

SECTION 10

WATER QUALITY

10.1 General

Local ordinances in the Caldwell County political subdivisions regarding water quality and quantity issues are minimal. The county does not have authority to create, implement and enforce regulations related to water quality and quantity. Incorporated cities do have that authority and can exercise that right under local charter rules to adopt new ordinances. The US Environmental Protection Agency (USEPA) and the Texas Commission on Environmental Quality (TCEQ) are the national and state agencies that provide standards and regulate water quality.

10.2 City Ordinances

A search conducted on www.municode.com provided some detail of existing regulations for the cities of Lockhart and Luling. These two cities were the only local governments listed for Caldwell County. The city of Martindale's website provided minimal city code information and a phone number to call for inquiries. Searches for Mustang Ridge, Uhland, and Neiderwald were unsuccessful.

In reviewing the local code for Lockhart and Luling, only ordinances regulating water quantity and not water quality are discussed briefly. Water quantity is controlled by limiting or preventing an increase in run-off from a site. The quality of the run-off from a site however is not discussed.

Water quality issues arise from uncontrolled and unregulated point source and non-point source pollution. The uncontrolled quality of discharges into streams and rivers has resulted in substandard water quality in rivers and streams that is not acceptable at the State and National level.

10.3 United States Environmental Protection Agency (USEPA)

The USEPA is a federal agency that was established in 1970 to regulate and monitor various aspects of the environment. The USEPA creates and enforces regulations such as the Clean Water Act (CWA). The CWA was passed in 1972 and intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters. This task was to be accomplished by preventing point and nonpoint pollution sources, providing assistance to publicly-owned facilities for the improvement of wastewater treatment, and maintaining the integrity of wetlands. The USEPA provides partnerships, educational programs, and grants to protect the environment.

10.3.1 The National Pollutant Discharge Elimination System (NPDES)

Section 402 of the CWA controls direct discharges or "point source" discharges into navigable waters. These are from sources such as pipes and sewers. NPDES permits are issued by either the EPA or an authorized state/tribe. Water quality criteria and standards vary from state to state and site to site, depending on the use classification of the receiving body of water. Most states follow USEPA guidelines that define aquatic life and human health criteria for many of the 126 priority pollutants.

10.4 Texas Commission on Environmental Quality (TCEQ)

The TCEQ is the environmental regulating agency for the state. The TCEQ was commissioned to "protect our state's human and natural resources consistent with sustainable economic development." The "goal is clean air, clean water, and the safe management of waste." All activities relating to water quality require permits, registrations, and conformance to standards. The regulated water quality activities include but are not limited to:

- Stormwater
- Wastewater

- General activities
- Agricultural operations
- City MS4s
- Industrial facilities

10.4.1 The Texas 303(d) List

As mandated by the CWA, *the Texas 303(d) List* is a management tool to identify streams that fail to have water quality that supports aquatic life and recreational use. In order to fulfill the requirements of the Section 303(d) of the federal CWA the state requires Total Maximum Daily Loads be established for the impaired watershed. The Plum Creek Watershed Partnership was developed in an effort to initiate remediation on a voluntary basis and in effort to mitigate sources of pollution within the watershed and restore full use of the water body.

Due to the unhealthy condition of the largest watershed in Caldwell County, Plum Creek was put on the *Texas 303(d) List* in 2002. The Texas Water Quality Inventory and 303(d) List reports on the status of the state's waters.

10.4.2 Texas Pollutant Discharge Elimination System (TPDES)

The state of Texas in 1998 assumed the authority to administer the National Pollutant Discharge Elimination System (NPDES) program for the USEPA. The Texas Commission on Environmental Quality (TCEQ) Texas Pollutant Discharge Elimination System (TPDES) program now has regulatory authority over discharges of pollutants to Texas surface water, with the exception of discharges associated with oil, gas, and geothermal exploration and development activities, which are regulated by the Railroad Commission of Texas.

10.4.3 Source Water Protection

Source Water Protection is not a regulated activity but a voluntary program that helps public water systems protect their drinking water sources. The program requires only time from the water utility staff to participate.

10.5 Total Maximum Daily Loads Program (TMDL)

A TMDL program works to improve water quality in impaired or threatened water bodies. The program is intended to control and monitor pollution by targeting pollutants and their respective levels. The development of TMDL's is a scientifically rigorous process of intensive data collection and analysis. The loads are established after adoption by the TCEQ and review and approval by the USEPA.

With established TMDL, wastewater permit holders are required to adhere to higher levels of tertiary treatment to reduce the loadings on the stream. This will include implementation of new technologies and requirements to treat run-off from streets. Livestock and agricultural practices will need to implement better methods in order to reduce non-point source loadings.

At this time TMDL have not been established for any stream segments in Caldwell County. Enforcement by the USEPA has not been implemented and only voluntary monitoring has been established.

10.6 Plum Creek Watershed Protection Plan

The Plum Creek Watershed Protection Plan was developed in response to being posted on the 303d list. Efforts of the Plum Creek Watershed Protection Plan were voluntary and not mandated by the USEPA. Efforts to remediate Plum Creek are underway with recommended strategies to mitigate and eliminate pollution contributions.

Pollution sources listed in the Plum Creek Watershed Protection Plan included pets, sheep, goats, horses, cattle, deer, hogs, croplands, urban run-off, septic systems, WWTF, and oil production facilities. Pollution contributions include bacteria, nutrients, and other constituents such as E.coli. Voluntary monitoring of these constituents in Plum Creek will continue until recommended standards are met.

Estimated loading sources of pollution in the Plum Creek Watershed are listed in **Table 10-1**. The Plum Creek Watershed Protection Plan monitored the stream levels and collected data at monitoring stations to estimate pollutant loads and required reductions. A Load Duration Curve (LDC) to predict point and nonpoint source pollution was used with the SELECT approach to identify sources and contributions. SELECT is a Spatially Explicit Load Enrichment Calculation Tool developed by the Spatial Sciences Laboratory and the Biological and Agricultural Engineering Department at Texas A&M University.

TABLE 10-1 Potential Pollution Sources			
Source	Bacteria	Nutrients	Other
URBAN			
Run-off	x	x	x
Pets	x	x	
WASTEWATER			
Septic Systems	x	x	x
WWTF	x	x	x
AGRICULTURE			
Sheep and Goats	x	x	
Horses	x	x	
Cattle	x	x	
Cropland	x	x	x
WILDLIFE			
Deer	x	x	
Feral Hogs	x	x	
OTHER			
Oil and Productions			x

10.6.1 E.coli Potential

It is estimated that the sub-watersheds with the most impervious cover have the greatest potential to load the stream with the most average daily E.coli. In Caldwell County the cities of Lockhart and Luling have the greatest impervious cover. The impervious cover creates a mode of transporting more constituents and bacteria found in pet waste to streams and rivers. Densities of pets are greater in urban areas yielding an increase in the concentrations and contribution from the cities.

Estimated wastewater and septic systems loads for Caldwell County were also greatest in Lockhart and Luling. Permitted discharges for wastewater treatment facilities have the potential to release concentrated amounts of bacterial larger than what is allowed by the Texas Water Quality Standard criterion of 126 cfu/100 mL.

The potential impacts of agricultural contributions varied depending on the source. For example, the E.coli from horse and cattle had the most significant loading impacts in the watershed, whereas sheep and goats only appeared to contaminate the south and northwest portions of the basin. Deer and feral hogs also have significant loading potential in Caldwell County.

Oil and gas contributions were not assessed for E.coli in the Plum Creek Watershed Protection Plan. The loads contributed by oil and gas include other compounds. Although, other pollutants such as trash and solid waste materials in the watershed are not believed to contribute E.coli loadings, they do contribute to the deterioration of the stream.

10.7 Seasonal Loading Impacts

Significant nonpoint source pollution loading contributions that degrade water quality are made during rainfall events. Stormwater runoff contains high TSS,

VSS, COD, Bacteria, Nutrients, and Lead concentrations that are transported to the streams. The continuous additions of constituents further concentrate the contaminant levels in the water. The concentration levels are also increased when runoff disturbs once settled sediment. The agitation of the water reloads the once settled constituents back into the system. The concentrations of sampled data at monitoring stations during dry and wet conditions help correlate loadings with high, mid-range, and low flow levels.

Monitoring stations in Lockhart, Luling and Uhland sampled constituents and plotted the results on a LDC. The LDC plots the condition of the stream flow with the percent of days the flow exceeds the water quality standards. The LDC and monitored data provide a means to calculate the load reduction required to meet water quality standards. **Tables 10-2, 10-3** and **10-4** list the load reductions calculated to meet water quality standards. E.coli, Nitrate, Phosphorus, and Orthophosphorus were the constituents monitored.

TABLE 10-2
Estimated Loadings from Lockhart Monitoring Station

Load	Required % Reduction in Flow			
	High- Moist	Mid Range	Dry - Low	Target
E.coli			15	15
Nitrate	18	66	80	80
Orthophosphorus			49	49
Total Phosphorus			5	5

TABLE 10-3
Estimated Loadings from Luling Monitoring Station

Load	Required % Reduction in Flow			
	High- Moist	Mid Range	Dry - Low	Target
E.coli	41	11	8	41
Nitrate			1	1
Phosphorus				-

TABLE 10-4				
Estimated Loadings from Uhland Monitoring Station				
Load	Required % Reduction in Flow			
	High- Moist	Mid Range	Dry - Low	Target
E.coli	65	51	26	65
Nitrate		0.3	43	43
Phosphorus			27	27

E.coli was the consistent load that exceeded the standard in most flow conditions at all monitoring sites. Nitrate was consistent in Dry-Low flow conditions as was phosphorous. Phosphorus and Orthophosphorus also exceeded the standards in Dry-Low flow conditions. The results correlate with the land use. The monitored nutrients are found in fertilizers and pesticides commonly used in agriculture.

The initiatives in the Plum Creek Watershed Protection Plan to control the contaminant levels and restore Plum Creek to a healthy stream segment are discussed in Section 14. The BMP recommendations in the Plum Creek Watershed Protection Plan can be implemented in any watershed as a proactive approach to maintaining healthy streams and rivers.