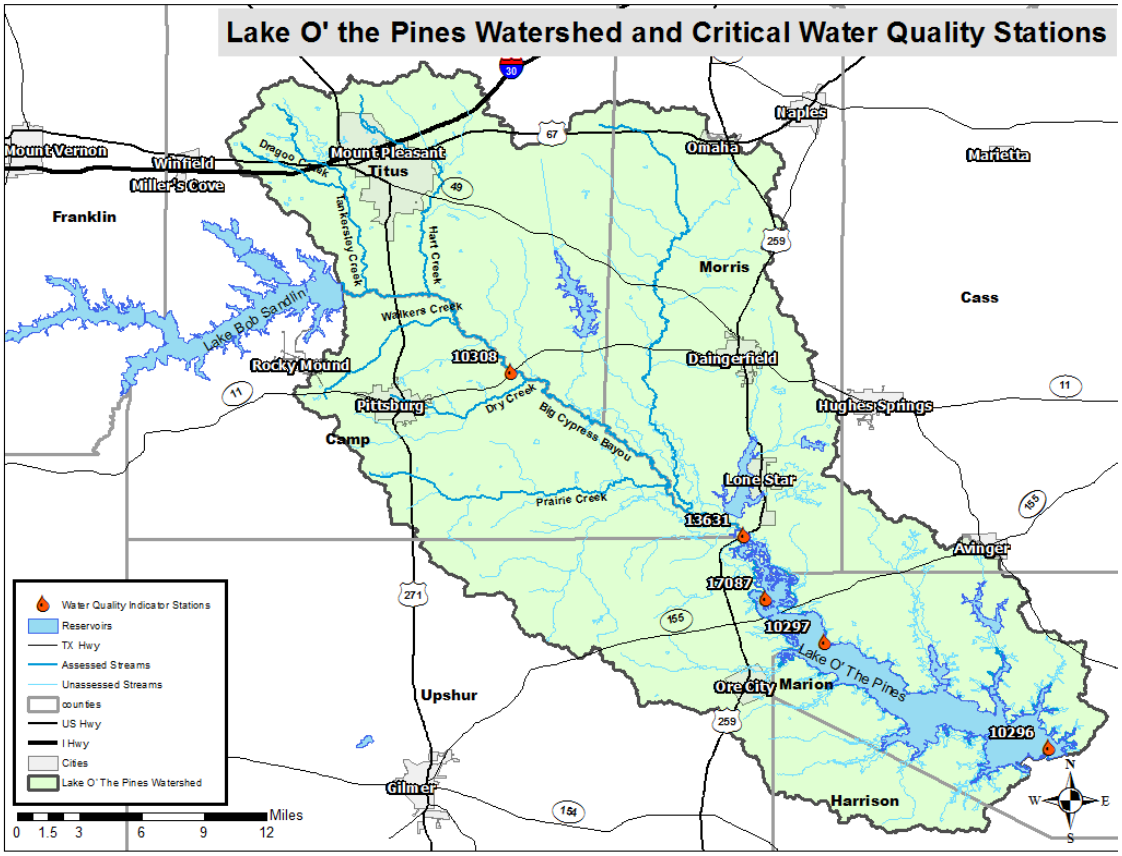

Figure 6. Monitoring Station Location Map

Dissolved Oxygen and Nutrient Monitoring in Lake O' the Pines

Water quality monitoring is being conducted to determine compliance with the state's water quality standards for dissolved oxygen in Lake O' the Pines. Water quality monitoring will also be conducted to monitor TP and related constituents in Lake O' the Pines.

The monitoring is accomplished at the two automated stations to be established by NETMWD and the U.S. Army Corps of Engineers and at the TCEQ routine station (13631) above the US 259 crossing. The two automated stations are located

at station 10296 in the main pool near the dam and station 10297 adjacent to the NETMWD intake. The platforms monitor dissolved oxygen, temperature, pH, conductivity, and chlorophyll-*a*. In order to increase the frequency of nutrient sampling in the lake so reasonable estimates of lake-wide nutrient concentration and content can be made, water samples will be collected quarterly at the two automated stations in the main lake basin (10296 and 10297), and the TCEQ routine station (13631) and will be analyzed using CRP monitoring protocols.

If funding can be secured by NETMWD, monthly water samples will be analyzed for the nutrient parameter set identified above. Since algal blooms in Lake O' the Pines have been observed to occur at TP levels at and above 0.7 mg/l, the lower reporting limits employed for the Segment 0404 samples will be used in the reservoir to reduce the uncertainty associated with large numbers of censored values when trying to calculate lake-wide average concentrations and loads. The ability of the automated stations to monitor diel dissolved oxygen levels provides a unique opportunity to assess conditions throughout the lake, define the dissolved oxygen climate of Lake O' the Pines, and monitor its seasonal and interannual variation. The frequency and nature of low dissolved oxygen concentration episodes will be a direct measure of standards attainment and progress in implementing the TMDL.

Sampling and analytic methods for phosphorus loadings and water quality in the reservoir will follow state protocols. The costs of monitoring phosphorus loadings to the reservoir and water quality in the reservoir as described are estimated to be $100,000 per year. Funding for these activities will be sought from existing monitoring program resources as well as other state and federal sources.

Data Deficiencies, Challenges and Needs

Water quality and hydrologic data currently available from the Lake O' the Pines watershed provides a decent basis for conducting rough assessments of water quality and to a lesser extent, specific pollutant loadings. The amount of concentration data for nutrient parameters at the Stations 10308 and 13631 are reasonable; however, instantaneous flow volumes are often not associated with these data. Station 10308 is the only site with instantaneous flow volume data available in TCEQ's Surface Water Quality Monitoring Information System (SWQMIS) during the implementation period. While it is understood that Station 13631 is located in the upper reaches of Lake O' the Pines, the lack of instantaneous flow volume data renders the nutrient concentration data at this site relatively useless and leaves only data collected at Station 10308 available for direct loading calculations. To remedy this deficiency, pollutant concentration and flow volume data from other sites in the watershed should be collected. The spatial distribution of additional sites should be considered when looking for other sites.

Funding is the biggest need to address data deficiencies in the watershed. Monitoring regimes described earlier will improve data availability in the watershed, but need sufficient funding support to be implemented. Without additional fund-

ing to support water quality monitoring, the ability to improve upon previous water quality assessments and models will be severely hampered. Stakeholder's ability to document improvements in water quality as a result of I-Plan implementation will also be extremely difficult if not impossible with sufficient data collection support. As such, the need to secure funding to carry out needed water quality monitoring is critical.

Additionally, the diffused storage of data regarding instream, in-lake and BMP effectiveness makes it difficult to determine exactly what data is available. TCEQ's SWQMIS houses routine water quality data collected through the CRP program, NETMWD houses real-time water quality data collected by automated instrumentation installed on the lake, and NETMWD/TSSWCB house BMP effectiveness data from efficiency trials conducted during development of the original I-Plan. A brief data summary that describes the types, quality, data ranges and acceptable use of data available from each of these sources would improve the general understanding of the data available.

Review Strategy

This I-Plan is a flexible tool that permits stakeholders to adapt to changing circumstances and to apply the lessons learned from experience. The TCEQ and stakeholders in TMDL implementation projects will periodically assess the results of the planned activities and other sources of information to evaluate the adequacy of the I-Plan. Project stakeholders evaluate several factors, such as the pace of implementation, the effectiveness of best management practices, load reductions, and progress toward meeting water quality standards. The I-Plan presents a general process and timetable that specifies how and when the I-Plan will be evaluated and may be revised. Stakeholders will document the results of these evaluations and its rationale for maintaining or revising elements of the I-Plan, and will present them as part of the state's reporting processes and through local informational outlets.

The results of implementation and water quality tracking activities in the Lake O' the Pines watershed will be reviewed annually by the Lake O' the Pines watershed stakeholders to support decision-making with respect to their evaluation of the adequacy of the I-Plan and its component elements. As part of this evaluation, stakeholders will review implementation activities and the monitoring results to determine if progress is being made toward achieving project goals. Actual results will be compared to goals established in the I-Plan. Compliance with the wasteload allocation established in the TMDL for point source dischargers will be determined based on a review of annual monitoring reports submitted to the TCEQ.

Monitoring data will be analyzed and summarized to determine achievement of loading targets and water quality standards. The seasonal course of change in nutrient concentrations and loads will be calculated for Big Cypress Creek at SH 11 and at US 259. Hydraulic loading of Lake O' the Pines will be calculated with the streamflow data from USGS gage 07344500 (SH 11), the drainage area relationship with Station 13631 (US 259), and streamflow data available from adjacent, uncontrolled drainages (Black Cypress Bayou and Little Cypress Creek).

Compliance with the load allocation established in the TMDL for nonpoint sources in the watershed will be determined by calculating the annual loading of TP to Lake O' the Pines as described above and subtracting the corresponding loadings from point sources and the estimated background loading.

The nutrient concentrations and dissolved oxygen regimes present at the automated stations in the reservoir, together with monthly data from Station 17087, will be summarized to characterize seasonal changes, standards compliance, and progress with respect to the TMDL goals.

Data analysis during the initial years of monitoring will also focus on evaluation of sampling methods and frequencies in order to maximize the efficiency of monitoring nutrient loading and the response of dissolved oxygen concentrations in

Lake O' the Pines. Statistical characteristics of this data set will be evaluated to determine the sampling intensity necessary to detect given levels of change in the target parameters, and to better assess the likely time required to achieve the goals of the TMDL.

If stakeholders determined that implementation milestones and/or targets for load reductions or ambient water quality conditions are not being met, further analyses will be required. The reasons for not meeting the project goals must be ascertained. This analysis will consist of answering such questions as:

- Is the evaluation timeframe sufficient to allow progress to be detected? Sometimes it takes much longer to see results in the water body than anticipated.
- Has the evaluation period been representative of longer-term conditions in terms of weather, watershed activities, or other factors?
- Are control actions being enforced properly? Are additional efforts required to support compliance programs?
- Are management measures sufficient to meet load allocations stipulated in the TMDL?
- Are management measures being maintained properly? Are additional efforts required to support maintenance programs?
- Was the TMDL accurate? Does it accurately portray how water quality conditions will respond to changes in watershed loadings?

Stakeholders may determine that there are sufficient reasons why project goals are not met during the evaluation period and conclude that implementation of the plan should continue. Alternatively, stakeholders may determine the plan or elements of the plan to be insufficient and make modifications to the plan. The results of these assessments and the rationale for maintaining or modifying the plan will be documented. Substantive modifications of the plan will require state agency approvals.

Communication Strategy

Communication is necessary to ensure that stakeholders understand the I-Plan and its progress in restoring water quality conditions. The TCEQ and the TSSWCB will disseminate the information derived from tracking I-Plan activities to interested parties, including watershed stakeholders, state leadership, government agencies, nongovernmental organizations, and individuals.

The TCEQ will report results and evaluations from implementation tracking to stakeholders as needed. The TMDL Program will summarize all actions taken to address the impairment and will report trends observed in the water quality data collected to track the progress of implementation as needed. Responsible parties will provide appropriate information to the TCEQ to update these progress assessments and will communicate information at annual meetings.

In accordance with the Clean Water Act §319, the state must annually report to USEPA on success in achieving the goals and objectives of the *Texas Nonpoint Source Management Program*, including progress in implementing the NPS portion of TMDLs. The TCEQ and TSSWCB jointly publish *Managing Nonpoint Source Water Pollution in Texas: Annual Report*, which highlights the state's efforts during each fiscal year to collect data, assess water quality, implement projects that reduce or prevent NPS pollution, and educate and involve the public to improve the quality of water resources. Previously published annual reports are available at <www.tceq.texas.gov/waterquality/nonpointsource/mgmtplan/annual-reports.html>.

The TCEQ will participate in annual meetings for up to the next five years to support stakeholders in evaluating their progress. Stakeholders will continue to take part in annual meetings over the five-year period to evaluate implementation efforts. At the completion of the scheduled I-Plan activities, stakeholders will assemble and evaluate the actions, overall impacts, and results of their implementation efforts..

Presentations on the results of the tracking and review activities of the I-Plan for Lake O' the Pines will be made to regular meetings of basin stakeholders at the Cypress Creek Basin Clean Rivers Program/Lake O' the Pines TMDL Combined Steering Committee. In addition to meeting presentations, tracking and monitoring results will be posted to a dedicated internet Web page and included in water quality publications for the basin.

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Appendix A. I-Plan Implementation Progress through July 31, 2013

Lake O' The Pines TMDL I-Plan Implementation Status as of July 2013					
Action	**Responsible Party**	**Performance Measure**	**Goal from Approved I-Plan**	**Implementation Status**	**Implementation Notes**
PS1 -- Establish entity responsible for group permit	Co-permittees in group permit	Establish entity	Complete by 2009	Not needed under revised group TPLA	TCEQ wouldn't agree to group permit for enforcement purposes; stakeholders developed the TPLA as a surrogate to the group permit
PS2.1 -- Permitting, Industrial Permit Amendment	Pilgrim's Pride Corp	Submit application	Submit in 2009	complete	Pilgrim's Pride permit with TP limits approved May 25, 2012
	TCEQ Permits	Issue permit amendment	Issue in 2010	complete	TCEQ issued permit amendment June 6, 2012
PS2.2 -- Permitting Municipal Permit Amendment	TCEQ Permits	Issue permit amendment	Issue up to 7	5 municipal permits reissued by TCEQ, not EPA approved; 2 permits under review by EPA	Reissued permits did not include TP limits; were not approved by EPA. Permits in process are at EPA where they are being objected to due to the lack of TP limits.
PS2.3 -- Permitting, Group Permit	Group permit entity	Submit application	Submit in 2010	Revised approach established a Total Phosphorus Loading Agreement (TPLA) in place of a true group permit	TCEQ rejected the idea of a group permit due to inability to enforce permit violations; TPDES permittees collectively developed the TPLA and ratified it effective June 1, 2013
	TCEQ Permits	Issue permit	Issue in 2011	Not needed under revised group TP reduction approach; TCEQ initiated permit revision in process to include TP load monitoring requirement	TPLA is not a permit, but rather an agreement that TPDES Permittees adhere to voluntarily. TCEQ will initiate TPDES permit revisions to include monitoring requirements as outline in the TPLA
PS3 -- Permit Implementation	Permittees	Permit compliance	In Compliance by 2013	Each permittee operates in compliance with their individual permit or faces enforcement action from TCEQ	Permit compliance is tracked by TCEQ. One permit violation was documented during the 5 year implementation period.

AG1.1 – Animal Feeding Operations	TSSWCB	Certify WQMP - Poultry	Certify 105 / yr	58 poultry WQMPs	Only 58 poultry operations exist in watershed; original number likely included operations outside of the watershed; while some operations have consolidated or gone out of business
	TSSWCB	Certify WQMP - Dairy	Certify 6 / yr	1 dairy WQMP certified annually	Only 1 non-TCEQ permitted dairy remains in operation. Others have sold out or moved
	TSSWCB	Certify WQMP - Non AFO	no goal established	Non-AFO WQMPs certified in the watershed 2009: 34 2010: 34 2011: 34 2012: 35	These WQMPs implemented exceeded I-Plan goals; however, when these WQMPs were implemented is not known.
	TSSWCB	WQMP status review	Review 25% of certified WQMPs in watershed / yr	14 in 2009 17 in 2010 9 in 2011 4 in 2012	The level of inspections fell short of the 25% goal; however, inspection numbers thus far in 2013 are on track to reach this goal; inspection results unknown
AG1.2 – Animal Feeding Operations	TCEQ	Administer permits and authorizations	Administer 4 Permits / yr	1 CAFO permitted	3 CAFOs no longer in business; 1 active permit
		Inspection	Inspect 4 permits / yr	1 inspection annually	3 CAFOs no longer in business; inspection status unknown
AG2 – Financial Assistance	TSSWCB	WQMP Program funding (state appropriations)	$81,000 / yr dependent upon state appropriations	2009: $52,616 2010: $52,616 2011: $58,947 2012: $59,325 2013: $59,325	Total of annual WQMP funding available in all SWCDs in the watershed. These SWCDs include areas outside of the Lake O' the Pines watershed.
	NRCS	EQIP Program funding (federal appropriations)	$144,000 / Co-Yr dependent on Farm-Bill appropriations		
AFO3 -- BMP Evaluations	NETMWD, TSSWCB	Final project report	Complete in 2009	Completed 2010	2011 report available online at: http://www.tsswcb.texas.gov/en/managementpro

					gram/cypress
FO1 -- BMP Evaluations	TFS	BMP Implementation Evaluation	Complete projects to evaluate BMPs	2009 complete; 2012 underway (assessments evaluated 150 sites including areas outside of the watershed)	2009 report available online at: http://www.tsswcb.texas.gov/en/managementprogram/txsilvbmp
FO2 -- Technical Assistance	TFS	Training workshops	Conduct 3 workshops / yr	In progress	TFS conducts periodic workshops around East Texas which are open to forestry professionals operating in the Lake O' the Pines watershed
OSSF1 -- OSSF Program Administration	Authorized Agents, Designated Representatives	Administer Permits	Administer 607 permits / yr	Permit administration ongoing as needed by NETMWD and other Authorized Agents	An average of 591 permits per year have been administered; however, rule changes in Harrison Co. resulted abnormally high levels of activity for several years
		Complaint investigations	Investigate 126 complaints /yr	Complaint investigations ongoing by NETMWD and other Authorized Agents	An average of 146 complaint investigations have been addressed annually that led to system repair or replacement; however, rule changes in Harrison Co. resulted abnormally high levels of activity for several years
OSSF2 -- Financial Assistance	NETMWD	Systems replaced	Replace 40 OSSFs / yr	After initial 40 systems with SEP; 14 systems replaced with SEP funding	Continued SEP funding did not materialize as anticipated resulting in a lower than expected number of OSSF replacements
MS1 -- Marine Sanitation Device Permitting	NETMWD	Permitted new vessels	Permit 30 new vessels / yr in 2009 and 2010	Completed in 2006	Initial permit issuance was completed in 2006; however, the lack of enforcement and a functioning septage disposal system resulted in an ineffective permitting system
		Administer Permits	Administer 146 permits / yr by 2011	Program revised in 2012; all houseboats on the lake will be inspected and repermitted	Permits were not administered as originally planned. A revised MSD Permitting and Inspection program with enforcement and disposal provisions is being developed
LA 1 -- Land Application Permits	TCEQ	Administer Permits	Administer 3 permits / yr	2 entities permitted in watershed and 3 registered domestic septage applicators	All permittees and registrants are currently approved; inspection documentation was unavailable

ED1 - Commercial Phosphorus Provider Education	NETMWD and AgriLife Extension	CEU Workshop	Conduct 1 training / yr	Annual workshops hosted by NETMWD and Titus County Extension	Annual workshops hosted by NETMWD and Titus County Extension every summer targeting commercial fertilizer providers
ED2 -- Residential Lawn & Garden	AgriLife Extension	Master Gardener training	Conduct 1 training / yr	5 Master naturalist workshops completed and Titus Co. Cypress Basin Master Gardener	Texas Watershed Steward Workshop (55) in Marion Co.
ED3.1 -- Agricultural Producers	AgriLife Extension	Seminar	Conduct 1 seminar / yr	6 seminars conducted	January Pesticide CEU Seminar Annually Titus Co.
ED3.2 -- Agricultural Producers	AgriLife Extension	Educational Programs	Conduct 6 education programs / yr	6 seminars conducted annually	Seminars and field days conducted on a variety of topics: water quality, managing forages to avoid phosphorus buildup in soil, streamside management zones, invasive species, home landscape, rainwater harvesting and organic fertilizers
ED4 -- Residential OSSF	NETMWD	Workshop	Conduct 3 OSSF workshops / yr	4 workshops given	The broad based need for OSSF education didn't warrant 3 workshops per year; instead, educational focus was directed to local authorities to aid in identifying permit violators
ED5 -- Forestry Operations	TFS	Newsletter	Deliver Forestry newsletter quarterly	8 newsletters specific to the LOP area delivered in 2009 & 2010. Other newsletters relevant to forestry in East Texas delivered as well.	BMP guides, newsletters, brochures, fact sheets and technical reports available online at: http://texasforestservice.tamu.edu/main/article.aspx?id=74&ptaxid=146&dtaxid=168&taxid=238
WMS1 -- Update SWAT Model	NETMWD	TBD	TBD	No action	Funding to support an update to the SWAT Model was not sought nor secured. Limited water quality data and delays in implementation reduced the need to remodel the watershed at this point
WMS2 -- Update Water Quality Model	NETMWD	TBD	TBD	No action	Funding to support an update to the Water Quality Model was not sought nor secured. Limited water quality data and delays in implementation reduced the need to remodel the watershed at this point
WMS3 -- Sediment Study	NETMWD	TBD	TBD	No action	Funding to support a sediment study was not sought nor secured.

WMS4 -- Reevaluate Water Quality Standards	TCEQ	Participate in SWQS revision	On-going	Discussions held, no changes recommended	Discussions are held annually on the subject during the annual Clean Rivers Program meeting. Current standards are still held as appropriate for the Lake O' the Pines watershed

Appendix B. The "Total Phosphorus Load Agreement"

TOTAL PHOSPHORUS LOAD AGREEMENT

THIS TOTAL PHOSPHORUS LOAD AGREEMENT (the "Agreement") is made and entered into by and between Pilgrim's Pride Corporation, a Delaware corporation duly licensed to conduct business in the State of Texas ("Pilgrim's Pride"); Northeast Texas Municipal Water District (the "District"), a conservation and reclamation district created pursuant to Article XVI, Section 59 of the Texas Constitution and governed by the provisions of Article 8280-147, Vernon's Revised Civil Statues, as amended; the City of Mount Pleasant, a Texas home-rule municipality operating pursuant to Section 5, article XI of the Texas Constitution, the general laws of the State of Texas, and its municipal charter ("Mount Pleasant"); the City of Pittsburg, a Texas home-rule municipality operating pursuant to Section 5, article XI of the Texas Constitution, the general laws of the State of Texas, and its municipal charter ("Pittsburg"); the City of Daingerfield, a Texas home-rule municipality operating pursuant to Section 5, article XI of the Texas Constitution, the general laws of the State of Texas, and its municipal charter ("Daingerfield"); the City of Ore City, a Texas Type A General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 6 ("Ore City"); the City of Lone Star, a Texas Type A General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 6 ("Lone Star"); and the City of Omaha, a Texas Type B General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 7 ("Omaha") (all the aforementioned entities are collectively referred to herein as the "Parties" or as individually the "Party").

WITNESSETH:

WHEREAS, Pilgrim's Pride and the cities of Daingerfield, Mount Pleasant, Pittsburg, Omaha, Ore City and Lone Star (individually each "City" and collectively "the Cities") have been issued separate Texas Pollutant Discharge Elimination System Permits ("TPDES Permits") issued by the Texas Commission on Environmental Quality ("TCEQ") to discharge treated effluent from their respective wastewater treatment plants ("WWTPs"); and

WHEREAS, TCEQ has identified stream Segment No. 0403 (the "Segment") as an impaired waterbody and developed a Total Maximum Daily Load (the "TMDL") for Dissolved Oxygen for the Segment; and

WHEREAS, the TMDL was adopted by TCEQ on April 12, 2006 and approved by the Environmental Protection Agency ("EPA") on June 7, 2006; and

WHEREAS, the TMDL identified nutrients, total phosphorus ("TP") in particular, as the primary constituent of concern causing the low levels of dissolved oxygen in the Segment; and

WHEREAS, TCEQ approved the *Implementation Plan for One Total Maximum Daily Load for Lake O' The Pines* (the "Plan") for the Segment on July 9, 2008; and

WHEREAS, the Parties were active stakeholders and participants in developing the TMDL and the Plan; and

WHEREAS, the Plan intends to control the TP loading by Pilgrim's Pride and the Cities by utilizing a combined reduction of TP loading for these entities; and

WHEREAS, as part of the combined reduction of TP loading, Pilgrim's Pride has agreed to treat and reduce the load of TP discharged for the Cities in the amounts identified in the Plan; and

WHEREAS, the Cities would receive the benefit of Pilgrim's Pride treating its effluent to remove TP to the load allocation identified in the Plan, and hereby desire to engage the District to monitor and collect revenue to support implementation of the Plan and compliance with the respective TPDES Permits; and

WHEREAS, the District has agreed to perform such monitoring and reporting and has been designated as the TCEQ-approved monitor for the Segment pursuant to the Clean River Program (the "CRP") and the Plan; and

WHEREAS, the Parties endeavor to work collectively in order to assist in raising the level of dissolved oxygen in the Segment through a controlled loading of TP, the total loading of which is not to exceed the amount authorized in the Plan.

NOW THEREFORE, in consideration of the foregoing and the mutual agreements hereinafter set forth, and for other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Parties hereby agree as follows:

1. DEFINITIONS, CONSTRUCTION, AND OBLIGATIONS

1.1 The following terms used in this Agreement, and in any exhibit or attachment that is or is made a part of this Agreement, and not otherwise defined herein, shall have the following meanings:

Agreement. The Parties' mutual promises, covenants and considerations as contained in this Agreement and any written amendments thereto.

Effective Date. The last date on which this Agreement has been executed by the Parties.

Force Majeure. This term means and shall be limited to any event or circumstance which is beyond the reasonable control of, without the fault or negligence of, and should not, in the exercise of reasonable caution, have been foreseen and avoided or mitigated by, the Party asserting Force Majeure (the "Affected Party"), and which delays or prevents the Affected Party from timely performing any obligation hereunder, including, without limitation: (i) acts of God, earthquakes, fire, storms, severe droughts, floods, lightning, hurricanes, tornadoes, and severe snow storms; (ii) explosions, wars, civil insurrections, acts of the public enemy, acts of civil or military authority, sabotage, and terrorism; (iii) strikes, lockouts or other labor disputes with respect to which the Affected Party has not been determined by the National Labor Relations Board to have engaged in any unfair labor practices; and (iv) any change in any Requirement of Law or the interpretation thereof by a responsible Governmental Authority which shall in any circumstances under this Subsection impact a Party's ability to perform its obligations of the Agreement; provided, a "Force Majeure" shall not include economic conditions that render a Party's performance of this Agreement unprofitable or otherwise uneconomical, or the inability of a Party to make payment when due under this Agreement, unless the cause of such inability is an event that physically prevents payment and that would otherwise constitute Force Majeure as described above.

Governmental Authority. This term includes any federal, state, local or other governmental body; any governmental or quasi-governmental, regulatory or administrative agency commission, body or other authority exercising or entitled to exercise any administrative, executive, judicial, legislative, policy, regulatory or taxing authority or power; or any court or other governmental tribunal.

Requirement of Law. This term means any statute, ordinance, code, rule or regulation, tariff or policy, and judicial or administrative order, request or judgment, any common law doctrine or theory, any provision or condition of any permit issued pursuant to the Clean Water Act or any other binding determination of any Governmental Authority.

Term. This term shall mean the term of this Agreement, as more fully defined in Article 6 of this Agreement.

1.2 In this Agreement:

a. unless the context otherwise clearly requires, (i) references to the plural include the singular, and references to the singular include the plural, (ii) the words "include," "includes," and "including" do not limit the preceding terms or words and shall be deemed to be followed by the words "without limitation," (iii) the terms "hereof," "herein," "hereunder," "hereto," and similar terms refer to the entire agreement in which they appear and not to any particular provision of such agreement, (iv) "or" is used in the inclusive sense of "and/or," (v) unless otherwise specified, the terms "year" and "years" mean and refer to year(s);

b. unless otherwise specified, all references to articles and sections are references to the Articles, Sections, Schedules and Exhibits of this Agreement.

1.3 The general obligations of the Parties are as follows, with specific performance obligations as identified further herein:

a. Pilgrim's Pride shall own and operate the WWTP responsible for the removal of TP to ensure the pollutant load allocation identified for the Parties in the Plan;

b. The Cities shall own and operate their respective WWTPs in compliance with their respective TPDES Permits, and shall report TP loading to Pilgrim's Pride and the District on a monthly basis. The Cities shall also provide compensation to the District for water quality monitoring in the Segment; and

c. The District shall be responsible for implementing the provisions of the Plan as they relate to this Agreement, and for performing water quality monitoring in accordance with the terms and conditions of the Plan and the CRP.

2. MONITORING AND REPORTING

2.1 Monitoring. Each City shall monitor its respective TP loading to the Segment on a weekly basis, and shall provide a monthly report to Pilgrim's Pride and the District not later than the 5th day of each month following submittal of its Discharge Monitoring Report ("DMR") to TCEQ.

2.2 Limitation on Loadings. Each City agrees to limit its respective TP discharge on a monthly basis to not more than 10 percent of the respective annual load allocation identified for that City as provided in Table 3, pg. 9 of the Plan ("Table 3"). Pilgrim's Pride agrees to limit its monthly discharge to not more than 10 percent of the collective annual load allocation for TP identified in Table 3.

2.3 Operations and Reporting. Pilgrim's Pride will operate its WWTP to ensure the total annual loading of TP to the Segment, as identified in Table 3, is not exceeded for each calendar year, which is defined for purposes of this Agreement as beginning on January 1st and ending December 31st. On or before January 31st of each year, Pilgrim's Pride will provide an annual report of that calendar year's TP loading to the District and the Cities. The District shall provide copies of any and all monthly, or annual, load allocation reports to TCEQ for inspection at any time.

3. VALUATION AND ALLOCATION OF COSTS

3.1 Valuation and Assessment. Pilgrim's Pride shall treat and remove TP from its own discharges, as well as a portion of the TP associated with discharges of the Cities, at its WWTP. Pilgrim's Pride is authorized to discharge an annual quantity of 53,200 pounds of TP pursuant to Table 3 of the Plan. By this Agreement, Pilgrim's Pride agrees to limit its discharges of TP to that amount, less the allocations of the Cities, for a total amount of 44,600 pounds. The value of each pound of TP that Pilgrim's Pride removes from its treated effluent on behalf of the Cities prior to discharge shall be initially established as $3.00 per pound, and shall be adjusted semi-annually to cover the actual cost per pound of TP removal. On or before January 15th of each calendar year, Pilgrim's Pride will provide an update of the actual cost per pound of TP removal for the preceding calendar year, and such cost shall be provided to the Cities in accordance with the semi-annual reports prepared as identified in Section 3.2. Should the cost per pound for

removal of TP exceed $5.00, the Parties reserve the right to renegotiate the means and methods for valuation of treatment as identified in this Section, and to amend this Agreement accordingly.

3.2 Calculation and Allocation. The District shall calculate the pounds of TP removed on behalf of each City on a semi-annual basis, and each City shall remit payment for the treatment of TP by Pilgrim's Pride to the District. The District shall provide an updated accounting and allocation of costs for each City not later than February 15th and August 15th.

4. COST REIMBURSEMENT

4.1 Payments. Each City shall pay its individual share of the treatment cost incurred by Pilgrim's Pride, in terms of cost per pound of TP removal as provided in Section 3.1 above, with such payments made directly to the District.

5. SEGMENT MONITORING

5.1 The District shall utilize the money received from the Cities to monitor water quality in the Segment pursuant to the terms and conditions of the TCEQ-approved workplan for the Cypress River Basin as part of the CRP.

5.2 The District will provide annual reports of its monitoring efforts to the Cities and Pilgrim's Pride, with such reports including information regarding the cost allocation and resources expended utilizing payments made pursuant to this Agreement.

6. TERM

6.1 This Agreement shall extend for a period of ten (10) years, or until the Plan is amended and approved in writing by TCEQ. The Parties agree that this Agreement may be extended for a period of one additional ten (10) year term upon written approval of all Parties.

7. REGULATORY COMPLIANCE

7.1 The Parties shall comply with their respective TPDES Permits, and any and all Requirements of Law applicable to implementation of the Plan.

7.2 Pilgrim's Pride and the Cities agree to allow TCEQ to include a requirement in their respective TPDES permits making the effectiveness of their respective TPDES permits conditioned upon the effectiveness of this Agreement.

8. APPLICABLE LAW

8.1 The Constitution and the laws of the State of Texas and the decisions of its Courts shall govern with respect to any question or controversy which may arise hereunder. Venue for any

actions arising under this Agreement shall lie exclusively in the courts of Titus County, Cass County, Morris County or Upshur County Texas.

9. NOTICES

9.1 Any notice, request or other communication under this Agreement shall be given in writing and shall be deemed to have been given to the other Party upon either of the following dates:

a. the date of the mailing thereof, as shown by a post office receipt, if mailed to the Party by registered or certified mail at the latest address specified for such other Party in writing; or

b. the date of the receipt thereof by such other Party if not so mailed by registered or certified mail.

9.2 Notice shall be made as follows:

If to Pilgrim's Pride: Pilgrim's Corporation, Attn: Chief Operating Officer, 1770 Promontory Circle, Greeley, CO 80634.

If to District: Northeast Texas Municipal Water District, Attn.: Executive Director, P.O. Box 955, Hughes Springs, Texas 75656.

If to Daingerfield: City of Daingerfield, Attn.: Mayor, 108 Coffey Street, Daingerfield, Texas 75683.

If to Mount Pleasant: City of Mount Pleasant, Attn.: Mayor, 501 North Madison, Mount Pleasant, Texas 75455-3650.

If to Pittsburg: City of Pittsburg, Attn.: Mayor, 200 Rusk Street, Pittsburg, Texas 75686.

If to Ore City: City of Ore City, Attn.: Mayor, 302 East Main Street, Ore City, Texas 75683.

If to Lone Star: City of Lone Star, Attn.: Mayor, P. O. Box 218, Lone Star, Texas 75668-0218.

If to Omaha: City of Omaha, Attn.: Mayor, P.O. Box 937, Omaha, Texas 75571-0937.

9.3 Any Party may change its address and/or designated representative as identified above by providing written notice to all other Parties.

10. FORCE MAJEURE

10.1 Procedure for Calling Force Majeure

a. Notice of Force Majeure. The Affected Party shall give prompt notice to the other Party of any event or circumstance of Force Majeure as soon as reasonably practicable after becoming aware of such event or circumstance. Each notice served by an Affected Party to the other Party pursuant to this Subsection 10.1.a. shall specify the event or circumstance of Force Majeure in respect of which the Affected Party is claiming relief. Noncompliance by the Affected Party with the procedure specified in this Subsection 10.1.a. shall relieve the other Party from accepting the Affected Party's claim of Force Majeure until the Affected Party so complies, and the Affected Party shall not be excused from performance of any obligation under this Agreement until it so complies.

b. Obligations During Pendency of Force Majeure. The Affected Party shall, by reason of any event or circumstance of Force Majeure in respect of which it has claimed relief under Subsection 10.1.a.:

i. use its best efforts to mitigate the effects of such Force Majeure and to remedy any inability to perform its obligations hereunder due to such event or circumstance as promptly as reasonably practicable;

ii. furnish weekly reports to the other Party regarding the progress in overcoming the adverse effects of such event or circumstance of Force Majeure; and

iii. resume the performance of its obligations under this Agreement as soon as is reasonably practicable after the event or circumstance of Force Majeure is remedied or such event or circumstance, or the effect thereof on the Affected Party, ceases to exist.

c. Resumption of Performance. When the Affected Party is able, or would have been able if it had complied with its obligations under this Section 10.1, to resume the performance of any or all of its obligations under this Agreement affected by the occurrence of an event or circumstance of Force Majeure, then the period of

Force Majeure relating to such event or circumstance shall be deemed to have ended.

10.2 Effects of Force Majeure

a. Relief From Obligation of Performance. Except as provided in Section 10.3 of this Agreement, provided it has complied with its obligations under Section 10.1, the Affected Party shall be relieved from any liability for the non-performance of its obligations under this Agreement where and to the extent that such non-performance is attributable directly to the event or circumstance of Force Majeure asserted.

b. Relief From Obligation of Counter-Performance. Except as provided in Section 10.3 of this Agreement, the non-Affected Party shall not be required to perform or resume performance of its obligations to the Affected Party corresponding to the obligations of the Affected Party excused by reason of Force Majeure.

10.3 Limitations on Force Majeure

a. Scope and Duration. No event or circumstance of Force Majeure shall relieve the Affected Party of any obligation that accrued prior to the commencement of such event or circumstance of Force Majeure.

b. No Extension of Term. Except as agreed by the Parties, no suspension, delay or failure of performance caused by a Force Majeure event shall extend this Agreement beyond the Term.

c. Continuing Responsibility to Make Payments. Regardless of the occurrence or continuation of an event or circumstance of Force Majeure, Purchaser shall not be relieved of its responsibility to make payments as required under this Agreement.

11. GENERAL PROVISIONS

11.1 The obligations of the Parties hereto are subject to final approval by the respective governing bodies of each, and upon request of the other Parties, each Party will provide sufficient documentation to the other Parties that this Agreement has been authorized by its respective governing body.

11.2 The Parties are each entering into this Agreement solely for the benefit of themselves and agree that nothing in this Agreement shall be construed to confer any right, privilege or benefit on any person or entity other than the Parties.

11.3 This Agreement may not be modified or amended except by an instrument in writing signed by authorized representatives of the Parties.

11.4 The terms of this Agreement shall be binding upon, and inure to, the benefit of each of the Parties and their permitted successors and assigns. However, no assignment of the rights and duties of a Party may be made unless approved in writing by all Parties.

11.5 This Agreement may be executed by the Parties in any number of separate counterparts, each of which, when so executed and delivered, shall be deemed an original, but all such counterparts shall together constitute one and the same contract. If this Agreement is executed in counterparts, then it shall become fully executed and effective only as of the execution of the latter such counterpart called for by the terms of this Agreement to be executed.

11.6 This Agreement shall be governed by and construed in accordance with the laws and court decisions of the State of Texas, without regard to conflict of law or choice of law principles of Texas or of any other state.

11.7 The headings of the Articles of this Agreement are included for convenience only and shall not be deemed to constitute a part of this Agreement.

11.8 The Parties agree and acknowledge that this Agreement does not create a joint venture, partnership, or joint enterprise, and that each Party is not an agent of the other entity and that each Party is responsible in accordance with the laws of the State of Texas for its own negligent or wrongful acts or omissions and for those of its officers, agents or employees in conjunction with the performance of services covered under this Agreement, without waiving any governmental immunity available to the Parties under Texas law and without waiving any defenses of any Party under Texas law. The provisions of this section are solely for the benefit of the Parties and are not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

IN WITNESS WHEREOF, the Parties have executed this Agreement as indicated below.

PILGRIM'S PRIDE CORPORATION

By: Bill Lovette

Bill Lovette
Chief Executive Officer

Date: 06 | 18 | 13

ATTEST:

By: Secretary

Date: 06 | 21 | 13

NORTHEAST TEXAS MUNICIPAL WATER DISTRICT, conservation and reclamation district created pursuant to Article 16, Section 59, of the Texas Constitution and governed by the provisions of Article 8280-147, Vernon's Revised Civil Statues, as amended

By: Stan Wyatt

STAN WYATT,

Date: 10/22/12

ATTEST:

By: _____
Secretary, Board of Directors

Date: 10/22/12

(Corporation Seal)

THE CITY OF DAINGERFIELD, a home-rule city operating under the laws and Constitution of the State of Texas and pursuant to its home rule charter

By: _____

LOU IRVIN
Mayor

Date: 11-19-12

ATTEST:

By: _____
City Secretary

Date: 11-19-12
(Seal)

THE CITY OF MOUNT PLEASANT, a home-rule city operating under the laws and Constitution of the State of Texas and pursuant to its home rule charter

By: _____

PAUL MERIWETHER,
Mayor

Date: 12/4/2012

ATTEST:

By: Brenda Reynolds
City Secretary

Date: 12/4/2012
(Seal)

THE CITY OF PITTSBURG, a home-rule city operating under the laws and Constitution of the State of Texas and pursuant to its home rule charter

By: _____

SHAWN KENNINGTON,
Mayor

Date: 11-16-12

ATTEST:

By: _____
City Secretary

Date: 11-16-12
(Seal)

THE CITY OF ORE CITY, a Type A General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 6

By: Glenn Breazeale

GLENN BREAZEALE,
Mayor

Date: 11-20-12

ATTEST:

By: Gail Weir
City Secretary

Date: 11-20-12
(Seal)

CITY OF ORE CITY, TEXAS
Corporate
SEAL

THE CITY OF LONE STAR, a Type A General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 6

By: C. E Nichols

C.E. NICHOLS,
Mayor

Date: 11-29-12

ATTEST:

By: Gina Sparks
City Secretary

Date: 11-29-12

(Seal)

CITY OF LONE STAR, TEXAS

THE CITY OF OMAHA, a Type B General-Law municipality operating pursuant to Section 4, article XI of the Texas Constitution and Local Government Code Chapter 7

By: Janet Blackburn
Janet Blackburn
Mayor

Date: 1-14-13

ATTEST:

By: Debbie LaFollett
City Secretary

Date: 1-14-13
(Seal)

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Appendix C. Summary of Actions to Implement the Lake O' the Pines TMDL

Action	Responsible Party	Performance Measure	Goal	Interim Milestones by Year				
				1	2	3	4	5
Control Actions for Point Sources								
PS1 – Implement "Total Phosphorus Load Agreement"	Pilgrim's Pride	Own & Operate TP removal WWTP	1	1	1	1	1	1
	TPDES permittees	Own & Operate WWTPs in permit compliance	7	7	7	7	7	7
		self-report TP loadings to NETMWD	8	8	8	8	8	8
	NETMWD	monitor TP loads	8	8	8	8	8	8
	TPDES permittees	pay loading exceedance fee	when applicable	N/A	N/A	N/A	N/A	N/A
PS2 – TPDES TP Monitoring and Reporting	TPDES permittees	TP load monitoring	8	8	8	8	8	8
		TP load limiting	8	8	8	8	8	8
	Pilgrim's Pride	Annual Report	1	1	1	1	1	1
	NETMWD	TP load database	1	1	1	1	1	1
		monthly sampling	12	12	12	12	12	12
		secure additional sampling funds	1	1	1	1	1	1
PS3 – TPDES Permit Administration	TCEQ	Permit renewals	7 / 5 year period; 1 per 3 year period	Permit renewals are required within 5 years of the last renewal date except for PPC which requires renewal every 3 years. See Table 3 for latest permit renewals.				
		TP monitoring and reporting requirements	upon next permit renewal	Permit renewals are required within 5 years of the last renewal date except for PPC which requires renewal every 3 years. See Table 3 for latest permit renewals.				
		Facility inspections	8 annually	8	8	8	8	8

Action	Responsible Party	Performance Measure	Goal	Interim Milestones by Year				
				1	2	3	4	5
Management Measures for Nonpoint Sources								
Agricultural Operations								
AG1.1 – TSSWCB WQMP Program	TSSWCB	Certify WQMP-Poultry	All applicable poultry farms	Variable dependent upon the number of qualifying poultry farms in operation				
		Certify WQMP-Dairy	Cooperating dairies	Variable dependent upon the number of qualifying and cooperating dairy farms in operation				
		WQMP status review	25% /Yr	Variable dependent upon the number of certified WQMPs in the watershed				
AG1.2 – TCEQ Agricultural Permits and Authorizations	TCEQ	Administer Permits	All qualifying AFOs	Variable dependent upon the number of qualifying AFOs in the watershed				
		Administer Authorizations	All qualifying AFOs	Variable dependent upon the number of qualifying AFOs in the watershed				
		Compliance Inspections	Annual inspection	Variable dependent upon the number of permitted or authorized AFOs in the watershed				
AG1.3 – Voluntary Practice Implementation	NRCS & TSSWCB	Administer Technical & Financial Assistance Programs	As requested	Variable dependent upon the number of cooperating and qualifying landowners in the watershed				
AG2 – Financial Assistance	TSSWCB	WQMP Program funding	As requested	Variable dependent upon state appropriations to the WQMP program and landowner participation				
	NRCS	EQIP Program funding	As requested	Variable dependent upon federal appropriations to the farm bill and landowner participation				
		NWQI Program funding	As requested	Funding available totals $704,000 in years 1 and 2. Participation will be dependent upon qualified landowner participation				
Forestry Operations								
FO1 – BMP Evaluations	TFS	BMP Implementation Evaluation	5 to 7 sites in watershed	5 to 7 sites	N/A	N/A	5 to 7 sites if funding available	N/A
		Distribute BMP Evaluation Reports	When possible	Distribution will be conducted when possible via electronic and hard copy				

Action	Responsible Party	Performance Measure	Goal	Interim Milestones by Year				
				1	2	3	4	5
FO2 – Technical Assistance	TFS	Training workshops	3 / Yr in East Texas	3	3	3	3	3
		Educational Resources	Continual delivery to target audience	Information dissemination to the Texas forestry industry is continual via electronic media such as blogs, online newsletters and other avenues as appropriate				
Feral Hogs								
FH1 – Education and Outreach	Multiple Entities	Deliver educational programming as needed	As needed	Information dissemination will be conducted as needed and as available through workshops, meetings, media and other outlets as appropriate				
On-Site Sewage Facilities								
OSSF1 – OSSF Program Administration	Authorized Agents, Designated Representatives	Administer Permits	100% of permit applications received	The number of permits administered varies depending on the number of permit applications received annually				
		Complaint investigations	100% of complaints received	The number of complaints responded to varies depending on the number of complaints received annually				
OSSF 1 – OSSF Program Administration	NETMWD & other DRs	Secure funds to estimate OSSF numbers	Complete by year 3 - Cost TBD		Funding secured		Estimation completed	
OSSF2 – Financial Assistance	Funding entities	Secure funding for repairs or replacements	As much as possible: $5,ooo per system	The amount of funding available for OSSF repairs or replacements will vary depending on SEP funding availability and successful acquisition of other resources				
	Designated Entities	Repair or replace OSSFs	As many as funding allows	The number of OSSF repairs or replacements will vary depending on funding availability and system type				
Marine Sanitation								
MS1 – Marine Sanitation	NETMWD	Revise MSD program	by September 2013	1	N/A	N/A	N/A	N/A

Action	Responsible Party	Performance Measure	Goal	Interim Milestones by Year				
				1	2	3	4	5
		Inspect and repermit all vessels	100% of vessels with MSD	Ensure all vessels with an MSD are permitted and inspected				
		Establish septage disposal strategy	by September 2013	1	N/A	N/A	N/A	N/A
	NETMWD & USACE	enforce MSD permits	continually	1	1	1	1	1
Land Application Sites								
LA 1 – Land Application Permits	TCEQ	Administer Permits	100% of permit applications received	The number of permits administered varies depending on the number of permit applications received annually				
LA 1 – Land Application Permits	TCEQ	Perform annual inspections	100% of permitted lands inspected	The number of inspections performed annually varies depending on the number of permits in place				
Educational Activities								
ED1 – Commercial Providers	NETMWD	Workshop	1 / Yr	1	1	1	1	1
ED2 – Residential, Lawn & Garden	AgriLife Extension	Master Gardener training	1 / Yr	1	1	1	1	1
ED3.1 – Agricultural Producers	AgriLife Extension	Seminar	1 / Yr	1	1	1	1	1
ED3.2 – Agricultural Producers	AgriLife Extension	Educational Programs	6 / Yr	6	6	6	6	6
ED4 – Residential, OSSF	NETMWD	Workshop	1/2 Yrs	1	N/A	1	N/A	1
ED5 – Forestry Operations	TFS	Newsletter	Quarterly	4	4	4	4	4

Action	Responsible Party	Performance Measure	Goal	Interim Milestones by Year				
				1	2	3	4	5
Watershed Management Support								
WMS1 – Update SWAT Model	NETMWD	Reevaluate need during next I-Plan revision	TBD	TBD	TBD	TBD	TBD	TBD
WMS2 – Update Water Quality Model	NETMWD	Reevaluate need during next I-Plan revision	TBD	TBD	TBD	TBD	TBD	TBD
WMS3 – Sediment Study	NETMWD	Reevaluate need during next I-Plan revision	TBD	TBD	TBD	TBD	TBD	TBD
WMS4 – Re-evaluate Water Quality Standards	NETMWD & TCEQ	Participate in SWQS revision discussions	Continue annual discussions	1	1	1	1	1
Water Quality Monitoring								
WQM1 – Water Quality Monitoring	NETMWD	Conduct monthly TPLA verification monitoring	monthly sampling at 8 TPDES outfalls	96	96	96	96	96
WQM2 – Water Quality Monitoring	NETMWD	Conduct quarterly CRP monitoring	quarterly sampling at 5 sites	20	20	20	20	20
WQM3 – Water Quality Monitoring	NETMWD	Work to secure additional monitoring funds	$100,000 plus/year	Any additional funding will be utilized to the extent possible to bolster monitoring data availability				
Communication Strategy								
Annual update meeting	TCEQ	Host annual meeting of stakeholders to review implementation progress	annually	1	1	1	1	1