

# Eagle Mountain Lake Watershed Protection Plan Stakeholder Meeting Agenda

March 6, 2026 | 1 p.m.

## **1:00 TRWD and Watershed Protection Planning Updates** *Kate Zielke, TRWD*

- Recap of watershed protection planning
- Where we are in WPP process

## **1:10 Chapter 6 Review of Stakeholder Feedback** *Kate Zielke, TRWD*

- Review of feedback and updates from previous meeting
- Stakeholder discussion of *E. coli* reduction measures

## **1:30 Chapter 7 Guided Review** *Kate Zielke, TRWD*

- Review of technical assistance
- Review of financial assistance
- Stakeholder discussion of implementation plan

## **2:00 Chapter 8 Guided Review** *Kate Zielke, TRWD*

- Review of water quality targets
- Stakeholder discussion of interim milestones and BMP implementation
- Review of monitoring plan
- Stakeholder discussion of progress updates
- Review of adaptive management

## **2:30 Wrap up** *Aaron Hoff, TRWD*

- Review next steps for watershed protection plan
- Additional questions or comments from stakeholders
- Adjourn

Please direct questions regarding this meeting or the Eagle Mountain Lake Watershed Protection Plan to Kate Zielke, Rural Programs Supervisor at [kate.zielke@trwd.com](mailto:kate.zielke@trwd.com) or 817.720.4419



## 6.0 Management Strategies and Associated Load Reductions

### 6.1 Meeting Water Quality Goals

The primary water quality reduction goals for the watershed, as defined in Section 5.2, are specifically for *E. coli* loads. To meet this challenge, load reduction goals will refer to the Primary Contact Recreation 1 water quality standard for *E. coli* of 126 MPN/100 mL, which is measured as a concentration rather than a load. With a 10% MOS, the water quality target for the waterbodies of interest will effectively be 113 MPN/100 mL for calculating the *E. coli* loads.

Also of interest is nutrient loads, as some nitrate and chlorophyll-*a* concerns exist in the watershed. This is not a focal point for this WPP, but it is a parameter to keep an eye on for future updates to the WPP. Sediment loads are also a strong consideration for TRWD's water supply goals, but are not used as a load reduction metric for the regulatory purposes of this WPP. Loads of all pollutants of concern are expected to fluctuate throughout the life of the WPP, with BMP implementation at times offset by LULC changes.

Typically, one index site is chosen for establishing water quality goals in a WPP. The index site for this WPP is station 10969 because it accounts for a majority of the watershed area flowing into the lake via the West Fork Trinity River and Big Sandy Creek. Stakeholders agreed with the suggestion to utilize the mid-range conditions flow regime as the basis for calculating the load reductions needed to reach the water quality goal. An annual reduction for this portion of the watershed during mid-range flow conditions of *E. coli* is        MPN/yr is needed to achieve water quality goals. Stakeholders may opt to set an interim goal for the purposes of this WPP.

Nutrient and sediment reductions are inherently tied to management recommendations for *E. coli*, since many bacteria BMPs, (specifically those for water retention/detention and treatment) are also expected to curb both nutrient and sediment loads as well.

### 6.2 The Watershed Approach to Water Quality Goals

Stakeholders understand that focusing efforts on a single source will likely result in diminishing returns in the form of load reductions with successive incremental funding increases. Instead, it is prudent to offset these diminishing returns by selecting appropriate BMPs for a variety of pollutant source categories. While the overall loads from each source are an important consideration, the stakeholder BMP recommendation process also incorporated feasibility, cost-effectiveness, and community visibility. It is for this reason that some unmodeled pollutant sources received a higher stakeholder priority rating than did more significant *E. coli* sources, as illustrated in Table 4-1. Due to the difficulty of addressing *E. coli* loads from native wildlife and the fact that they represent a small portion of the overall load, wildlife BMPs are not considered in this WPP.

Prioritization by source was then followed by spatial prioritization. Placement of physical/environmental BMPs should follow the results of the SELECT analysis for maximum targeting of sources. Similarly, education-based BMPs should be targeted in areas where the educational goal matches the relevant land uses or populations – for example, OSSF maintenance workshops should be ideally held in areas with higher OSSF concentration, while grazing management workshops should be held in locales with higher livestock numbers. Priority areas will likely fluctuate in size, shape, and location as needs arise or are resolved. These adjustments will rely heavily on stakeholder input, and only those BMP recommendations approved by stakeholders (at present or in the future) will be considered. Stakeholders, with technical and financial assistance outlined in Chapter 7, are responsible for implementing these voluntary recommendations, and their willingness to do so will ultimately define the speed and efficacy with which water quality goals are achieved.

## 6.3 Animal Sources

### 6.3.1 Livestock

Livestock species (cattle, horses, sheep, and goats) ranked 1<sup>st</sup> with respect to daily potential *E. coli* loading according to the SELECT analysis (Figure 5-7). As a source, waste from livestock may sometimes be deposited directly into a water body if the animals are allowed access for drinking or wading to cool off during hotter seasons. However, livestock waste is typically deposited in upland areas and washed into waterways via stormwater runoff. As such, a significant amount of the *E. coli* deposited by livestock as waste dies before it can reach a stream or lake (REF Wagner et al., 2013). In addition to direct water quality impacts from *E. coli*, direct access may significantly impact bank stability and increase sedimentation near the access area. Based on the high overall potential load and availability of effective BMPs, stakeholders ranked this a 1<sup>st</sup>-tier management priority.

In production agriculture, BMPs for water quality improvement typically involve managing population density and distribution. Using exclusionary fencing is a simple method for reducing or eliminating livestock access to streams but requires the construction of alternative watering facilities and shade to accommodate livestock needs. Even if fencing is not used, alternate watering facilities placed closer to animal grazing areas can effectively reduce traffic to streams. These additional water sources are usually supplied by wells but can be fed by municipal supply in some cases.

To reduce stormwater runoff of *E. coli* in upland areas, BMPs focused on improving soil infiltration and reducing runoff velocity are most effective. Prescribed grazing, when combined with herbaceous weed control, brush management, and strategic plantings of forage species will improve the vegetative cover quality of grazing areas. Increased surface coverage, combined with increased root depth and density slow runoff and increase infiltration, thus reducing erosion and flows of *E. coli* into water bodies. Responsible pest and nutrient management will further improve forage health and reduce the potential for excess additives being washed into waterbodies.

These practices are most effective when applied simultaneously across an entire property using a comprehensive management plan. To assist producers, technical and financial assistance is available through Natural Resources Conservation Service (NRCS) as conservation plans (CPs) and the Texas State Soil & Water Conservation Board (TSSWCB) as water quality management plans (WQMPs). These plans, usually administered through local soil and water conservation districts (SWCDs), are developed with input from district-level technicians familiar with the management methods best suited for the local area. A summary of priority project areas, stakeholder recommendations and the associated load reductions for livestock are provided in Table 6-1.

Table 6-1 Recommended BMPs for livestock

| Pollutant Source: Livestock |   |
|-----------------------------|---|
| <b>Concerns</b>             | Overstocking results in overgrazing, degradation of riparian buffers and terrestrial habitat, stream bank destabilization and erosion, nutrient transport to surface water. (Refer to REF NRCS Natural Resource Concern List and Planning Criteria for more detail.)  |
| <b>Potential Impacts</b>    | (1) Indirect <i>E. coli</i> loading to waterbody from pasture and range land, (2) Direct <i>E. coli</i> loading from defecation in water body, (3) Sedimentation due to increased erosion both upland and on streambank, (4) Property damage from streambank failures |
| <b>Critical Areas</b>       | Production agriculture operations, especially along riparian areas  |
| <b>Goal</b>                 | Reduce <i>E. coli</i> loading and sediment yield by encouraging participation in WQMP/CP programs, with focus on reducing animal time spent in riparian areas and land/grazing management methods that improve vegetative cover and soil structure.                   |

|   |   |
|---|---|
| <b>Objectives</b>   | (1) Promote use of WQMPs/CPs in the watershed, with emphasis on operations near riparian zones, (2) provide educational opportunities for ag producers to improve management of their property  |
| <b>Recommendations</b>  |   |
| <b>Focal Groups</b>   | <b>Management Practices</b>   |
| Producers   | Develop and implement WQMPs and CPs for 27 properties in the EML watershed, using land management strategies to reduce the annual <i>E. coli</i> load to that equivalent to reducing the stocking rate by 25%   |
| Producers, hobby farmers  | Provide educational programs and resources about grazing management practices and exclusionary fencing  |
| <b>Estimated Load Reductions</b>  |   |
| Adherence to prescribed whole-farm management plans like WQMPs and CPs is expected to reduce <i>E. coli</i> loading to streams through indirect and direct inputs. Improving landcover management and limiting the time spent by animals in riparian zones are expected to provide a total annual <i>E. coli</i> load reduction of 9.8 MPN/yr*10 <sup>15</sup> , in addition to reductions to both nutrient and sediment loads. For simplicity, this calculation was made using only the cattle population, as they were by far the highest contributor to potential <i>E. coli</i> loads. Additional detail regarding this estimate is provided in Appendix C. |   |
| <b>Effectiveness</b>  | Reducing the time spent by livestock within riparian zones, coupled with proper management of vegetative cover in upland areas, are expected to provide significant direct and indirect reductions to <i>E. coli</i> loads, reaching waterbodies, with those used directly within riparian zones being the most effective.  |
| <b>Certainty</b>  | Locating willing landowners will be heavily dependent on local natural resource representatives, and there is no guarantee that future owners will continue to utilize the BMPs identified in the site plans if the property changes ownership  |
| <b>Commitment</b>   | Agricultural landowners are typically willing to engage in land conservation practices once they're made aware of the benefits, especially if those practices relate to cost savings in the form of reduced erosion and more efficient use of pesticides, herbicides, and fertilizers. However, initial costs may limit adoption of such practices.   |
| <b>Needs</b>  | Significant financial support, as directed through the WQMP and CP programs, is essential for the success of this component, which is capable of providing significant load reductions if utilized across all ag species. Therefore, education pertaining to participation and benefits of these programs is also imperative, as is funding for education targeted to new small-acreage landowners. |

### 6.3.2 Pet Waste

Pet waste issues in the EML watershed stem from the southern end of the watershed, where there is much more urban and suburban land use. As the Fort Worth metro area continues to expand northward, numbers of dogs and cats in the watershed will continue to rise. BMPs selected for reduction of *E. coli* loads from pet waste will primarily focus on dogs, as it is assumed that most domestic cats use litter boxes and have their waste deposited in the landfill. However, it is expected that some portions of domestic felines are indoor/outdoor cats, barn cats, or other feral cats that do defecate outdoors. It is also likely that some cat owners dump soiled cat litter into the environment.

Management practices recommended to reduce pet waste *E. coli* loads seek to remove pet waste from stormwater runoff primarily by confining the waste to a landfill. This includes capitalizing on several educational opportunities that are already being promoted through various entities in the DFW metropolitan area. This includes relevant print media (utility bill inserts, info pamphlets, public signage) as well as mass media campaigns (websites, videos). This also includes promotion of proven waste management strategies, such as providing supplementary pet waste stations for public

areas. Runoff avoidance can also be achieved through infiltration via in-ground pet waste digesters, which are a less common but potentially effective pet waste solution. Stakeholder ranked this a 2<sup>nd</sup>-tier management priority. A summary of recommendations and the associated load reductions for pet waste are provided in Table 6-2.

Table 6-2 Recommended BMPs for Pet Waste

| <b>Pollutant Source: Pet Waste</b>   |   |
|--|---|
| <b>Concerns</b>  | (1) Improper disposal of pet waste, (2) lack of education on impacts and proper disposal, (3) disease transmission and public safety  |
| <b>Potential Impacts</b>   | (1) Indirect <i>E. coli</i> loading to waterbody from yards, public greenspaces, kennels, and shelters, (2) spread of disease amongst/between species   |
| <b>Critical Areas</b>  | (1) Subwatersheds adjacent to the lake, (2) urbanized areas   |
| <b>Goal</b>  | Reduce the <i>E. coli</i> load from pet waste delivered to waterbodies through management of <i>E. coli</i> loads representing 50%/80% of the present pet population.   |
| <b>Objectives</b>  | (1) Increase education and outreach efforts pertaining to proper disposal of pet waste, (2) Provide opportunities for proper waste disposal/abatement   |
| <b>Recommendations</b>   |   |
| <b>Focal Groups</b>  | <b>Management Practices</b>   |
| Cities, counties, NCTCOG, regional entities  | Expand delivery of existing pet waste education resources, develop/implement new educational resources (e.g., utility bill inserts, websites, info pamphlets, videos, signage in public greenspaces/trails)   |
| Cities, counties, HOAs, neighborhood associations (NAs)  | (1) Development and adoption of model pet waste pickup/disposal ordinances for municipalities and bylaws for HOAs/NAs (2) Reconnaissance of critical areas for pet waste station placement in municipal or community greenspaces (3) Phased installation of 34 new pet waste stations and fund supplies (collection bags, wastebin bags) for the duration of the 10-year implementation timeline (4) Phased installation of 8 bioswales/rain gardens in parks for onsite treatment of pet waste in stormwater/irrigation runoff |
| <b>Estimated Load Reductions</b>   |   |
| BMPs recommended for pet waste seek to a) confine the waste to a landfill, or b) treat waste on-site in the ground. In doing so, the amount of <i>E. coli</i> from pet waste sources entering waterways via runoff from rainfall or irrigation will be reduced. It is reasonable to assume that some pet waste management is already occurring in the watershed, as many people do pick up after their pets. Therefore, an overall reduction goal of 50%/80% of the potential load from a baseline with no management is reasonable. Similarly, it is expected that the recommendations will likely only capture loads from only 50%/80% of the present pet population. This results in a reasonable estimate of the total annual pet waste reduction of 6.13/9.80 MPN/yr*10 <sup>15</sup> for the managed pet population. |   |
| <b>Effectiveness</b>   | With denser population centers in the southern areas of the watershed, pet populations are estimated to be similarly dense. Treatment in this case is by direct removal of the pollutant source and internment elsewhere, exhibiting a high removal efficiency. Therefore, noticeable reductions are likely even by managing a limited population.  |
| <b>Certainty</b>   | Improving opportunities for proper pet waste disposal for those aware of the contamination concern will provide most of the reductions. It is assumed that those who have other reasons for not properly disposing of waste will be difficult to convince to modify their behavior.   |
| <b>Commitment</b>  | Many green spaces already have some level of pet waste stations on-site. Signage for ordinances/by-laws are less visible, and enforcement thereof is limited or non-existent.   |
| <b>Needs</b>   | Funds for increasing the number and continued maintenance of pet waste stations, enactment of pet waste disposal ordinances/by-laws or enforcement of those existing.   |

### 6.3.3 Wildlife

Deer constituted about 1.5% of the potential *E. coli* load in the EML watershed. Management of *E. coli* loading from deer and other native wildlife is difficult to achieve because some level of natural bacterial load from these sources is inevitable. If population numbers are healthy, there are not many management actions to be taken. In areas of overpopulation of deer or other wildlife species, reducing human feeding activities (deer feeders, bird feeders, water bird feeding) or introducing deterrents (nesting deterrents, dummy predators) can abate the issues. However, due to its relatively low estimated load, absence of major overpopulation issues, stakeholder ranked this a 3<sup>rd</sup>-tier management priority. As such, wildlife management BMPs will not be a technical or financial focus for this WPP.

### 6.3.4 Feral Hogs

The potential *E. coli* load from feral hogs was not significant enough to warrant its own ranking according to SELECT analysis, and feral hog control as a means of load reduction was accordingly given a 3<sup>rd</sup>-tier ranking by stakeholders. In addition to its low capacity to meaningfully reduce *E. coli* loads, population management with feral hogs is difficult, due in no small part to the species' prolific reproductive capacity. Feral hogs also prefer dense habitat, are opportunistic feeders, and can quickly adapt to trapping tactics.

Despite these obstacles, feral hogs' preference for riparian habitat and propensity for property damage means that they will continue to be a target for educational opportunities and structural controls by several partner agencies. TRWD will continue to support these efforts as requested, but feral hogs will not be a major focus for technical and financial assistance for the purposes of this WPP.

## 6.4 Wastewater

### 6.4.1 On-Site Sewer Facilities

OSSFs, which are extremely prevalent in the EML watershed, use onsite treatment of human waste into a soil drain field as opposed to routing waste to a centralized WWTF. With sound construction and normal maintenance, these systems are an effective method of sequestering and mitigating various pollutants within the soil, away from human and animal contact that could result in disease transmission. System can fail due to poor design and construction, neglected maintenance, or use beyond their capacity. Failures result in excess releases of pathogens, nutrients, and other BOD-related substances, endangering human health and contaminating local surface water sources.

Though spatially explicit lists could not be obtained from all Authorized Agents in the watershed, supplemental estimation methods suggest that the highest concentrations of OSSFs exist in the southern end of the watershed. The most affected subwatersheds seem to align with areas with low density suburban/exurban developments; areas that either formerly or currently are outside the reach of city sewage services, but not as low density as truly rural areas in the northern half of the watershed.

Stakeholders ranked OSSFs as a 1<sup>st</sup>-tier priority pollutant source due to its high potential load ranking in the SELECT analysis and their relatively high concentration in subwatersheds adjacent to the lake. However, addressing OSSF issues is costly, so emphasis should be strategically placed on OSSFs that exist within the riparian buffer or along the lake, as these are the most likely to be pollutant sources.

Repair or replacement of failing OSSFs is the most straightforward method of contaminant reduction, but funding these activities directly is cost-prohibitive, especially given the sheer number of OSSFs in the EML watershed. It is likely more cost effective to provide OSSF maintenance education, paired with incentives offsetting the costs of both inspection

and/or pump out. Along with the requisite homeowner-focused OSSF maintenance training, training for real estate professionals would also be beneficial. Inexperienced homeowners moving from more urban areas may be unaware that they even have an OSSF on their property, a scenario that can quickly lead to system failure. Providing support to counties and municipalities to draft and enforce ordinances requiring OSSFs to be inspected (and potentially even pumped out) before properties change hands could also be effective. Support for municipal “septic to sewer” programs, designed to bring older properties within municipal jurisdictions that still use OSSFs onto the centralized WWTF, will also be considered, along with encouraging HOAs/NAs to coordinate w/ private OSSF contractors to develop neighborhood-wide inspection/pumpout events in an attempt to reduce costs for residents. A summary of priority project areas, stakeholder recommendations and the associated load reductions for OSSFs are provided in Table 6-3.

Table 6-3 Recommended BMPs for OSSFs

| Pollutant Source: OSSFs   |  |
|---|--|
| <b>Concerns</b>   | (1) Direct/indirect pollutant loading from failing OSSFs, (2) disease transmission/public safety   |
| <b>Potential Impacts</b>  | (1) Indirect <i>E. coli</i> loading to waterbody from failing OSSFs, (2) spread of disease amongst/between species   |
| <b>Critical Areas</b>   | Riparian buffer zones in unincorporated areas  |
| <b>Goal</b>   | Reduce the <i>E. coli</i> load from OSSFs delivered to waterbodies directly or indirectly through education, outreach, and incentivized inspections to yield reduction in estimated failure rates from 15% to 10%/5%. This goal may lead to an unrealistic number of repairs or replacements. For this reason, OSSFs in riparian areas will be prioritized, and the WPP recommends incentivizing 50 repairs annually and 5 replacements annually upon receiving implementation funding.  |
| <b>Objectives</b>   | (1) Increase education and outreach efforts pertaining to proper maintenance of OSSFs, (2) Provide access to affordable inspections/pump outs for at-risk OSSFs in the watershed   |
| Recommendations   |  |
| Focal Groups  | Management Practices   |
| Residents, HOAs, NAs, NCTCOG, AgriLife  | Provide homeowner-focused OSSF care/maintenance training   |
| Residents, HOAs, Nas  | (1) Incentivize OSSF inspections and/or pumpouts for property owners with at-risks systems that have not been recently inspected (\$350 incentive toward 450 inspections and/or pumpouts over the implementation timeline) with priority for OSSFs within riparian buffer zones (2) Where HOAs/NAs exist, encourage coordination of neighborhood-wide inspection/pumpout days to reduce costs (3) Replace failing systems within lake or riparian buffer zones (\$8,000 incentive toward 40 replacements over the implementation timeline) |
| Real estate agents, OSSF professionals, NCTCOG  | Provide practice-focused OSSF training for awareness of pollution potential, local ordinances, and importance of routine maintenance/cleanouts   |
| Cities, Counties  | (1) Work with municipalities to create/expand “septic to sewer” programs to transition eligible properties with OSSFs over to the centralized wastewater collection system (2) Conduct spatially-explicit OSSF inventories (3) Draft and enforce ordinances that require OSSFs to be inspected before property changes hands   |
| Estimated Load Reductions   |  |
| Efforts involve BMPs focused on OSSF owner education and incentivized inspections targeting at-risk OSSFs, with priority given to those located in riparian buffer zones. By applying these recommended BMPs, a decrease in the estimated failure rate of 15% to 10%/5% is expected, resulting in an <i>E. coli</i> load reduction 8.5/17.0 MPN/yr*10 <sup>15</sup> , Reductions for nutrients are also expected, with ranges of 10-40% for nitrogen, and 85-95% for phosphorus species (REF USEPA 2002). |  |

|                      |  |
|----------------------|--|
| <b>Effectiveness</b> | Lack of awareness and proper maintenance are inferred to be the main causes of malfunction. Repair or replacement of faulty OSSFs will provide direct reductions to <i>E. coli</i> loading to nearby waterways.  |
| <b>Certainty</b>     | Workshops targeted to residents/homeowners are subject to wide ranges of variance in attendance, but those targeted to trade professionals are usually well-attended, especially for those with education requirements. If a malfunction is identified during an inspection, most authorized agencies require reporting and remedy to the OSSF. This may motivate some owners to not be proactive and eschew the inspection incentives |
| <b>Commitment</b>    | It is unclear if homeowners will put what they learn into practice, but professionals are likely to adopt curriculum into their long-term business practices. It is also unclear whether OSSF owners will continue with proactive inspections after receiving initial incentive.   |
| <b>Needs</b>         | Significant funding is required for the incentivized inspection/pumpout program, along with identification of several local private contractors willing to conduct the work in cooperation   |

## 6.4.2 Centralized Wastewater

For incorporated areas where onsite wastewater treatment is infeasible, centralized systems are the most common method of wastewater treatment. These systems use a network of pipelines connecting homes and businesses to a centralized processing facility where it is treated before being released into a nearby waterway. The data shows that most WWTFs within the EML watershed generally function as intended, with effluent averages well below limits. However, several facilities in the watershed have a handful of daily average *E. coli* exceedances, and a good deal more ammonia exceedances (Table 4-2).

Vulnerabilities within the sewage conveyance system, including above ground and underground pipelines, pump stations, and manholes can also release bacteria and nutrients. These include both I/I issues that cause the majority of wet-weather SSOs, as well as blockages and physical damage that can result in dry-weather SSOs. Of these, I/I issues tend to cause the majority of large-volume SSOs that are most likely to reach waterbodies before being contained. Dry-weather SSOs tend to be the result of system misuse, especially improper disposal of non-flushable items in toilets. While SSOs were not assessed for potential volume as an *E. coli* loading source in the watershed, stakeholders placed SSOs and WWTFs in the 1<sup>st</sup>-tier priority pollutants list.

Education and outreach efforts will focus on preventing blockages and damage by educating citizens about the consequences of indiscriminately using toilets as means of waste disposal. Addressing SSOs from I/I issues is primarily reliant on training for wastewater infrastructure operators, with emphasis on establishing and/or improving interdepartmental and inter-entity communication to ensure that I/I issues are quickly identified and addressed. The majority of construction for SSO-related water quality improvement rests with municipal capital improvement program (CIP) funding, as infrastructure projects are typically outside of the purview of CWA 319(h) funding mechanisms. A summary of priority project areas, recommendations and the associated load reductions for centralized wastewater are provided in Table 6-4.

Table 6-4 WWTF and SSO Recommended BMPs

| <b>Pollutant Source: WWTFs and SSOs</b> |  |
|---|--|
| <b>Concerns</b>                         | (1) Overloaded wastewater infrastructure from inflow/infiltration, illicit discharges, or conveyance blockages from improperly disposed waste items, (2) failure of deteriorated, aging, or undersized wastewater infrastructure |
| <b>Potential Impacts</b>                | Direct/indirect loading to waterbodies from failing infrastructure/overloaded systems, (2) localized human health hazards  |

|   |   |
|---|---|
| <b>Critical Areas</b>   | (1) Subwatersheds adjacent to the lake, (2) older neighborhoods w/ aging infrastructure, (3) areas applying for new WWTF permits and WWTFs with significant enforcement actions   |
| <b>Goal</b>   | Reduce the E. coli load from human sewage delivered to waterbodies through failing or overloaded wastewater conveyance infrastructure by reducing the instance of SSOs by 10%   |
| <b>Objectives</b>   | (1) Identify high-priority SSOs, their causes, and available remedies, (2) Increase public education and outreach efforts pertaining to protection of wastewater infrastructure   |
| <b>Recommendations</b>  |   |
| <b>Focal Groups</b>   | <b>Management Practices</b>   |
| Wastewater infrastructure operators   | (1) Use interdepartmental communication mechanisms to identify recurring/high-volume SSOs to target for rehab/ replacement through capital improvement programs, (2) proactively address effluent violations, (3) encourage new facilities to tie into established, reliable wastewater networks  |
| Cities, counties  | Conduct stormwater infrastructure assessments for identification of illegal wastewater connections, proper placement and abundance of storm drains, other opportunities to improve conveyance/reduce pollution  |
| Cities, commercial properties, developers   | Incentivize installation of GSI like permeable pavers and detention/retention facilities like rain gardens to reduce stormwater runoff and decrease likelihood of I/I - related SSOs  |
| Residents   | Coordinate with other entities on established public outreach campaigns related to wastewater infrastructure protection/SSO prevention  |
| <b>Estimated Load Reductions</b>  |   |
| Effects from SSOs are highly localized and acute in nature, and in many cases, discharges are contained before reaching a waterway. Therefore, making accurate predictions for load reductions based on these BMPs may be difficult. Much of the wastewater produced within the watershed is conveyed to WWTFs elsewhere, and <i>E. coli</i> violations at WWTFs in the watershed are rare. Therefore, reducing the instance of SSOs on a numeric basis was deemed as the appropriate metric for tracking progress. |   |
| <b>Effectiveness</b>  | Identification and correction of SSOs will provide a direct reduction to <i>E. coli</i> loads reaching waterbodies. Reductions in the amount of improperly flushed items will significantly reduce the instance of pipeline blockages that lead to many of the smaller, dry-weather SSOs.   |
| <b>Certainty</b>  | SSOs can usually be identified easily by both trained staff and concerned citizens, but an entity's ability to address SSO issues is often limited by available funding, with many entities opting for 5- 10-year capital improvement plans (CIPs). Improving awareness of what is safe to flush among uninformed individuals may produce some benefit, but it is assumed that those who do so out of convenience will be difficult to convince to modify their behavior. |
| <b>Commitment</b>   | Most cities already employ some level of interdepartmental communication for alerts about stormwater/sewer issues. Regular messaging through education/outreach may be necessary to ensure that the public remains aware of how their actions affect wastewater infrastructure.   |
| <b>Needs</b>  | Significant funding is needed to correct even the smallest SSO issue, and many municipalities lack sufficient funding to address them all in a timely fashion. Identifying supplemental funds for CIP projects will be of utmost importance. Existing NCTCOG outreach campaigns like "Defend Your Drains" and "Cease the Grease" are well-known and are low-cost message delivery mechanisms.   |

## 6.5 Sediment and Flooding

Due to increased flooding from development and long-term lake capacity and water quality threats posed by excess sediment, this was given 2<sup>nd</sup>-tier management priority.

## 6.5.1 Sediment

In addition to addressing flow and nutrient sources, the SWAT modeling effort also addressed potential sediment yield reductions associated with various BMPs (Appendix C). Excess and suspended sediment in waterbodies can harbor bacteria and nutrients, decrease die-off of bacteria, impact DO levels, alter flow regimes, and decrease water supply and flood control capacity in EML. The primary sources of sediment in the EML watershed are agricultural activities associated with grazing on pasture or rangeland. Increasing vegetation quality and soil health are key to reducing runoff and therefore, erosion. According to NRCS suggestions, most grazed areas in the EML watershed are overstocked. However, it is not palatable to many agricultural stakeholders to make sharp reductions to livestock numbers. Alternate measures, such as range planting, rotational grazing, and cover cropping pastures can achieve some sediment yield reductions in lieu of reduction in actual animal numbers. It is important to note that many of the management measures for bacteria and nutrients also function to provide erosion control and sediment capture, and thus some recommendations, management measures, and load reductions are included in other tables throughout Chapter 6.

## 6.5.2 Flooding

Increased development can lead to decreased riparian buffers, decrease in filtration capacity, and an increase in erosion due to runoff velocities. Hydrologically functional open space, both within urban areas and across the urban landscape, acts as a sponge that absorbs rainfall and decreases floods. On a small scale, GSI, parks, and riparian greenbelts can reduce localized flooding. Protection and sound ecological management of large open tracts throughout the watershed allow for greater infiltration on a landscape scale.

Management measures are identified based on feasibility. Coordination with partner efforts and programs that overlap with these concerns is recommended as part of the BMPs. A summary of priority project areas and recommendations for sediment and flooding are provided in Table 6-5.

Table 6-5 Sediment Recommended BMPs

| Pollutant Source: Sediment                               |   |
|--|---|
| <b>Concerns</b>  | (1) Sediment loading to EML, reducing capacity for water supply and flood mitigation (2) increased risk in flooding in developing areas, (3) loss of natural areas/green spaces, (4) loss of fertile soil in managed pasture areas  |
| <b>Potential Impacts</b>                                 | (1) Impact to aquatic life, (2) Impact to water supply and flood supply capacity in EML, (3) Direct/indirect nutrient and bacteria loading to waterbodies from runoff and erosion events, (4) public health and safety, (5) erosion, (6) infrastructure damage  |
| <b>Critical Areas</b>                                    | Watershed wide  |
| <b>Goal</b>  | Mitigate sediment loading and flooding  |
| <b>Objectives</b>  | (1) Work with partners and agencies tasked with flood assessment to incorporate water quality concerns in future development and planned flood mitigation projects, (2) identify and install green infrastructure in coordination with cities, counties, and property owners (list not exhaustive), (3) Protect high-functioning open spaces to provide regulating ecosystem services, including erosion mitigation and infiltration (park spaces, conservation easements/agreements, rewilding), (4) Encourage use of cover crops in managed pasture areas |
| Recommendations  |   |
| <b>Focal Groups</b>                                      | <b>Management Practices</b>   |
| Cities, property owners, contractors, agencies, partners | Identify and install green infrastructure as funding becomes available  |

|   |  |
|---|--|
| Cities, counties  | Conduct stormwater infrastructure assessments for identification of illicit discharges, proper placement and abundance of storm drains, other opportunities to improve conveyance/reduce pollution, and identify erosion and prevent erosion   |
| USACE, cities, counties, State partners, nonprofits, volunteer groups   | Riparian, Wetland, and/or Stream Restoration Projects  |
| Landowners, land trusts, agencies, cities, counties   | Protect and preserve large tracts of land for increased rainfall infiltration and erosion mitigation. Permanently protected landscapes provide the highest long-term ROI – fee simple purchases of parkland or open space, voluntary conservation easements, and mitigation banks are proven vehicles for this work.   |
| Cities, counties, NCTCOG, regional entities   | Expand delivery of existing sediment, flooding, and BMP education resources, develop/implement new educational resources (e.g., utility bill inserts, websites, info pamphlets, videos, signage in public greenspaces/trails)  |
| <b>Estimated Load Reductions</b>  |  |
| BMPs recommended for mitigation of sediment loading and flooding are not tied to a specific <i>E.coli</i> or nutrient reduction, but it is likely that reductions in the incidence of <i>E.coli</i> and nutrients will occur to some degree as nutrients can be bound to soil and sediments, which can harbor <i>E.coli</i> and reduce die-off. Potential load reductions were not calculated because the location, type, and size of projects installed will dictate the potential load reductions; however, they have not been identified yet. Sediment yield, however, can be calculated for different adoption rates of cover crops for managed pasture areas. A 25 percent increase in adoption of cover crops can generate a 71.10 percent reduction in sediment yield. |  |
| <b>Effectiveness</b>  | The effectiveness of BMPs at reducing sediment loadings and mitigating flooding is dependent on the design, site selection and maintenance of the BMP. Permanent land protection practices come with stipulations about future management of the property, so these, if implemented, provide effective long-term ecosystem service benefits.   |
| <b>Certainty</b>  | Design and installation of BMPs can require high up-front costs, which may turn away many municipalities and businesses/developers despite long-term ROI. Similarly, large-scale restoration or land protection projects have a high cost barrier. Conservation easements and mitigation banking are not yet common in the region, but there is a growing presence of organizations that do this work. |
| <b>Commitment</b>   | Municipalities and businesses have to engage in long-term maintenance of GSI BMPs. Conservation easements or open space acquisitions require perpetual stewardship and monitoring.   |
| <b>Needs</b>  | Significant funding is needed to identify, install, maintain and monitor GSI BMPs. Significant funding is needed to design and implement restoration projects and identify and implement land protection via purchase or conservation easement.  |

## 6.6 Human Activities

### 6.6.1 Illegal Dumping and Litter Accumulation

*E. coli* loads comprise only a fraction of the potentially hazardous substances that may arise from illegal dumpsites, which commonly occur in easily accessible areas, constituting a public health hazard. For these reasons, stakeholders consider illegal dumping to be a 2nd-tier priority for water quality improvement.

Several regional campaigns for littering currently exist, which can be administered in the watershed. TRWD hosts an annual lakeshore Trash Bash at EML and Save Eagle Mountain Lake runs additional stewardship and clean-up events.

TRWD runs a robust Adopt-a-Trail program along the Fort Worth Floodway – this programming could feasibly be expanded to TRWD-owned recreation facilities on EML. Stakeholders also had an interest in the proliferation of home hazardous waste pickup/drop off events into rural/unincorporated areas, as those efforts are currently only available to residents of participating cities. A summary of priority project areas, stakeholder recommendations and associated load reductions for illegal dumping and litter accumulation are provided in Table 6-6.

Table 6-6 Illegal Dumping Recommended BMPs

| <b>Pollutant Source: Illegal Dumping and Litter Accumulation</b>   |  |
|--|--|
| <b>Concerns</b>  | (1) Multiple pollutants from illegally dumped materials leaching into local water resources, (2) large dumped items restricting/redirecting flow in waterways  |
| <b>Potential Impacts</b>   | (1) Direct/indirect contamination of waterbodies from <i>E. coli</i> , nutrients, and hazardous materials, (2) localized human health hazards, (3) Flow obstruction/alteration resulting in impoundment or erosion   |
| <b>Critical Areas</b>  | (1) Riparian buffers   |
| <b>Goal</b>  | Reduce trash and litter in watershed, including hazardous waste, and educate the public about watershed-related threats of illegal dumping   |
| <b>Objectives</b>  | (1) Continue hosting TRWD Trash Bashes at EML (2) Increase education and outreach efforts pertaining to litter and illegal dumping through existing mass media campaigns, (3) Support other stakeholder entities engaging in cleanup events  |
| <b>Recommendations</b>   |  |
| <b>Focal Groups</b>  | <b>Management Practices</b>  |
| TRWD. residents  | Continuation of annual TRWD Trash Bash cleanup; track participation and litter removed by year   |
| Cities, counties, CDPs, NCTCOG   | Work with county representatives and local leaders in unincorporated areas to institute hazardous waste pickup days or landfill dropoff days   |
| Cities, counties, NCTCOG, HOAs, NAs, nonprofits, resource agencies   | Coordinate w/ other watershed entities on public outreach/education opportunities via existing litter/illegal dumping mass media campaigns, educational resources, and illegal dumping hotlines or other monitoring efforts  |
| <b>Estimated Load Reductions</b>   |  |
| BMPs recommended for illegal dumping and litter accumulation are not tied to a specific <i>E. coli</i> reduction, but it is likely that reductions in the incidence of <i>E. coli</i> will occur to some degree. Although this group of BMPs may not necessarily be tied to a load reduction, its visual nature garners community support and participation. |  |
| <b>Effectiveness</b>   | The "patchwork" urban/rural landscape of the watershed provides prime opportunities for illegal dumping activity. Treatment in this case is by direct removal of the pollutant source, exhibiting a high removal efficiency. Due to the highly visible nature of the pollutant source, identification takes minimal effort.  |
| <b>Certainty</b>   | Improving opportunities for proper waste disposal for those aware of the contamination concern is expected to yield little, if any, improvement, as illegal dumping typically takes place as a matter of convenience for perpetrators, and thus it will be difficult to convince them to modify their behavior. Therefore, it is assumed that the bulk of illegal dumping concerns will be addressed through enforcement of city ordinances and criminal investigations. |
| <b>Commitment</b>  | Several municipalities have code enforcement staff currently available to handle illegal dumping activities, but lack the staff to actively patrol for violations. Community engagement to provide these staff with the evidence they need via a regional hotline or each municipalities code violation submission process will improve their efficiency and response time.  |
| <b>Needs</b>   | Fund support of HHW pickup/dropoff and cleanup events; enforcement of existing illegal dumping codes once evidence has been provided.  |

## 6.6.2 Lawn Residue and Waste

Stakeholders evaluated concerns related to residue and waste from managed green spaces stemming from ignorance of the environmental impacts, lack of proper education/training, or potentially willful disregard of existing laws and ordinances. There is a lack of solid information required to make pollutant load estimates, meaning that lawn residue and waste could not be quantitatively compared to other pollutant sources. Despite this lack of information, stakeholders saw the benefits of including BMPs for this water quality concern, identifying it as a 2<sup>nd</sup> –tier priority to be addressed. As urbanization continues to spread, especially in the southern areas of the watershed closer to the lake, this will likely become an increasingly important component of nutrient abatement.

As is the case with many other pollutant sources, education and outreach initiatives are a vital first step. In this case, that entails ensuring that both staff and citizens have the knowledge to recognize behaviors that produce nutrient and DO concerns, which can consequently lead to fish kills, taste/odor problems in drinking water, or other impacts from eutrophication. Existing programs from TRWD, AgriLife Extension, NCTCOG, and others address low-input, low-waste landscaping solutions that are accessible and affordable for homeowners.

Impervious surfaces in developed and urbanized areas increase the amount of rainfall that becomes runoff. This increased overland flow can carry urban/suburban pollutants to nearby water bodies, even during small rainfall events. The variables are too numerous to model with certainty (urban fertilizer and pesticide use, construction sites, urban avian and terrestrial wildlife, trash and other waste, and many other nonpoint sources); however, any reduction in runoff will result in a reduction of pollutants reaching surface waterbodies. There are various stormwater/green infrastructure BMPs available to reduce the volume of stormwater that runs off developed sites, potentially decreasing the amount of pollutants entering the stream. Based on one study in Texas, implementing rainwater harvesting, permeable pavers and rain gardens in 20%-34% of properties with roofs and 31% to 47% of properties with parking lots, an estimated reduction in surface runoff varies from 14% to 29% and reduction in nitrate runoff varies between 24% and 30% (REF Seo et al., 2017). In another study, stormwater quality improvements were seen through installation of pervious pavement, raingardens, bioswales, and bioretention ponds that reduced pollutant loads by 25-100% (REF Clary et al., 2017).

The TRWD RainScapes provides a model for green stormwater infrastructure (GSI) implementation. Education programs utilizing this resource are available to homeowners, municipal staff, and private landscaping and engineering firms in the DFW metro. A summary of priority project areas, stakeholder recommendations, and associated load reductions for lawn residue/waste are provided in Table 6-7.

Table 6-7 Lawn Residue Recommended BMPs

| Pollutant Source: Lawn Residue and Waste |   |
|--|---|
| <b>Concerns</b>                          | (1) Improper disposal of organic lawn waste, (2) excessive fertilizer, herbicide, pesticide, or other chemical application on lawns and other open areas      |
| <b>Potential Impacts</b>                 | (1) Direct/indirect contamination of waterbody from E. coli , nutrients, and hazardous materials;<br>(2) impacts to aquatic wildlife                          |
| <b>Critical Areas</b>                    | (1) Lake-adjacent urban subwatersheds, (2) managed open spaces (sports fields, golf courses, oil/gas pad sites)   |
| <b>Goal</b>                              | Prevention of new nutrient-related concerns from developing as subwatersheds near the lake and the Fort Worth metro continue to densify.                      |
| <b>Objectives</b>                        | (1) Increase education and outreach efforts pertaining to proper handling of organic yard waste,<br>(2) Promote use of residential/commercial lawn management |

| Recommendations  |  |
|--|--|
| Focal Groups   | Management Practices   |
| TRWD, Cities, counties, NCTCOG, regional entities, resource agencies   | (1) Expand delivery of existing lawn waste education resources, develop/implement new educational resources (utility bill inserts, websites, pamphlets, videos, signage in public greenspaces/trails) (2) Deliver education programs (WaterWise, Healthy Lawns, Healthy Waters, TRWD programs) to residents/landscapers for proper lawn care, landscaping, and stormwater management, w/ soil nutrient testing opportunity   |
| Residents, businesses, cities, counties  | Incentivize use of GSI practices through demonstration projects (rainwater harvesting, permeable pavers, native and adapted plant gardens, etc.)   |
| Estimated Load Reductions  |  |
| BMPs recommended for lawn residue/waste seek to reduce the amount of organic matter, nutrients, and chemicals reaching waterbodies via stormwater runoff and irrigation. Although the LDC analysis revealed that load reductions were only needed in two monitored tributaries, urban/suburban landscaping byproducts are expected to increase as the watershed urbanizes. It is expected that several of the BMPs recommended for <i>E. coli</i> reductions will also reduce nutrient loading, by either a) confining the organic matter to a landfill, b) on-site retention and composting, or c) more efficient applications of lawn additives. In doing so, the amount of organic matter, nutrients, and other chemicals from lawn waste and residue entering waterways via runoff from rainfall or irrigation will be reduced at values proportional to those of <i>E. coli</i> . |  |
| <b>Effectiveness</b>   | Effectiveness varies depending on the BMP of interest, with direct removal/reductions possible with respect to proper lawn waste management, but less direct benefits from lawn chemical application training/management.  |
| <b>Certainty</b>   | Education on properly managing lawn waste is a low-cost solution that most individuals can adopt easily. Adoption of structural GSI that mitigates inputs and therefore waste at municipal, commercial, and residential spaces is a higher burden that may require further incentives.   |
| <b>Commitment</b>  | Homeowner adherence to lawn waste management protocols can be fleeting, dependent on perceptions of convenience, aesthetics, and understanding of negative impacts. Most homeowners understand the impacts of over-application of lawn additives, but may be uncomfortable with customizing their lawn care regimens even after receiving training to do so. Use of appropriate GSI BMPs that reduce waste can require higher upfront costs or retrofits that deter entities from utilization. |
| <b>Needs</b>   | Funding for development and delivery of educational resources, funding of demonstration projects in the watershed.   |

## 6.7 Summary of Expected Load Reductions

While reductions to watershed-wide *E. coli* loads are the primary goal of this WPP, stakeholders also chose to incorporate other water quality-related goals for the watershed. In many recent WPPs, education and outreach have become prominent components. While these can be effective means of achieving pollutant reductions, they are difficult to quantitatively measure due to the lengthy response time inherent to many BMPs that rely on behavioral change. The use of before/after surveys for these activities can be used to test knowledge gained but cannot predict what knowledge attendees will put into practice. Furthermore, any water quality improvements from education/outreach initiatives often run parallel to other recommended BMPs, particularly those targeted at reducing animal waste volumes through population control. These BMPs provide direct, and often the most significant, reductions to *E. coli* loads. Less prominent activities targeted at correction/removal of SSOs, as well as malfunctioning OSSFs, will provide some additional relief for systems stressed by excessive *E. coli* loads. The overall anticipated load reduction provided by the management measures is        MPN/yr.

There is an expectation that steps taken to physically reduce *E. coli* loads would inherently reduce both nutrient and sediment loads as well. Additionally, measures related to illegal dumping and lawn waste and residues will can reduce water quality concerns for nitrate and other pollutants. As indicated earlier, reductions of these nature are dependent on the level of participation, which cannot always be predicted or differentiated from the load reduction as a whole.

WPP recommendations associated with cover cropping and cattle stocking rate have been modeled for their potential to reduce nutrients and sediment yield (Appendix C). The anticipated nutrient load reduction of these recommendations is 3.68 percent for nitrate and 48.66 percent for total phosphorus. The anticipated sediment yield reduction of these practices is 72.86 percent.

## 7.0 Plan Implementation

The management recommendations of the EML WPP will require technical and financial assistance. Technical assistance from partner agencies, non-profit groups, and stakeholders will promote implementation of the broad scope of projects recommended by stakeholders. The level of assistance required will vary by management recommendation, as will the need for financial assistance. Financial assistance must be matched with eligible management recommendations. Because implementation will require many moving parts in terms of personnel and financing, the schedule must be flexible. Interim milestones may be needed to track progress and adjust implementation as necessary.

### 7.1 Technical Assistance

Possible sources of technical assistance include federal, state, and local government entities; nonprofit organizations; wastewater infrastructure operators; and HOAs and NAs. Staff or members of some of these entities have already participated in the WPP as stakeholders.

Sources of technical assistance will vary depending on pollutant source and management recommendations. Possible providers of technical assistance are listed for categories of pollutant sources:

**Livestock:** NRCS and FSA; AgriLife; nonprofit organizations.

**Pet Waste:** Cities and counties; councils of governments; HOAs and NAs

**Wastewater Infrastructure:** cities and counties; wastewater infrastructure operators; HOAs and NAs

**Sediment and Flooding:** USACE; cities and counties; AgriLife; councils of governments; nonprofit organizations

**Illegal Dumping and Litter Accumulation:** TRWD; cities and counties; councils of governments; nonprofit organizations; HOAs and NAs

**Lawn Residue and Waste:** TRWD; cities and counties; councils of governments; HOAs and NAs

The kinds of WPP-relevant technical assistance provided by these sources are described in Tables 6-1 through 6-7.

Technical assistance will be tied to financial assistance in some cases. For example, some NRCS programs provide both technical and financial assistance. These programs enable farmers and ranchers to implement conservation practices to improve water quality and reduce soil erosion and sedimentation.

### 7.2 Financial Assistance

Financial assistance is available as grants, loans, and in-kind contributions. TRWD will use in-kind contributions to fund staffing for as many EML WPP recommendations as possible. But additional financial assistance will be

essential given the scope of the WPP recommendations. TRWD will seek funding from federal, state, and non-profit organizations. The following funding sources were available at the time the WPP was submitted for review. Potential applicants should confirm funding availability and funding cycles, because they could be impacted by federal and state decision making. Useful websites to review available programs include:

**NRCS Programs & Initiatives:** <https://www.nrcs.usda.gov/programs-initiatives>

**FSA Fund a Program:** <https://www.fsa.usda.gov/resources/programs>

**EPA Grants:** <https://www.epa.gov/grants>

**National Fish and Wildlife Foundation:** <https://www.nfwf.org/programs>

**National Rural Water Association:** <https://nrwa.org/>

**TCEQ:** [https://www.tceq.texas.gov/agency/water\\_main.html](https://www.tceq.texas.gov/agency/water_main.html)

**TWDB Financial Assistance Programs:** <https://www.twdb.texas.gov/financial/programs/index.asp>

**TSSWCB:** <https://tsswcb.texas.gov/programs>

**TPWD:** <https://tpwd.texas.gov/landwater/land/private/>

The following list of financial assistance sources includes descriptions of practices funded under each program. The practices described are limited to practices relevant to implementing the WPP; most programs support a broader range of practices than described here.

### 7.2.1 USDA Financial Assistance

#### **Agricultural Conservation Easement Program (ACEP) -- Agricultural Land Easements (ALE)**

**Funder:** USDA/NRCS

**Eligibility:** Agricultural land owners, land trusts, state and local governments, and nongovernmental organizations

**Description:** Provides financial assistance to partners for purchasing Agricultural Land Easements that protect the agricultural use and conservation values of land.

**Funding Cycle:** Applications accepted year-round but see <https://www.nrcs.usda.gov/ranking-dates> for state-specific ranking dates. Competitive process.

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/ale-agricultural-land-easements>

#### **Agricultural Conservation Easement Program (ACEP) -- Wetland Reserve Easements (WRE)**

**Funder:** USDA/NRCS

**Eligibility:** American Indian tribes and agricultural land owners with farmed or converted wetlands

**Description:** Provides technical and financial assistance directly to private landowners and American Indian tribes to restore, enhance, and protect wetlands through the purchase of a wetland reserve easement.

**Funding Cycle:** Applications accepted year-round but see <https://www.nrcs.usda.gov/ranking-dates> for state-specific ranking dates. Competitive process.

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/wetland-reserve-easements>

#### **Conservation Innovation Grants (CIG)**

**Funder:** USDA/NRCS

**Eligibility:** State or local governments, federally recognized American Indian tribes, non-governmental organizations, and individuals

**Description:** Drives public- and private-sector innovation in resource conservation by developing tools, technologies, and strategies to support next-generation conservation efforts on working lands and supporting on-farm trials of innovative practices.

**Funding Cycle:** Competitive grants with variable timing for funding announcement; natural resource focus may vary from year to year

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/conservation-innovation-grants>

### **Conservation Reserve Program (CRP)**

**Funder:** USDA/Farm Service Agency (FSA)

**Eligibility:** Agricultural producers and landowners with environmentally sensitive land that meets criteria related to cropping history and environmental characteristics

**Description:** Provides rental payments and cost-share assistance to convert highly erodible and other environmentally sensitive acreage to vegetative cover, such as native grasses, trees, and riparian buffers.

**Funding Cycle:** Varies based on the type of signup; contact local FSA office

**Source:** <https://www.fsa.usda.gov/resources/programs/conservation-reserve-program>

### **Conservation Stewardship Program (CSP)**

**Funder:** USDA/NRCS

**Eligibility:** Farmers, ranchers, and forest landowners who own or rent agricultural land and have already been doing conservation work

**Description:** Compensates agricultural and forest producers who increase their level of conservation activities while maintaining their baseline level of conservation.

**Funding Cycle:** Applications accepted year-round but see <https://www.nrcs.usda.gov/ranking-dates> for state-specific ranking dates.

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/conservation-stewardship-program>

### **Environmental Quality Incentives Program (EQIP)**

**Funder:** USDA/NRCS

**Eligibility:** Farmers, ranchers, and forest landowners who own or rent agricultural land

**Description:** Provides technical and financial assistance to implement conservation practices that improve water and air quality; conserve ground and surface water; increase soil health and reduce soil erosion and sedimentation; improve or create wildlife habitat; and mitigate against drought and increasing weather volatility.

**Funding Cycle:** Applications accepted year-round but see <https://www.nrcs.usda.gov/ranking-dates> for state-specific ranking dates.

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/environmental-quality-incentives-program>

### **Farmable Wetlands Program (FWP)**

**Funder:** USDA/FSA

**Eligibility:** Farmers and landowners with previously cropped land suitable for wetland restoration

**Description:** Provides payments for restoration of farmable wetlands, including establishing vegetative cover and installing conservation structures to control water flow and improve habitat.

**Funding cycle:** Contact FSA

**Source:** <https://www.fsa.usda.gov/resources/programs/farmable-wetlands-program>

#### **Feral Swine Eradication and Control Pilot Program (FSCP)**

**Funder:** USDA/NRCS/Animal and Plant Health Inspection Service

**Eligibility:** State agencies, non-profit organizations, academic programs, and others in areas where feral swine have been identified as a threat

**Description:** Removes feral swine and provides restoration efforts and assistance to producers for feral swine control.

**Funding Cycle:** Contact USDA

**Source:** <https://www.nrcs.usda.gov/feral-swine-eradication-and-control-pilot-program>

#### **"Grassroots" Source Water Protection Program (SWPP)**

**Funder:** USDA/FSA/NRWA

**Eligibility:** Small water utilities, local businesses, agriculture, government, and others

**Description:** Identifies areas with need for pollution prevention and identifies voluntary actions farmers and ranchers can install to prevent source water pollution.

**Funding Cycle:** Contact local FSA office

**Source:** <https://nrwa.org/sourcewater-protection-program/>, <https://www.fsa.usda.gov/programs-and-services/conservation-programs/source-water-protection>

#### **Grazing Lands Conservation Initiative (GLCI)**

**Funder:** USDA/NRCS

**Eligibility:** Contact the National Grazing Lands Coordinator for information

**Description:** Leverages partner capacity, expertise, and technical assistance for livestock producers to increase the use of conservation practices on grazing lands.

**Funding Cycle:** Contact NRCS

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/grazing-lands-conservation-initiative>

#### **Joint Chiefs' Landscape Restoration Partnership (LRP)**

**Funder:** USDA/NRCS and U.S. Forest Service

**Eligibility:** States, agricultural producers, forest landowners, tribes, public land managers, non-governmental organizations

**Description:** Reduces wildfire threats to communities, protects water quality and supply, and improves wildlife habitat for at-risk species through collaborative partnerships on a landscape scale.

**Funding Cycle:** Contact local NRCS office or Forest Service contact

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/joint-chiefs-landscape-restoration-partnership>

#### **National Water Quality Initiative (NWQI)**

**Funder:** USDA/NRCS in partnership with state water quality agencies, local conservation districts, and EPA

**Eligibility:** Farmers, ranchers, and forest landowners in watersheds identified as impaired, threatened, or critical

**Description:** Identifies and address impaired water bodies through voluntary, on-farm conservation investments and focused water quality monitoring and assessment resources. Includes source water protection for surface and ground water public water systems.

**Funding Cycle:** Contact local NRCS office

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/national-water-quality-initiative>

### **Regenerative Pilot Program (RPP)**

**Funder:** USDA/NRCS

**Eligibility:** Farmers and ranchers

**Description:** Addresses whole-farm resource concerns through support for voluntary regenerative agriculture conservation plans by bundling regenerative practices into a single application. Associated with the EQIP and CSP programs.

**Funding Cycle:** Applications should be submitted by January 15, 2026. It's not clear if this program will be annual or is a one-time thing. Well, because it is a pilot program.

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/regenerative-pilot-program>

### **Regional Conservation Partnership Program (RCPP) Alternative Funding Arrangements (AFAs)**

**Funder:** USDA/NRCS

**Eligibility:** Agricultural or silvicultural producer associations, state or local governments, Indian tribes, farmer cooperatives, water districts or organizations that deliver water to agricultural producers, municipal water or wastewater treatment entities, institutes of higher education, organizations that have previously worked with NRCS, entities that have a farmland or grassland protection program that purchases land easements, conservation districts

**Description:** Reimburses partners for conservation activities done for or on behalf of producers, landowners, or other entities.

**Funding Cycle:** Contact local NRCS office

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/regional-conservation-partnership-program>

### **Regional Conservation Partnership Program (RCPP) Classic**

**Funder:** USDA/NRCS

**Eligibility:** Agricultural or silvicultural producer associations, state or local governments, Indian tribes, farmer cooperatives, water districts or organizations that deliver water to agricultural producers, municipal water or wastewater treatment entities, institutes of higher education, organizations that have previously worked with NRCS, entities that have a farmland or grassland protection program that purchases land easements, conservation districts

**Description:** Promotes public/private partnerships using NRCS contracts and easements with producers, landowners and communities, in collaboration with project partners.

**Funding Cycle:** Contact local NRCS office

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/regional-conservation-partnership-program>

### **Voluntary Public Access and Habitat Incentive Program (VPA-HIP)**

**Funder:** USDA/NRCS

**Eligibility:** State and tribal governments

**Description:** Helps state and tribal governments encourage landowners to allow public access to their land for hunting, fishing, and other wildlife-dependent recreation. Provides incentives to improve wildlife habitat on enrolled public access program lands.

**Funding Cycle:** Competitive grants program; contact USDA

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/voluntary-public-access-and-habitat-incentive-program>

### **Watershed Protection and Flood Prevention Operations (WFPO) Program**

**Funder:** USDA/NRCS

**Eligibility:** Units of federal, state, local, and federally recognized tribal governments

**Description:** Plans and implements watershed programs related to watershed protection, flood prevention, municipal water supply, water quality management, public fish and wildlife, and other benefits. Agricultural benefits, including rural communities, must be  $\geq 20\%$  of the total benefits for the project. Includes conservation easements for wetlands or floodplains.

**Funding Cycle:** Contact local NRCS office

**Source:** <https://www.nrcs.usda.gov/programs-initiatives/watershed-protection-and-flood-prevention-operations-program>

## **7.2.2 EPA Financial Assistance**

### **Clean Water Act Section 319(h) (CWA §319)**

**Funder:** EPA

**Eligibility:** Designated state and tribal agencies

**Description:** Supports nonpoint source management programs, including technical assistance, financial assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects.

**Funding Cycle:** Annual formula funds

**Source:** <https://www.epa.gov/nps/cwa-ss319-grant-current-guidance>

### **Environmental Education (EE) Grants**

**Funder:** EPA

**Eligibility:** Local education agencies, state education or environmental agencies, colleges or universities, non-profit organizations, non-commercial educational broadcasting entities, tribal education agencies

**Description:** Promotes environmental awareness and stewardship and helps provide people with the skills to take responsible actions to protect the environment. Environmental priorities can vary from year to year.

**Funding Cycle:** Notice of funding opportunity issued annually

**Source:** <https://www.epa.gov/education/grants>

### **Midsize and Large Drinking Water System Infrastructure Resilience and Sustainability Program (IRSP)**

**Funder:** EPA

**Eligibility:** Medium and large size public water systems

**Description:** Funds programs or projects that increase the resilience of public water systems to natural hazards, including drinking water infrastructure resiliency measures against natural hazards.

**Funding Cycle:** Contact EPA

**Source:** <https://www.epa.gov/dwcapacity/midsize-and-large-drinking-water-system-infrastructure-resilience-and-sustainability#Eligible%20Applicants>

### **Water Pollution Control (Section 106) Grant Program**

**Funder:** EPA

**Eligibility:** States, interstate agencies, and eligible tribes

**Description:** Supports water pollution prevention and control programs and activities, including monitoring and assessing water quality, developing water quality standards, identifying impaired waters and TMDLs, protecting source water, and managing outreach and education programs.

**Funding Cycle:** Formula funds provided annually to states and interstate agencies

**Source:** <https://www.epa.gov/water-pollution-control-section-106-grants>

### **Wetland Program Development Grants (WPDGs)**

**Funder:** EPA

**Eligibility:** States, tribes, local governments, interstate associations, and intertribal consortia are eligible to apply for the Regional WPDG requests for proposals (RFPs); nonprofits, interstate associations, and intertribal consortia are eligible to apply for the National WPDG RFPs

**Description:** Promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys and studies relating to the causes, effects, extent, prevention, reduction and elimination of water pollution

**Funding Cycle:** RFPs typically issued in the spring time

**Source:** <https://www.epa.gov/wetlands/wetland-program-development-grants-and-epa-wetlands-grant-coordinators>

## **7.2.3 National Fish and Wildlife Foundation**

### **America's Ecosystem Restoration Initiative (AERI)/Private Forests, Rangeland and Farmland Grants**

**Funder:** NFWF and public and private partners

**Eligibility:** Nonprofit organizations, states, tribal nations, territories, local and municipal governments, and educational institutions

**Description:** Supports outreach and engagement with private landowners for voluntary conservation efforts on working lands

**Funding Cycle:** Contact National Fish and Wildlife Foundation

**Source:** <https://www.nfwf.org/programs/americas-ecosystem-restoration-initiative?activeTab=tab-3>

### **Conservation Partners Program (CPP)**

**Funder:** National Fish and Wildlife Foundation and public and private partners

**Eligibility:** Non-profit 501(c) organizations, state government agencies, local governments, municipal governments, tribal governments and organizations, and educational institutions serving geographic focus areas, including the Great Plains in Texas

**Description:** Accelerates the adoption of regenerative agriculture principles and conservation practices on private lands at a landscape scale; provides technical assistance to landowners and operators, including assistance to enroll in Farm Bill conservation programs.

**Funding Cycle:** Contact National Fish and Wildlife Foundation

**Source:** <https://www.nfwf.org/programs/conservation-partners-program>

#### **Five Star and Urban Waters Restoration Program (5SUWRP)**

**Funder:** National Fish and Wildlife Foundation (NFWF) and public and private partners

**Eligibility:** Local governments, universities, school districts, nonprofit organizations, and others

**Description:** Funds on-the-ground restoration or green infrastructure activities that integrate education, outreach, and training; community partnerships for ecological and educational outcomes; and measurable benefits.

**Funding Cycle:** Contact National Fish and Wildlife Foundation

**Source:** <https://www.nfwf.org/programs/five-star-program?activeTab=tab-3>

#### **Grassland Resilience and Conservation Initiative (GRCI)**

**Funder:** NFWF and public and private partners

**Eligibility:** NFWF partner organizations (may expand in future years) serving grasslands including the Great Plains

**Description:** Funds projects that provide technical and financial assistance to ranchers seeking to adopt voluntary conservation and grazing management practices. Grantees will hire or support field conservation professionals to help ranchers develop and implement economically sound management plans and practices.

**Funding Cycle:** Contact National Fish and Wildlife Foundation

**Source:** <https://www.nfwf.org/programs/grassland-resilience-and-conservation-initiative?activeTab=tab-3>

### **7.2.4 U.S. Department of Housing and Urban Development**

#### **Community Development Block Grant (CDBG) Program**

**Funder:** U.S. Department of Housing and Urban Development

**Eligibility:** Qualified cities, qualified urban counties, states

**Description:** Supports acquisition of real property and construction of water and sewer facilities.

**Funding Cycle:** Annual grants

**Source:** <https://www.hud.gov/hud-partners/community-cdbg#top>

### **7.2.5 National Rural Water Association**

#### **Decentralized Wastewater Technical Assistance and Training Program (DWTATP)**

**Funder:** National Rural Water Association (NRWA)

**Eligibility:** Small and rural communities

**Description:** Identifies solutions to community water and wastewater problems and assists with improving management and operations of wastewater systems

**Funding Cycle:** Contact NRWA

**Source:** <https://nrwa.org/decentralized-wastewater-technical-assistance-and-training-program/>

## 7.2.6 Texas Commission on Environmental Quality

### **Supplemental Environmental Projects (SEP) Program**

**Funder:** Respondent or eligible and financially qualified local governments

**Eligibility:** Businesses or individuals who have failed to comply with environmental laws and are facing an enforcement settlement.

**Description:** Funds TCEQ-approved environmental projects to offset assessed penalties in enforcement actions. Respondent can contribute to a pre-approved SEP performed by a third party; respondent can perform the project with their own resources; or an eligible local government may correct alleged violations or remediate environmental harm caused by alleged violations.

**Funding Cycle:** Contact TCEQ

**Source:** <https://www.tceq.texas.gov/compliance/enforcement/sep>

### **Texas Clean Rivers Program (TCRP)**

**Funder:** TCEQ

**Eligibility:** River authorities

**Description:** Identifies and evaluates water quality issues, establishes priorities for corrective action, works to implement those actions, and adapts to changing priorities.

**Funding Cycle:** Contact TCEQ

**Source:** <https://www.tceq.texas.gov/waterquality/clean-rivers/index.html#Fund>

## 7.2.7 Texas Water Development Board

### **Agricultural Water Conservation Grant and Loan Programs (AWCG)**

**Funder:** TWDB

**Eligibility:** State agencies and political subdivisions

**Description:** Funds agricultural water conservation programs and projects, including technical assistance, technology transfer, demonstrations, education and preparation of dry land for more efficient use of natural precipitation.

**Funding Cycle:** Closes in March

**Source:** <https://www.twdb.texas.gov/financial/programs/AWCG/index.asp>

### **Clean Water State Revolving Fund (CWSRF)**

**Funder:** EPA/TWDB

**Eligibility:** Political subdivisions, federally authorized tribal organizations, private entities (for nonpoint source or estuary projects only)

**Description:** Provides low-cost financing for wastewater, stormwater, reuse, and other pollution control projects, including stormwater control, nonpoint source pollution control projects such as failing on-site systems, wetlands restoration, conservation easements, and agricultural BMPs.

**Funding Cycle:** Opens in December of every year and closes in March of the following year

**Source:** <https://www.twdb.texas.gov/financial/programs/CWSRF/>, <https://www.epa.gov/cwsrf/clean-water-state-revolving-fund-cwsrf-agricultural-best-management-practices>

### **Drinking Water State Revolving Fund (DWSRF) Loan Program**

**Funder:** EPA/TWDB

**Eligibility:** Publicly and privately owned community water systems; nonprofit water supply corporations; nonprofit, noncommunity public water systems; state agencies

**Description:** Provides low-cost financing for water projects that facilitate compliance with drinking water standards, including implementing green projects (pursuant to EPA guidance) and source water protection projects. Projects must be consistent with the State Water Plan.

**Funding Cycle:** Opens in December of every year and closes in March of the following year

**Source:** <https://www.twdb.texas.gov/financial/programs/DWSRF/index.asp>

### **Economically Distressed Areas Program (EDAP)**

**Funder:** TWDB

**Eligibility:** Cities, counties, water districts, nonprofit water supply corporations, and all other political subdivisions; projects must be located in an economically distressed area as defined by TWDB.

**Description:** Provides loans to address failing on-site sewage systems or wells or for existing water or wastewater systems that do not meet minimum state standards.

**Funding Cycle:** Contact TWDB

**Source:** <https://www.twdb.texas.gov/financial/programs/EDAP/index.asp>

### **Rural Water Assistance Fund (RWF)**

**Funder:** TWDB

**Eligibility:** Rural political subdivisions

**Description:** Assists small rural utilities to obtain low-cost financing for water and wastewater projects, including water quality enhancements such as wetland wastewater treatment facilities and nonpoint source pollution abatement.

**Funding Cycle:** Not currently accepting applications; contact TWDB this may have been one-time funding

**Source:** <https://www.twdb.texas.gov/financial/programs/RWF/index.asp>

### **Texas Water Development Fund (DFund)**

**Funder:** TWDB

**Eligibility:** Political subdivisions of the state, including cities, counties, districts, and river authorities

**Description:** Funds planning, design, and construction for water supply and wastewater projects and for structural and nonstructural flood protection improvements. Wastewater projects include nonpoint source pollution abatement.

**Funding Cycle:** Closes in December

**Source:** <https://www.twdb.texas.gov/financial/programs/TWDF/index.asp>

### **Water Supply and Infrastructure Grants (WSIG)**

**Funder:** TWDB

**Eligibility:** Cities, districts, counties, river authorities, and other political subdivisions

**Description:** Funds projects that address water loss, a TCEQ violation, or provide additional water supply, including source water protection through land acquisition and conservation (the latter for population sizes no larger than 150,000). Projects must be consistent with the 2027 State Water Plan.

**Funding Cycle:** One-time opportunity with applications due July 2026

**Source:** <https://www.twdb.texas.gov/financial/programs/WSIG/index.asp>

## 7.2.8 Texas State Soil and Water Conservation Board

### **Water Quality Management Plan Program (WQMP)**

**Funder:** TSSWCB

**Eligibility:** Owners of agricultural or silvicultural lands

**Description:** Assists with developing a WQMP for a landowner; provides cost-shares for implementing strategies from WQMPs.

**Funding Cycle:** Contact TSSWCB

**Source:** <https://tsswcb.texas.gov/programs/water-quality-management-plan>

### **Water Supply Enhancement Program (WSEP)**

**Funder:** TSSWCB

**Eligibility:** not clear

**Description:** Uses a competitive grant process to implement targeted brush control of species that are detrimental to water conservation.

**Funding Cycle:** not clear

**Source:** <https://tsswcb.texas.gov/programs/water-supply-enhancement-program>

## 7.2.9 Texas Parks and Wildlife Department

### **Landowner Incentive Program (LIP)**

**Funder:** TPWD

**Eligibility:** Privet, non-federal landowners

**Description:** Funds projects that enhance and protect wildlife habitat and/or enhance target watersheds. Common practices include native plant restoration, control of exotic vegetation, prescribed burning, selective brush management, wetland enhancement, riparian restoration, and forest stand improvement.

**Funding Cycle:** Contact TPWD

**Source:** <https://tpwd.texas.gov/landwater/land/private/lip/>

### **Texas Farm and Ranch Lands Conservation Program (TFRLCP)**

**Funder:** TPWD

**Eligibility:** Agricultural land owners

**Description:** Maintains and enhances the ecological and agricultural productivity of working lands through Agricultural Conservation Easements.

**Funding Cycle:** The next funding cycle will open in July 2027

**Source:** <https://tpwd.texas.gov/landwater/land/private/farm-and-ranch/>

### 7.2.10 Texas Department of Agriculture

**Funder:** U.S. Department of Housing and Urban Development

**Eligibility:** Non-entitlement cities under 50,000 in population and non-entitlement counties with a non-metropolitan population under 200,000 in the non-entitlement cities and unincorporated areas of the county

**Description:** Supports public improvement projects including water/sewer improvements.

**Funding Cycle:** Two-year application cycle

**Source:** <https://texasagriculture.gov/Grants-Services/Rural-Economic-Development/-TxCDBG-Rural-Community-Development-Block-Grant>

### 7.2.11 Councils of Governments

**Funder:** Nortex Regional Planning Commission/Texas Commission on Environmental Quality

**Eligibility:** Cities, counties, public schools and school districts, general and special law districts with authority and responsibility for water quality protection or municipal solid waste management; must be within Nortex's 11-county region

**Description:** Funds local and regional implementation of solid waste projects, plans, studies, enforcement, cleanups, and education and training.

**Funding Cycle:** Call for projects every two years

**Source:** <https://nortexrpc.org/>

**Funder:** North Central Texas Council of Governments/Texas Commission on Environmental Quality

**Eligibility:** Cities, counties, public schools and school districts, general and special law districts with authority and responsibility for water quality protection or municipal solid waste management; must be within NCTCOG's 16-county region

**Description:** Funds local and regional implementation of solid waste projects, plans, studies, enforcement, cleanups, and education and training.

**Funding Cycle:** Call for projects every two years

**Source:** <https://www.nctcog.org/envir/Materials-Management/Grants>

### 7.2.12 Private Funding Sources

#### Member Collective Grants (MCG)

**Funder:** The Conservation Alliance

**Eligibility:** Local and national nonprofit organizations, Tribes, and groups with fiscal sponsorship

**Description:** Funds projects that establish long-term protection for land and/or water or that support management processes and planning that promote the climate resiliency and biodiversity of protected areas.

**Funding Cycle:** Annual

**Source:** <https://conservationalliance.com/member-collective-grants/>

#### **The Cynthia & George Mitchell Foundation (CGMF) Grant**

**Funder:** The Cynthia & George Mitchell Foundation

**Eligibility:** 501(c)(3) public charities

**Description:** Funds projects related to conservation including capacity building and finance and stewardship incentives; sustainability education; and water, including water quality.

**Funding Cycle:** Submit a Letter of Inquiry

**Source:** <https://cgmf.org/p/home.html>

#### **Environmental Fund of Texas (EFT) Grant**

**Funder:** Environmental Fund of Texas

**Eligibility:** 501(c)(3) charities; public, tax-exempt schools for teacher projects

**Description:** Supports projects that engage volunteers and local communities in on-the-ground conservation action related to protecting natural water sources and their watersheds; protecting, restoring, and providing stewardship of ecologically functional natural areas; protecting and sustaining native, at-risk wildlife; and engaging local classrooms, teachers, and students in conservation action.

**Funding Cycle:** Year-round

**Source:** <https://www.efundtexas.org/grant-guidelines>

#### **Communities Foundation of Texas (CFT) Community Grants**

**Funder:** Communities Foundation of Texas

**Eligibility:** 501(c)(3) tax-exempt designation from the Internal Revenue Service that has been active for at least two years; serves population in the broader North Texas area

**Description:** Provides resources to nonprofits to help them achieve their missions.

**Funding Cycle:** Contact CFT

**Source:** <https://www.cftexas.org/nonprofits/>

### **7.3 Schedule, Interim Milestones, and Estimated Costs**

Implementation is planned to occur over 10 years. The implementation schedule, however, is subject to funding availability. The schedule also is subject to factors such as staff turnover and delayed project initiation. Modifications to the planned 10-year implementation schedule and list of feasible BMPs may be necessary.

Early emphasis for implementation will be on projects that have lower management needs, favorable cost-to-benefit ratios, and the ability to significantly reduce loadings for *E. coli* and other contaminants. These “low-hanging fruits” are often projects that have been widely utilized across the state or nation with documented and significant positive influence on water quality. If further reductions are required after implementation of these projects, stakeholders may choose to proceed with incrementally less favorable, more cumbersome, or more costly methods of load reduction.

Table 7-1 identifies an implementation schedule and estimated costs for each management measure recommended in Tables 6-1 through 6-7. Potential funding sources are identified by the acronyms provided in

Section 7.2. Estimated costs are just that – planning-level estimates. Costs for time and materials are subject to change over time. Management measures that are considered an existing part of staff responsibilities do not include costs for staff hours. TRWD will develop detailed implementation budgets for management measures closer to implementation; in some cases, these budgets will be necessary to apply for funding.

**TABLE 7-1 GOES HERE**

## 7.4 Synergies with Existing and Ongoing Water Quality Initiatives

EML implementation efforts may overlap ongoing water quality and environmental initiatives led by other entities within the watershed. Participants in the EML WPP will do their best to identify these other initiatives to reduce duplication of efforts, avoid division of resources, and uncover opportunities for collaboration. Stakeholders should also be aware of the MS4-related activities currently being required of all the Phase I and Phase II entities in the watershed. This should be done to ensure that no grant funding is being used to conduct activities already required by an entity’s MS4 permit. Section 319 funds cannot be used to fund any measures in the MS4 permits but can potentially be used to fund stormwater management activities that go above and beyond permit requirements (EPA, 2024).

## 8.0 Measuring Success

The EML WPP recommends water quality targets and interim milestones to measure the success of WPP implementation. These targets include quantified reductions in *E. coli*, quantified implementation of BMPs, and more qualitative outputs. Stakeholders will receive annual updates and an opportunity to revise BMPs based on demonstrated feasibility and success.

### 8.1 Water Quality Targets and Interim Milestones

Modeling and stakeholder input was used to identify and prioritize potential pollutant sources and management practices in Table 4-1. Stakeholder decision-making was influenced by feasibility in addition to model outputs. This led to stakeholders creating three tiers to prioritize implementation.

First-tier prioritizations for pollutant sources include livestock/cattle, OSSFs, WWTFs, and SSOs. Second-tier pollutant sources include pet waste, yard waste, illegal dumping, and sediment and flooding. Third-tier pollutant sources include wildlife and feral hogs, which generated negligible pollutant loads according to SELECT modeling; these pollutant sources will not be addressed in the EML WPP.

Feasibility again influenced stakeholder recommendations for water quality targets and milestones for *E. coli*. Modeling to estimate MPN/year reductions is documented in Appendix C.

## 8.1.2 Animal Sources

Stakeholders identified animal sources of *E. coli* as a first-tier priority (livestock) and second-tier priority (pet waste). Wildlife and feral hogs were considered third-tier priorities; targets and milestones have not been developed for these pollutant sources.

### 8.1.2.1 Livestock

Stakeholders provided input on cattle stocking rate changes and grazing management, a first-tier priority. Table 4-3 demonstrates stocking rates in the EML watershed; these rates generally exceed those recommended by NRCS. Stakeholders were hesitant to recommend reduced stocking rates because of the impact this would have on agricultural producers' incomes. Instead, they recommended alternative strategies that could provide an *E. coli* reduction equivalent to reducing stocking rates by 25 percent. Strategies recommended included:

- Promoting the wildlife tax valuation (Section 1-d-1 of the Texas Constitution) to landowners to allow lower stocking rates than those required to meet agricultural tax valuations
- Educating ranchers and assisting construction of lagoons and restoration of agricultural riparian buffers
- Improving land management practices, including adopting rotational grazing and reducing the duration livestock spend in water sources

The EML WPP recommends livestock management practices that will accomplish the water quality benefit equivalent to reducing stocking rates by 25 percent. This strategy would provide an *E. coli* reduction of 9.8 MPN/yr\*10<sup>15</sup> in the watershed.

A Year Five interim milestone is 4.36 MPN/yr\*10<sup>15</sup>, based on the implementation timeline in Table 7-1.

### 8.1.2.2 Pet Waste

Stakeholders were split between recommending a 50 percent or 80 percent reduction in pet waste, a second-tier priority. Educational programs already exist, such as NCTCOG's "Doo the Right Thing" campaign. This program engages dog owners via a social media campaign and annual photo contest.

The EML WPP recommends a/n 50/80 percent reduction in pet waste. The EML WPP assumes some pet owners are already picking up pet waste, so an 80 percent reduction is feasible. \*or\* The EML WPP notes the individual compliance required to reduce pet waste and selects a 50 percent reduction as feasible. This reduction would provide an *E. coli* reduction of 6.13 MPN/yr\*10<sup>15</sup> \*or\* 9.80 MPN/yr\*10<sup>15</sup> in the watershed.

A Year Five interim milestone is 2.85 MPN/yr\*10<sup>15</sup> \*or\* 4.9 MPN/yr\*10<sup>15</sup>, based on the implementation timeline in Table 7-1.

## 8.1.3 Wastewater

All wastewater-related pollutant loads are a first-tier priority for stakeholders, who identified partners and strategies for addressing failings of this infrastructure.

### 8.1.3.1 On-Site Sewer Facilities

The estimated failure rate in the EML watershed according to septic drainfield limitation class was assumed to be 15 percent (Appendix C). Non-permitted systems have a failure rate of up to 50% (Reed et al 2001).

Stakeholders provided input on improvements to these failure rates. They recommended the WPP seek reduction to a 10 percent failure rate/5 percent failure rate. However, they noted the challenge of identifying failing OSSFs because non-permitted OSSFs in the watershed are not on record. The development of regulations, such as state laws, also was noted as a potential option for creating mechanisms to identify non-compliant sites. HOAs and local pumping services were identified as potential partners in identifying failing OSSFs. Stakeholders also noted that financial incentives to repair or replace failing systems could encourage residents to self-report. Stakeholders believed reducing the OSSF failure rate would be a cost-effective strategy.

The EML WPP recommends a reduction of the OSSF failure rate from 15 percent to 10 percent/5 percent. This would require repairs or replacements of 1,350/2,700 failing OSSFs to provide an *E. coli* reduction of 8.5 MPN/yr\*10<sup>15</sup> /17.0 MPN/yr\*10<sup>15</sup> in the watershed.

A Year Five interim milestone was selected by stakeholders. This goal is \_\_\_\_\_.

#### 8.1.3.2 Centralized Wastewater

Stakeholders provided qualitative input on WWTF violations. Stakeholders noted that a focus should be on preventing inflow and infiltration violations during storms.

The EML WPP recommends practices such as stormwater infrastructure assessments, proactive efforts to address effluent violations, and use of green stormwater infrastructure to reduce stormwater runoff and the risk of inflow and infiltration violations. *E. coli* reductions for WWTFs and SSOs are qualitative because these violations are sporadic, but the number of actions taken can be quantified, including education and outreach and the installation of GSI. The EML WPP recommends annual education and outreach efforts and the installation of 18 GSI locations.

A Year Five interim milestone per Table 7-1 includes five completed annual education and outreach efforts and eight installed GSI locations.

#### 8.1.4 Sediment and Flooding

The EML WPP focuses on reducing *E. coli*. However, the format of WPPs allows them to address additional concerns in the watershed.

##### 8.1.4.1 Sediment

While *E. coli* transport is associated with sediment, sediment is also of interest to stakeholders and TRWD because increasing sediment in reservoirs reduces their capacity to store raw water.

One strategy to reduce the runoff of sediment into EML is to increase the use of cover crops by agricultural producers. Stakeholders recommended a 25 percent increase in row crop acreage utilizing cover crops. Stakeholders noted the benefits cover crops provide to producers and suggested these benefits could improve adoption rates. Stakeholders suggested partnering with NRCS, SWCDs, extension agents, and non-profit organizations. They suggested creating demonstration projects to illustrate benefits.

The EML WPP recommends a 25 percent increase in pasture land acreage using cover crops. This increase is modeled in SELECT to yield a 71.10 percent decrease in sediment yield, a 27.95 percent decrease in TP, but a 5.23% increase in NO<sub>3</sub>. Any corresponding impact on E. coli is not modeled in SELECT.

The recommended 25 percent reduction in stocking rates, or alternate strategies that produce equivalent results in sediment runoff as discussed in 8.1.2.1, is modeled to yield a 1.76 percent reduction sediment yield, a 20.71% reduction in TP, and an 8.91% reduction in NO<sub>3</sub>.

A Year Five interim milestone is a 0.78 percent reduction in sediment yield, based the implementation timeline in Table 7-1.

#### *8.1.4.2 Flooding*

Flooding can result in exceedances at high flows. These exceedances are considered inherently unmanageable, and flood control is generally outside the scope of the WPP. However, portions of the EML watershed are within the study area of a flood study led by NCTCOG. The Upper Trinity River Transportation and Stormwater Infrastructure Project is expected to be completed in December 2026. The study will recommend flood-prevention strategies. The EML WPP recommends adoption of these strategies as feasible to support flooding and water quality benefits.

### **8.1.5 Human Activities**

Human activities related to trash and yard waste were both second-tier priorities for stakeholders.

#### *8.1.5.1 Illegal Dumping and Litter Accumulation*

To address illegal dumping and litter accumulation, stakeholders recommended two strategies to address these issues:

- Creating a hotline to report illegal dumping sites coupled with signs in locations where dumping occurs
- Increasing public awareness of Trash Bash events to improve public participation and support for watershed protection

Illegal dumping reductions on *E. coli* are qualitative because they are challenging to quantify and are not accounted for in SELECT. However, implementation actions can be quantified.

The WPP recommends implementing annual Trash Bashes and other TRWD litter-related public engagement programs for a total of 15 events/programs; 81 hazardous/electrical/tire waste pickups; and 10 education and outreach programs.

A Year Five interim milestone per Table 7-1 includes 8-9 Trash Bashes and other TRWD litter-related public engagement programs; 36 hazardous/electrical/tire waste pickups; and 5 education and outreach programs.

#### *8.1.5.2 Yard Waste and Residue*

Stakeholders also identified yard waste and residue as second-tier priorities. They identified education and outreach as key strategies to reduce pollution from yard waste and residue. Like illegal dumping yard waste and residue reductions are not accounted for in SELECT. Therefore, they yard waste and residue reductions on *E. coli* are qualitative, but their implementation actions can be quantified.

The EML WPP recommends actions such as education and outreach, public programming, and demonstration projects.

A Year Five interim milestone per Table 7-1 includes five education and outreach programs, four workshops, and four demonstration projects.

## 8.2 Water Quality Monitoring

TRWD conducts quarterly water quality monitoring of five sites in EML and at 10 sites on the West Fork of the Trinity River as indicated in Table 5-1. Quarterly monitoring also occurs on a rotating basis at 10 WWTFs. TRWD conducts monthly testing on five sites in EML tributaries, one of which duplicates a West Fork site. All sites monitor *E. coli*.

This quarterly and monthly monitoring regime will continue throughout the EML WPP implementation period. Where USGS gages are available, flow data during mid-range flows will enable the use of LDCs to verify whether nonpoint sources are the likely contributor to pollutant loads. These sites are identified in Table 8-1.

Table 8-1 SWQM Stations and USGS Gages for Load Duration Curves

| Location                                    | SWQM Station | USGS Gage |
|---|--------------|-----------|
| West Fork Trinity River NE of Boyd near 730 | 10969        | 8044500   |
| Walnut Creek west of Reno near FM1542       | 10853        | 8044800   |
| Big Sandy Creek at US380                    | 15688        | 8044000   |

Monitoring results are reported to TCEQ and incorporated into the Texas IR. Assuming implementation is launched in the EML watershed in 2027, results of BMPs could be reflected in the Texas IR in the mid- to late-2030s.

For the purposes of the WPP, site 10969 on the West Fork Trinity River will be used to monitor progress. This is the most important tributary site for understanding pollutant loading in EML because of the drainage it collects.

## 8.3 BMP Implementation

Several pollutant sources identified by stakeholders may indirectly reduce *E. coli* in ways that cannot be monitored, or their benefits may otherwise not be modeled using SELECT. These pollutant sources include:

- WWTFs
- SSOs
- Sediment and flooding
- Illegal dumping and litter accumulation
- Lawn residue and waste

The success of strategies to address these pollutant sources will be monitored qualitatively or will be monitored quantitatively by identifying the number of implementation actions taken. TRWD's watershed coordinator will coordinate with implementing partners to track reductions of these pollutant sources.

## 8.4 Progress Updates

TRWD's watershed coordinator will communicate progress to stakeholders on an annual basis via email updates and/or stakeholder meetings. Meetings will take place in year 5 and any year monitoring results indicate change may be necessary in the implementation plan.

The goal of the EML WPP is to attain *E. coli* load reductions of \_\_\_ MPN/yr\*10<sup>15</sup> over a 10-year implementation timeline. The implementation timeline identifies an interim, five-year goal of *E. coli* load reductions of \_\_\_ MPN/yr\*10<sup>15</sup>.

However, progress can be hampered by factors beyond TRWD and stakeholder control. Funding limitations or delays in acquiring funding, staff turnover, and landowner or pet owner resistance to implementing change could all delay the recommended improvements in water quality. It is understood that the commitment to reducing *E. coli* is a long-term one, and strategies may need to evolve over time.

## 8.5 Adaptive Management

Adaptive management allows the WPP to set goals, take initial actions, monitor the watershed's response to those actions, evaluate progress toward the goals and, if necessary, identify additional actions that will be taken until the final goal is accomplished. This process requires the input of watershed stakeholders.

Annual communications with stakeholders will be an opportunity to review and modify the WPP's recommended strategies, both for feasibility and success. Feasibility can be evaluated by success in acquiring funding and the number of implementation actions taken. Success can be evaluated by the number of implementation actions taken as well, but analyzing water quality data will be another important means to evaluating success of the WPP.

Challenges exist. Water quality data and modeling may be unable to identify cause and effect between specific BMPs and results. Time lags between actions and results can further obscure these connections. For these reasons, watershed planning requires a long-term commitment and cooperation between partners and jurisdictions.

## Relevant Tables from Appendix C Load Reduction Strategies for the Eagle Mountain Watershed

Table 1. Increase in cover crop area and corresponding average reductions in NO<sub>3</sub>, TP, and sediment yield (SYLD) across the Eagle Mountain watershed.

| Increase   | Area (acres) | NO <sub>3</sub> % Change | TP % Change    | SYLD % Change  |
|------------|--------------|--------------------------|----------------|----------------|
| 15%        | 2,996        | 3.63%                    | -20.64%        | -55.39%        |
| <b>25%</b> | <b>3,281</b> | <b>5.23%</b>             | <b>-27.95%</b> | <b>-71.10%</b> |
| 40%        | 3,680        | 7.29%                    | -35.57%        | -74.49%        |

Table 4. Modification in cattle stocking rate and corresponding average reductions in NO<sub>3</sub>, TP, and sediment yield (SYLD) across the Eagle Mountain watershed.

| % Modification | Stocking Rate (acres/head) | NO <sub>3</sub> % Change | TP % Change    | SYLD % Change |
|----------------|----------------------------|--------------------------|----------------|---------------|
| 15%            | 8.7                        | -5.54%                   | -12.49%        | -0.84%        |
| <b>25%</b>     | <b>9.9</b>                 | <b>-8.91%</b>            | <b>-20.71%</b> | <b>-1.76%</b> |
| 40%            | 12.4                       | -13.56%                  | -32.98%        | -4.04%        |

Table 12. The amount of potential reduction in loading for changes in cattle stocking rates (MPN/yr\*10<sup>15</sup>).

| Stock Rate Reductions | E.coli Reduction (MPN/yr*10 <sup>15</sup> ) |   |                    |                 |           |
|-----------------------|---|---|--------------------|-----------------|-----------|
|                       | WF Trinity River Near Boyd (WFTR4)          | WF Trinity River at Bobo Bridge (WFTR5) | Walnut Creek (WC1) | Ash Creek (AC1) | Watershed |
| 25%                   | 9.8   | 10.7                                    | 0.8                | 0.3             | 12.6      |
| 50%                   | 19.7  | 21.4                                    | 1.7                | 0.6             | 25.3      |
| 75%                   | 29.5  | 32.1                                    | 2.5                | 0.8             | 37.9      |

Table 14. The amount of potential reduction in E.coli loading for reduced OSSF fail rates MPN/yr\*10<sup>15</sup>.

| OSSF Failure Rate Reduction (Target Failure Rates) | E.coli Reduction (MPN/yr*10 <sup>15</sup> ) |   |                    |                 |           |
|--|---|---|--------------------|-----------------|-----------|
|  | WF Trinity River Near Boyd (WFTR4)          | WF Trinity River at Bobo Bridge (WFTR5) | Walnut Creek (WC1) | Ash Creek (AC1) | Watershed |
| 10%  | 8.5   | 10.6                                    | 4.6                | 1.8             | 20.6      |
| <b>5%</b>  | <b>17.0</b>                                 | 21.2                                    | 9.3                | 3.7             | 41.1      |

Table 16. The amount of potential reduction in *E.coli* loading for various amounts of pet reduction in MPN/yr\*10<sup>15</sup>.

| Pet (Waste) Reduction | <i>E.coli</i> Reduction (MPN/yr*10 <sup>15</sup> ) |   |                    |                 |           |
|-----------------------|--|---|--------------------|-----------------|-----------|
|                       | WF Trinity River Near Boyd (WFTR4)                 | WF Trinity River at Bobo Bridge (WFTR5) | Walnut Creek (WC1) | Ash Creek (AC1) | Watershed |
| 50%                   | 6.13   | 7.14                                    | 1.89               | 1.63            | 15.81     |
| 80%                   | 9.80   | 11.43                                   | 3.03               | 2.61            | 25.30     |

DRAFT

Table 7-1 Implementation Plan

| Management Measure  | Responsible Party                                      | Unit Cost (\$) <sup>1,2</sup> | Units Implemented by Years |     |     |     |      | Total Cost (\$) <sup>3</sup>         | Potential Funding Sources  |
|---|--|-------------------------------|----------------------------|-----|-----|-----|------|--------------------------------------|--|
|   |  |                               | 1-2                        | 3-4 | 5-6 | 7-8 | 9-10 |                                      |  |
| <b>Livestock</b>  |  |                               |                            |     |     |     |      |                                      |  |
| WQMPs and CPs   | Producers, NRCS, SWCDs                                 | \$17,000                      | 3                          | 6   | 6   | 6   | 6    | \$459,000                            | WQMP, CRP, CSP, EQIP, SWPP, GLCI, NWQI, RPP, RCPP/AFA, RCPP, VPA-HIP, WFPO, CWA §319, IRSP, AERI, CPP, 5SUWRP, GRCI, TCRP, AWCG, WQMP, WSEP, LIP, TFRLCP, MCG, CGMF, EFT |
| Education and outreach programs   | Producers, hobby farmers, NRCS, SWCDs, nonprofits      | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | ACEP, WRE, CIG, EQIP, SWPP, GLCI, NWQI, RCPP/AFA, RCPP, VPA-HIP, WFPO, CWA §319, EE, Section 106, WPDG, AERI, CPP, 5SUWRP, GRCI, AWCG, WQMP, CGMF, EFT, CFT              |
| <b>Pet Waste</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Education and outreach general  | Cities, counties, NCTCOG, regional entities, residents | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | CWA §319, EE, Section 106, 5SUWRP, CGMF, EFT, CFT  |
| Pet waste ordinance/regulation adoption                                     | Cities, counties                                       | N/A                           | As early as feasible       |     |     |     |      | N/A                                  | N/A  |
| Materials for pet waste station installation                                | Cities, counties, HOAs, NAs                            | \$450                         | 8                          | 12  | 12  | 12  | 12   | \$25,200                             | CWA §319   |
| Pet waste station bags/replacements 4x year through implementation timeline |  | \$85                          | 8                          | 12  | 12  | 12  | 12   | \$74,800                             | CWA §319   |
| Install bioswales at parks and dog parks                                    |  | \$40/square foot              | 0                          | 2   | 2   | 2   | 2    | Variable by square footage installed | CWA §319, 5SUWRP, CWSRF, DWSRF   |
| <b>OSSFs</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Incentives for inspection and/or pump out                                   | Residents, HOAs, NAs                                   | \$350 <sup>4</sup>            | 50                         | 100 | 100 | 100 | 100  | \$157,500                            | CWA §319, DWTATP, CWSRF, EDAP, RWF   |
| Coordination of neighborhood-wide inspection/pump out days                  |  | N/A                           | Assistance/input as needed |     |     |     |      | N/A                                  | CWA §319, DWTATP, CWSRF, EDAP, RWF   |
| Incentives to replace failing OSSFs   |  | \$8,000 <sup>4</sup>          | 0                          | 10  | 10  | 10  | 10   | \$320,000                            | CWA §319, CDBG, DWTATP, CWSRF, EDAP, RWF, DFund, TxCDBG  |

|  |  |   |   |   |   |   |     |   |   |
|--|--|---|---|---|---|---|-----|---|---|
| Education and outreach for homeowners  | Residents, HOAs, NAs, cities, counties, AgriLife | \$2,000   | 2   | 2 | 2 | 2 | 2   | \$20,000  | CWA §319, Section 106, CWSRF, DWSRF, EDAP   |
| Education and outreach for real estate professionals                                       | Real estate agents, OSSF professionals           | \$ Awaiting estimate  | 0   | 1 | 1 | 1 | 1   | \$ Awaiting estimate  | CWA §319, Section 106, CWSRF, DWSRF, EDAP   |
| Septic to sewer programs   | Cities, counties                                 | \$750,000   | 0   | 1 | 1 | 1 | 1   | \$3,000,000   | CDBG, TxCDBG  |
| Adoption of ordinances/laws/regulations to require inspection before ownership transitions | Cities, counties                                 | N/A   | As early as feasible                          |   |   |   | N/A | N/A   |   |
| <b>WWTFs and SSOs</b>  |  |   |   |   |   |   |     |   |   |
| ID recurring/high volume SSOs for rehab  | Wastewater infrastructure operators              | Variable based on size of project, but can run from tens of thousands of dollars to millions of dollars | 0   | 1 | 1 | 1 | 1   | N/A   | CWA §319, Section 106, CDBG, WPDG, DWTATP, TCRP, CWSRF, DWSRF, EDAP, RWAf, DFund, TxCDBG, water and wastewater impact fees, bonds |
| Address effluent violations  |  |   | As identified/needed/funding available        |   |   |   | N/A | CWA §319, Section 106, CDBG, WPDG, DWTATP, TCRP, CWSRF, DWSRF, EDAP, RWAf, DFund, TxCDBG, water and wastewater impact fees, bonds |   |
| Tie new facilities to existing wastewater networks   |  |   | As identified/needed/funding available        |   |   |   | N/A | CWA §319, Section 106, CDBG, WPDG, DWTATP, TCRP, CWSRF, DWSRF, EDAP, RWAf, DFund, TxCDBG, water and wastewater impact fees, bonds |   |
| Stormwater infrastructure assessments  | Cities, Counties                                 | N/A   | Ongoing responsibility of local jurisdictions |   |   |   | N/A | CWA §319, Section 106, CDBG, WPDG, DWTATP, TCRP, CWSRF, DWSRF, EDAP, RWAf, DFund, TxCDBG, stormwater fees                         |   |
| Incentivize installation of GSI  | Cities, commercial properties, developers        | \$5,000-\$10,000  | 2   | 4 | 4 | 4 | 4   | \$90,000-\$180,000  | CWA §319, CWSRF, DWSRF, EDAP, stormwater fees   |
| Education and outreach about protection of wastewater infrastructure                       | Cities, counties, NCTCOG                         | \$2,000   | 2   | 2 | 2 | 2 | 2   | \$20,000  | EE, Stormwater fees, MCG, CGMF, EFT, CFT  |

| <b>Sediment and Flooding</b>  |  |   |  |   |   |   |   |                     |  |  |  |
|---|--|---|--|---|---|---|---|---------------------|--|--|--|
| Riparian, wetland, or stream restoration projects                     | USACE, cities, counties, State partners, nonprofits/volunteer groups | Estimates range from \$3,000-\$46,000 per acre for riparian; \$10,000-\$20,000 per acre for wetland; \$64,000-\$2.6 million/river mile for stream restoration | As identified/needed/funding available   |   |   |   |   | N/A                 | ACEP-WRE, CRP, CSP, EQIP, FWP, SWPP, GLCI, NWQI, RPP, RCPP/AFA, VPA-HIP, WFPO, CWA §319, AERI, CPP, 5SUWRP, GRCI, TCRP, AWCG, CWSRF, WQMP, LIP, MCG, EFT |  |  |
| Conservation easements  | Landowners, land trusts, State and Federal agencies                  | \$50,000-\$75,000 in landowner costs, depending on easement size  | 0  | 1 | 1 | 1 | 1 | \$200,000-\$300,000 | ACEP/ALE, ACEP/WRE, RCPP/AFA, RCPP Classic, WFPO, CPP, TFRLCP  |  |  |
| Mitigation banks  | Mitigation banking companies   | N/A   | Driven by demand for mitigation credits, which is typically spurred by development |   |   |   |   | N/A                 | Investors, speculators, landowners, purchases of mitigation credits  |  |  |
| Open space or parkland purchases                                      | Landowners, cities and counties, partner companies                   | Varies from tens of thousands of dollars to more than \$1 million, depending on parcel size   | 0  | 1 | 1 | 1 | 1 | N/A                 | Bond programs, public-private partnerships, DFund  |  |  |
| Education and outreach  | Producers, SWCDs, NRCS, cities, counties, NCTCOG, land trusts        | \$2,000   | 2  | 2 | 2 | 2 | 2 | \$20,000            | CIG, EQIP, FWP, SWPP, GLCI, RPP, RCPP/AFA, WFPO, CWA §319, EE, WPDG, AERI, CPP, 5SUWRP, GRCI, AWCG, CWSRF, MCG, CGMF, EFT, CFT                           |  |  |
| <b>Illegal Dumping and Litter Accumulation</b>                        |  |   |  |   |   |   |   |                     |  |  |  |
| Trash Bashes and other TRWD litter-related public engagement programs | TRWD, residents  | \$1,000-\$20,000  | 3  | 3 | 3 | 3 | 3 | \$205,000-\$275,000 | 5SUWRP, TRWD, NCTCOG, local sponsors   |  |  |

|  |   |  |  |    |    |    |     |             |   |
|--|---|--|--|----|----|----|-----|-------------|---|
| Litter trap installation   | TRWD, cities and counties                                 | \$490,000  | As needed/identified/funding available   |    |    |    |     | N/A         | TRWD                                    |
| Hazardous and other waste pickups and landfill drop-off days (chemicals, electronics, and tires) | Cities and counties, trash and recycling companies, RC&Ds | \$100,000-\$150,000 first year with reduced costs for subsequent years | 9  | 18 | 18 | 18 | 18  | \$7,350,000 | 5SUWRP, NCTCOG                          |
| Education and outreach   | Cities and counties, NCTCOG, HOAs, nonprofits             | \$2,000  | 2  | 2  | 2  | 2  | 2   | \$20,000    | CWA §319, EE, 5SUWRP, NCTCOG, CGMF, EFT |
| <b>Lawn Residue and Waste</b>  |   |  |  |    |    |    |     |             |   |
| Education and outreach general   | TRWD, cities and counties, NCTCOG,                        | \$1,000  | 2  | 2  | 2  | 2  | 2   | \$10,000    | CWA §319, EE, 5SUWRP, CGMF, EFT         |
| Public programming (workshops)   | State agencies, nonprofits                                | \$5,000  | 1  | 2  | 2  | 2  | 2   | \$45,000    | CWA §319, EE                            |
| Demonstration projects   | Residents, businesses, cities and counties                | \$15,000   | 1  | 2  | 2  | 2  | 2   | \$135,000   | CWA §319, EE                            |
| Curbside collection, drop-off centers, seasonal collection events                                | Landowners, cities  | N/A  | Ongoing responsibility of local jurisdictions; landowners in areas without service |    |    |    | N/A | Fees        |   |

<sup>1</sup> Unit cost does not include staff hours when work is a typical responsibility for the responsible party or an effort already underway by the responsible party. An exception has been made for WQMPs and CPs.

<sup>2</sup> Unit cost may include ranges to cover multiple strategies per row or to account for variability in costs

<sup>3</sup> Total cost may vary from simple multiplication of unit cost by units implemented per year. This can reflect size variations, multiple strategies per row, or variation in the length of time costs may continue.

<sup>4</sup> Unit cost provided is for the cost of incentives, not the total cost of inspections and/or pump outs or replacements of OSSFs.



# Eagle Mountain Lake Watershed Protection Plan Stakeholder Meeting

March 6, 2026



Kate Zielke, TRWD, Rural Programs Supervisor  
Aaron Hoff, TRWD, Watershed Programs Manager



# What is a Watershed Protection Plan?

*“A strategy that provides assessment and management information for a defined watershed”*



- ▶ Clean Water Act §319 → EPA Framework
  - ▶ TCEQ Integrated Report (303(d) List)
- ▶ Address non-point source pollution
- ▶ Additional focus on water quality goals - sediment, nutrients
- ▶ Stakeholder involvement
- ▶ Actions supported by sound science
- ▶ Non-regulatory

# What is Non-Point Source Pollution?

- ▶ Stormwater
- ▶ Sediment
- ▶ Toxic chemicals
- ▶ Agricultural runoff
- ▶ Nutrients

## Point Source Pollution

Discernible, confined, and discrete

### Examples:

- Pipes, ditches, channels
- Containers, floating vessels
- Concentrated animal feeding operations

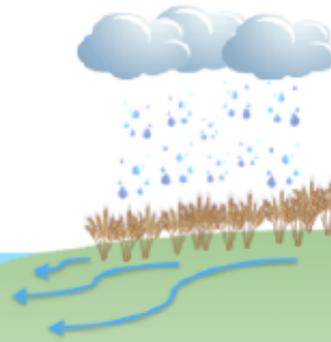


## Nonpoint Source Pollution

Spread over a wide area from uncontrolled sources

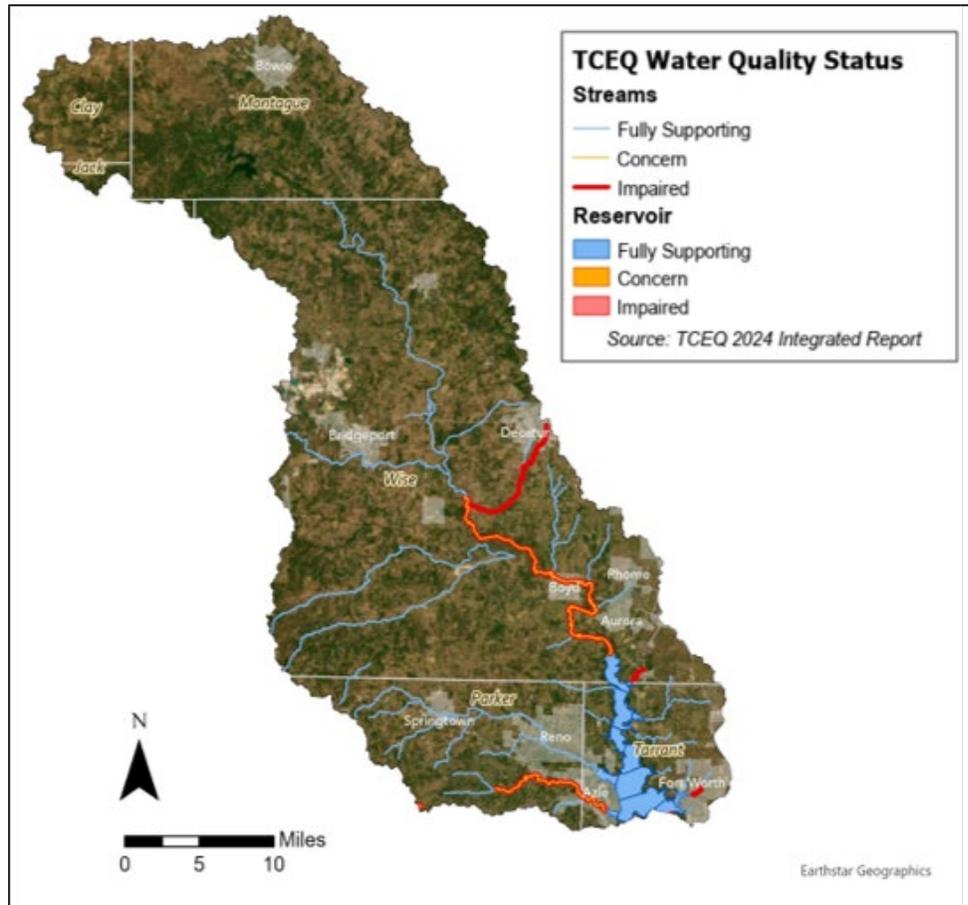
### Examples:

- Agricultural Runoff
- Industrial Runoff
- Urban Runoff



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# Water Quality Issues in Eagle Mountain Lake Watershed

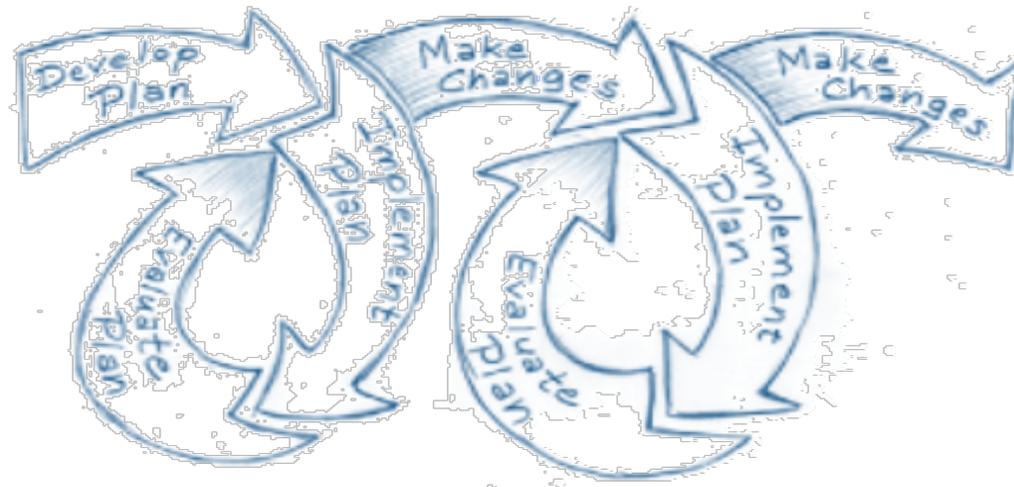


## Impaired Segments

| Name  | Impairments                    | Concerns                                   |
|---|--------------------------------|--|
| Ash Creek                                     | Bacteria<br>( <i>E. coli</i> ) | Nitrate (NO <sub>3</sub> -)<br>(screening) |
| Dosier Creek                                  | Bacteria<br>( <i>E. coli</i> ) |  |
| Derrett Creek                                 | Bacteria<br>( <i>E. coli</i> ) |  |
| West Fork Trinity River Below Lake Bridgeport | Bacteria<br>( <i>E. coli</i> ) | Chlorophyll-a<br>(screening)               |
| Martin Branch                                 | Bacteria<br>( <i>E. coli</i> ) |  |

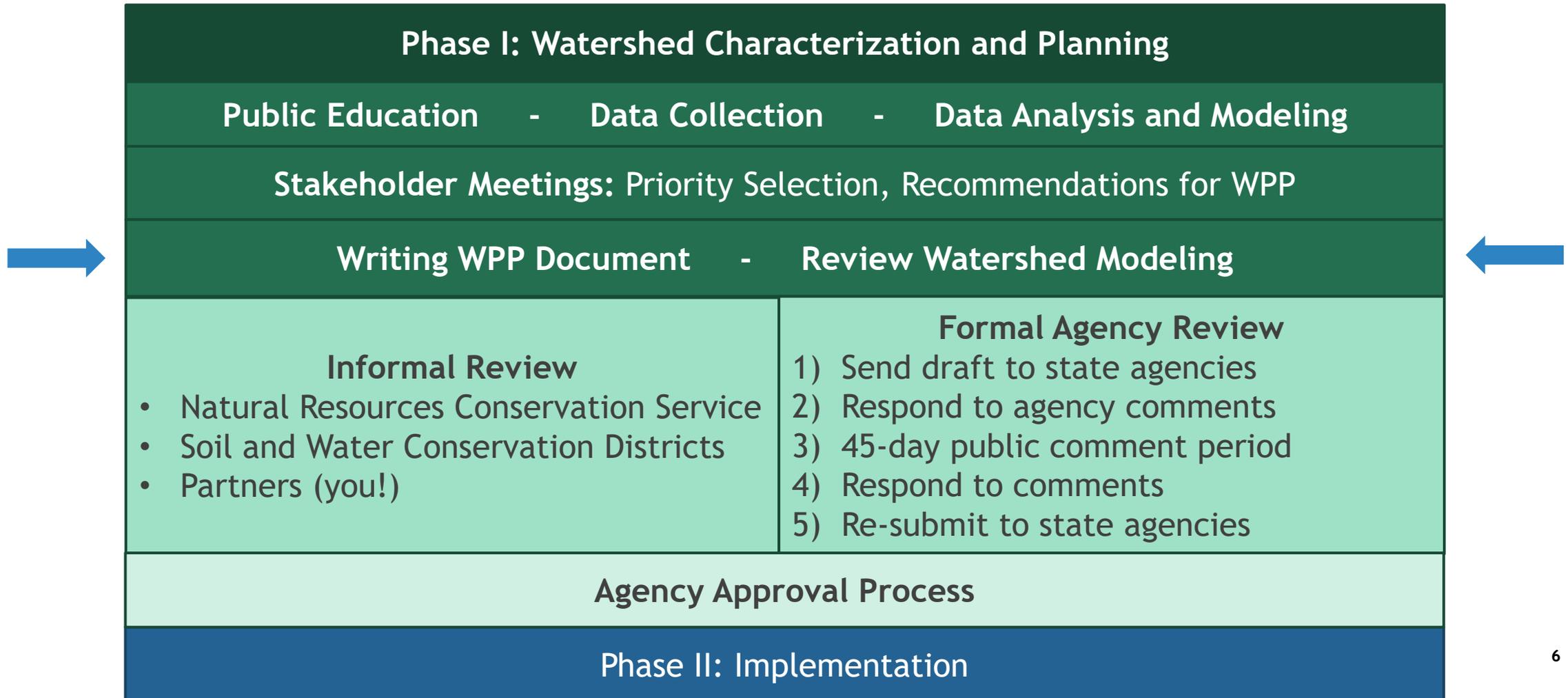
# Six Steps to Effective Watershed Management

1. Build partnerships
2. Characterize your watershed
3. Establish goals and identify solutions
4. Develop an implementation program
5. Implement your plan
6. Measure progress and make adjustments





# Watershed Protection Plan Process





# Previous Stakeholder Meetings for EML WPP

## 2019 November

- ▶ EPA and TCEQ comments on submitted WPP

## 2025 January

- ▶ Review of Chapters 1 and 2
  - ▶ Background on watershed management
  - ▶ Overview of EML watershed characteristics

<https://www.trwd.com/watersheds/>

## Eagle Mountain Lake

Eagle Mountain Lake is located northwest of Fort Worth, and is a major water supply reservoir for Fort Worth and surrounding cities. The Eagle Mountain Lake watershed is 869 square miles in size and includes parts of Tarrant, Parker, Wise, Jack, Montague, and Clay Counties. This largely rural watershed is dominated by range and grassland as well as a growing suburban population.

The goal of the Eagle Mountain Lake WPP is to slow algae growth in the lake by reducing phosphorus contributions to the lake. The WPP reflects input from many partners and stakeholders to address agricultural and urban sources throughout the watershed, and is based on scientific and economic studies presented in the WPP Modeling Report. TRWD is currently updating this plan. Click the newsletter button to receive updates about ongoing watershed initiatives and opportunities to participate.

The Eagle Mountain Lake Conservation Initiative, which ran from 2011 to 2022, was a partnership between the NRCS, Wise SWCD, Wise County WCID1, Wise County Commissioners Court, and TRWD to address agricultural sources of sediment and nutrients to the lake. The purpose of the initiative was to enhance technical assistance and conservation planning in the Eagle Mountain Lake Watershed and encourage implementation of agricultural conservation systems to address water quality concerns.

WATERSHED PROTECTION PLAN

FACT SHEET & MAP

### Stakeholder Meetings

2025 August  
2025 July  
2025 July Presentations  
2025 January  
2019 November

### Reports

Eagle Mountain Lake WPP  
Modeling Report 2016



# Previous Stakeholder Meetings for EML WPP

## 2025 July

- ▶ Overview of modeling methods
- ▶ Review of Chapters 3, 4, and 5
  - ▶ Assessment of current water quality in EML and tributaries
  - ▶ Identification of potential pollutant sources
  - ▶ Modeling of potential pollutant sources

<https://www.trwd.com/watersheds/>

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WATERSHED PROTECTION PLAN

FACT SHEET & MAP

### Stakeholder Meetings

2025 August  
2025 July  
2025 July Presentations  
2025 January  
2019 November

### Reports

Eagle Mountain Lake WPP  
Modeling Report 2016



# Previous Stakeholder Meetings for EML WPP

## 2025 August

- ▶ Review of Chapter 6
  - ▶ Identification of management strategies and associated load reductions

<https://www.trwd.com/watersheds/>

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Eagle Mountain Lake is located northwest of Fort Worth, and is a major water supply reservoir for Fort Worth and surrounding cities. The Eagle Mountain Lake watershed is 869 square miles in size and includes parts of Tarrant, Parker, Wise, Jack, Montague, and Clay Counties. This largely rural watershed is dominated by range and grassland as well as a growing suburban population.

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WATERSHED PROTECTION PLAN

FACT SHEET & MAP

### Stakeholder Meetings

[2025 August](#)  
[2025 July](#)  
[2025 July Presentations](#)  
[2025 January](#)  
[2019 November](#)

### Reports

[Eagle Mountain Lake WPP Modeling Report 2016](#)



# Today's EML WPP Updates

## Chapter 6

- ▶ Factsheets updated with *E. coli* reduction goals

## Chapter 7

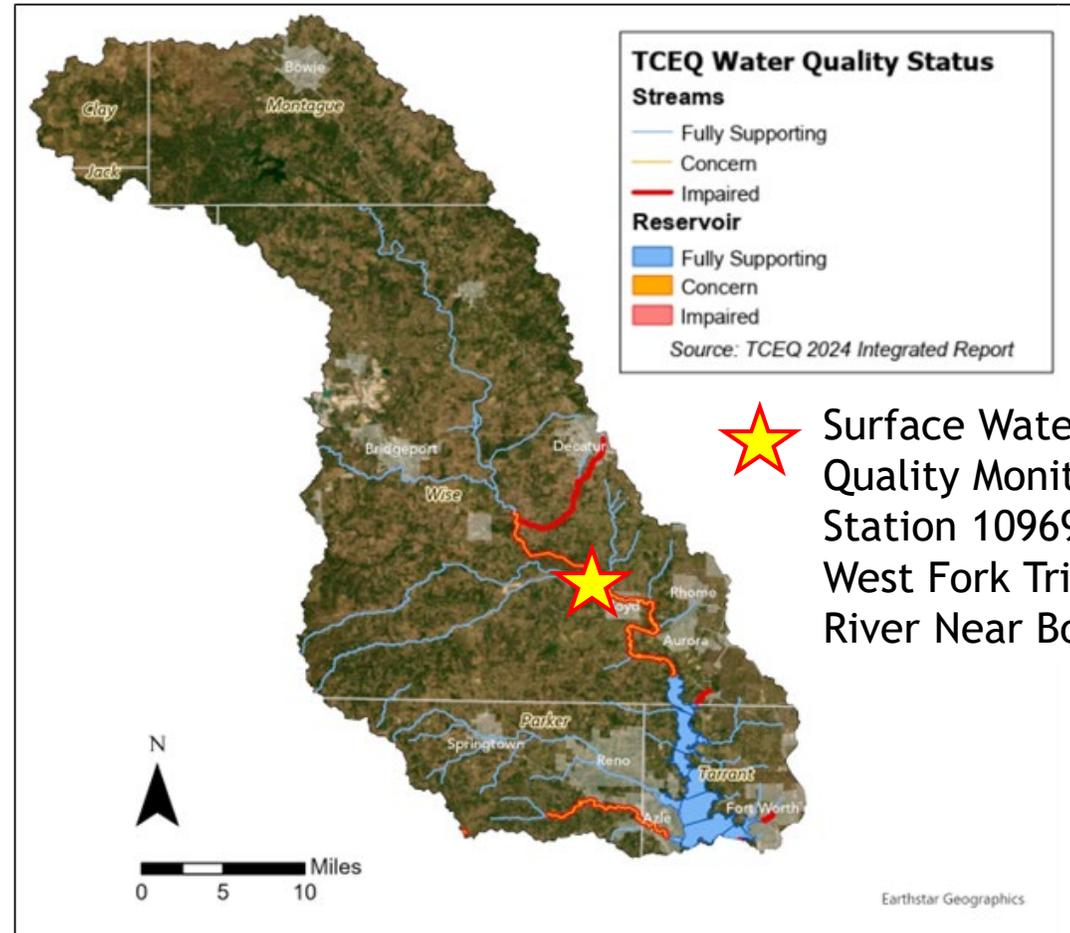
- ▶ Technical assistance content drafted
- ▶ Financial assistance content drafted
- ▶ Implementation schedule and cost estimate drafted

## Chapter 8

- ▶ 10-year and 5-year milestones drafted
- ▶ Plans for water quality monitoring, best management practice (BMP) implementation, progress updates, and adaptive management

# E. Coli Monitoring Location

- ▶ Site 10969 will be used to monitor progress
- ▶ Collects drainage that is most important to understanding pollutant load in EML
- ▶ Referred to as WF Trinity River Near Boyd (WFTR4) in Appendix C Tables



# Here's Where We Need Stakeholder Input



- ▶ Chapters sent via email
- ▶ Chapters also available on table



# Chapter 6: Review

## Management Strategies and Associated Load Reductions

- ▶ Provides management measures to reduce pollutant load created by:
  - ▶ Livestock \* \*\*
  - ▶ Pet Waste \*
  - ▶ On-Site Sewer Facilities (OSSFs) \*
  - ▶ Wastewater Treatment Facilities (WWTFs) and Sanitary Sewer Overflows (SSOs)
  - ▶ Sediment
  - ▶ Illegal Dumping and Litter Accumulation
  - ▶ Lawn Residue and Waste

\* Modeling results available on measures' ability to reduce *E. coli*

\*\* Modeling results available on measures' ability to reduce sediment and nutrients

# Chapter 6: Pet Waste

- ▶ Responses received at August 2025 meeting were evenly split between reducing pet waste by 50% or 80%
- ▶ SELECT modeling is worst-case scenario
  - ▶ Assumes 0% pet waste is currently picked up
  - ▶ 50% pet waste picked up
    - 6.13 MPN/yr\*10<sup>15</sup> *E. coli* reduction
  - ▶ 80% pet waste picked up
    - 9.80 MPN/yr\*10<sup>15</sup> *E. coli* reduction

## Survey Questions 1 and 2



# Chapter 6: OSSFs

- ▶ Revising question asked of stakeholders in August 2025 to match available modeling
- ▶ Assumption: 27,000 OSSFs exist in EML watershed
- ▶ Assumption: 15% failure rate currently
- ▶ SELECT modeling demonstrates reduction in failure rate to:
  - ▶ 10% failure rate
    - 1,350 OSSFs repaired or replaced
    - 8.5 MPN/yr\*10<sup>15</sup> *E. coli* reduction
  - ▶ 5% failure rate
    - 2,700 OSSFs repaired or replaced
    - 17.0 MPN/yr\*10<sup>15</sup> *E. coli* reduction

## Survey Questions 3 and 4



# Chapter 7: Review

## Plan Implementation

### Technical Assistance

- ▶ Federal, state, and local government entities
- ▶ Nonprofit organizations
- ▶ Wastewater infrastructure operators
- ▶ Homeowners associations and neighborhood associations
- ▶ Vary by strategy



# Chapter 7: Review

## Plan Implementation

### Financial Assistance

- ▶ Grants, loans, in-kind contributions
- ▶ TRWD funding
- ▶ Federal, state, and local funding
- ▶ Private funding



# Chapter 7: Implementation Plan

**Table 7-1**

- ▶ Management measures included in WPP are eligible for Clean Water Act §319 funding
- ▶ Summarizes measures and estimates frequency, costs, and potential funding sources
- ▶ Organized by pollutant source
- ▶ Handout available

| Management Measure  | Responsible Party                                      | Unit Cost (\$) <sup>1,2</sup> | Units Implemented by Years |     |     |     |      | Total Cost (\$) <sup>3</sup>         | Potential Funding Sources  |
|---|--|-------------------------------|----------------------------|-----|-----|-----|------|--------------------------------------|--|
|   |  |                               | 1-2                        | 3-4 | 5-6 | 7-8 | 9-10 |                                      |  |
| <b>Livestock</b>  |  |                               |                            |     |     |     |      |                                      |  |
| WQMPs and CPs   | Producers, NRCS, SWCDs                                 | \$17,000                      | 3                          | 6   | 6   | 6   | 6    | \$459,000                            | WQMP, CRP, CSP, EQIP, SWPP, GLCI, NWQI, RPP, RCPP/AFA, RCPP, VPA-HIP, WFPO, CWA §319, IRSP, AERI, CPP, SSUWRP, GRCl, TCRP, AWCG, WQMP, WSEP, LIP, TFRCLP, MCG, CGMF, EFT |
| Education and outreach programs   | Producers, hobby farmers, NRCS, SWCDs, nonprofits      | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | ACEP, WRE, CIG, EQIP, SWPP, GLCI, NWQI, RCPP/AFA, RCPP, VPA-HIP, WFPO, CWA §319, EE, Section 106, WPDG, AERI, CPP, SSUWRP, GRCl, AWCG, WQMP, CGMF, EFT, CFT              |
| <b>Pet Waste</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Education and outreach general  | Cities, counties, NCTCOG, regional entities, residents | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | CWA §319, EE, Section 106, SSUWRP, CGMF, EFT, CFT  |
| Pet waste ordinance/regulation adoption                                     | Cities, counties                                       | N/A                           | As early as feasible       |     |     |     |      | N/A                                  | N/A  |
| Materials for pet waste station installation                                | Cities, counties, HOAs, NAs                            | \$450                         | 8                          | 12  | 12  | 12  | 12   | \$25,200                             | CWA §319   |
| Pet waste station bags/replacements 4x year through implementation timeline |  | \$85                          | 8                          | 12  | 12  | 12  | 12   | \$74,800                             | CWA §319   |
| Install bioswales at parks and dog parks                                    |  | \$40/square foot              | 0                          | 2   | 2   | 2   | 2    | Variable by square footage installed | CWA §319, SSUWRP, CWSRF, DWSRF   |
| <b>OSSFs</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Incentives for inspection   | Residents, HOAs,                                       | \$350 <sup>4</sup>            | 50                         | 100 | 100 | 100 | 100  | \$157,500                            | CWA §319, DWTATP, CWSRF, EDAP,   |

# Chapter 7: Implementation Plan

**Table 7-1**

- ▶ What number of Water Quality Management Plans or Conservation Plans is reasonable annually?
- ▶ Should funding for OSSF inspections and/or pump outs and OSSF replacements cover an incentive or the full cost?

## Survey Questions 5 and 6



# Chapter 7: Implementation Plan

**Table 7-1**

- ▶ Any additional questions/comments on the implementation plan?

| Management Measure  | Responsible Party                                      | Unit Cost (\$) <sup>1,2</sup> | Units Implemented by Years |     |     |     |      | Total Cost (\$) <sup>3</sup>         | Potential Funding Sources  |
|---|--|-------------------------------|----------------------------|-----|-----|-----|------|--------------------------------------|--|
|   |  |                               | 1-2                        | 3-4 | 5-6 | 7-8 | 9-10 |                                      |  |
| <b>Livestock</b>  |  |                               |                            |     |     |     |      |                                      |  |
| WQMPs and CPs   | Producers, NRCS, SWCDs                                 | \$17,000                      | 3                          | 6   | 6   | 6   | 6    | \$459,000                            | WQMP, CRP, CSP, EQIP, SWPP, GLCI, NWQI, RPP, RCPP/AFA, RCPP, VPA-HIP, WFPD, CWA §319, IRSP, AERI, CPP, SSUWRP, GRCI, TCRP, AWCG, WQMP, WSEP, LIP, TFRLCP, MCG, CGMF, EFT |
| Education and outreach programs   | Producers, hobby farmers, NRCS, SWCDs, nonprofits      | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | ACEP, WRE, CIG, EQIP, SWPP, GLCI, NWQI, RCPP/AFA, RCPP, VPA-HIP, WFPD, CWA §319, EE, Section 106, WPDG, AERI, CPP, SSUWRP, GRCI, AWCG, WQMP, CGMF, EFT, CFT              |
| <b>Pet Waste</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Education and outreach general  | Cities, counties, NCTCOG, regional entities, residents | \$2,000                       | 2                          | 2   | 2   | 2   | 2    | \$20,000                             | CWA §319, EE, Section 106, SSUWRP, CGMF, EFT, CFT  |
| Pet waste ordinance/regulation adoption                                     | Cities, counties                                       | N/A                           | As early as feasible       |     |     |     |      | N/A                                  | N/A  |
| Materials for pet waste station installation                                | Cities, counties, HOAs, NAs                            | \$450                         | 8                          | 12  | 12  | 12  | 12   | \$25,200                             | CWA §319   |
| Pet waste station bags/replacements 4x year through implementation timeline |  | \$85                          | 8                          | 12  | 12  | 12  | 12   | \$74,800                             | CWA §319   |
| Install bioswales at parks and dog parks                                    |  | \$40/square foot              | 0                          | 2   | 2   | 2   | 2    | Variable by square footage installed | CWA §319, SSUWRP, CWSRF, DWSRF   |
| <b>OSSFs</b>  |  |                               |                            |     |     |     |      |                                      |  |
| Incentives for inspection   | Residents, HOAs,                                       | \$350 <sup>4</sup>            | 50                         | 100 | 100 | 100 | 100  | \$157,500                            | CWA §319, DWTATP, CWSRF, EDAP,   |



# Chapter 8: Measuring Success

## *E. coli* Water Quality Targets - Year Ten

| Pollutant Source | Management Measures  | Target <i>E. coli</i> reduction as modeled |
|------------------|--|--|
| Livestock        | Reduce stocking rate by 25% (using alternative measures that provide same benefit) | 9.8 MPN/yr*10 <sup>15</sup>                |
| Pet Waste        | Reduce presence of pet waste by:   |  |
|                  | 50%  | 6.13 MPN/yr*10 <sup>15</sup>               |
|                  | 80%  | 9.80 MPN/yr*10 <sup>15</sup>               |
| OSSFs            | Reduce failure rate to:  |  |
|                  | 10%  | 8.5 MPN/yr*10 <sup>15</sup>                |
|                  | 5%   | 17.0 MPN/yr*10 <sup>15</sup>               |
| <b>TOTAL</b>     |  | <b>Depends on today's choices</b>          |

### Survey Question 7



▶ Input on targets



# Chapter 8: Measuring Success

## *E. coli* Water Quality Interim Milestones - Year Five

| Pollutant Source | Management Measures  | Target <i>E. coli</i> reduction for Year Five |
|------------------|--|---|
| Livestock        | Reduce stocking rate by 25% (using alternative measures that provide same benefit) | 4.36 MPN/yr*10 <sup>15</sup>                  |
| Pet Waste        | Reduce presence of pet waste by:   |   |
|                  | 50%  | 2.85 MPN/yr*10 <sup>15</sup>                  |
|                  | 80%  | 4.90 4.55 MPN/yr*10 <sup>15</sup>             |
| OSSFs            | Reduce failure rate to:  |   |
|                  | 10%  | 3.78 MPN/yr*10 <sup>15</sup>                  |
|                  | 5%   | 7.56 MPN/yr*10 <sup>15</sup>                  |
| <b>TOTAL</b>     |  | <b>Depends on today's choices</b>             |

Based on Table 7-1 timeline

Survey Question 8



▶ Input on targets



# Chapter 8: Measuring Success

## Sediment Water Quality Targets

| Pollutant Source | Management Measures                           | Change in Sediment Yield as Modeled |
|------------------|---|-------------------------------------|
| Livestock        | Increase cover crop use in pastureland by 25% | -71.10%                             |
| Livestock        | Equivalent to reducing stocking rate 25%      | -1.76%                              |

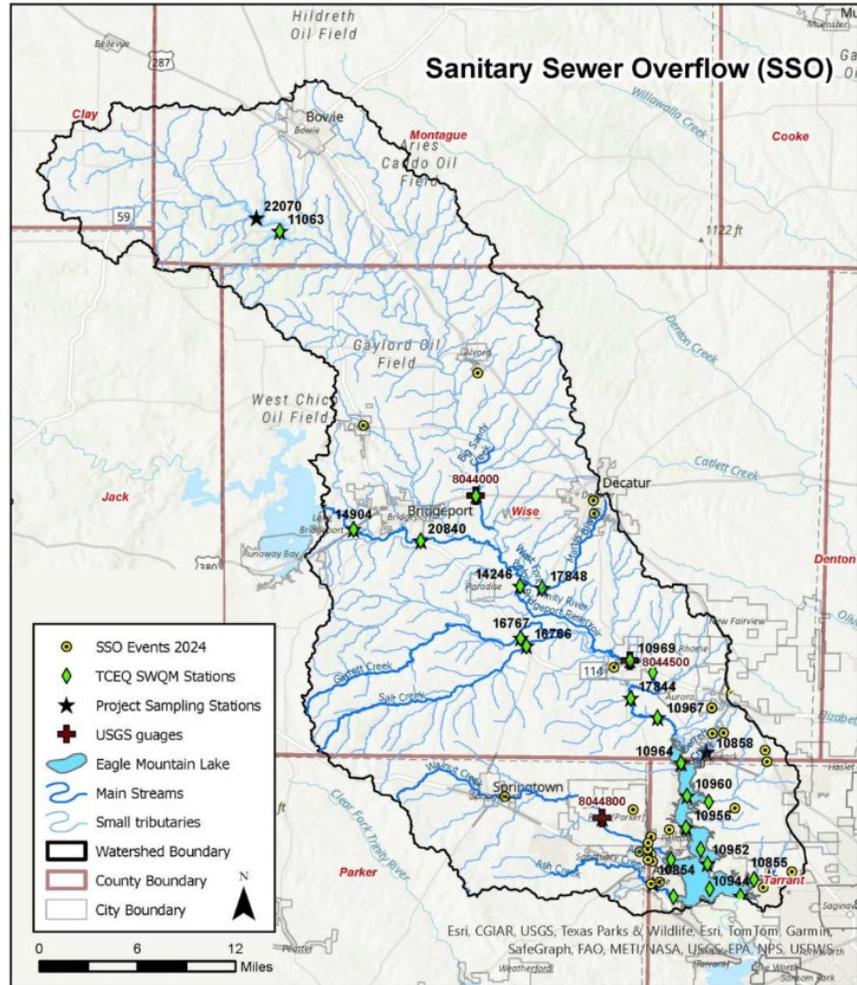


# Chapter 8: Measuring Success

## Nutrient Water Quality Targets

| Pollutant Source | Management Measures                           | Nutrient         | Change in Nutrient Yield as Modeled |
|------------------|---|------------------|-------------------------------------|
| Livestock        | Increase cover crop use in pastureland by 25% | Nitrate          | +5.23%                              |
|                  |   | Total Phosphorus | -27.95%                             |
| Livestock        | Equivalent to reducing stocking rate 25%      | Nitrate          | -8.91%                              |
|                  |   | Total Phosphorus | -20.71%                             |

# Chapter 8: Measuring Success



## Water Quality Monitoring

- ▶ TRWD existing monitoring schedule will continue
- ▶ Three monitoring sites can provide data for modeling
  - ▶ Paired with USGS gages that provide flow data
- ▶ Site 10969 will be site of record for EML WPP

# Chapter 8: Measuring Success

## BMP Implementation

- ▶ *E. coli* benefits of some BMPs cannot be quantified by modeling:
  - ▶ Wastewater treatment facilities
  - ▶ Sanitary sewer overflows
  - ▶ Sediment and flooding
  - ▶ Illegal dumping and litter accumulation
  - ▶ Lawn residue and waste
- ▶ Success measured:
  - ▶ Qualitatively
  - ▶ Quantitatively by the number of implementation actions taken

# Chapter 8: Measuring Success

## Progress Updates

- ▶ Annual progress updates will be provided to stakeholders
  - ▶ Via email
  - ▶ Via meeting if significant changes are sought
  - ▶ Via meeting in Year Five
- ▶ To receive updates, provide contact information



## Survey Questions 9-11



# Chapter 8: Measuring Success

## Adaptive Management

- ▶ Annual progress updates are an opportunity to identify need for course correction
  - ▶ Feasibility
  - ▶ Success
- ▶ Challenges
  - ▶ Cause and effect
  - ▶ Time lag



# Next Steps

## Phase I: Watershed Characterization and Planning

Public Education - Data Collection - Data Analysis and Modeling

Stakeholder Meetings: Priority Selection, Recommendations for WPP

Writing WPP Document - Review Watershed Modeling

### Informal Review

- Natural Resources Conservation Service
- Soil and Water Conservation Districts
- Partners (you!)

### Formal Agency Review

- 1) Send draft to state agencies
- 2) Respond to agency comments
- 3) 45-day public comment period
- 4) Respond to comments
- 5) Re-submit to state agencies

Agency Approval Process

Phase II: Implementation



# Questions or Comments?





# Contact Information

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