

RATIONALE FOR RECLASSIFYING PLUM CREEK (SEGMENT 1810) FROM CATEGORY 5 TO CATEGORY 4B ON THE 2010 TEXAS INTEGRATED REPORT

The federal Clean Water Act (CWA) requires that the State of Texas identify waterbodies failing to meet water quality standards (WQS) and to establish a total maximum daily load (TMDL) for each of these waterbody-pollutant combinations. A TMDL defines the maximum amount of a pollutant that a waterbody can assimilate on a daily basis and still meet WQS.

The State of Texas believes that in some watersheds the development and implementation of a holistic watershed protection plan (WPP) may be a more viable approach to restoring water quality than through the establishment of a TMDL. Essentially, this perspective recognizes that certain alternative pollution control measures, such as a WPP, may obviate the need for a TMDL and that the most effective method for achieving WQS for some waterbodies may be through management measures developed and implemented without TMDLs.

The U.S. Environmental Protection Agency Region 6 (USEPA-R6) has outlined a process by which the State may submit a WPP in lieu of a TMDL. The *EPA Region 6 Process for Review of Watershed-based Plans in lieu of TMDLs* (May 23, 2007) discusses the national guidance and regulatory mechanisms governing the process of utilizing WPPs in lieu of TMDLs, as well as, provides detail on how Integrated Report Category 4b relates to the nine essential elements of WPPs. This Rationale for Plum Creek was based on the State of Texas' understanding and interpretation of that *Process*.

The *Plum Creek WPP*, published in February 2008, was developed by the Plum Creek Watershed Partnership Steering Committee – a group of local stakeholders facilitated by the Texas AgriLife Extension Service – through a CWA §319(h) nonpoint source grant from the Texas State Soil and Water Conservation Board (TSSWCB).

On July 24, 2009, USEPA-R6 completed review of the *Plum Creek WPP* and concluded that it is consistent with and satisfies the expectations of the nine elements fundamental to watershed-based plans as described in USEPA's *2004 Nonpoint Source Program and Grants Guidelines for States and Territories* [68 Fed. Reg. 60653-60674 (October 23, 2003)].

The *Plum Creek WPP* is available as a PDF at <http://plumcreek.tamu.edu>.

Identification of Segment and Statement of Problem Causing the Impairment

Segment Description

Plum Creek, classified by the Texas Commission on Environmental Quality (TCEQ) as segment 1810, is located in portions of Caldwell and Hays Counties within the Guadalupe River Basin in south central Texas. The stream originates in the City of Kyle and flows 52 miles through the Texas Blackland Prairie and East Central Texas Plains ecoregions, past the Cities of Lockhart and Luling, to its confluence with the San Marcos River. The 248,949-acre watershed also includes a small portion of Travis County. A map of the watershed (Figure 2.10 from the WPP) is included for reference.

The watershed historically has been dominated by livestock and row crop agriculture, with oil and gas production also an important component of the economy in certain areas. In recent years, rapid urbanization in the northern portion of the watershed near Interstate 35 has dramatically changed the environmental and economic characteristics of the area. Anticipated development accompanying the completion of State Highway 130, which bisects the watershed, likely will continue this trend.

Additional detail describing the segment and the watershed is provided in the *Plum Creek WPP* on pp. 5-19.

Impairment and Pollutant Causing Impairment

Each of the three assessment units (AUs) comprising the segment have been identified as having primary contact recreation use impaired by high levels of indicator bacteria (*E. coli*) geometric means in excess of the WQS criterion (126 cfu/100mL).

The 2008 Texas 303(d) List only identified AUs 1810_01 and 1810_03 as impaired. The assessment period for the 2010 Texas Integrated Report (IR) is 12/01/2001 to 11/30/2008. The 2010 IR reports the geometric mean for AU 1810_01 as 199.2 cfu/100mL, AU 1810_02 as 141.0 cfu/100mL, and AU 1810_03 as 235.1 cfu/100mL.

Sources of Pollutant Causing Impairment

The primary contributors of bacteria are nonpoint source (NPS) in nature; including urban runoff, septic system failures, livestock, pets, wildlife, and invasive species (feral hogs). However, point sources [wastewater treatment facilities (WWTFs)] also contribute to *E. coli* loads along certain portions of the segment. A summary of estimated potential bacteria loading by source and subwatershed is presented on pp. 46-64 and in Appendix F of the *Plum Creek WPP*. The Spatially Explicit Load Enrichment Calculation Tool (SELECT) was utilized to identify and quantify potential pollutant source contributions to Plum Creek.

Description of Pollution Controls and How They Will Achieve WQS

Water Quality Target

Plum Creek has been designated by TCEQ for high aquatic life use, fish consumption use, general use, primary contact recreation use, and aquifer protection use (some portions). Since 2004, portions of Plum Creek have been listed as having the primary contact recreation use impaired by excessive indicator bacteria. *E. coli* levels must not exceed the geometric mean criterion of 126 cfu/100mL. The *Plum Creek WPP* identifies this criterion as the water quality target which management measures to be implemented are designed to achieve.

Point and Nonpoint Source Loadings That When Implemented Will Achieve WQS

Load duration curves (LDCs) were used to understand general pollutant loading and to estimate load reductions needed to achieve WQS. LDCs were developed utilizing historical water quality and flow data for each of the three AUs in order to examine the assimilative capacity of Plum Creek and the existing loading of *E. coli*. LDCs are presented on pp. 36-39 and in Appendix E of the *Plum Creek WPP*. Tables 5.1 and 5.2 describe the existing annual loading, the allowable annual loading, and the reduction in *E. coli* needed for the critical condition for each AU. While

the LDCs represent the total daily allowable loading under any flow condition, a critical condition was identified for each of the three AUs. The 10-40% flow regime was identified as the critical condition for the upper and lower AUs (i.e., Uhland and Luling) and the 60-90% flow regime was identified as the critical condition for the middle AU (i.e., Lockhart).

Controls That Will Achieve WQS

Through a cooperative interagency effort, the Plum Creek Watershed Partnership developed a WPP outlining strategies that, if implemented, will improve and ultimately restore water quality in Plum Creek. Based on a spatial analysis of potential loading by different sources of *E. coli* (pp. 46-64 and Appendix F of the *Plum Creek WPP*), stakeholders identified management measures to reduce loading of bacteria. These practices have been tailored to address specific land uses. Since potential sources differ in distribution and density across the watershed, management practices vary between subwatersheds; maps showing the critical areas for addressing each source of bacteria are provided in the *Plum Creek WPP*. Practices and programs implemented or planned for implementation are described in the WPP as follows:

- Urban NPS management measures: pp. 68-74.
- Wastewater management measures: pp. 75-82.
- Agricultural NPS management measures: pp. 83-88.
- Wildlife and non-domestic animal management measures: pp. 89-91.
- Outreach and education programs: pp. 93-102.

The responsible party, implementation milestones and estimated financial cost for individual management measures and outreach/education activities are presented in Tables 10.1 and 10.2 (pp. 113-116). Table 10.3 (pp. 120-121) describes the load reductions expected from the full implementation of all management measures prescribed in the WPP. Key management measures and outreach/education activities recommended in the WPP, or subsequently adopted by the Steering Committee through adaptive management, that have been implemented or are in process to be implemented are outlined below:

Urban Stormwater Management Measures

- The Cities of Kyle and Lockhart have enacted pet waste ordinances and have or will install pet waste stations in key parks and public areas. These stations were supported by TCEQ §319(h) funds in Kyle and city funds in Lockhart. Public education campaigns in each area are in place to encourage use of the pet waste stations.
- TCEQ §319(h) funds have been allocated to conduct urban stormwater assessments in Kyle and Lockhart. These analyses will map current stormwater flows and conveyance systems, identify needs, and determine optimal placement of additional stormwater controls. None of these areas are currently regulated by TCEQ as municipal separate storm sewer systems (MS4s).
- The City of Kyle received TCEQ §319(h) grant funding to retrofit two existing stormwater detention basins that receive runoff from a significant portion of the city to provide water quality benefits.
- The City of Lockhart received TCEQ §319(h) funding to conduct an illicit discharge survey and install filters on storm drain inlets.

- The Cities of Buda, Kyle, Lockhart, and Luling initiated street sweeping programs by February 2009 with city funds. These programs will be adjusted to account for new development, with expansion of frequency and coverage as necessary and possible.
- The City of Lockhart has committed, with city resources, to managing waterfowl populations in City Park and other locations at appropriate levels and will relocate animals to reduce bacteria loading to local tributaries.

Wastewater Management Measures

- Several WWTFs have initiated voluntary bacteria monitoring of effluent with their own fiscal resources; all facilities will eventually be required by TCEQ to conduct such monitoring through new requirements of the Texas Pollutant Discharge Elimination System (TPDES). These new rules also call for bacteria effluent limits on WWTF discharges. A table is included that describes which WWTFs TCEQ has applied these new bacteria effluent limits and monitoring requirements to.
- The Cities of Kyle, Lockhart, Luling, and Buda have budgeted city funds to replace old and degraded sewer pipes and other components of their wastewater collection systems, and continue to replace problem areas as needed. The Cities have made varied progress in replacing sanitary sewer pipes since the WPP was published. The City of Lockhart has replaced approximately 4,000 linear feet of sewer. The City of Kyle has replaced approximately 4,660 linear feet of sewer main and extended new service lines to approximately 50 homes at a cost of about \$432k. The City of Luling extended first-time sewer service to homes and businesses with 16,672 linear feet of sewer main and service lines. The City of Buda installed 2,652 linear feet of new wastewater pipe which replaced 1,500 linear feet of degraded sewer lines for a cost of about \$216k; the city of Buda expects to replace 8,523 linear feet of pipe over the next three years at a projected cost of \$1.467M.
- Hays County and the City of Buda have partnered to develop a proposal for Texas Water Development Board (TWDB) funding to connect 360 homes in one subdivision to sewer service. These homes are all currently on septic systems.
- The Guadalupe-Blanco River Authority (GBRA), with TWDB funding, conducted a Regional Wastewater Facility Planning Study for Eastern Hays County that investigated regionalization of WWTFs to minimize adverse effects to water quality from anticipated population growth. This study was completed prior to developing the WPP.
- GBRA, again with TWDB funding, conducted a Regional Wastewater Facility Planning Study for Caldwell County that investigated regionalization of WWTFs to minimize adverse effects to water quality from anticipated population growth. This study was initiated, in large part, due to wastewater management issues raised during the development of the *Plum Creek WPP*.

Agricultural NPS Management Measures

- With TSSWCB §319(h) funding, the Caldwell-Travis Soil and Water Conservation District (SWCD), in cooperation with the Hays County SWCD, hired a Technician to provide technical assistance to agricultural producers for the development and implementation of TSSWCB-certified Water Quality Management Plans (WQMPs). The focus is on reducing bacteria loading from livestock operations in targeted areas across the watershed.

- Also through TSSWCB §319(h) funding, the SWCDs are providing cost-share assistance to agricultural producers for implementing certain best management practices (BMPs) prescribed in WQMPs which will achieve bacteria load reductions.
- AgriLife Extension has promoted interaction between the Steering Committee and the U.S. Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) Local Work Groups to blend the goals of the *Plum Creek WPP* with the resource concerns and conservation priorities for the Environmental Quality Incentives Program (EQIP). Recommendations from the Local Work Groups assist USDA-NRCS in allocating EQIP county base funds and with resource concerns for other USDA Farm Bill programs.

Invasive Species Management Measures

- TSSWCB §319(h) funds were utilized to hire an AgriLife Extension Assistant based in the watershed to conduct one-on-one and group landowner outreach on feral hog management techniques.
- Texas Department of Agriculture (TDA) funding (state general revenue) to Texas Wildlife Services has supported aerial control of feral hogs in the watershed; AgriLife Research and AgriLife Extension conducted instream monitoring to assess impacts on water quality from aerial control of feral hogs.
- An on-line feral hog activity reporting system was developed by AgriLife Extension, with TSSWCB §319(h) funds, to support identification of target areas for implementation of control activities.

Water Quality Monitoring Component

- GBRA continues to conduct routine monitoring at three sites on Plum Creek with resources dedicated by TCEQ through the Texas Clean Rivers Program (CRP).
- A 27-month intensive targeted monitoring project on tributaries, springs, wastewater effluent, urban stormwater runoff, and additional mainstem instream sites funded through a TSSWCB §319(h) grant has recently been completed by GBRA. With state general revenue, TSSWCB is continuing to fund the mainstem and tributary portions of this regime through December 2010.
- GBRA will continue this comprehensive monitoring regime for three additional years with FY2010 §319(h) funding from TSSWCB. This monitoring will be used to assess the instream effect of implementing the strategies in the WPP.
- GBRA annually conducts stream biological assessments near the Uhland and Luling monitoring stations. These surveys will be continued to determine if water quality trends result in measurable changes in the biological communities in Plum Creek.

Broad-Based Outreach and Education Programs

- AgriLife Extension has delivered two Texas Watershed Steward workshops in the watershed with funding support from TSSWCB §319(h).
- AgriLife Extension, GBRA, and TSSWCB, in collaboration with other partner agencies, have produced countless publications, press releases, and newsletters directed to watershed stakeholders. In addition, multiple websites have been developed as information and education resources for the public.

- Through ongoing efforts of the GBRA, approximately 3,000 students and 79 teachers from eight schools throughout the watershed have participated in a Plum Creek water quality curriculum that incorporates classroom instruction and water quality monitoring.
- GBRA, using TCEQ CWA §106 funding, and AgriLife Extension, using TSSWCB §319(h) funding, developed watershed protection brochures that have been distributed throughout the area.
- Texas Parks and Wildlife Department (TPWD) and AgriLife Extension partnered to conduct a stream and riparian management workshop in the watershed in October 2010.

Urban Stormwater Education Programs

- With support from TCEQ §106 funds, AgriLife Extension hosted two Nonpoint Education for Municipal Officials (NEMO) workshops in the watershed.
- The TCEQ conducted a total of nine non-regulatory site assessments of water supply facilities, WWTFs, private companies, and municipal operations facilities through a TCEQ §106 grant that resulted in recommendations for pollution prevention strategies.
- AgriLife Extension has conducted numerous educational events to provide training to urban citizens on proper nutrient and pesticide management.
- AgriLife Extension conducted a Sports and Athletic Field Education (SAFE) workshop for personnel from area parks departments and school athletics departments.
- Funded by TCEQ §106, GBRA developed an on-line educational model for city staff explaining the processes and best practices for urban stormwater management.
- The TCEQ §319(h) grants to the Cities of Kyle and Lockhart include outreach efforts such as storm drain marking and NPS education for the public.

Wastewater Education Programs

- Award-winning on-line educational modules were developed by the GBRA with TCEQ §106 funds to provide information on wastewater treatment; septic system maintenance; and disposal of fats, oils, and grease.
- Eight septic system maintenance workshops targeting homeowners and septic system practitioners and inspectors in the watershed have been conducted by AgriLife Extension with funding from TCEQ §106.

Agricultural NPS Education Programs

- Annual county-based soil and water testing campaigns are being conducted by AgriLife Extension with support from TSSWCB §319(h) funds.
- AgriLife Extension has conducted several training events for agricultural producers on BMPs for proper grazing management, fertilizer management, and pesticide management.
- Funded with TSSWCB §319(h), the Texas Water Resources Institute and AgriLife Extension are developing the Lone Star Healthy Streams-Grazing Cattle curriculum. Once developed, this education program will be delivered statewide and serve as the foundation for landowners' understanding of the impact of BMPs designed to reduce bacteria from grazing cattle. A demonstration site for the BMP effectiveness study included in this project was located on a private ranch in the Plum Creek watershed.
- The TCEQ, the TDA, and AgriLife Extension cooperated to host an agricultural waste pesticide collection day in the watershed.

Invasive Species Education Programs

- With funding support from TSSWCB §319(h), AgriLife Extension hosts an annual feral hog management workshop to educate and train agricultural producers, landowners and land managers on control techniques.
- Using TSSWCB §319(h) funds, AgriLife Extension has developed a series of five publications addressing management strategies and techniques for feral hog control that are tailored to the Plum Creek watershed; these publications have been disseminated in both hardcopy and electronic forms to landowners in the watershed.

Other Education Programs

- GBRA utilized TCEQ §106 funding to identify locations of persistent illegal dumping activity, and along with county personnel conducted debris removal at 7 sites in Caldwell and Hays Counties removing over 7 tons of trash. Subsequently, AgriLife Extension worked with Caldwell County to secure funding from the TCEQ and the Capital Area Council of Governments (CAPCOG) for personnel and equipment to continue these efforts. In conjunction with these efforts, special signage was developed and installed to discourage additional dumping.
- TCEQ §106 funds provided partial support for highly successful community stream cleanup events in Kyle and Lockhart. The GBRA and AgriLife Extension worked with city staff to conduct these annual events, and city funds will be used to continue these programs.

Additional Management Measures

- TCEQ §319(h) grants awarded to the City of Lockhart include provisions for hosting an annual hazardous and electronic waste collection day. Lockhart's project also includes installation of a kitchen grease and used oil disposal service at the city recycling center.
- The City of Kyle received \$500k from the TPWD to purchase land and develop the Plum Creek Preserve and Nature Trail. In addition to the recreational benefits, over 300 acres of parkland will be protected in the riparian corridor along the urbanized upper portion of the stream.
- The Trust for Public Land, Envision Central Texas, and CAPCOG completed the *Central Texas Greenprint for Growth*. A Greenprint helps communities make informed land use decisions, guiding where growth and development should ideally occur in relation to the protection of important natural, cultural, and recreational resources. This *Central Texas Greenprint* identifies the high priority areas for conservation in Hays, Caldwell, and Bastrop Counties that meet ecosystem protection goals, local open space and park needs, and help realize the overarching vision of sustainable growth for the Central Texas area. The Plum Creek Watershed Partnership was represented in this Greenprinting process. For both Hays and Caldwell Counties, protecting water quality and quantity was selected as the highest priority goal. Cities and Counties will incorporate the Greenprint into their planning/zoning and master plan processes in order to identify opportunities to conserve and protect the high priority areas identified.
- As a result of construction of State Highway 130, the Texas Department of Transportation was required to mitigate construction impacts on wetlands as part of a CWA §404 permit issued by the U.S. Army Corps of Engineers. In response, a 265 acre floodplain site north of Lockhart directly along Plum Creek was selected for development

of a multi-purpose complex that includes the creation and preservation of 175 acres of wetland and woodland environments lost due to highway construction.

Flood Control Management Measures

- The Plum Creek Conservation District (PCCD), in partnership with the Caldwell-Travis SWCD and Hays County SWCD, operates 28 floodwater retarding structures in the Plum Creek watershed. While the primary purpose of the structures is the protection of lives and property by reducing the velocity of floodwaters and thereby releasing flows at a safer rate, a secondary benefit is the reduction of pollutants (e.g., sediment) in floodwater downstream (i.e., NPS pollution). While not expressly identified as an implementation strategy in the *Plum Creek WPP*, properly maintained and functioning floodwater retarding structures contribute to protecting water quality in Plum Creek.
- Funded through the American Recovery and Reinvestment Act (ARRA) of 2009, USDA-NRCS has provided over \$3.78M in federal funds to PCCD to rehabilitate and repair aging flood control structures in the Plum Creek watershed.
- TSSWCB has allocated over \$56k in state general revenue in each of FY2010 and FY2011 through its Flood Control O&M Grant Program to the Caldwell-Travis SWCD and Hays County SWCD to conduct operation and maintenance activities on the flood control structures in the Plum Creek watershed.

Description of Requirements Under Which Pollution Controls Will Be Implemented

The *Plum Creek WPP* was developed and is being implemented under the general auspices of the *Texas NPS Management Program* which is jointly administered by the TCEQ and the TSSWCB. The specific legal authority of both agencies to execute the Program is described in Appendix A of the *Texas NPS Management Program* document, in addition to a certification that the laws of the State of Texas provide adequate authority to implement the Program.

The TCEQ has general jurisdiction and primary responsibility over Texas' water quality program including water quality management planning, the issuance of permits for point source discharges, abatement of NPS pollution other than from agricultural and silvicultural sources, and enforcement of water quality rules, standards, orders, and permits. The TCEQ is responsible for establishing the level of quality to be maintained in, and controlling the quality of, water in the state (Texas Water Code §5.013 and §26.0136).

The TSSWCB is the lead agency in Texas for planning, implementing, and managing programs and practices for preventing and abating agricultural and silvicultural NPS pollution (Texas Agriculture Code §201.026).

As described above in the *Controls That Will Achieve WQS* section of this Rationale, much of the implementation of the *Plum Creek WPP* is currently being funded through §319(h) grants from USEPA through either TCEQ or TSSWCB to collaborating entities. These §319(h) grant-funded projects include grant obligations and requirements between USEPA and TCEQ/TSSWCB, in addition to contractual obligations between TCEQ/TSSWCB and collaborating entities.

Estimate or Projection of Time When WQS Will Be Met

Where the primary contributors of pollutants are NPS in nature, as is the case in Plum Creek, achieving water quality restoration is difficult and requires a significant, long-term effort from all sectors. Due to factors such as spatial and temporal variability in weather and the implementation of specific BMPs, there is an expected lag time between implementation of BMPs and measurable improvements in water quality. These same factors confound detection of trends, particularly when dealing with relatively short periods of time. Nonetheless, full implementation of the *Plum Creek WPP*, as characterized in Tables 10.1 and 10.2, is expected to result in achievement of primary contact recreation standards.

Based on the 2010 IR, for the three Plum Creek AUs, the degree of impairment is not severe; some bacteria impairments in Texas are orders of magnitude above the criterion. Comparatively, a lesser degree of implementation and a shorter timeframe will be needed to restore water quality in Plum Creek. Additionally, based on the LDCs, the needed load reductions to restore water quality in Plum Creek are considerably lower compared to other TCEQ-adopted and USEPA-approved bacteria TMDLs for Texas.

The projected timeline for achievement of WQS is presented in Table 9.1 (p. 104) of the WPP. The WPP was developed based on a 10-year implementation schedule; the WPP was published in February 2008 with implementation scheduled through the end of calendar year 2018. This table will be used to assess interim progress in achieving the long-term load reduction goals. The 2014 IR will be a key juncture for assessing interim progress in achieving restoration with full implementation of the WPP measured in the 2020 IR.

Hypothetical *E. coli* load reductions by AU and source, based on full implementation of BMPs over time, are presented in the chart below. The chart is based strictly on information in the *Plum Creek WPP* (primarily Tables 5.1, 5.2, 10.1, and 10.3) and includes no new information; the chart simply portrays implementation of the WPP in a different manner. Note that the 2008 baseline in the chart differs from the geometric means in the *2006 and 2008 Texas Water Quality Inventories* and the 2010 IR because the baselines in the chart are based on the geometric means of data only from the critical condition identified in the WPP for each AU.

Schedule for Implementing Pollution Controls

The WPP outlines a schedule for adoption of BMPs by diverse audiences and various responsible parties throughout the watershed. These outcomes will be achieved through the leadership and commitment of the Plum Creek Watershed Partnership Steering Committee, as facilitated by AgriLife Extension, and by engagement and cooperation of other local stakeholders. A schedule for implementation of management measures is presented in Tables 10.1 and 10.2 (pp. 112-116) of the WPP. The WPP was published in February 2008 with implementation scheduled through the end of calendar year 2018.

Monitoring Plan to Track Effectiveness of Pollution Controls

Progress in implementing specific projects will be compared with the interim milestones outlined in Tables 10.1 and 10.2 (pp. 112-116) to track implementation effectiveness and guide adaptive management decision-making conducted by the Steering Committee in concert with specific project partners and TCEQ/TSSWCB personnel.

The GBRA routinely collects water quality data monthly at three sites along Plum Creek to determine the overall instream conditions of the waterbody. Monitoring efforts at these sites are supported by TCEQ through CRP. GBRA has recently completed an intensive targeted monitoring regime funded through TSSWCB §319(h); TSSWCB is continuing this monitoring regime with state general revenue through December 2010. GBRA will continue this sampling for an additional three years through an FY2010 §319(h) grant from TSSWCB. This monitoring regime expands the number of routine sites to eight, and adds a number of wastewater effluent, spring flow, and seasonal instream tributary sites. The description and a map of these locations are presented on p. 106 and in Figure 9.1 (p. 107) of the WPP. This monitoring regime is planned to be carried out throughout the 10-year implementation schedule of the WPP. Data collected by GBRA with CRP funds and with TSSWCB §319(h) and state general revenue funds are reported to the Steering Committee for use in adaptive management, to the public through various websites and reports, and to TCEQ for use in the biennial assessment to develop the IR.

In addition, certain components of selected TCEQ §319(h) projects funded for the urban areas include monitoring components to determine effectiveness of individual urban NPS management practices. A TSSWCB §319(h) project examined the effectiveness of certain BMPs in reducing bacteria loading from grazing cattle at a demonstration site in the Plum Creek watershed. TSSWCB will work with GBRA to examine the need for monitoring to determine effectiveness of individual agricultural NPS management practices. AgriLife Extension and AgriLife Research have conducted instream monitoring to assess impacts on water quality from aerial control of feral hogs. Results of these BMP effectiveness studies will be provided to the Steering Committee for use in project planning and adaptive management. Results of these BMP effectiveness studies will also be used to demonstrate interim progress in achieving water quality restoration.

Quality Assurance Project Plans (QAPPs) which describe the quality assurance standards and quality control mechanisms in place for all water quality monitoring conducted with TCEQ and TSSWCB funds are available for review.

In accordance with CWA §319, the State must annually report to USEPA on success in achieving the goals and objectives of the *Texas NPS Management Program*. This *Annual Report on Managing NPS Water Pollution in Texas* 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. The State is committed to reporting on progress of implementing the *Plum Creek WPP* in each *Annual Report*.

In accordance with CWA §319(h) NPS grant requirements and USEPA program activity measures (PAMs), the State must report to USEPA progress in implementing §319-funded projects and pollutant load reductions achieved through BMPs implemented in those projects. The State annually reports load reductions through USEPA's Grants Reporting and Tracking System (GRTS). For those §319-funded projects implementing BMPs prescribed in the *Plum Creek WPP*, the State will report to USEPA load reductions achieved.

Commitment to Revise Pollution Controls as Necessary

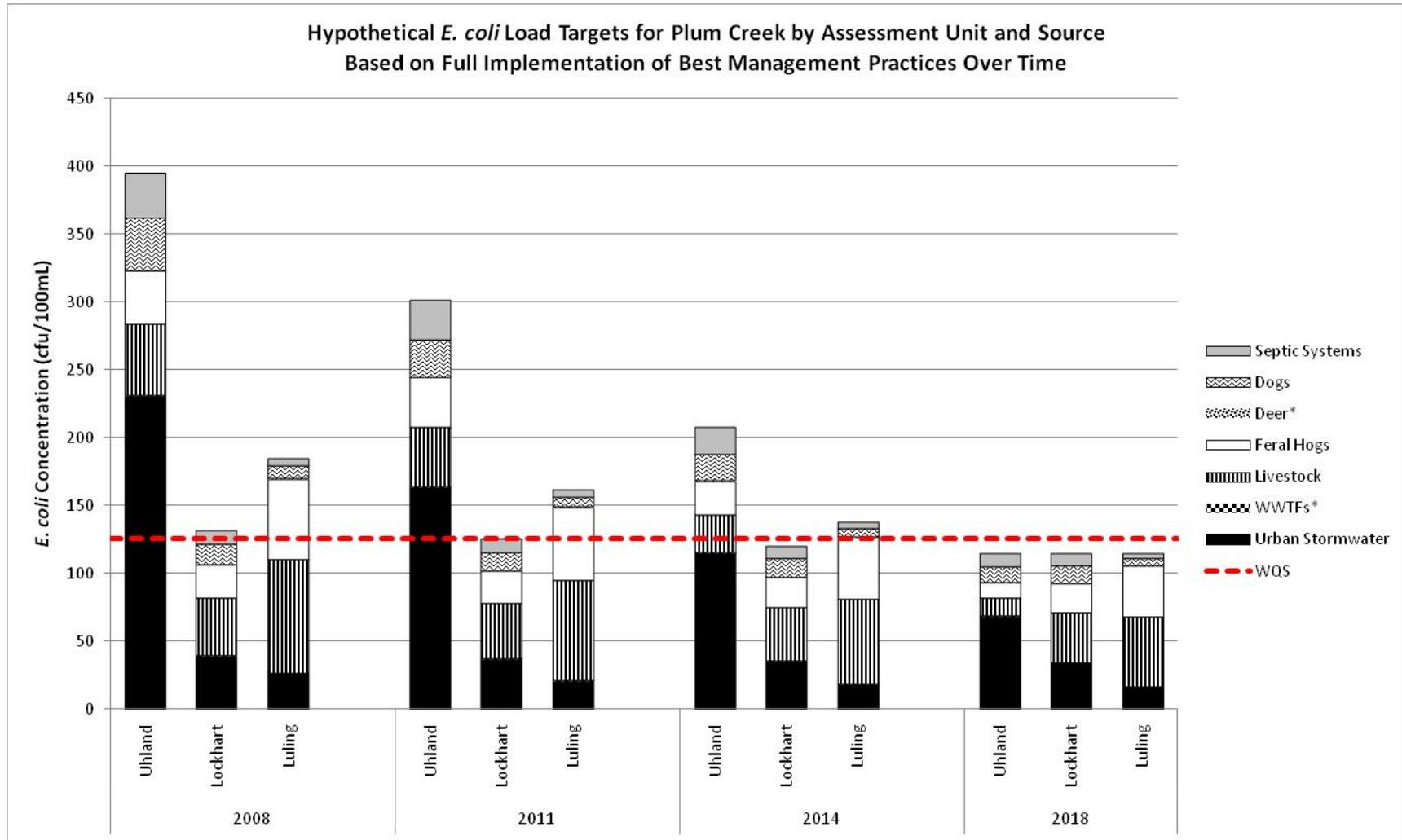
Adaptive management is a type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices [65 Fed. Reg. 62566-62572 (October 18, 2000)].

The essence of successful watershed planning and management is a commitment to adaptive management. The Plum Creek Watershed Partnership is committed to adaptive management of the *Plum Creek WPP*. Over the course of project implementation, instream monitoring data provided by GBRA will be compared with interim milestones and water quality criteria to determine progress in achieving WQS. If water quality improvement is not being demonstrated within the proposed timeframes, efforts will be made to increase adoption of BMPs and/or adjust strategies or focus areas if and when necessary.

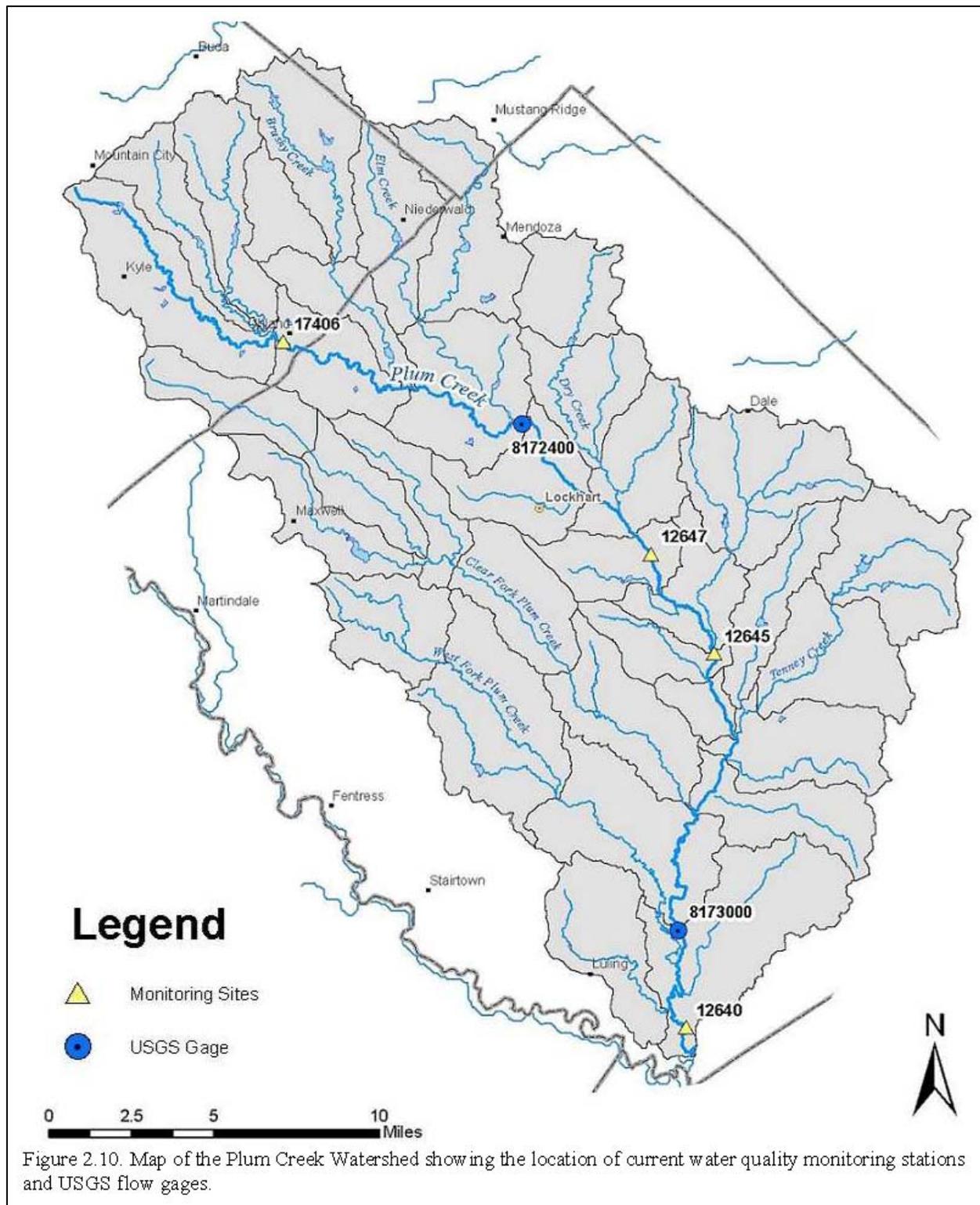
The TSSWCB has committed §319(h) funds for an AgriLife Extension Watershed Coordinator to facilitate the work of the Steering Committee and to develop a biennial update to the WPP. The biennial update will document project outputs and outcomes throughout the implementation process, an analysis of collected data to ascertain interim progress in achieving water quality restoration, and modifications to components of the WPP, such as the implementation schedule and interim milestones. While not expressly identified in the WPP, TSSWCB expects that such an update to or report on the WPP will continue to be generated at least biennially.

The State of Texas, specifically TCEQ and TSSWCB, are committed to applying adaptive management in the implementation of the *Plum Creek WPP*. The State is committed to working with the Plum Creek Watershed Partnership Steering Committee to examine the need to revise strategies (i.e., pollution controls) in the WPP if progress towards meeting WQS is not being demonstrated. Specifically, the State is committed to reviewing the WPP at least biennially as a cyclical defense of this Rationale through the CWA §§ 305(b) and 303(d) assessment process used to develop the IR. Any necessary modifications to strategies in the WPP, as a result of this biennial review, will only be made upon the approval of the Steering Committee.

Hypothetical *E. coli* Load Targets for Plum Creek by Assessment Unit and Source
Based on Full Implementation of Best Management Practices Over Time



* Deer and WWTFs were identified as contributors of *E. coli* in the Plum Creek WPP, but, based on SELECT modeling of total annual loading, are insignificant relative to other sources of bacteria loading, especially nonpoint sources and direct deposition. However, the contribution from WWTFs is important particularly under base-flow conditions as the likelihood that wastewater effluent contains pathogens is high, compared to non-human sources.



**TPDES Wastewater Discharge Permits
In Plum Creek (Segment 1810) Watershed**

FACILITY NAME	Type of Disinfection	MAX PERMITTED FLOW (MGD)	PERMIT NUMBER	EFFECTIVE DATE	EXPIRATION DATE	E. coli effluent limit in permit?	E. coli effluent monitoring in permit?
KYLE	chlorine	3/4.5	WQ0011041-002	02/04/2010	02/01/2015	no limit in either phase ¹	no monitoring requirement in either phase ¹
LOCKHART NO. 2 (FM 20 Plant)	UV	1.5	WQ0010210-002	02/04/2010	02/01/2015	126 cfu/100mL daily avg ² ; 394 cfu/100mL daily max	once per day
BUDA	chlorine	0.6/0.95/1.5	WQ0011060-001	02/16/2010	02/01/2015	no limit in either phase ¹	no monitoring requirement in either phase ¹
LOCKHART NO. 1 (Larremore Street Plant)	chlorine	1.1	WQ0010210-001	03/04/2010	02/01/2015	126 cfu/100mL daily avg ² ; 394 cfu/100mL daily max	once per week
LULING-NORTH	chlorine	0.9	WQ0010582-002	05/28/2009	02/01/2014	no limit ¹	no monitoring requirement ¹
RANCH AT CLEAR FORK	chlorine	0.33/0.7	WQ0014439-001	04/28/2008	02/01/2013	no limit in either phase ¹	no monitoring requirement in either phase ¹
NIEDERWALD (SWEETWATER)	chlorine	0.075/0.122/0.25	WQ0014672-001	09/21/2010	03/01/2015	126 cfu/100mL daily avg ² ; 394 cfu/100mL daily max	once per quarter
RAILYARDS-PARKLAND	UV	0.35	WQ0014165-001	07/28/2005	02/01/2010	n/a – permit expired	n/a – permit expired
RAILYARDS-VILLAGE HOMES	chlorine	0.075/0.12375	WQ0014060-001	05/11/2010	02/01/2015	126 cfu/100mL daily avg ² ; 394 cfu/100mL daily max	once per quarter
GOFORTH	chlorine	0.0424	WQ0013293-001	04/13/2010	02/01/2015	126 cfu/100mL daily avg ² ; 394 cfu/100mL daily max	once per week
SUNFIELD	chlorine	0.25/0.5/0.99	WQ0014377-001	08/06/2009	02/01/2014	no limit in either phase ¹	no monitoring requirement in either phase ¹
SHADOW CREEK (formerly CASTLETOP)	chlorine	0.162/0.486	WQ0014431-001	02/22/2010	02/01/2015	no limit in either phase ¹	no monitoring requirement in either phase ¹

¹ Language in “Other Requirements” – The permittee is hereby placed on notice that the Executive Director of the TCEQ will be initiating rulemaking and/or changes to procedural documents that may result in bacteria effluent limits and monitoring requirements for this facility.

² Language in “Definitions” defines *daily avg* as the arithmetic average of all effluent samples as required by the permit within a period of one calendar month consisting of at least four separate measurements.