

La Nana Bayou Watershed Protection Plan

Draft Chapter 9 – Measuring Success

Introduction

Implementing this WPP requires coordination with many stakeholders over the next 10 years. Implementation will focus on addressing readily manageable bacteria sources in the watershed to achieve water quality targets. This plan identified substantial financial resources, technical assistance, and education required to achieve these targets. Management measures identified in this WPP are voluntary but supported at the recommended levels by watershed stakeholders.

Measuring WPP implementation impacts on water quality is a critical process. Planned water quality monitoring at critical locations will provide data needed to document progress toward water quality goals. While improvements in water quality are the preferred measure of success, documenting implementation accomplishments can also be used. Combining water quality data and implementation accomplishments helps facilitate adaptive management by illustrating which recommended measures are working and which measures need modification.

Water Quality Targets

An established water quality goal defines the target for future water quality and allows the needed bacteria load reductions to be defined. The stakeholder selected water quality goal in La Nana Bayou is the existing primary contact recreation standard for *E. coli* of 126 cfu/100 mL (Table 1). If there are revisions or adoption of new water quality standards (such as nutrients), these targets may be revised or amended as appropriate.

Table 1. The water quality targets for impaired water bodies in the La Nana Bayou watershed

Station(s)	Segment	Current Concentration [†]	5 Years After Implementation [†]	10 Years After Implementation [†]
10474	0611B_01	279.46	76.73	≤126
20792	0611B_02	576.58	225.29	≤126
16301	0611B_03	443.93	158.97	≤126

[†] Geometric mean in units of most probable numbers of *E. coli* per 100 milliliters of water

Additional Data Collection Needs

Continued water quality monitoring in La Nana Bayou is necessary to track water quality changes resulting from WPP implementation. Currently, ANRA conducts quarterly water quality monitoring at three monitoring stations in the watershed. This continues data collection at monitoring stations used in state water quality assessment and is critical for future evaluations and should be continued.

Additionally, stations 10474, 20792, and 13096 were used in LDC analysis to determine needed load reductions to meet the water quality targets listed above. Continued data collection over time is imperative for changes in bacteria loading to be evaluated.

The current monitoring site distribution and data collection frequency across the watersheds limit potential to observe subtle changes water quality that result from WPP implementation. Defining localized water quality impacts from specific WPP implementation activities will require focused water quality monitoring efforts which can only be planned once specific WPP implementation activities and locations are known. Focused monitoring plans will require funding support and will be used to assess implementation effectiveness. Targeted water quality monitoring could include paired watershed studies, multiple watershed studies, or edge of field runoff analysis where different land use or management measures have been implemented. Data derived from this monitoring could demonstrate the applicability of different BMPs within the watershed. Targeted monitoring may also include more intensive sampling in other stream segments to identify potential pollutant sources.

Through the adaptive management process and WPP updates, future water quality monitoring needs will be evaluated and adjusted as necessary. This could include adding new sites to address new concerns or areas of interest in the watershed. Stakeholders are interested in collecting data along Banita Creek, another waterbody in the watershed that is not currently monitored, as well as collecting more data along La Nana Bayou.

Data Review

Watershed stakeholders are responsible for evaluating WPP implementation impacts on instream water quality. Stakeholders will use TCEQ's statewide biennial water quality assessment approach, which uses a moving seven-year geometric mean of bacteria data collected through the state's CRP as a primary means of gauging implementation success. This assessment is published in the *Texas Integrated Report and 303(d) List* and is available online at:

https://www.tceq.texas.gov/waterquality/assessment/305_303.html. It is noted that a two-year lag occurs in data reporting and assessment, therefore the 2026 or 2028 *Texas Integrated Report* will likely be the first to include water quality data collected during WPP implementation.

Identifying water quality improvements from WPP implementation is challenging if only relying on the seven-year-data window used for the *Texas Integrated Report*. Therefore, another method to evaluate water quality improvements is using the geometric mean of the most recent three years of water quality data identified within TCEQ's Surface Water Quality Monitoring Information System. To support data assessment as needed, trend analysis and other appropriate statistical analyses will be used. Regardless of method used, water quality changes resulting from WPP implementation will be difficult to determine and may be overshadowed by activity in the watershed that negatively influences water quality. As such, data review will not be relied on exclusively to evaluate WPP effectiveness. Data will be summarized and reported to watershed stakeholders at least annually through stakeholder meetings and ANRA's annual CRP meeting.

The watershed coordinator will be responsible for tracking implementation targets and water quality in the watershed. Implementation progress and water quality will be evaluated to describe the success of WPP implementation to that point. Should implementation targets or water quality lag significantly, adaptive management efforts will be initiated to reevaluate management recommendations and targets included in the WPP.

Interim Measurable Milestones

WPP implementation will occur over a 10-year timeframe. Milestones can be useful in evaluating incremental implementation progress of management measures described in the WPP. Milestones outline a clear process for progression throughout implementation. Interim measurable milestones for management measures and education and outreach are addressed in Chapter 6. In some cases, funding acquisition, personnel hiring, or program initiation may delay the start of some items. This approach provides incremental targets to measure progress throughout WPP implementation. Adaptive management may be used where necessary to reorganize or prioritize varying implementation aspects to achieve overarching water quality goals.

Adaptive Management

Watersheds are dynamic by nature with countless variables governing landscape processes; therefore, uncertainty is expected and the WPP was developed with this in mind. As WPP implementation progresses, it is necessary to track water quality over time and make needed adjustments to the implementation strategy. Including an adaptive management approach in the WPP provides flexibility that enables such adjustments.

Adaptive management is the ongoing process of accumulating knowledge regarding impairment causes and water quality response as implementation efforts progress and adjusting management efforts as needed. As implementation activities are instituted, water quality is tracked to assess impacts. This information can be used to guide adjustments to future implementation activities. This ongoing, cyclical implementation and evaluation process can focus project efforts and optimize its impacts. Watersheds where impairments are dominated by NPS pollutants are good candidates for adaptive management. Progress toward achieving established water quality targets will also be used to evaluate the need for adaptive management. An annual implementation progress and water quality trends review will be presented to stakeholders during meetings.

Due to numerous factors that can influence water quality and the time lag that often appears between implementation efforts and resulting water quality improvements, sufficient time should be allowed for implementation to occur before triggering adaptive management. In addition to water quality targets, if satisfactory progress toward achieving milestones is determined to be infeasible due to funding, implementation scope or other reasons that would prevent implementation, adaptive management provides an opportunity to revisit and revise the implementation strategy. If stakeholders determine inadequate progress toward water quality improvement or milestones is being made, efforts will be made to increase BMP adoption and adjust strategies or focus areas as appropriate.