AGRICULTURAL NONPOINT SOURCE MANAGEMENT MEASURES

To achieve bacteria and nutrient load reduction goals established for Plum Creek, specific management practices and combinations of practices will be implemented on agricultural land (Figure 7.5). Guided by the Agricultural Nonpoint Source work group, it was determined that this would best be achieved by developing voluntary, site-specific management plans for individual operations. Both the NRCS and the TSSWCB offer planning assistance for agricultural producers. Water Quality Management Plans (WQMPs) are developed by local Soil and Water Conservation Districts (SWCDs) under the statewide TSSWCB program and are tailored to meet the needs of each operation. The NRCS offers options for development and implementation of both individual practices and whole farm conservation plans. Cost-share assistance is available through associated programs to offset implementation costs. To facilitate development and implementation of these management plans, the Plum Creek Watershed Partnership will pursue funds to support a cost-share program and the creation of a new position at the SWCD level to be housed in the watershed.

Based on USDA-NASS data, the average farm in Caldwell and Hays Counties is estimated to be approximately 230 acres, and local knowledge from NRCS, Extension, and agricultural producers indicates that livestock operations maintain an average of approximately 50 animal units (cumulative cattle, sheep, goats, and horses). Utilizing this information, along with results from the SELECT and LDC analyses, the number of comprehensive management plans necessary for livestock and cropland operations within each subwatershed and monitoring station region was estimated and is presented below.

Livestock Operations

The estimated number of animal units in each subwatershed, was divided by the average number of animal units per operation to estimate the number of livestock operations within each subwatershed. Next, the bacteria reduction percentage for the corresponding monitoring station region (Uhland 65%, Lockhart 15%, Luling 41%) was applied to the total number of livestock operations within each subwatershed to determine the number of operations that should undergo plan development. Based on these estimates, the number of livestock operation management plans required for individual subwatersheds ranges from 1 to 19. A total of 235management plans are necessary for the entire Plum Creek Watershed (Table 7.5).

Table 7.5. Recommended number of management plans for livestock operations by subwatershed.

Region	Subwatershed	Animal Units	Number of Farms	Recommended # of Conservation Plans
Uhland	UH-1	493	10	6
	UH-2	403	8	5
	UH-3	731	15	10
	Region Total	1,627	33	21
Lockhart	LO-1	1,024	20	3
	LO-2	327	7	1
	LO-3	717	14	2
	LO-4	852	17	3
	LO-5	882	18	3
	LO-6	1,751	35	5
	LO-7	2,019	40	6
	LO-8	506	10	2
	LO-9	828	17	2
	LO-10	1,117	22	3
	LO-11	1,308	26	4
	Region Total	11,331	226	34
Luling	LU-1	168	3	1
	LU-2	748	15	6
	LU-3	498	10	4
	LU-4	322	6	3
	LU-5	1,257	25	10
	LU-6	1,879	38	15
	LU-7	694	14	6
	LU-8	1,027	21	8
	LU-9	542	11	4
	LU-10	600	12	5
	LU-11	1,020	20	8
	LU-12	1,787	36	15
	LU-13	999	20	8
	LU-14	1,662	33	14
	LU-15	1,173	23	10
	LU-16	1,124	22	9
	LU-17	344	7	3
	LU-18	986	20	8
	LU-19	2,348	47	19
	LU-20	1,981	40	16
	LU-21	989	20	8
	Region Total	22,148	443	180
Total		35,101	702	235

Focus Areas

Cost-share and technical assistance programs will be directed to subwatersheds with the greatest number of operations. However, recognizing that livestock numbers within individual subwatersheds vary due to weather conditions and market economics, programs provided in the watershed will require flexibility. In addition, preference will be given to operations with the greatest number of animal units, and particularly to those located closest to streams and drainage areas.

In the Uhland region, livestock operation plans will be targeted along Porter Creek (UH-3). Management plans in the Lockhart region will be focused along U.S. Highway 183 (LO-6 and LO-7), along Cowpen Creek south of Mustang Ridge, and Elm Creek in the vicinity of Niederwald (Table 7.6). Operations near the Dry Creek drainage west of Dale in Caldwell County (LO-11) will receive secondary focus for plan implementation. In the Luling region, management plans primarily will be focused along West Fork and along McNeil Creek east of Luling (LU-6, LU-19, LU-20). Operations near Tenney Creek (LU-14) and south of Dale (LU-12) also will receive priority consideration.

Table 7.6. Critical areas for livestock management plan development.

Region	Primary Focus	Secondary Focus
Uhland	Porter Creek drainage	Upper reaches of Plum Creek mainstem
Lockhart	Along U.S. Highway 183 Cowpen Creek near Mustang Ridge Elm Creek near Niederwald	Brushy Creek east of Buda Dry Creek and tributaries west of Dale
Luling	West Fork Drainage McNeil Creek east of Luling	Tenney Creek drainage Dry Creek and tributaries south of Dale

Cropland Operations

The number of cropland management plans required to achieve estimated nutrient load reductions was determined using an approach similar to that for livestock operations (Table 7.7). The total cropland acreage in each subwatershed was divided by the average watershed farm size (230 acres) to estimate the number of cropland operations. Next, the required phosphorus reduction for each monitoring station was used to determine the number of cropland operations within each subwatershed and monitoring station region needing plan development.

Table 7.7. Recommended number of management plans for cropland operations by subwatershed.

Region	Subwatershed	Cropland Acres	Number of Farms	Recommended # of Conservation Plans
Uhland	UH-1	1,374	6	2
	UH-2	930	4	1
	UH-3	569	2	1
	Region Total	2,873	12	4
Lockhart	LO-1	1,138	5	2
	LO-2	149	1	0
	LO-3	433	2	1
	LO-4	1,163	5	2
	LO-5	1,374	6	3
	LO-6	742	3	2
	LO-7	1,117	5	2
	LO-8	1,890	8	4
	LO-9	742	3	2
	LO-10	222	1	0
	LO-11	1,117	5	2
	Region Total	10,087	44	20
Luling	LU-1	4,059	18	0
	LU-2	2,171	9	0
	LU-3	2,623	11	0
	LU-4	3,143	14	0
	LU-5	148	1	0
	LU-6	72	1	0
	LU-7	1,106	5	0
	LU-8	1,890	8	0
	LU-9	742	3	0
	LU-10	88	1	0
	LU-11	500	2	0
	LU-12	240	1	0
	LU-13	289	1	0
	LU-14	88	1	0
	LU-15	506	2	0
	LU-16	24	1	0
	LU-17	70	1	0
	LU-18	351	2	0
	LU-19	72	1	0
	LU-20	30	1	0
	LU-21	351	2	0
	Region Total	18,563	86	0
Total		31,523	142	24

Focus Areas

To optimize the potential for nutrient load reductions, cropland management plans in the Uhland region primarily will be focused between Plum Creek and the southern portions of Bunton Branch in Hays County (Table 7.8). Additional plans will be implemented along the upper reaches of Porter Creek near Buda. In the Lockhart region, plans will be targeted on agricultural lands along Town Branch immediately west of Lockhart and bordering central portions of Brushy Creek near Niederwald. Upper portions of Dry Creek near Mendoza will receive secondary priority. Similar to livestock operations, planning efforts for cropland systems will give preference to those operations closest to streams and those with characteristics (including soil type and slope) which have the greatest potential to contribute pollutants to Plum Creek.

Table 7.8. Critical areas for cropland management plan development.

Region	Primary Focus	Secondary Focus
Uhland	Between Plum Creek and southern Bunton Branch	Upper Porter Creek south of Buda
Lockhart	Upper Town Branch west of Lockhart Brushy Creek near Niederwald	Upper Dry Creek near Mendoza
Luling	(none)	(none)

Management Measures

To focus management plan development and implementation, management measures addressing bacteria and nutrient issues will be encouraged and given top priority. Based on site-specific characteristics, plans should include one or more of the following management practices to reduce pollutant loads from agricultural lands:

- Prescribed Grazing: Manages the controlled harvest of vegetation with grazing animals to improve or maintain the desired species composition and vigor of plant communities, which improves surface and subsurface water quality and quantity.
- Riparian Herbaceous Buffers: Establishes an area of grasses, grasslike plants, and forbs along water courses to improve and protect water quality by reducing sediment and other pollutants in runoff as well as nutrients and chemicals in shallow groundwater.
- Grassed Waterways: Natural or constructed channel-shaped or graded and established with suitable vegetation to protect and improve water quality.
- Riparian Forest Buffers: Establishes area dominated by trees and shrubs located adjacent to and up-gradient from watercourses to reduce excess amounts of sediment, organic material, nutrients, and pesticides in surface runoff and excess nutrients and other chemicals in shallow groundwater flow.
- Watering Facilities: Places a device (tank, trough, or other watertight container) that provides animal access to water and protects streams, ponds, and water supplies from contamination through alternative access to water.

- Field Borders: Establishes a strip of permanent vegetation at the edge or around the perimeter of a field to protect soil and water quality.
- Filter Strips: Establishes a strip or area of herbaceous vegetation between agricultural lands and environmentally sensitive areas to reduce pollutant loading in runoff.
- Nutrient Management: Manages the amount, source, placement, form, and timing of the application of plant nutrients and soil amendments to minimize agricultural nonpoint source pollution of surface and groundwater resources.
- Conservation Cover: Establishes permanent vegetative cover to protect soil and water.
- Stream Crossings: Creates a stabilized area or structure constructed across a stream to provide a travel way for people, livestock, equipment, or vehicles, improving water quality by reducing sediment, nutrient, organic, and inorganic loading of the stream.
- Alternative Shade: Although not currently an approved cost-share practice, creation of shade reduces time spent loafing in streams and riparian areas, thus reducing pollutant loading. Efforts will be made to include this practice as a component of livestock management plans.

Figure 7.5. Clear Fork runs through grazing land in Caldwell County. Management plans will be used to protect water quality in agricultural areas.

WILDLIFE AND NON-DOMESTIC ANIMAL MANAGEMENT MEASURES

Feral Hog Control

Based on SELECT analysis, non-domestic animals are a significant potential contributor of pollutants to Plum Creek. TPWD manages native wildlife and oversees harvest of game species across the state. However, the feral hog, a nonnative species, appears to be growing in numbers in the watershed. The Water Quality and Habitat work group recommends that efforts to control feral hogs be undertaken to reduce the population, limit the spread of these animals, and minimize their effects on water quality and the surrounding environment. Other non-domestic animals, including feral dogs and cats also are likely contributors, although to a much lesser extent and at levels and locations that cannot be predicted at this time. In addition, native wildlife such as deer, raccoons, opossums, and bird species, are also contributing pollutants. However, this is considered background nonpoint source pollution. Active management of native wildlife for water quality purposes is generally not promoted in the state of Texas and will not be included in the Plum Creek Watershed Protection Plan.

To address the feral hog issue, the Plum Creek Watershed Partnership will rely heavily on the expertise and resources of the Texas Wildlife Damage Management Service (TWDMS), a division of the Texas AgriLife Extension Service. This agency protects the resources, property, and well-being of Texans from damages related to wildlife. TWDMS serves rural and urban areas with technical assistance, education, and direct control in wildlife damage management of both native wildlife and non-domestic animals. Pursuant to funding, a full-time position will be established through TWDMS to focus specifically on feral hog management in Plum Creek. The position will work directly with landowners to remove animals from the watershed by trapping and hunting.

To determine the approximate number of feral hogs that should be removed, the estimated number of hogs in each subwatershed was multiplied by the necessary load reduction for the corresponding water quality monitoring station region (Table 7.9). Because the SELECT analysis used to determine total hog numbers also identified the most likely habitat zones based on land cover, TWDMS personnel will target initial management efforts in those areas. These hog numbers represent initial goals over the course of the project, and as more information is gathered or if populations increase rapidly, these targets will be adjusted accordingly.

To further enhance program targeting and success, a website will be established to enable reporting of the date, time, location, and approximate number of hogs observed (Figure 7.6). In addition, a landowner survey also will be conducted through local Extension offices to identify specific properties for participation and to better quantify feral hog populations. This will be supported by an annual or biennial feral hog management seminar sponsored by Extension to address feral hog control issues.

Table 7.9. Recommended number of feral hogs to be removed by subwatershed.

Region	Subwatershed	Total Hogs	Hogs to Be Removed
Uhland	UH-1	127	83
	UH-2	89	58
	UH-3	192	125
	Region Total	408	266
Lockhart	LO-1	167	25
	LO-2	67	10
	LO-3	122	18
	LO-4	90	14
	LO-5	96	14
	LO-6	184	28
	LO-7	207	31
	LO-8	53	8
	LO-9	114	17
	LO-10	159	24
	LO-11	177	27
	Region Total	1,436	216
Luling	LU-1	98	40
	LU-2	111	46
	LU-3	87	36
	LU-4	119	49
	LU-5	146	60
	LU-6	316	130
	LU-7	130	53
	LU-8	146	60
	LU-9	90	37
	LU-10	93	38
	LU-11	173	71
	LU-12	280	115
	LU-13	131	54
	LU-14	177	73
	LU-15	206	84
	LU-16	220	90
	LU-17	40	16
	LU-18	139	57
	LU-19	239	98
	LU-20	194	80
	LU-21	160	66
	Region Total	3,295	1,353
Total		5,139	1,835

Administered by the Texas Association of Community Action Agencies (TACAA), the Texas Hunters for the Hungry Program is a statewide wild game donation program that provides a healthy source of protein to Texans who need assistance obtaining well-balanced, nutritious meals. Through participating meat processors, game is processed for a nominal fee and then distributed to food banks and similar entities. Statewide, venison has been the staple for the Hunters for the Hungry Program, but other game such as feral hogs are accepted. Current regulations stipulate that feral hogs must be trapped live and transported to an approved facility for inspection prior to slaughter. This has historically limited the quantity of feral hogs processed for distribution through this program. The Plum Creek Watershed Partnership will work with TACAA, TDA, and other partnering groups to explore the feasibility of integrating management of nuisance animal populations with the generation of low-cost food products for community groups and low-income families. If successful, this will serve as a model for a statewide coordinated feral hog management and food assistance program.

Figure 7.6. A feral hog in open brush. Control of hogs is a major strategy to reduce nonpoint source pollution and will be guided by an online reporting system.

Wildlife Surveys

To identify other potential sources among local wildlife populations, the Water Quality and Habitat work group recommends employing additional surveys to further quantify wildlife contributions. Bacterial Source Tracking may be utilized to determine which types of animals have the greatest *E. coli* contribution and is discussed later in this plan. Though formal TPWD deer surveys have been discontinued in the ecoregion comprising the watershed, the Plum Creek Watershed Partnership also recommends that periodic small-scale surveys be conducted every 5 years in the watershed to determine the extent of deer populations in the area. These may be conducted by personnel from the wildlife departments at state universities. In addition to these surveys, a complement of periodic avian and small mammal surveys will be conducted to yield additional information on the distribution of wildlife species in the area to guide future implementation of additional wildlife management strategies. Specific focus will be given to bird rookeries near Plum Creek and its major tributaries and to quantifying bird and bat populations utilizing bridges spanning Plum Creek waterways if sizable concentrations are noted.