Appendix A: GIS Analysis and Potential Load Calculations

Through a geospatial analysis of the watershed and its subwatersheds potential bacteria loads were estimated. This analysis utilizes estimates on potential sources calculated based on best available local public data provided by stakeholders, USDA, US Census Bureau, LCLU, and AVMA. This approach allows stakeholders to prioritize management implementation based on the results of the estimated potential loads by source and subwatershed. The GIS analysis provides an easy method to understand the relative contributions and spatial distribution across the watershed, without incorporating complex watershed modeling techniques that can increase uncertainty. The used approach calculates the estimates based on the spatial distribution of household or land cover data across the watershed within the five subwatersheds.

Dog Bacteria Loading Estimates

The dog population was estimated using latest (2024) AVMA statistics for the average number of dogs per household and the estimated number of households from Census block data (AVMA, 2024; US Census Bureau, 2020). The estimated number of households for subwatershed 1 is 57,396; 2 is 22,823; 3 is 28,815; 4 is 60,193; and 5 is 28,538. While the estimated number of dogs for subwatershed 1 is 39,173; 2 is 15,577; 3 is 19,666; 4 is 41,082; and 5 is 19,477.

Table A-1. Assumptions used in calculating bacteria loading for dogs.

Description	Assumption
Average number dogs per household	0.6825
Number of households	197,765
Estimated number of dogs	134,975
Fecal coliform production rate of dogs[1]	5.0 x 10^9 cfu/day
Fecal coliform to *E. coli* conversion	0.63 *E. coli*/cfu fecal coliform

1 USEPA et al. (2001)

Using the assumptions in Table A-1, the potential annual bacteria load from dogs is estimated as:

$$PAL_d = N_d \times FC_d \times C \times 365\, days/year$$

Where:

$PAL_d = Potential\ annual\ E.coli\ loading\ attributed\ to\ dogs$

$N_d = Number\ of\ dogs$

$FC_d = Fecal\ coliform\ loading\ rate\ of\ dogs$

$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$

The estimated potential annual loading across the watershed due to dogs is 1.55 x 10^{17} cfu *E. coli*/year.

Feral Cat Bacteria Loading Estimates

According to the National Feline Research Council, Feral cat population in the U.S. best estimates suggests there are approximately 32 million with 72% living in urban areas, but the population can only best be estimated based on local data (Rowan et al., 2019). However, local estimates are not well documented within the Rowlett Creek watershed and thus the feral cat population was calculated following a study done by Levy & Crawford (2004) estimated the average number of feral cats per household in the U.S. to be 0.5, and the estimated number of households from Census block data (US Census Bureau, 2020). The estimated number of households for subwatershed 1 is 57,396; 2 is 22,823; 3 is 28,815; 4 is 60,193; and 5 is 28,538. The estimated number of feral cats for subwatershed 1 is 28,698; 2 is 11,412; 3 is 14,408; 4 is 30,097; and 5 is 14,269.

Table A-2. Assumptions used in calculating bacteria loading for feral cats.

Description	Assumption
Average number feral cats per household	0.5
Number of households	197,765
Estimated number of feral cats	98,884
Fecal coliform production rate of feral cats[1]	5.0 x 10^9 cfu/day
Fecal coliform to *E. coli* conversion	0.63 *E. coli*/cfu fecal coliform

1 USEPA et al. (2001)

Using the assumptions in Table A-2 the potential annual bacteria load from feral cats is estimated as:

$$PAL_c = N_c \times FC_c \times C \times 365\, days/year$$

Where:

$PAL_c = Potential\ annual\ E.coli\ loading\ attributed\ to\ feral\ cats$

$N_c = Number\ of\ feral\ cats$

$FC_c = Fecal\ coliform\ loading\ rate\ of\ feral\ cats$

$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$

The estimated potential annual loading across the watershed due to dogs is 1.55 x 10^{17} cfu *E. coli*/year.

Agricultural Bacteria Loading Estimates

To calculate the potential bacteria loads from livestock, estimates for livestock populations were calculated across the watershed. This was accomplished using the USDA & NASS (2022) Census of Agriculture by county, Collin and Dallas counties, and LCLU data within the watershed to derive estimates at the watershed and subwatershed-levels (Dewitz, 2023). Livestock populations from the census were gathered for cattle, sheep, horses, chickens, and hogs. For each, the population was divided by the amount of county agriculture land and then the ratio of animal per acre was multiplied by the acre area of farmland within the watershed. Finally, to standardize stocking rates based on relative livestock grazing patterns compared to one, 1,000-lb mature cow, the estimated numbers of animals in the watershed were converted to animal units (AU). The assumptions used in this method are documented in Wagner & Moench (2009) and Borel et al. (2015), shown below in Table A-3.

Table A-3. Assumptions used in calculating bacteria loading for each livestock animal.

Animal	Estimated Number in Watershed	AU Conversion factor	Fecal coliform production rate
Chickens	260	0.01	3.71×10^{10} cfu/AnU-day[1]
Cattle	612	1	8.55×10^{9} cfu/AnU-day[1]
Horses	65	1.25	2.91×10^{8} cfu/AnU-day[1]
Hogs	12	0.25	9.73×10^{10} cfu/AnU-day[1]
Sheep	52	0.2	2.90×10^{11} cfu/AnU-day[1]
Fecal coliform to E. coli conversion rate			0.63 *E. coli*/cfu fecal coliform

1 Wagner & Moench (2009)

Using livestock population estimates, the potential annual load across the watershed and for each subwatershed was calculated as:

$$PAL_l = N_l \times AUC_l \times FC_l \times C \times 365\, days/year$$

Where:

$$PAL_l = Potential\ annual\ E.coli\ loading\ attributed\ to\ livestock\ animal$$

$$N_l = Number\ of\ animals$$

$$AUC_l = Animal\ units\ conversion\ factor$$

$$FC_l = Fecal\ coliform\ loading\ rate\ of\ animal$$

$$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$$

The estimated potential annual loading across the watershed due to cattle is 1.20×10^{15} cfu E. coli/year, sheep is 6.94×10^{14}, chicken is 2.22×10^{13}, hogs is 6.71×10^{13}, and horses is 5.44×10^{12}. The estimated potential annual loading across the watershed due to all livestock is 1.99×10^{15} cfu E. coli/year.

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Appendix B: Watershed Characterization Modeling Report Pollutant Source Load Estimate Calculations

The pollutant source load estimates derived from the Rowlett Creek Watershed Characterization Report (Jaber et al., 2023). This data was used in the development of the Rowlett Creek WPP.

Load Duration Curve Analysis

A widely accepted approach for analyzing water quality is the use of a Load Duration Curve (LDC). A LDC allows for a visual determination of how stream flow may or may not impact water quality, in regard to a specific parameter. The first step in developing an LDC is the construction of a Flow Duration Curve (FDC).

Next, data from the flow duration curve are multiplied by the concentration of the water quality standard for the pollutant to produce the allowable LDC. This curve shows the maximum load (amount per unit time; e.g., for bacteria CFU/day) a stream can carry across the range of flow conditions (low flow to high flow) without exceeding the water quality standard. Typically, a margin of safety (MOS) is applied to the threshold pollutant concentrations to account for possible variations in loading from potential sources, stream flow, effectiveness of management measures, and other sources of uncertainty. A 10% MOS for bacteria was selected for this plan.

Stream monitoring data for a pollutant also can be plotted on the curve to show frequency and magnitude of exceedances. Typically, flow regimes are identified as areas of the LDC where the slope of the curve changes because that correlates with a significant change in flow. In the LDCs for the Rowlett Creek watershed, there are three flow regimes: high (0-10th percentile flow), midrange (11th – 80th percentile flow), and low flows (81th -100th percentile flow). These regimes reflect where a change in the slope of the LDC line is detected. Pollutant data plotted on the LDCs for the Rowlett Creek Watershed in this report covered data collected from 1981 to 2022.

In the below figures, the red line indicates the maximum acceptable stream load for pollutants and the squares, triangles, and circles represent water quality monitoring data collected under high, mid-range and low flow conditions, respectively. Where the monitoring samples are above the red line, the actual stream load has exceeded the water quality standard, and a violation of the standard has occurred. Points located on or below the red line are in compliance with the water quality standard. In order to analyze the entire range of monitoring data, regression analysis is conducted using the monitored samples to calculate the “line of best fit” (blue line). Where the blue line is on or below the red line, monitoring data at that flow percentile is in compliance with the water quality standard. Where the blue line is above the red line, monitoring data indicate that the water quality standard is not being met at that flow percentile. Regression analysis also enables calculation of the estimated percent reduction needed to achieve acceptable pollutant loads. The green line indicates the 10% margin of safety agreed on for this project.

Nitrate-Nitrite Nitrogen

Nitrogen in the forms of nitrite and nitrate measures inorganic nitrogen in the stream. Nitrate is very abundant as an inorganic, oxidized form of nitrogen and nitrite is not as common as an inorganic, oxidized form of nitrogen. Levels of inorganic nitrogen appear to be slightly increasing over time during routine sampling. Nitrate level were at or below 10% MOS for all sites except low flows at site 5. That could be influenced by backflow from the Lake. Sites 3 and 4 are nearly at 10% MOS indicating a potential concern for nitrate at those subwatersheds.

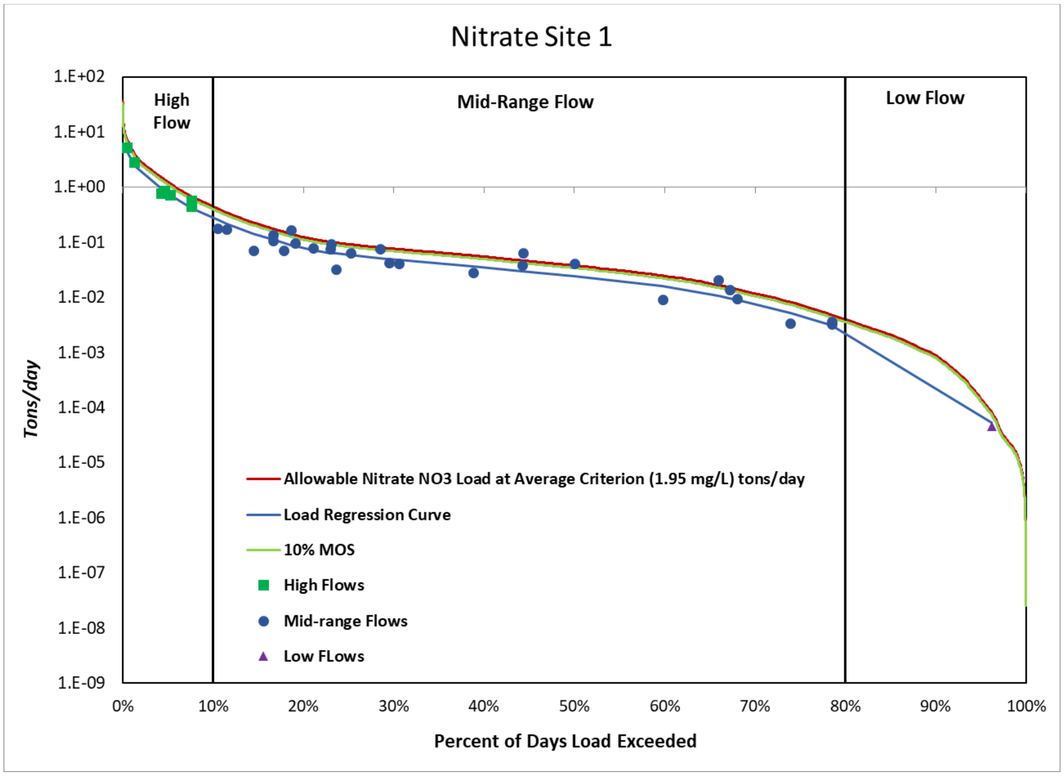

Figure 1. Nitrate/nitrite load duration curve at site 1 showing the allowable load and the 10% MOS.

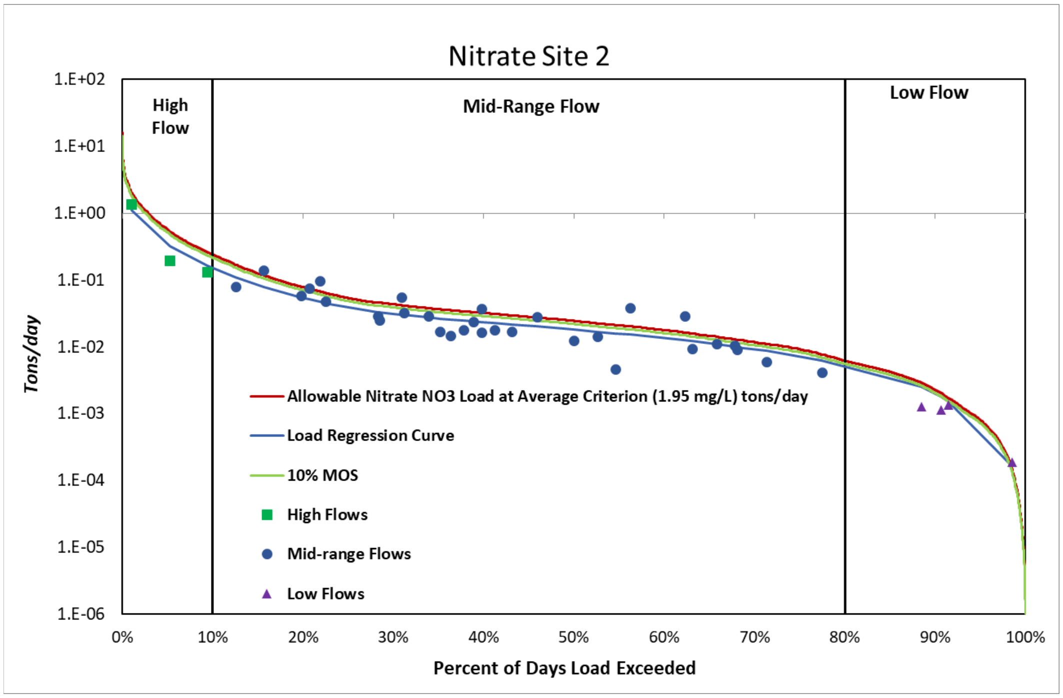

Figure 2. Nitrate/nitrite load duration curve at site 2 showing the allowable load and the 10% MOS.

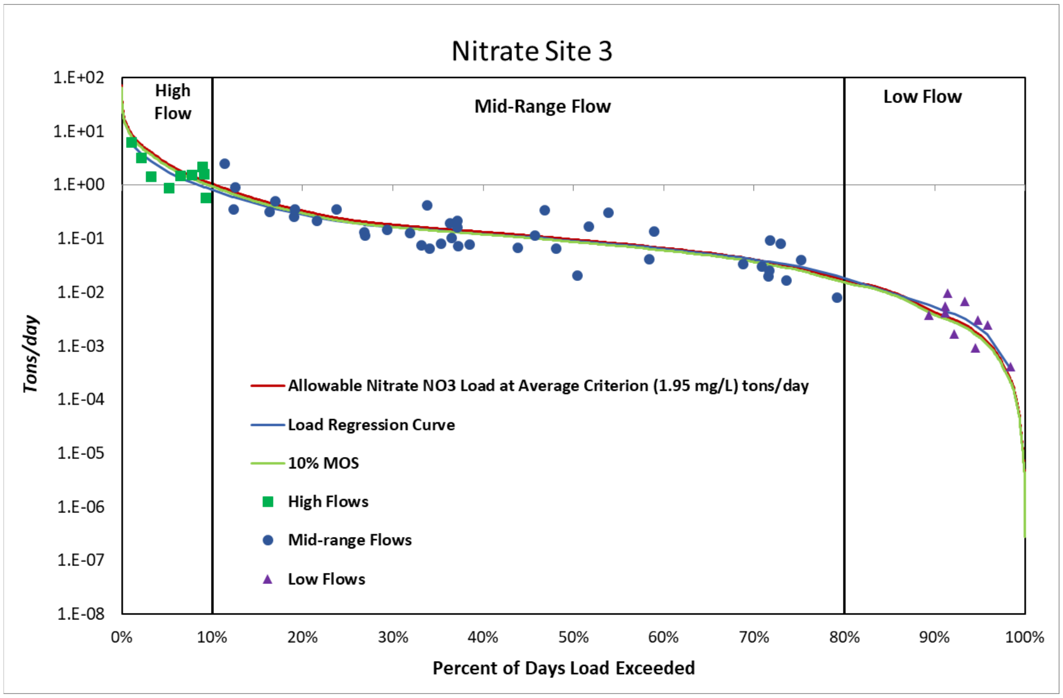

Figure 3. Nitrate/nitrite load duration curve at site 3 showing the allowable load and the 10% MOS.

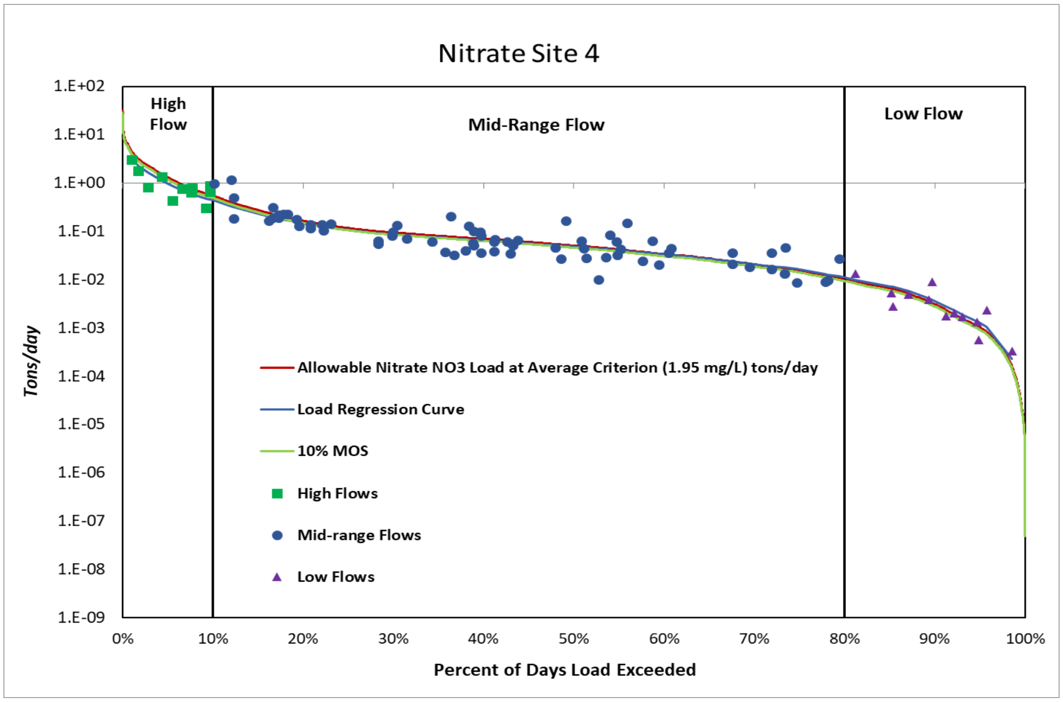

Figure 4. Nitrate/nitrite load duration curve at site 4 showing the allowable load and the 10% MOS.

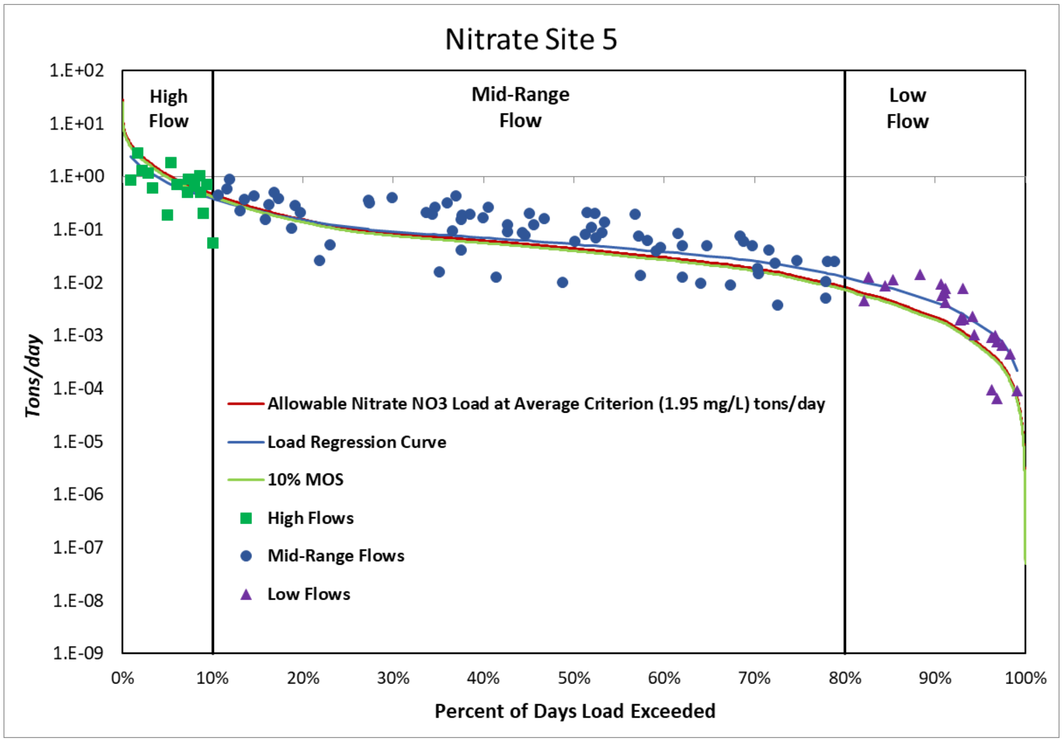

Figure 5. Nitrate/nitrite load duration curve at site 5 showing the allowable load and the 10% MOS.

Total Kjeldahl Nitrogen

Total Kjeldahl Nitrogen (TKN) is the measure of organic nitrogen plus ammonia nitrogen in a sample. TKN exceeded the allowable load for all sites with sites 2, 3 and 4 noticeably higher than the limit.

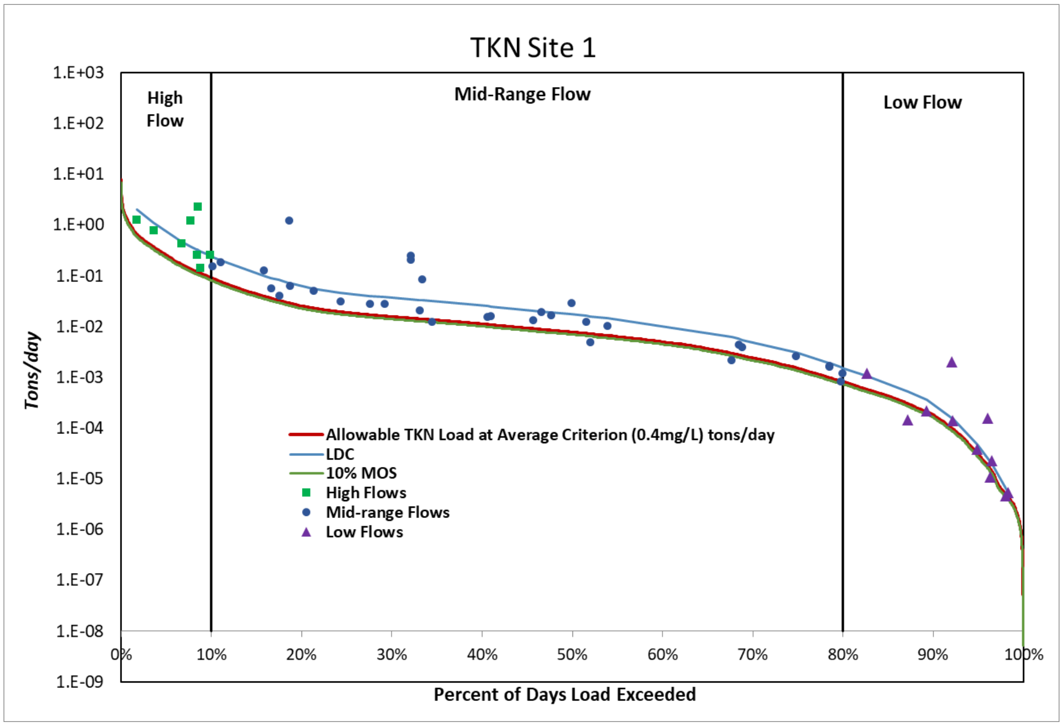

Figure 6. TKN load duration curve at site 1 showing the allowable load and the 10% MOS.

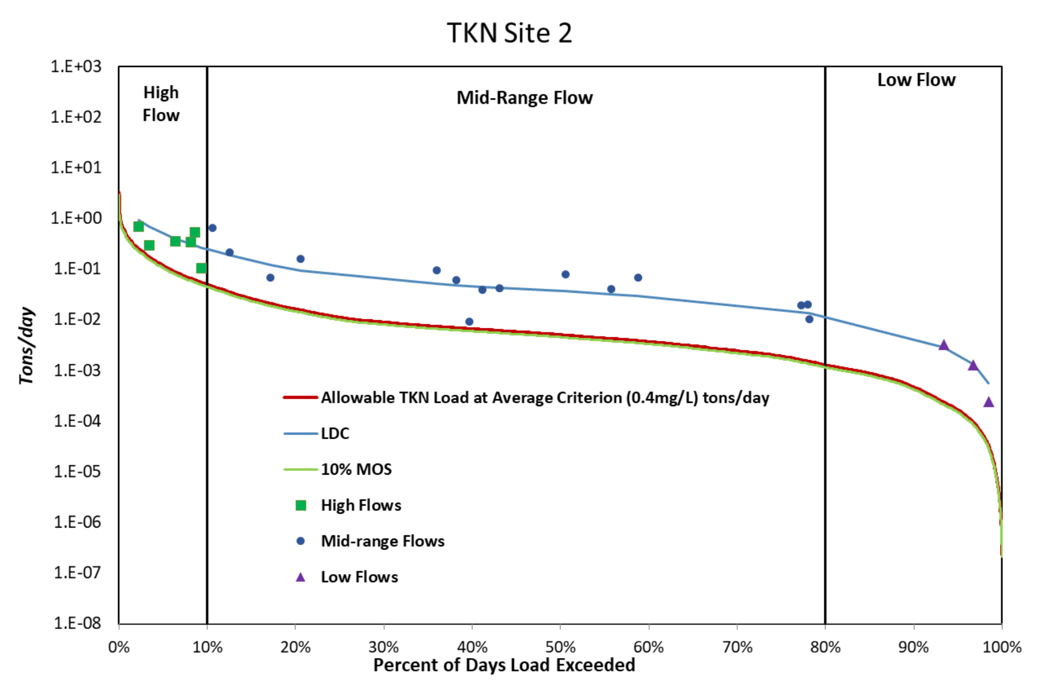

Figure 7. TKN load duration curve at site 2 showing the allowable load and the 10% MOS.

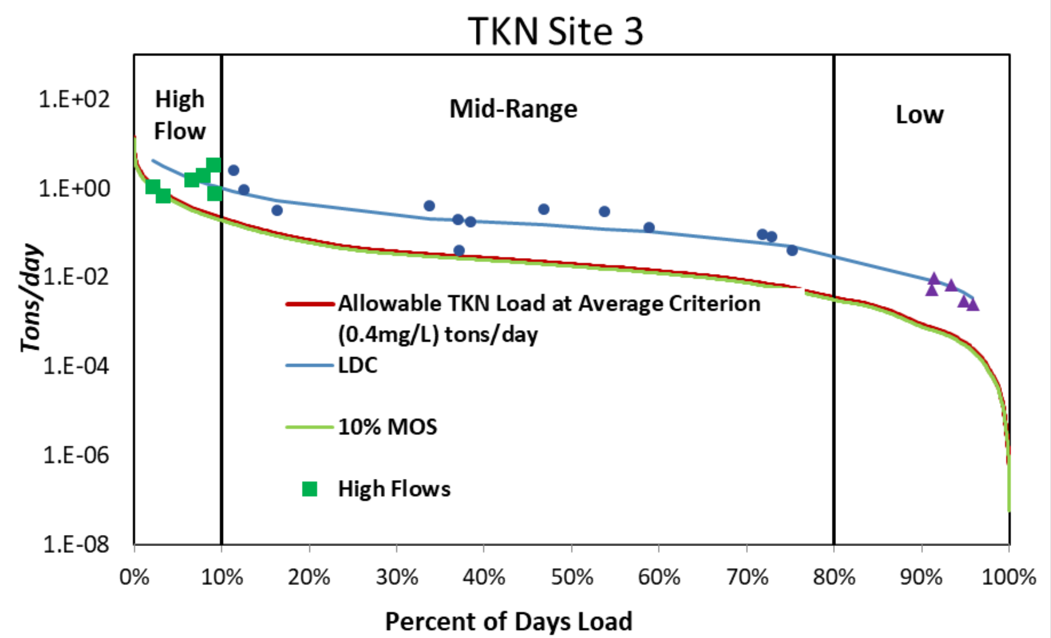

Figure 8. TKN load duration curve at site 3 showing the allowable load and the 10% MOS.

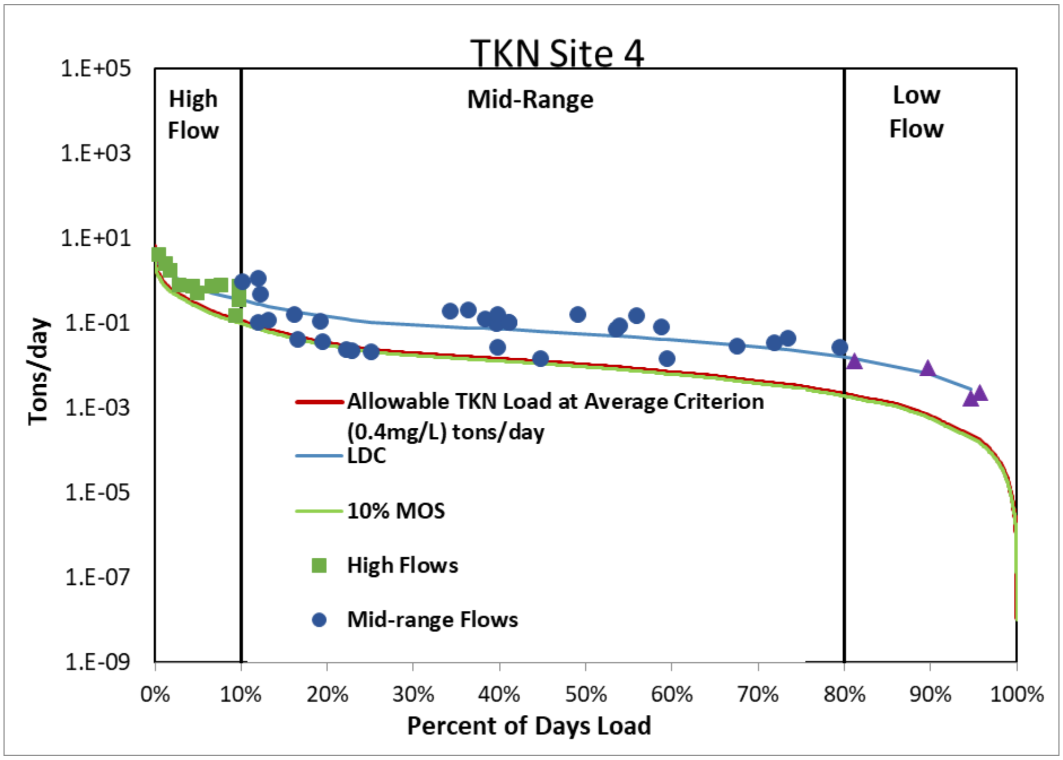

Figure 9. TKN load duration curve at site 4 showing the allowable load and the 10% MOS.

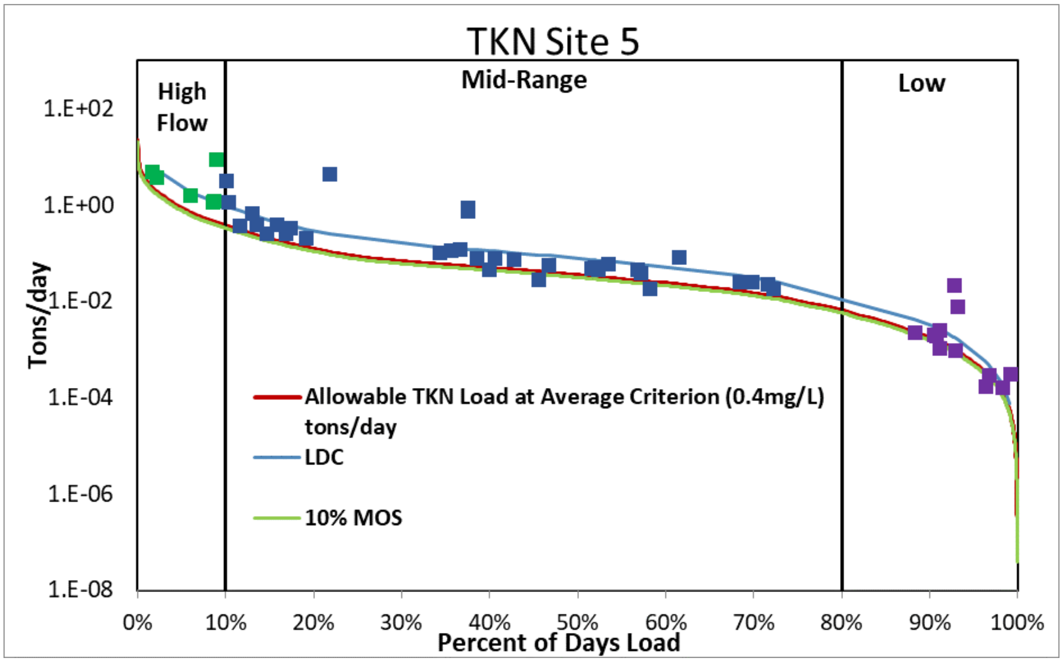

Figure 10. TKN load duration curve at site 5 showing the allowable load and the 10% MOS.

Ammonia Nitrogen

Ammonia levels in Rowlett Creek were below the allowable limit for all sites. This indicates that high TKN values shown above are mostly due to organic nitrogen. Notably, Site 4 had high ammonia loads at low flows.

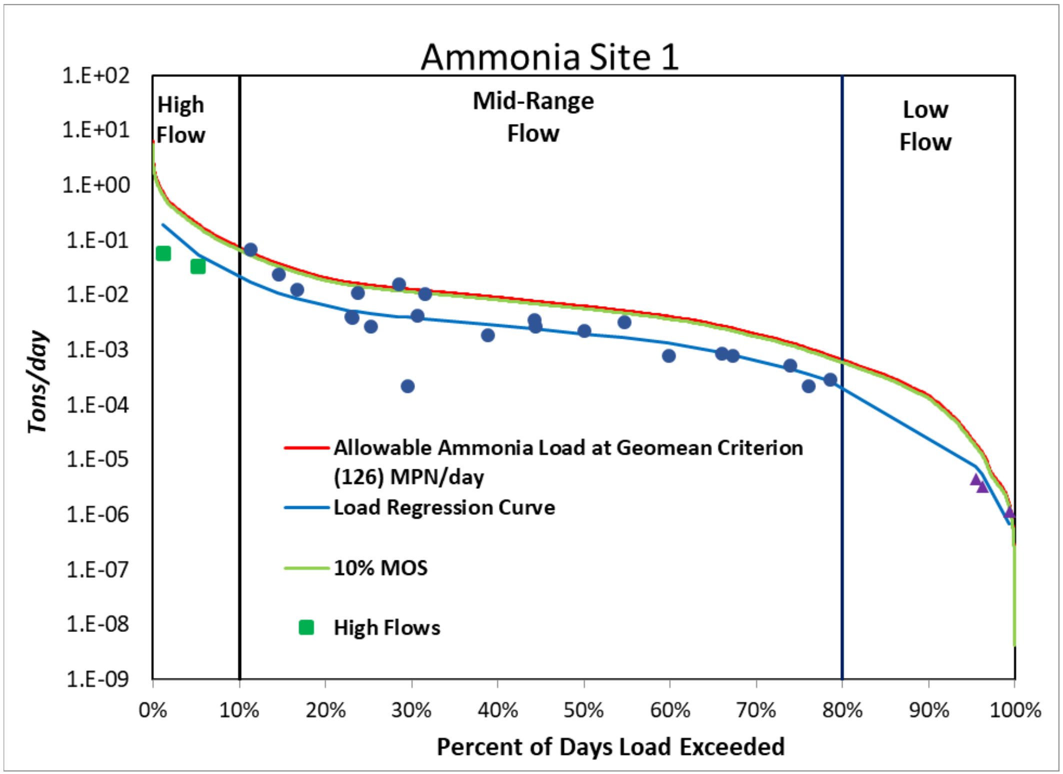

Figure 11. Ammonia load duration curve at site 1 showing the allowable load and the 10% MOS.

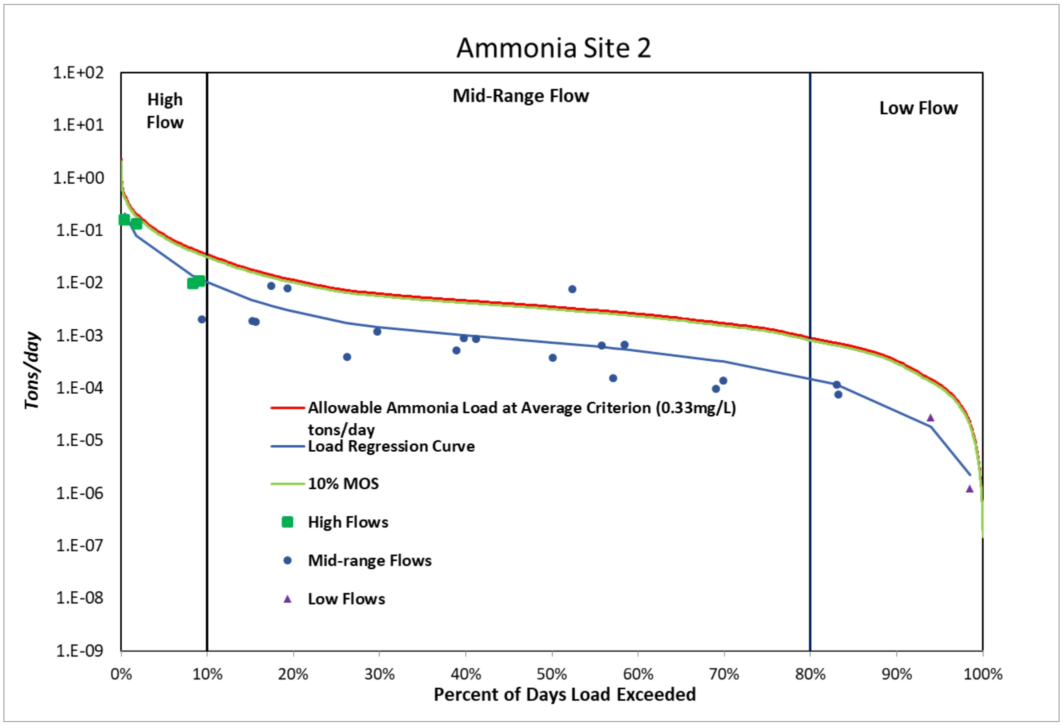

Figure 12. Ammonia load duration curve at site 2 showing the allowable load and the 10% MOS.

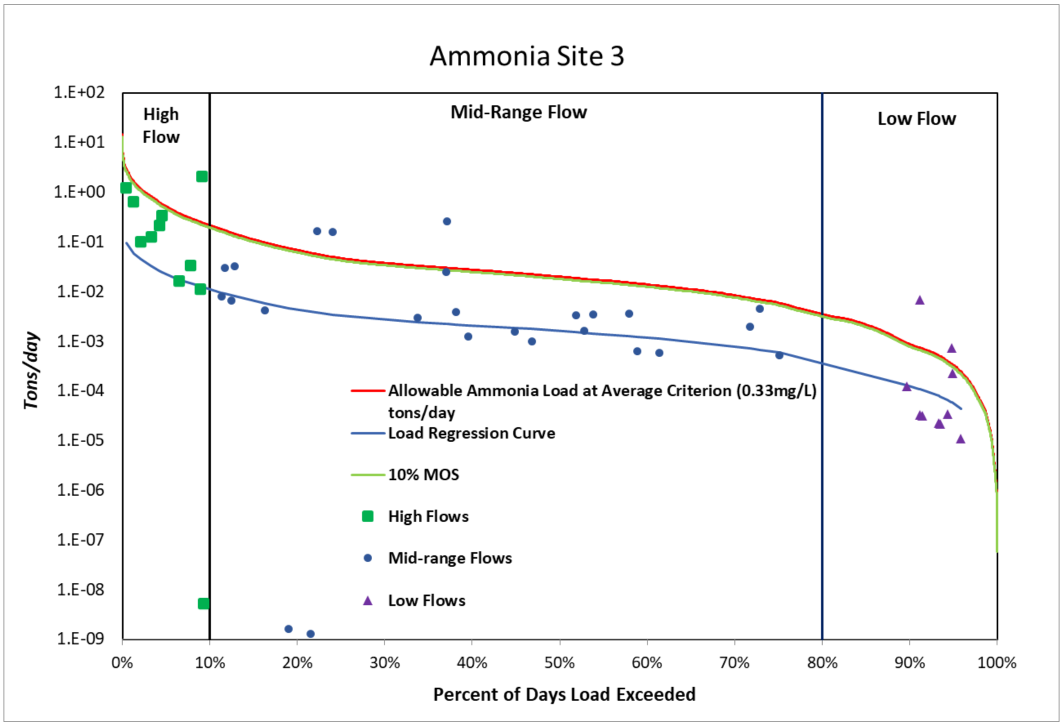

Figure 13. Ammonia load duration curve at site 3 showing the allowable load and the 10% MOS.

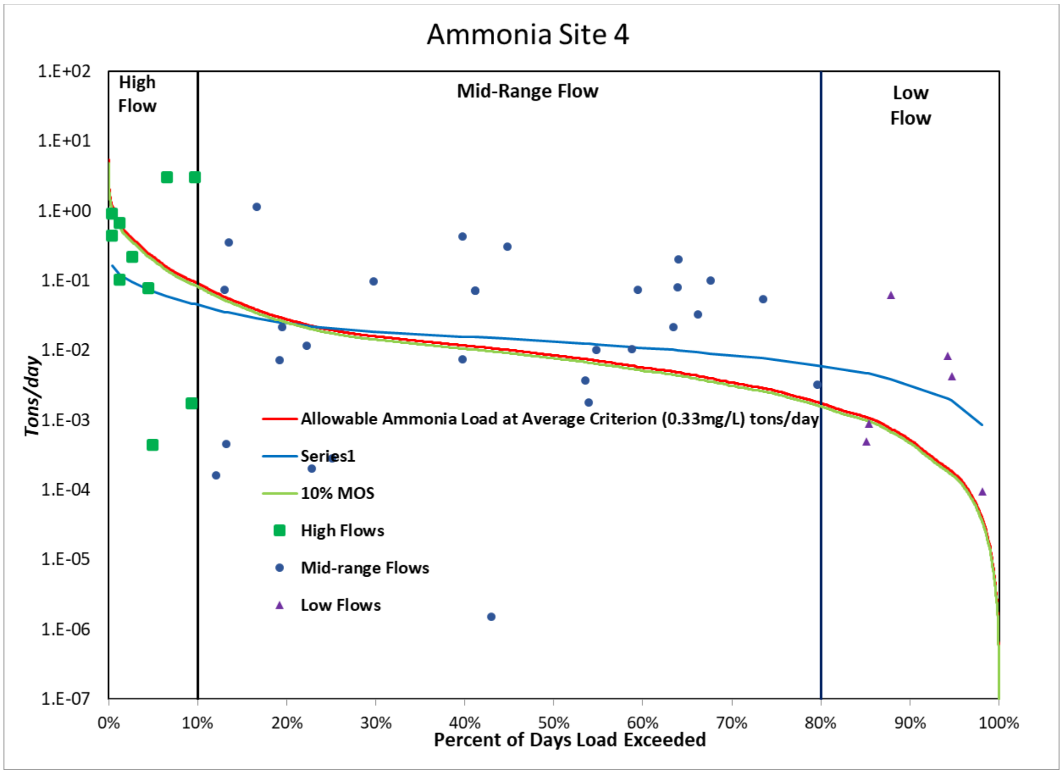

Figure 14. Ammonia load duration curve at site 4 showing the allowable load and the 10% MOS.

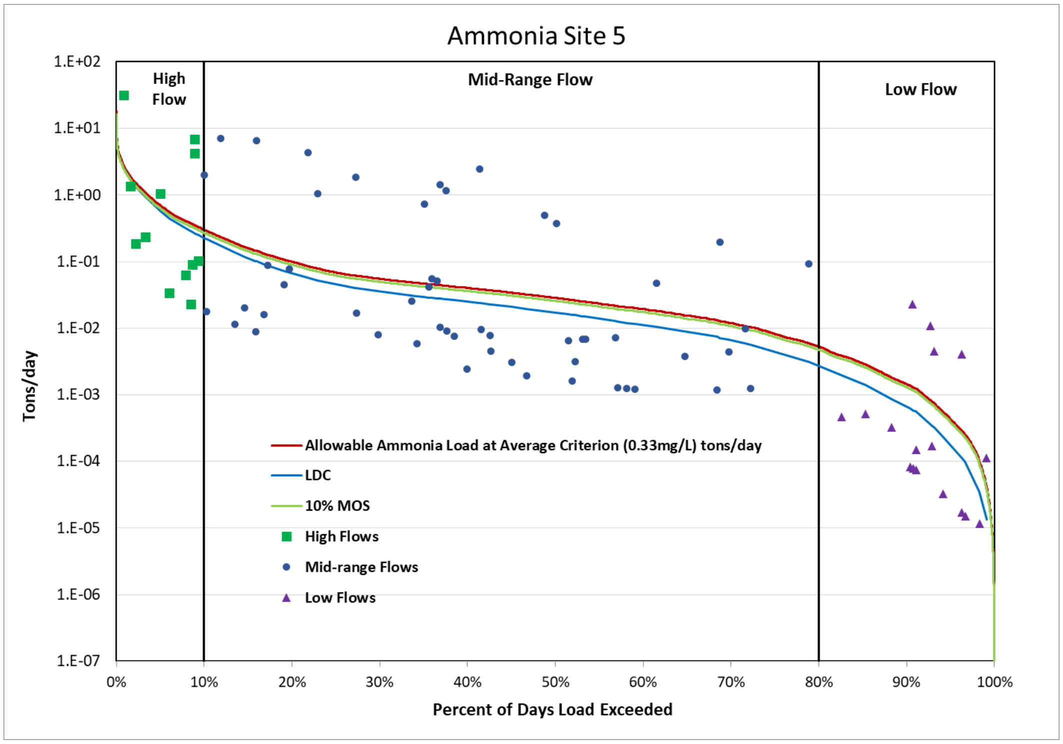

Figure 15. Ammonia load duration curve at site 5 showing the allowable load and the 10% MOS.

Total Phosphorus

Total phosphorus (TP) is a parameter used to analyze a water sample for all forms of phosphorus. Forms of phosphorus include organic and inorganic forms as well as dissolved and particulate forms. Total Phosphorus levels were in general lower than the MOS for all sites. A notable exception is high flows at site 3 and low flows at site 4.

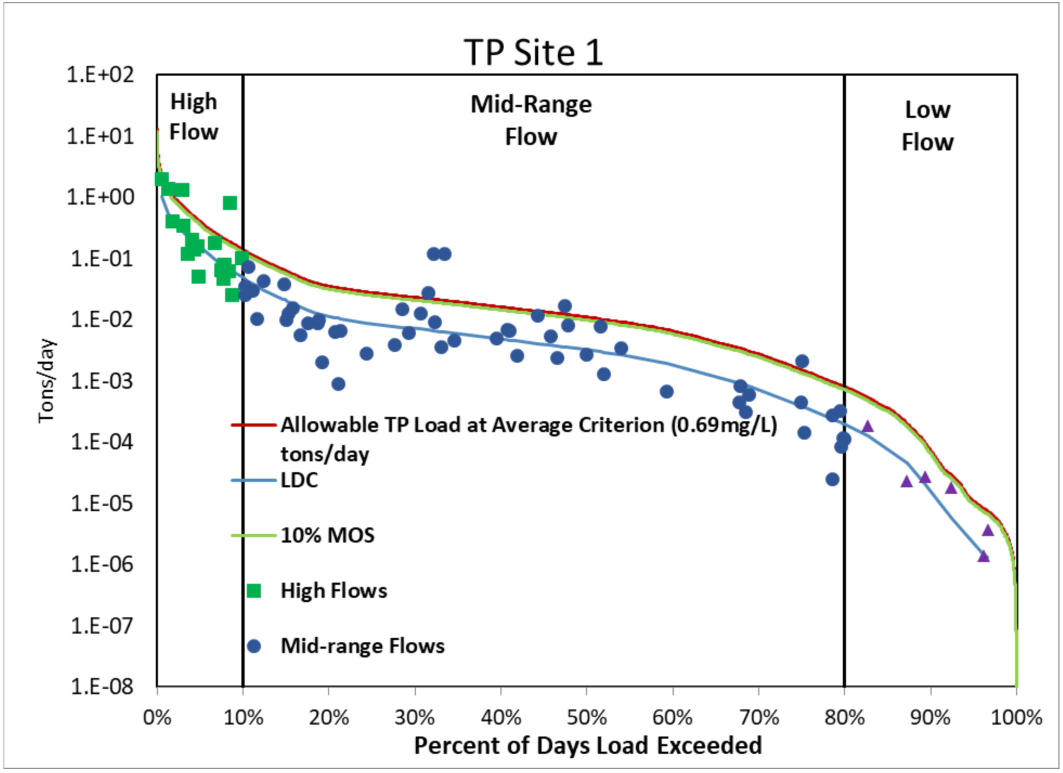

Figure 16. Total Phosphorus load duration curve at site 1 showing the allowable load and the 10% MOS.

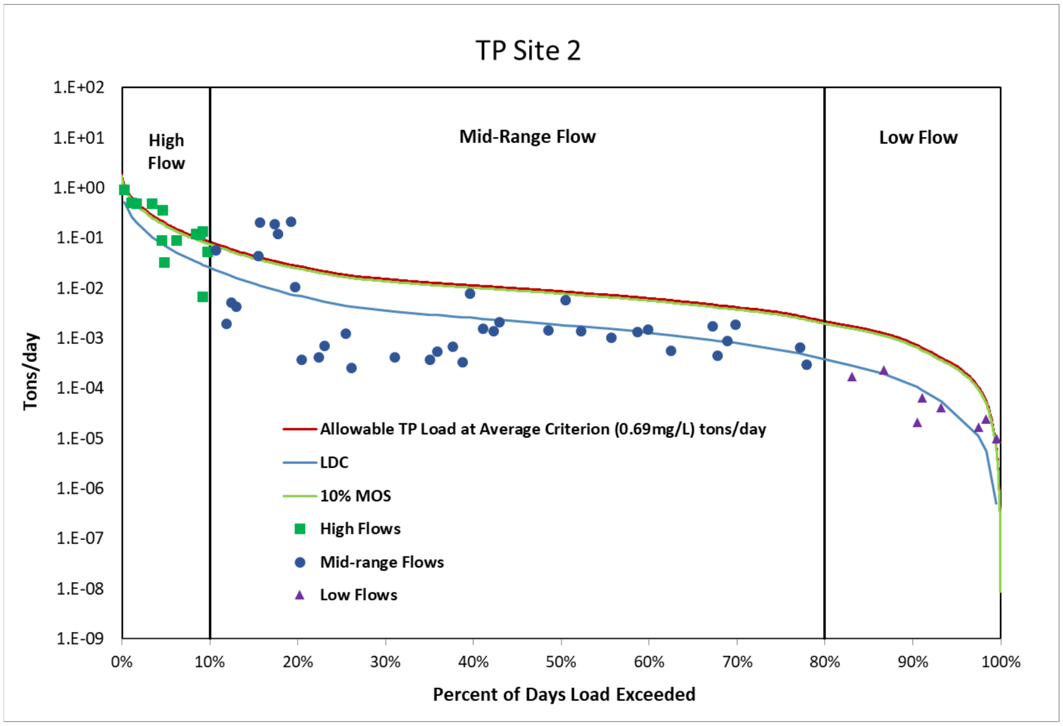

Figure 17. Total Phosphorus load duration curve at site 2 showing the allowable load and the 10% MOS.

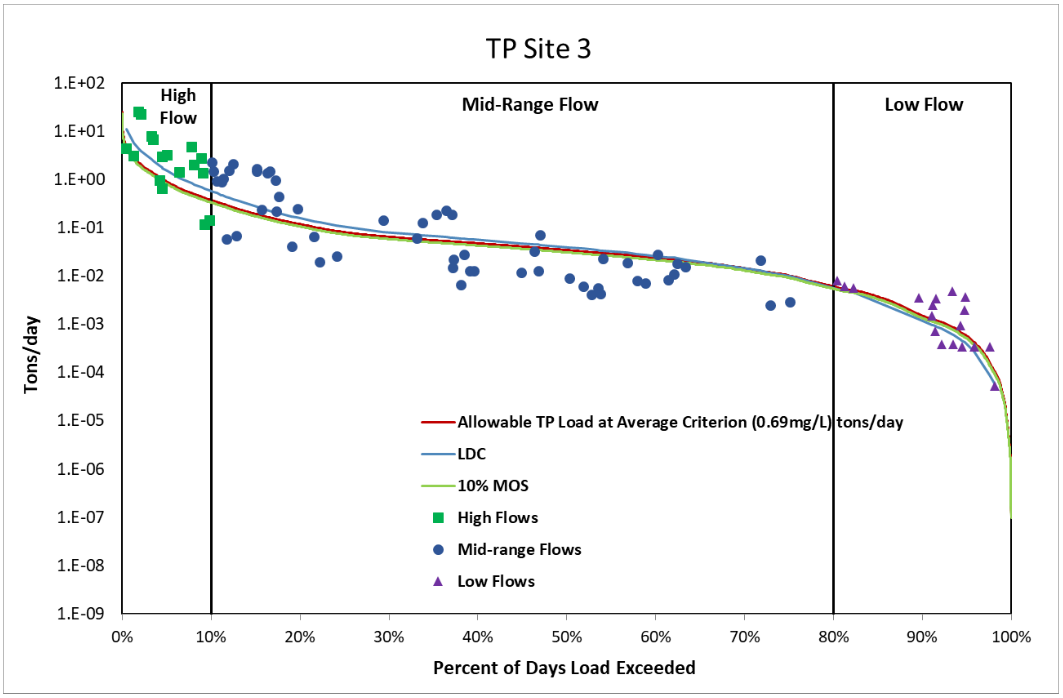

Figure 18. Total Phosphorus load duration curve at site 3 showing the allowable load and the 10% MOS.

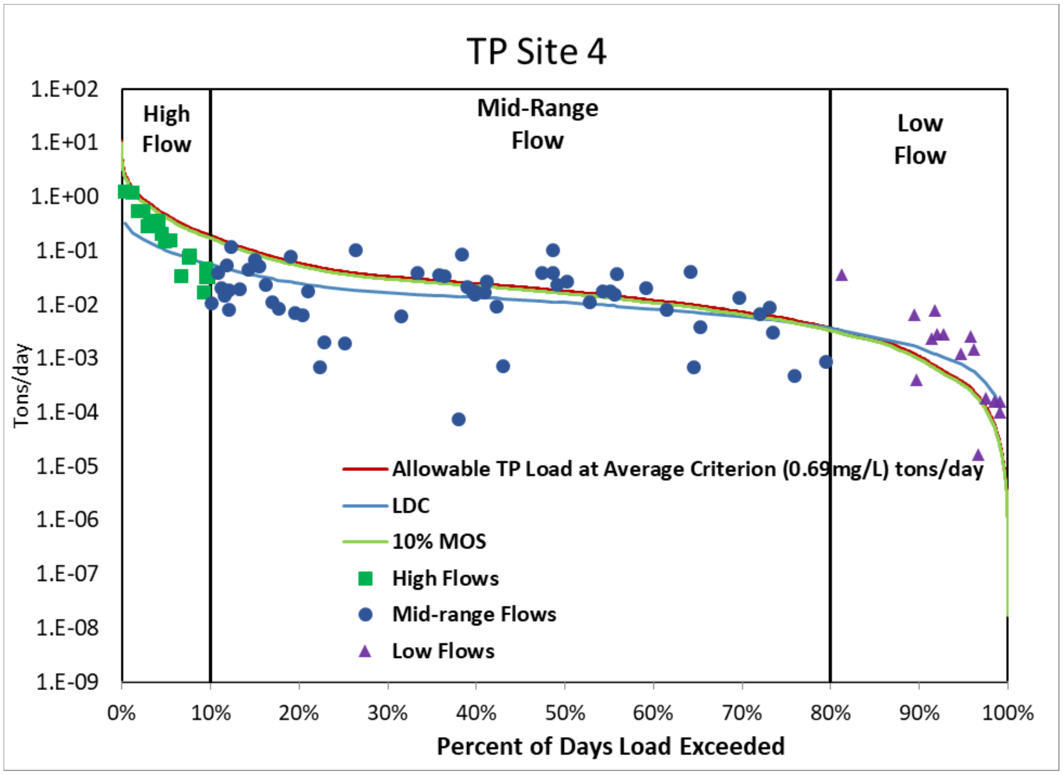

Figure 19. Total Phosphorus load duration curve at site 4 showing the allowable load and the 10% MOS.

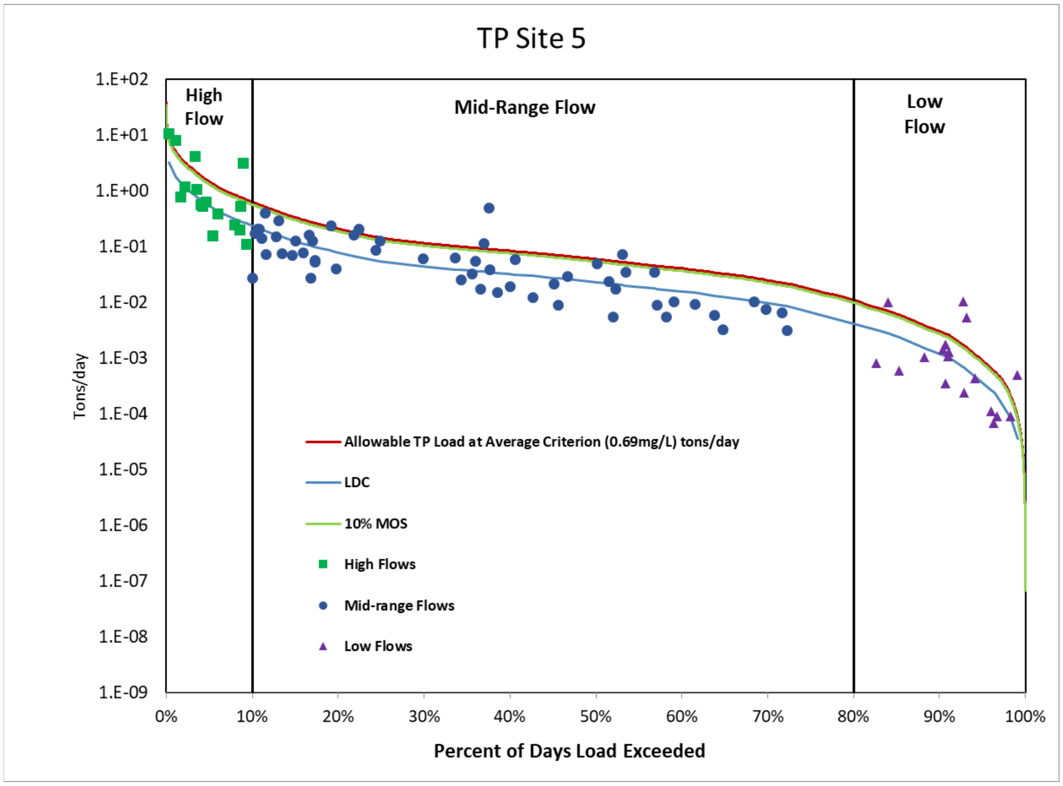

Figure 20. Total Phosphorus load duration curve at site 5 showing the allowable load and the 10% MOS.

Total Suspended Solids

Total suspended solids (TSS) are suspended particles in a water column that, when sampled, are not capable of passing through a specific pore sized filter. Solids are made up of organic matter that can include algal, bacterial cells or organisms as well as inorganic matter that includes soil sediments due to erosion. Suspended solids reduce water clarity and light penetration, slowing the growth of beneficial aquatic plant life. Fish are directly affected by sedimentation through the loss of insect prey, clogging and abrasion of gills and skin, and loss of species diversity. TSS loadings for the subwatersheds sizes were low at sites 1 and 2. These loads were significantly higher at sites 3 and to a lesser extent site 4. Site 5 was a little lower than sites 3 and 4 but the range of values was notably wider (large standard deviations). Such variability might be caused by the lake effects as Lake water levels sometimes impacted this site.

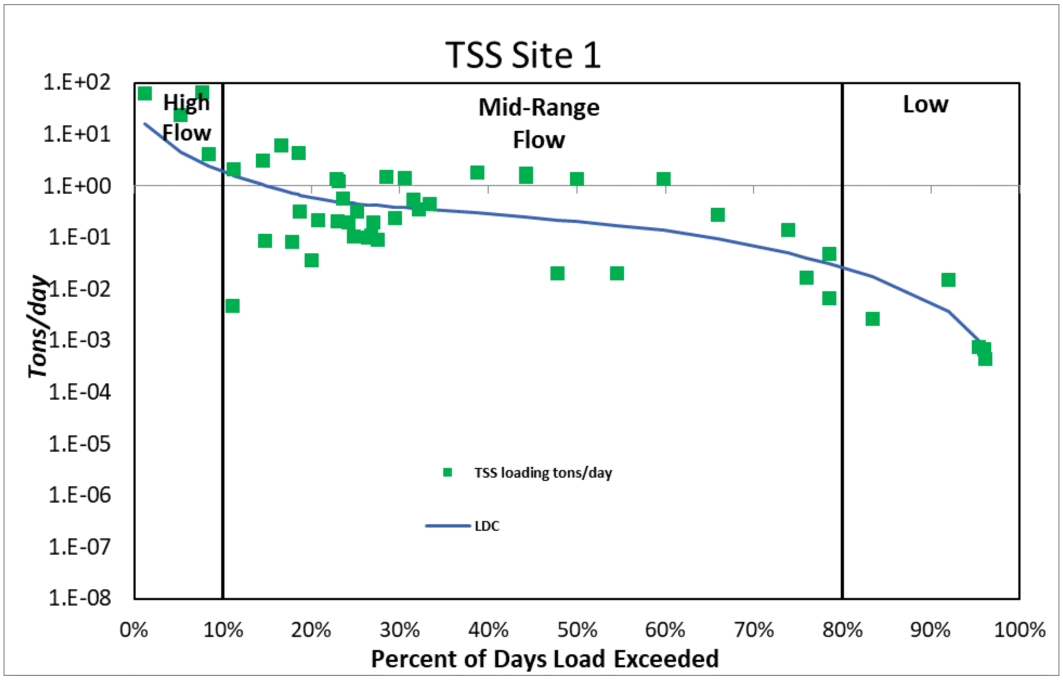

Figure 21. Total suspended solids load duration curve at site 1

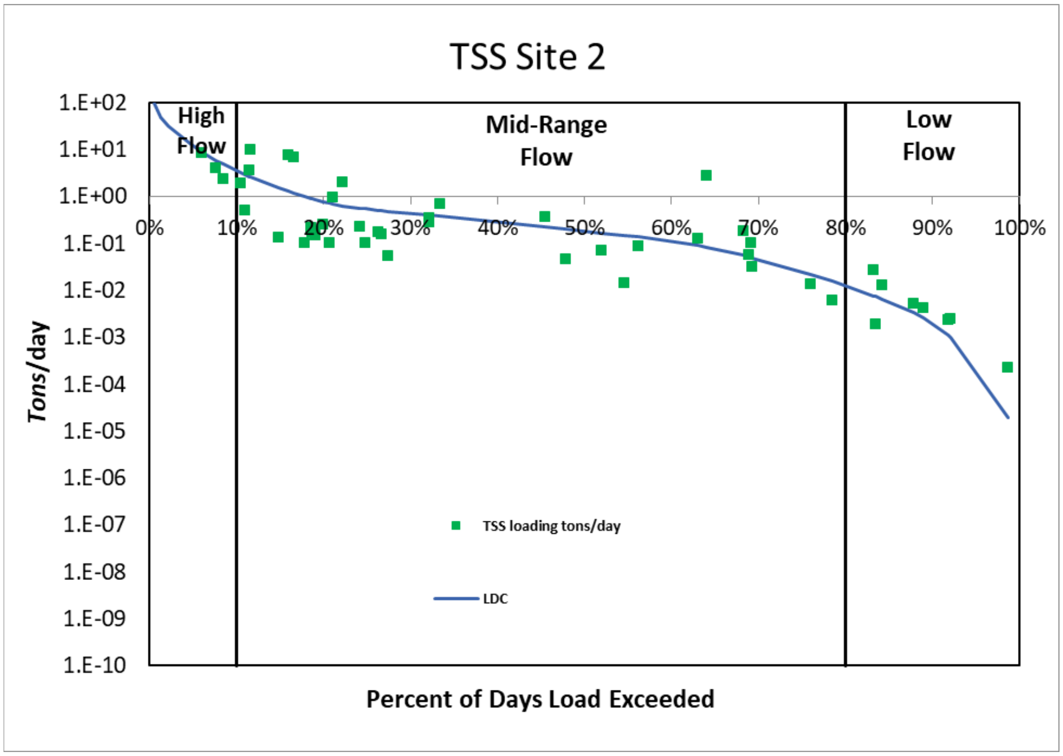

Figure 22. Total suspended solids load duration curve at site 2

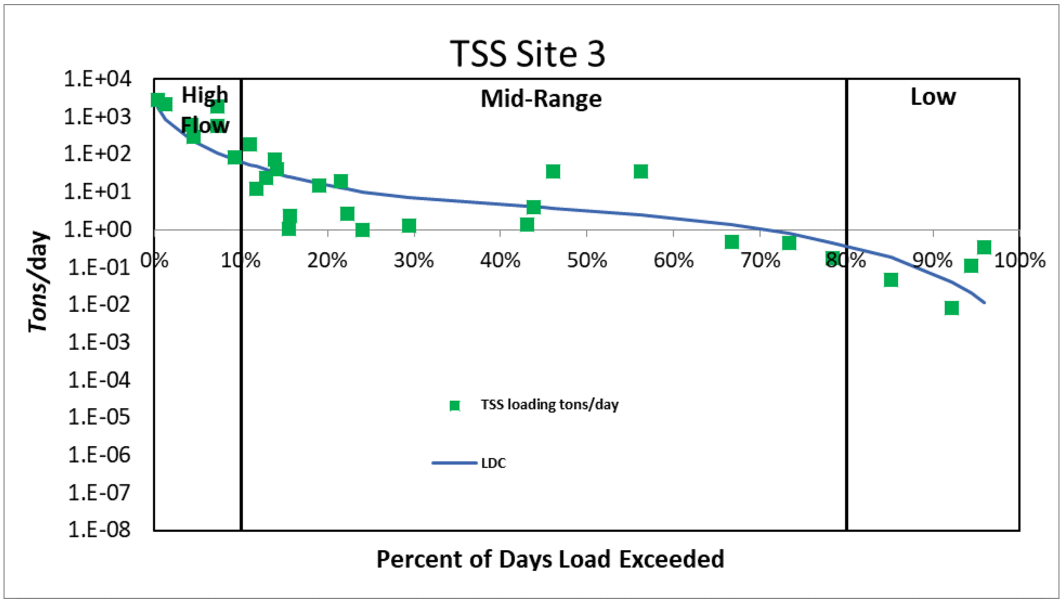

Figure 23. Total suspended solids load duration curve at site 3

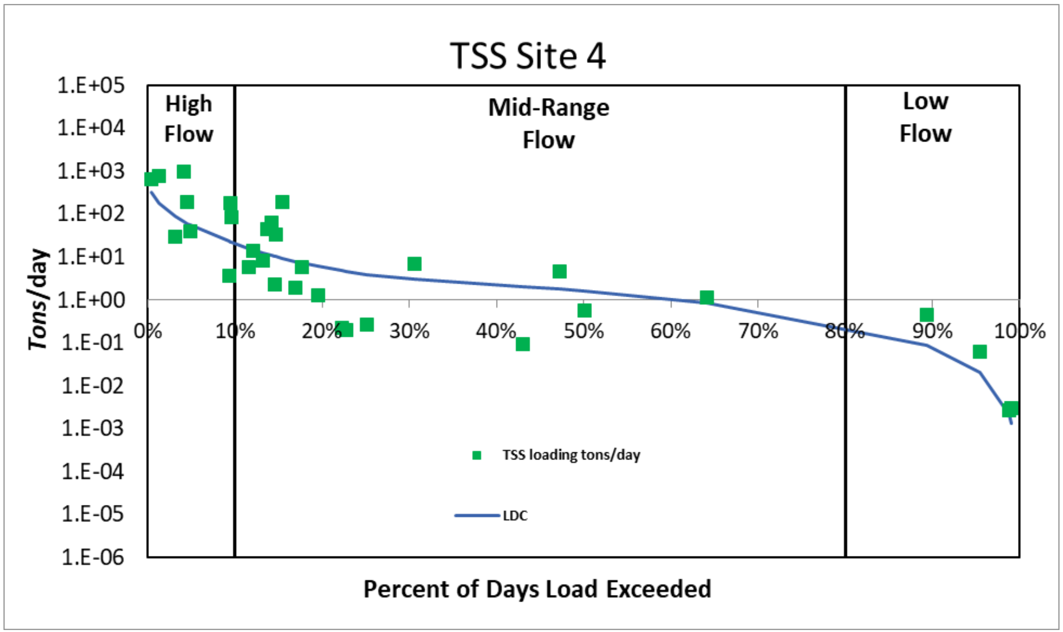

Figure 24. Total suspended solids load duration curve at site 4

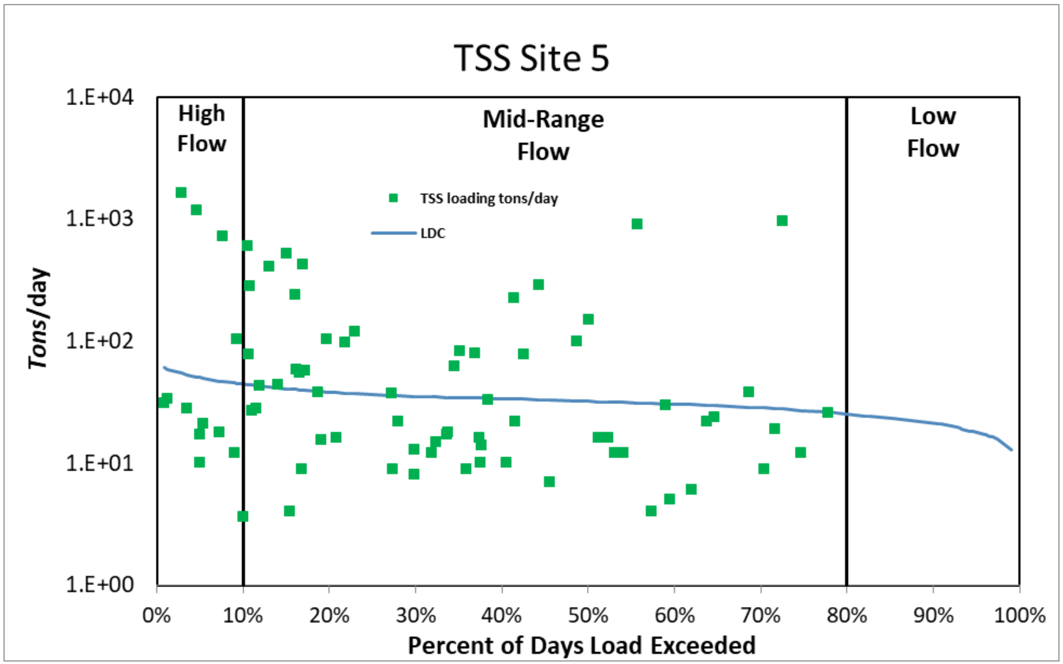

Figure 25. Total suspended solids load duration curve at site 5.

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Appendix C: Calculations for Potential Bacteria Load Reduction Estimates

Estimates for bacteria load reductions in the Rowlett Creek watershed are based on the best available information regarding the effectiveness of management measures agreed upon by local stakeholders. The real-world conditions where implementation is completed will ultimately determine the actual load reduction achieved, which may differ from the estimated values. Stakeholders determined the types and numbers of management measures to be implemented over a 10-year period based on perceived local acceptability, effectiveness, and available resources.

Pet Waste Load Reductions

Potential load reductions for pet waste depend on the number of pets that contribute loading and the amount of pet waste that is picked up and disposed of properly. Assessing the number of dog owners who do not pick up waste or who would change behavior based on education or availability of pet waste stations is fundamentally difficult. Thus, only estimates of potential reduction can be made through the best available knowledge. If we assume that 50% of dog owners walk their dogs, 40% of those walkers do not pick up pet waste, and of those 40%, about 60% would be willing to change their behavior then 12% (0.5 *0.4 *0.6 = 0.12) of dog walkers can be assumed to change their behavior to begin picking up after their pets, and that 75% of the waste was disposed of properly (Center for Watershed Protection, 1999).

Table C-1. Bacteria load reduction assumptions for dogs.

Description	Assumption
Estimated number of dogs	13,4975
Percent of dogs managed[1]	12%
Practice Efficiency	75%
Fecal coliform production rate[2]	5.00 x 10^9 cfu/animal-day
Fecal coliform to E. coli conversion rate	0.63 *E. coli*/cfu fecal coliform

1 Center for Watershed Protection (1999)

2 USEPA et al. (2001)

Using the assumptions in Table C-1, the potential annual bacteria load from dogs is estimated as:

$$LR_d = N_d \times M_d \times FC_d \times C \times 365\, days/year \times E_d$$

Where:

$LR_d = Potential\ annual\ E.coli\ load\ reduction\ attributed\ to\ proper\ dog\ waste\ disposal$

$N_d = Number\ of\ dogs$

$M_d = Percent\ of\ dogs\ managed$

$FC_d = Fecal\ coliform\ loading\ rate\ of\ dogs$

$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$

$$E_d = Assumption\ of\ percent\ efficiency\ of\ proper\ dog\ waste\ disposal$$

The estimated potential annual load reduction across the watershed attributed to proper dog waste disposal is 1.40 x 10^{16} cfu *E. coli*/year. Additionally, it can be anticipated that nutrient load reductions will accompany these *E. coli* reductions. The Tres Palacios and Carancahua Bay WPPs estimated annual load reductions between 0.8 - 1.0 pounds of nitrogen, and 0.2 pounds of phosphorus per additional dog managed (Schramm et al., 2017, 2019).

Feral Cat Load Reductions

Potential load reductions for feral cat waste depend on the number of cats that contribute loading, and the number of feral cats managed annually through trap-neuter-return (TNR) programs. Since TNR programs vary in effectiveness based on the management strategies implemented and the length of time implemented, assessing the amount of waste load reduction is fundamentally difficult (Dutcher et al., 2021). Thus, only estimates of potential reduction can be made through the best available knowledge and models which simulate trapping effectiveness. If we assume four trapping periods lasting 7-days each year leads to 57% of feral cats being successfully trapped and fixed annually, then over the course of 10 years this will lead to a reduction of the feral cat population by 25% (McCarthy et al., 2013). Though the model is exponential, for simplicity it was further assumed that there would be an equal cumulative annual effectiveness of 2.5% (0.25/10-years = 0.025) reduction in feral cat population. The assumptions were developed based on the moderate-high management control measures being implemented and does not account for potential inflow of new cats from abandonment and roaming, or cats being completely removed from the outside to be placed for adoption or humanely euthanized for health reasons (Coe et al., 2021; McCarthy et al., 2013; Spehar & Wolf, 2018).

Table C-2. Bacteria load reduction assumptions for feral cats.

Description	Assumption
Estimated number of dogs	13,4975
Percent of feral cats managed[1]	57%
Practice Efficiency[1]	25%
Fecal coliform production rate[2]	5.00 x 10^9 cfu/animal-day
Fecal coliform to E. coli conversion rate	0.63 *E. coli*/cfu fecal coliform

1 McCarthy et al. (2013)

2 USEPA et al. (2001)

Using the assumptions in Table C-2, the potential annual bacteria load from dogs is estimated as:

$$LR_c = N_c \times M_c \times FC_c \times C \times 365\, days/year \times \frac{E_c}{10\ years}$$

Where:

$$LR_c = Potential\ annual\ E.coli\ load\ reduction\ attributed\ to\ feral\ cat\ management$$

$$N_c = Number\ of\ feral\ cats$$

$$M_c = Percent\ of\ feral\ cats\ managed$$

$$FC_c = Fecal\ coliform\ loading\ rate\ of\ dogs$$

$$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$$

$$E_c = Assumption\ of\ percent\ efficiency\ of\ feral\ cat\ population\ management$$

The estimated potential annual load reduction across the watershed attributed to feral cat population reduction through management (TNR) is 1.62 x 10^{15} cfu *E. coli*/year.

Agricultural Nonpoint Source Load Reductions

The potential agricultural load reductions that are achieved through conservation planning (CP) and water quality management planning (WQMP) will depend on the specific management practices implemented by landowners. The load reduction will vary based on the type of practice implemented, existing land condition, number of cattle in each operation, and proximity to water bodies. Substantial research has been conducted on bacteria reduction efficiencies of practices, following other WPP development guidance's within Texas a median 62.8% load reduction effectiveness rate for conservation planning (Table C-3) was used in the calculations described below (Table C-5). Potential bacteria load reductions for livestock management measures were calculated first based on the assumed average number of grazing livestock per operation, average fecal coliform production rates, and standard conversions, conservation practice effectiveness, and proximity factor of practice to water body (Table C-4, Table C-5). The proximity factor is an estimated impact factor that accounts for an assumed stream impact based on the location of a practice to the stream. Practices closer to a stream are assumed to have a higher potential load reduction impact while those further away have a lower impact. Since actual practices and locations are unknown a proximity factor of 25% was assumed, like used in other WPPs (Monroe1 et al., 2023).

Table C-3. Estimated effectiveness of conservation practices.

Conservation Practice	Effectiveness		
	Low	Median	High
Exclusion Fencing[1]	30%	62%	94%
Prescribed Grazing[2]	42%	54%	66%
Watering Facility[3]	51%	73%	94%

1 (Brenner et al., 1996; Cook, 1998; Hagedorn et al., 1999; Line, 2002, 2003; Lombardo et al., 2000; Meals, 2004)

2 (EPA, 2010; Tate et al., 2004)

3 (Byers et al., 2005; Hagedorn et al., 1999; R. E. Sheffield et al., 1997)

Table C-4. Bacteria load assumptions for grazing livestock per operation.

Animal	Estimated AU in Watershed	AU per operation	Fecal coliform production rate
Cattle[1]	612	16.34	8.55 x 10^9
Horses[1]	81.25	2.17	2.91 x 10^8
Sheep[1]	10.4	0.28	2.90 x 10^{11}

1 Wagner & Moench (2009)

Table C-5. Bacteria load reduction assumptions for grazing livestock.

Description	Assumption
Number of farming operations[1]	37.5
Total daily load per operation	9.87×10^{10}
Practice Efficiency	62.8%
Proximity factor	25%
Fecal coliform to E. coli conversion rate	0.63

Using the above assumptions, the potential daily *E. coli* load per operation was estimated by:

$$PDL_o = \sum \frac{AU_l}{N_o} \times FC_l \times C$$

Where:

$PDL_{ol} = Potential\ daily\ E.coli\ loading\ of\ all\ livestock\ per\ operation$

$AU_l = Animal\ units$

$N_o = Number\ of\ operations$

$FC_l = Fecal\ coliform\ loading\ rate\ of\ animal$

$C = Fecal\ coliform\ to\ E.coli\ conversion\ rate$

Using the above assumptions and previous calculation, the potential annual load reduction was calculated as:

$$LR_l = N_p \times PDL_o \times 365\ days/year \times E_l \times P$$

Where:

$LR_l = Potential\ annual\ E.coli\ load\ reduction$

$PDL_{ol} = Potential\ daily\ E.coli\ loading\ of\ all\ livestock\ per\ operation$

$N_p = Number\ of\ plans$

$E_l = Median\ efficacy\ rate$

$P = Proximity\ factor$

The recommended number of WQMPs or CPs to be implemented is 5, resulting in a total potential annual load reduction of 2.83×10^{15} cfu E. coli/year across the watershed. The estimated potential annual loading across the watershed due to all livestock is 1.99×10^{15} cfu *E. coli*/year. Additionally, it can be anticipated that nutrient load reductions will accompany these *E. coli* reductions. The Tres Palacios and Carancahua Bay WPPs estimated annual load reductions between 733 – 983 pounds of nitrogen, and between 276 – 511 pounds of phosphorus per WQMP or CP depending on the size and type of operation (Schramm et al., 2017, 2019). Though it can be more appropriately assumed that given the smaller size of these operations (e.g., less than 19 AU/operation) compared to the ones described, the reductions may be much less.

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Appendix D: EPAs Elements of a Successful Watershed Protection Plan

The EPA's *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (USEPA, 2008) describes the nine elements critical for achieving improvements in water quality that must by sufficiently included in the WPP for it to be eligible for implementation funding through the CWA Section 319 funds. These elements do not preclude additional information from being included in the WPP. Below are the nine elements briefly described and references to the chapters and sections that fulfill each element.

A. Identification of Causes and Sources of Impairments

Identify the causes and sources or groups of similar sources that will need to be controlled to achieve the load reductions estimated in this watershed-based plan, and to achieve any other watershed goals identified in the watershed-based plan. Sources that need to be controlled should be identified at the significant subcategory level with estimates of the extent to which they are present in the watershed. Information can be based on a watershed inventory or extrapolated from a subwatershed inventory, aerial photos, GIS data, or other sources.

See Chapters 1, 3, 4, Appendix A, and B.

B. Estimated Load Reductions

Estimate the load reductions expected for the management measures proposed as part of the watershed plan.

See Chapter 4 and Appendix C.

C. Proposed Management Measures

Describe the management measures that will need to be implemented to achieve the estimated load reductions and identification (using a map or description) of the critical areas in which those measures will be needed to implement the plan. Proposed management measures are defined as including BMPs and measures needed to institutionalize changes. A critical area should be determined for each combination of source BMP.

See Chapter 5 and Appendix C.

D. Technical and Financial Assistance Needs

Estimate the amounts of technical and financial assistance needed, associated costs and/or the sources and authorities that will be relied upon to implement this plan. Authorities include the specific state or local legislation that allows, prohibits, or requires an activity.

See Chapter 6.

E. Information, Education and Public Participation Component

Information/education components will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the appropriate nonpoint source pollution management measures.

See Chapter 6.

F. Implementation Schedule

Schedule implementing the nonpoint source pollution management measures identified in the plan that is reasonably expeditious.

See Chapter 5.

G. Milestones

Provide a description of interim, measurable milestones for determining whether nonpoint source pollution management measures or other control actions are being implemented. Milestones should be tied to the progress of the plan to determine if it is moving in the right direction.

See Chapters 5 and 7.

H. Load Reduction Evaluation Criteria

Determine a set of criteria that can be used to determine whether loading reductions are being achieved over time and if substantial progress is being made toward attaining water quality standards. If not, it is also the criteria for determining if the watershed-based plan needs to be revised. The criteria for the plan needing revision should be based on the milestones and water quality changes.

See Chapters 5 and 7.

I. Monitoring Component

Include a monitoring component to evaluate the effectiveness of the implementation efforts over time that is measured against the evaluation criteria. The monitoring component should include required project-specific needs, the evaluation criteria, and local monitoring efforts. It should also be tied to the state water quality monitoring efforts.

See Chapter 7.