Total Maximum Daily Loads
for the
Lower Platte River Basin

**(Segments LP1-10000, LP1-20000, LP2-10000, LP2-10100
LP2-20000, LP2-20400, LP2-20500 and LP2-30000)**

Parameter of Concern: *E. coli* Bacteria

**Nebraska Department of Environmental Quality
Planning Unit, Water Quality Division**

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Executive Summary

Seven segments in the Lower Platte River Basin were included in the 2006 Nebraska Surface Water Quality Integrated Report (NDEQ 2006c) in Category 5 as impaired by excessive *E.* coli. As such, total maximum daily loads must be developed in accordance with the Clean Water Act. Recently, the primary contact recreation beneficial use was added to additional segments in the basin. Data from these segments indicate two of the waterbodies are impaired and will be included on the 2008 Integrated Report. Rather than delay preparation of the TMDLs until the listing, these two segments have been included.

One segment (LP2-20900) is wholly contained within the City of Lincoln corporate limits and has also been deemed impaired by excessive ammonia. TMDLs for these two parameters will be addressed in a separate document.

Based on the strategy of a basin wide approach as well as the hydrologic connections, TMDLs have been developed and included for eight waterbodies. In 2002, the Department opted to convert from fecal coliform to *E.* coli bacteria as the indicator for primary contact recreation assessment. This document presents TMDLs for *E. coli* that are designed to allow the Lower Platte River Basin segments to fully support the primary contact recreation beneficial use. The information contained herein should be considered eight TMDLs.

These TMDLs have been prepared to comply with the current (1992) regulations found at 40 CFR Part 130.7.

1. Name and geographic location of the impaired waterbody for which the TMDLs are being developed.
Lower Platte River Basin: LP1-10000, LP1-20000, LP2-10000, LP2-10100, LP2-20000, LP2-20400, LP2-20500 and LP2-30000.

2. Identification of the pollutant and applicable water quality standard
The pollutant causing the impairment(s) of the water quality standard and designated beneficial use is *E. coli* bacteria. Designated uses assigned to the above-identified segments include: primary contact recreation, aquatic life Warmwater class A and Warmwater Class B, agriculture and industrial water supply class A and aesthetics (NDEQ 2006a). Excessive *E. coli* has been determined to be impairing the primary contact recreation beneficial uses. The applicable water quality criteria are a recreation season (May 1-September 30) geometric mean of 126/100 ml for *E. coli*.

3. Quantification of the pollutant load that may be present in the waterbody and still allows attainment and maintenance of the water quality standards.
The allowable pollutant load is based upon the available stream flow volume. That is, loading capacities are developed for each flow by multiplying the water quality standard (WQS) by the selected stream flow and a conversion factor (C) with the equation being:

$$\text{Loading capacity} = \text{WQS} * \text{Flow} * \text{C}$$

4. Quantification of the amount or degree by which the current pollutant load in the waterbody, including upstream sources that is being accounted for as background loading deviates from the pollutant load needed to attain and maintain water quality standards.

Segment	# *E. coli* colonies <126/100 ml
LP1-10000	188
LP1-20000	624
LP2-10000	592
LP2-10100	405
LP2-20000	306
LP2-20400	1,278
LP2-20500	263
LP2-30000	332

5. Identification of the pollutant source categories.

Both point and nonpoint sources (including natural sources) have been identified to be contributing to the pollutant loads being delivered to the Lower River Basin segments.

6. Wasteload allocations for pollutants from point sources.

The wasteload allocations for point source discharges will be equivalent to the water quality criteria associated with the primary contact recreation beneficial use. Therefore, the WLA is a monthly geometric mean of 126/100 ml.

7. Load allocations for pollutants from nonpoint sources.

The load allocations assigned to these TMDLs will be based upon the stream flow volume and will be defined as:

$$LA_i = Q_i*126/100\ ml*C$$

Where:
LA_i = load allocations at the ith flow
Q_i = stream flow at the ith flow
126/100 ml = applicable/target water quality criteria for *E. coli* from Title 117
C = conversion factor

8 A margin of safety.

These TMDLs contain an implicit and explicit margin of safety. Specifically, decay/die-off from the potential source to the recreational segment was not included in the pollutant source evaluation, all point sources were assumed to be discharging the expected concentration. As well, the targeted reduction will focus on achieving 90% of the water quality target (≤113/100 ml).

9. Consideration for seasonal variation.

The water quality criteria are only applicable during the Title 117 defined recreation season that starts May 1 and ends September 30. Because of this, the water quality and stream volume data was limited to this time period.

10. Allowances for reasonably foreseeable increases in pollutant loads.

There was no allowance for future growth included in these TMDLs.

11. Implementation Plan

Implementation of the reductions for *E. coli* will be carried out through a combination of regulatory and non-regulatory activities. Point sources will be regulated under the auspice of the National Pollutant Discharge Elimination System and the Rules and Regulations Pertaining to Livestock Waste Control. Nonpoint source pollution will be addressed using available programs, technical advice, information and educations and financial incentives such as cost share.

The TMDLs included in the following text can be considered “phased TMDLs” and as such are an iterative approach to managing water quality based on the feedback mechanism of implementing a required monitoring plan that will determine the adequacy of load reductions to meet water quality standards and revision of the TMDL in the future if necessary. A description of the future monitoring (Section 4.0) that is planned has been included.

Monitoring is essential to all TMDLs in order to:

- Assess the future beneficial use status;
- Determine if the water quality is improving, degrading or remaining status quo;
- Evaluate the effectiveness of implemented best management practices.

The additional data collected should be used to determine if the implemented TMDLs has been or is effective in addressing the identified water quality impairments. As well the data and information can be used to determine if the TMDLs have accurately identified the required components (i.e. loading capacity, load allocations, etc.) and if revisions are appropriate.

1.0 Introduction

Seven segments within the Lower Platte River basin were listed in Category 5 of the 2006 Nebraska Surface Water Quality Integrated Report (Integrated Report) (NDEQ 2006c). Category 5 waterbodies are deemed impaired and in need of a TMDL. Data collected in 2004 indicate the primary contact recreation beneficial use is impaired with the pollutant of concern being *E. coli* bacteria. In 2005, the NDEQ added the primary contact recreation beneficial used to several waterbodies, including Wahoo Creek (LP2-10100) and Salt Creek (LP2-30000). Assessment of the data collected from Wahoo Creek and Salt Creek in 2004 does indicate each waterbody exceeded the applicable criteria and should be included on Category 5 of the 2008 Integrated Report. Rather than delay the preparation of the TMDLs until the listing, both TMDLs will be included in this document.

Table 1 below provides information of the 2006 Integrated Report assessments for all of the segments in the Lower Platte River basin, included Wahoo designated with the primary contact recreation beneficial use.

Table 1. 2006 Integrated Report Status for Primary Recreation Waters in Lower Platte Basin

Segment	Waterbody Name	2006 Integrated Report Status
LP1-10000	Platte River	Category 5
LP1-20000	Platte River	Category 5
LP2-10000	Salt Creek	Category 5
LP2-10100	Wahoo Creek	Category 5[1]
LP2-20000	Salt Creek	Category 5
LP2-20400	Dead Man's Run	Category 5
LP2-20500	Oak Creek	Category 5
LP2-20900	Antelope Creek	Category 5
LP2-30000	Salt Creek	Category 2[1]

[1]Assessment of the available *E. coli* data for the segment was not conducted for the 2006 Integrated Report because the primary contact recreation beneficial use had not been assigned. Following submission of the Integrated Report to EPA Region 7, approval of the designation by the Governor was received. Assessment of the data yields an impaired status.

The *E. coli* TMDL for Antelope Creek (LP2-20900) has been prepared and will be submitted in a separate document.

Based on the above, and as required by Section 303(d) of the Clean Water Act and 40 CFR Part 130, TMDLs have been developed for the impaired waters in the Lower Platte River Basin identified in Category 5 of the 2006 Nebraska Integrated Report as being impaired by excessive *E. coli* bacteria, with the exception of LP2-20900. The approach for these TMDLs will be to address all of the identified waterbodies simultaneously or as a watershed. Based upon this, the information contain herein should be considered eight TMDLs.

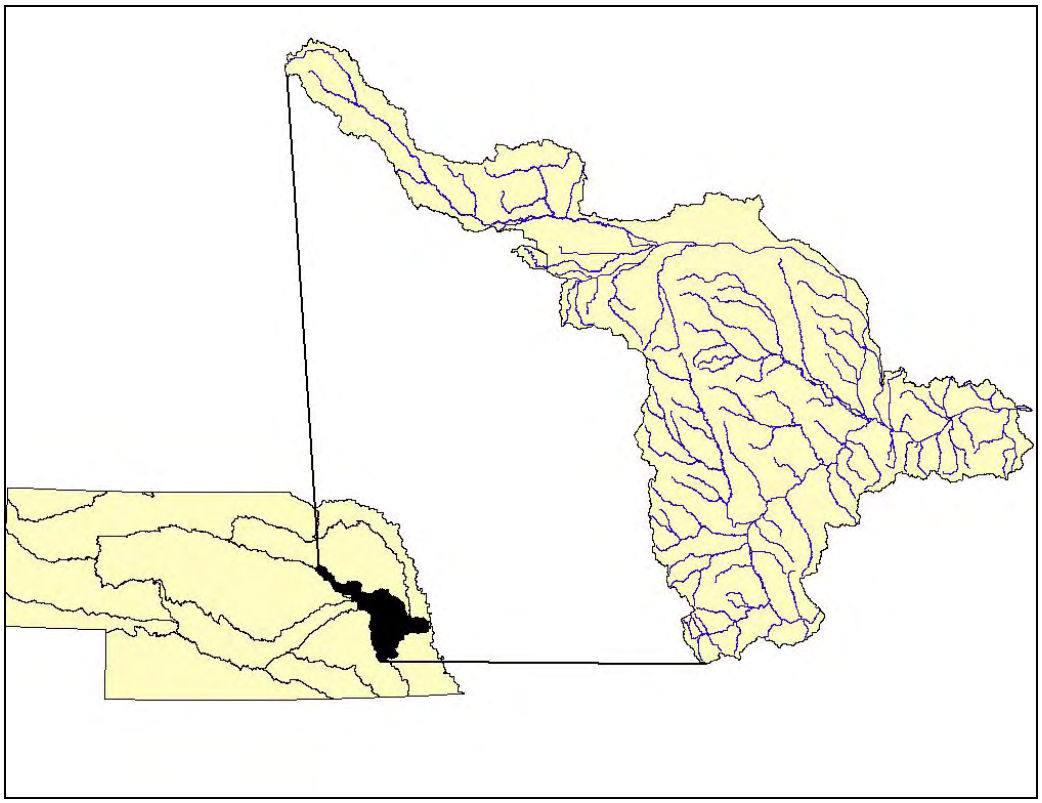
1.1 Background Information

The Lower Platte River Basin located in east and southeast Nebraska (Figure 1.1) and originates at the confluence of the Loup and Middle Platte River Basins to a point of confluence with the Missouri River near the City of Plattsmouth. Stream flow in the basin is a function of surface run-off and groundwater contributions. Several municipalities reside in the basin ranging from a primary class city to villages.

1.1.1 Waterbody Description

1.1.1.1 Waterbody Names and Stream Identification Numbers: Platte River – LP1-10000, LP1-20000, Salt Creek – LP2-10000, LP2-20000 and LP2-30000, Wahoo Creek – LP2-10100, Dead Man's Run, LP2-20400 and Oak Creek LP2-20500.

Figure 1.1 Location of the Lower Platte River Basin



1.1.1.2 Major River Basin: Missouri

1.1.1.3 Minor River Basin: Platte

1.1.1.4 Hydrologic Unit Codes: 10200201, 10200202 and 10200203

1.1.1.5 Assigned Beneficial Uses: Source Title 117 Nebraska Surface Water Quality Standards (Title 117)

Segment	Primary Contact Recreation	Aquatic Life Use	Water Supply	Aesthetics	Key Aquatic Species
LP1-10000	Yes	Warmwater A	Agriculture A Public Drinking	Yes	Title 117: 1,2,18, h, i, j, v, w
LP1-20000	Yes	Warmwater A	Agriculture A Public Drinking	Yes	Title 117: 18, i, j, w
LP2-10000	Yes	Warmwater A	Agriculture B	Yes	Title 117: i, w
LP2-10100	Yes	Warmwater A	Agriculture A	Yes	Title 117: i
LP2-20000	Yes	Warmwater A	Agriculture B	Yes	Title 117: i, w
LP2-20400	Yes	Warmwater B	Agriculture A	Yes	
LP2-20500	Yes	Warmwater A	Agriculture B	Yes	
LP2-30000	Yes	Warmwater A	Agriculture A	Yes	Title 117: i, w

Table 1.1.1.5 Title 117 Key Aquatic Species

Species Code	Common Name	Species Code	Common Name
1	Lake sturgeon	c	Brook trout
2	Pallid sturgeon	d	Brown trout
3	Northern redbelly dace	e	Rainbow trout
4	Pearl dace	f	Northern pike
5	Finescale dace	g	Muskellunge
6	Blacknose shiner	h	Blue catfish
7	Lake chub	i	Channel catfish
8	Brook Stickleback	j	Flathead catfish
9	Iowa darter	k	Striped bass
10	Johnny darter	l	White bass
11	Orangethroat darter	m	Rock bass
12	Blacknose dace	n	Largemouth bass
13	Grass pickerel	o	Smallmouth bass
14	Pumpkinseed	p	Spotted bass
15	Golden shiner	q	Redear sunfish
16	Common shiner	r	Bluegill
17	Topeka shiner	s	Black crappie
18	Sturgeon chub	t	White crappie
19	Scaleshell mussel	u	Yellow perch
a	Shovelnose sturgeon	v	Sauger
b	Paddlefish	w	Walleye

1.1.1.6 Major Tributaries: Four Mile Creek, Cedar Creek, Elkhorn River, Salt Creek, Lost Creek, Shell Creek, Wahoo Creek, Rock Creek and Oak Creek.

Table 1.1 Physical Description of the Lower Platte River Basin

Parameter	Lower Platte River Basin
State	Nebraska
Counties (whole or in part)	Boone, Butler, Cass, Colfax, Dodge, Douglas, Lancaster, Madison, Platte, Sarpy, Saunders and Seward
Watershed Area	3,110 mi^2
Sub-basins	2
Designated Stream Segments	126
Stream Miles (designated)	1,248 miles

1.1.2 Watershed Characteristics

1.1.2.1 Physical Features: The Lower Platte River Basin watershed encompasses approximately 3,110 mi^2 in the east and southeast portion of the state. The basin originates at the confluence of the Loup and Middle Platte Rivers and ends at the Platte River's confluence with the Missouri River near the city of Plattsmouth. The ecoregions of the basin include the Western Corn Belt and Central Great Plains (Chapman, et. al. 2001). Agriculture is the major land use with approximately 93% of the agriculture lands being classified as arable (NDNR 1974). Urbanization has and continues to reduce the amount of land being used strictly for agricultural purposes.

The topography of the basin varies from steep bluffs to flat valley plains. The upper end, in the Shell and Skull Creek drainage areas, is composed of rolling hills and narrow tablelands between well defined drainage ways. Through the central part of the Basin, especially on the north side of the river, the valley lands are broad and flat and the drainage is poorly defined. The lower Basin contains steep tolling hills with higher more dissected tablelands that often interface with the stream channel. Generally, the southern uplands consist of rolling loess hills with the exception of the level flat lands of the Todd valley situated in Saunders County (NNRC 1974).

1.1.2.2 Climate: Precipitation ranges from an annual average of 23 inches in the northwestern portion of the basin to approximately 30 inches near the mouth at the Platte River. (NNRC 1974). Typically, a majority of the precipitation occurs during the spring and early summer. Temperatures in the basin range from an average high in the 80's during the summer to average lows in the 20's during the winter (NOAA Satellite Information Service).

1.1.2.3 Demographics: Forty-nine municipal communities reside in the Lower Platte River basin boundaries and range from primary class cities to villages. Some of the larger communities include: Lincoln – population 226,081, Fremont – population 25,174, Columbus – population 20,998, Schuyler – population 5,406, Wahoo – population 3,942, Waverly – population 2,448, Gretna – population 2,355, Ashland – population 2,262 Springfield – population 1,450, Yutan – population 1,216, North Bend – population 1,213, Hickman – population 1,111 and Louisville – population 1,046. Along with the municipal governments, several cluster developments lies in the basin with or without formal governing bodies.

1.1.2.4 Land Use: The upland areas of the basin are generally devoted to cultivated cropland with small amounts of grassland. Greater portions of the steeply rolling hills are devoted to grassland and woodland. The broad alluvial lowlands of the Platte River valley are generally used for cultivated crops. In the lower basin, non-irrigated agriculture is quite extensive.

The large deposits of sand and gravel in the Platte River valley have been developed extensively. Limestone is quarried near Louisville and clay is mined west of Lincoln.

2.0 *E. coli* TMDL

2.1 Problem Identification

Segments MT1-10110 and MT1-10120 were included in Category 5 of the 2006 Integrated Report as having an impaired primary contact recreation beneficial use with the parameter of concern being *E. coli* bacteria. Recently, the primary contact recreation beneficial use was assigned to segments MT1-10100, MT1-10111, MT1-10111.1, and MT1-10200. *E* coli data from these segments indicates the use is not being met. This section deals with the extent and nature of the water quality impairments caused by excessive *E. coli* bacteria in the Papillion Creek Basin.

2.1.1 Water Quality Criteria Violated and/or Beneficial Uses Impaired

The Primary Contact Recreation beneficial use has been deemed impaired on the above-identified segments. The Primary Contact Recreation beneficial use applies to surface waters which are used or have the potential to be used for primary contact recreation that includes activities where the body may come into prolonged or intimate contact with the water such that water may be accidentally ingested or sensitive body organs (e.g. eyes, ears, nose) may be exposed (NDEQ 2006a).

2.1.2 Data Sources

The Nebraska Department of Environmental Quality (NDEQ) monitors surface waters based upon a rotating basin scheme, whereby monitoring is limited to two or three river basins each year with all 13 basins being (partially) examined in a five year period. Under the auspice of the rotating basin plan, data was collected from the Lower Platte Basin in 2004. Data collected in 2004 included stream flow (volume) information and will be used for these TMDLs. Stream flow data and information were obtained from the United States Geological Survey (USGS) and Nebraska Department of Natural Resources (NDNR) who operates the monitoring gages. Where long term data was lacking, field measurements and extrapolations were used to develop hydrographs.

During the triennial review of Title 117 – Nebraska Surface Water Quality Standards (Title 117), conducted in 2005, removed fecal coliform as a Title 117 parameter for assessing the primary contact recreation in the future.

E. coli will be the sole parameter for assessing the recreation use and the advances of analytical techniques; fecal coliform data was not obtained during 2004. Because fecal coliform will be removed as criteria in the future, these TMDLs will focus on the attainment of the primary contact recreation beneficial use, using only *E. coli*.

2.1.3 Water Quality Assessment

Water quality data assessments were based upon the beneficial use assessment procedures used to identify Category 5/impaired waters for the 2006 Integrated Report. The procedures are based on the application of the "binomial distribution" method that applies a confidence interval to the exceedance rate in an effort to determine the true exceedance of the waterbody versus the data set. A complete description of the water quality data assessment procedures can be found in the *Methodologies for Waterbody Assessments and Development the 2004 Integrated Report for Nebraska*, October 2003.

The details of the assessment process to determine the use support of the Primary Contact Recreation beneficial use can be found in table 2.1.3

Table 2.1.3 Assessment of the Primary Contact Recreation Beneficial Use Using *E. coli* Bacteria Data

Parameter	Season Geometric Mean	Supported	Impaired
E. coli	≤126/100 ml	Season geometric mean ≤126/100 ml	Season geometric mean >126/100 ml

2.1.4 Water Quality Conditions

E. coli data collected during the 2004 recreation season (May 1 through September 30) was assessed to determine the beneficial use support for primary contact recreation. Table 2.1.4 presents this information.

2.1.5 Potential Pollutant Sources

2.1.5.1 Point Sources: Point sources discharge or have the potential to discharge to waters in the Lower Platte River basin. Facility types include: municipal wastewater treatment facilities and industrial facilities. The facilities that have been issued a National Pollutant Discharge Elimination System Permit (according to EPA's Permit Compliance System) in the Lower Platte River Basin are shown in Figure 2.1.5.1a.

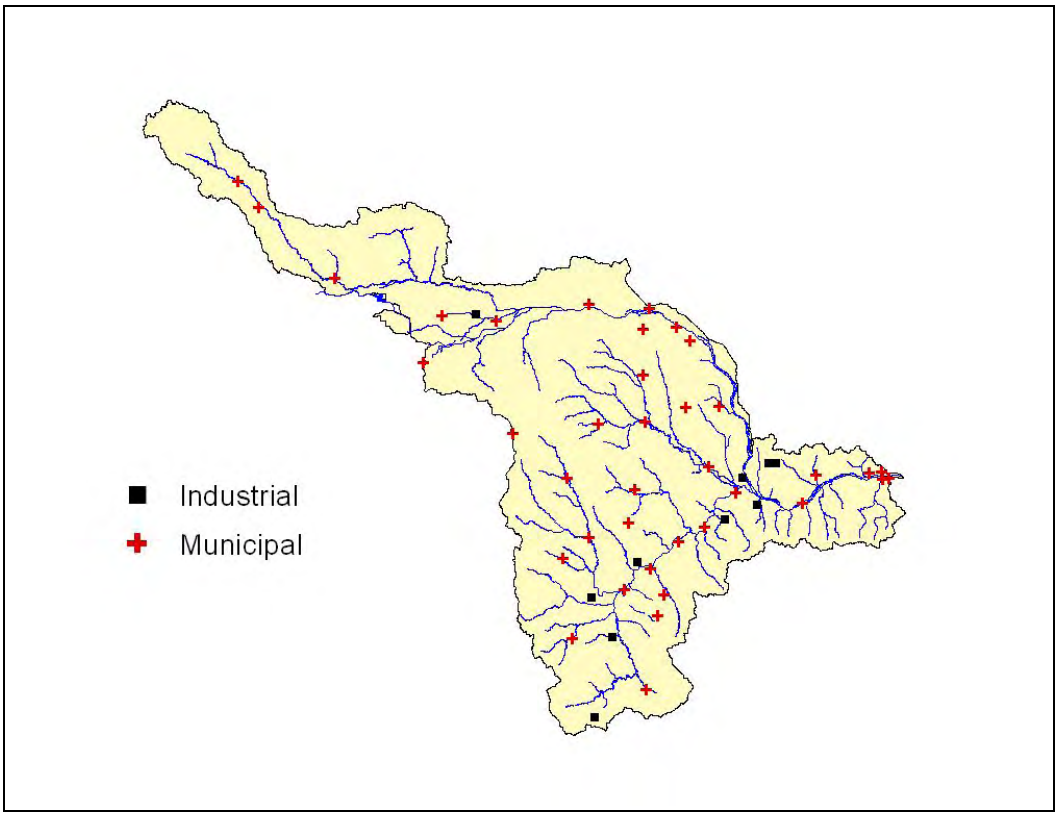
Municipalities and other entities have been issued stormwater permits and are considered point sources and regulated under the NPDES program.

Illicit connections and discharges, combined sewer overflows; sanitary sewer overflows, straight pipes from septic tanks or other on-site wastewater systems can also be sources of *E. coli* bacteria. While these are potential sources, there have not been investigations to determine the nature and extent of these sources contributions.

Table 2.1.4 Lower Platte River Basin – 2004 *E. coli* Data and Assessments – Category 5 Waterbodies

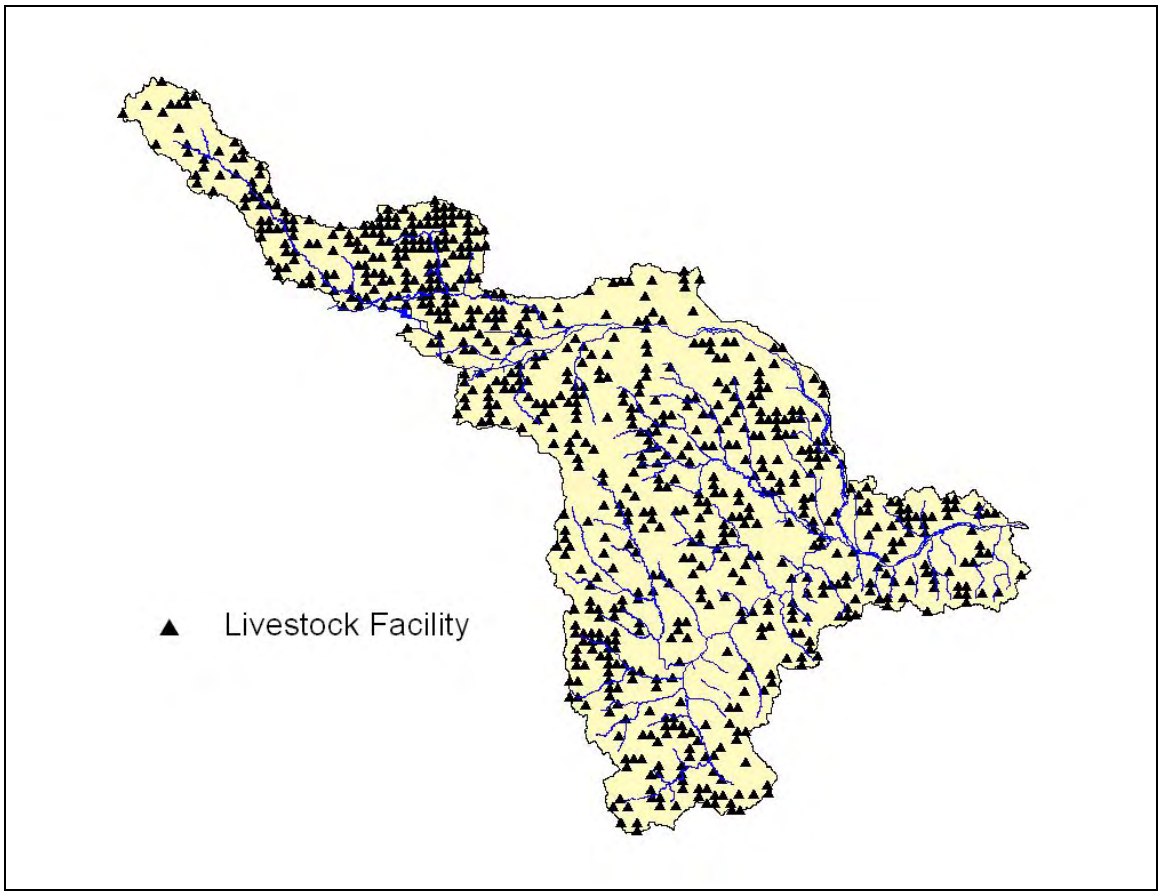
Segment	Site Location	USGS/DNR Gage Associated with Site	Number of Samples	Season Geometric Mean (#/100 ml)
LP1-10000	Platte River @ Louisville	06805500	22	314
LP1-20000	Platte River @ North Bend	06796000	22	750
LP2-10000	Salt Creek @ Greenwood	06803555	21	718
LP2-10100	Wahoo Creek @ Ashland	06804700	22	531
LP2-20000	Salt Creek @ Lincoln	06803500	20	432
LP2-20400	Dead Man's Run @ Lincoln	None	20	1,404
LP2-20500	Oak Creek @ Lincoln	06803486	20	389
LP2-30000	Salt Creek @ Pioneers Blvd: Lincoln	06803080	20	458

Figure 2.1.5.1a NPDES Permitted Facilities in the Lower Platte River Basin



Animal feeding operations that have been issued State of Nebraska permits, required for construction and operation of livestock waste control facilities (LWCF) if the operation has discharged, or has the potential to discharge, livestock waste to waters of the State are also considered potential sources. Figure 2.1.5.1b shows the facilities within the Lower Platte River Basin that have been issued or requested a permit. These facilities are designed to contain any run-off that is generated by storm events that are less in intensity than the 25 year, 24-hour rainfall.

Figure 2.1.5.1b Animal Feeding Operations in the Lower Platte River Basin Issued or Requesting a State Construction or Operating Permit or Requesting an Inspection



2.1.5.2 Nonpoint Sources: Several nonpoint sources of *E. coli* exist in the Lower Platte River Basin. These sources include: failing septic tanks or other on-site wastewater systems, run-off from livestock pastures, improper or over-application of biosolids (wastewater treatment facility sludge, septage or manure) and urban stormwater runoff not regulated by an NPDES permit.

2.1.5.3 Natural Sources: The primary natural source of *E. coli* is wildlife. A variety of wildlife is native to or have adapted to the diverse habitat of the Lower Platte River Basin. Big game, upland game, furbearers, waterfowl and non-game species have been documented to reside within the basin.

2.2 TMDL Endpoint

The endpoint for these TMDLs will be based on the numeric criteria associated with the Primary Contact Recreation beneficial use.

2.2.1 Numeric Water Quality Criteria

Water quality criteria established for the protection of the Primary Contact Recreation beneficial use can be found in Title 117, Chapter 4 and are as follows:

E. coli
E. coli bacteria shall not exceed a geometric mean of 126/100 ml. For increased confidence of the criteria, the geometric mean should be based on a minimum of five samples taken within a 30-day period. This does not preclude fecal coliform limitations based on effluent guidelines. The following single sample maxima shall be used solely for issuing periodic public advisories regarding use of waterbodies for Primary Contact Recreation.

235/100 ml at designated bathing beaches
298/100 ml at moderately used recreational waters
406/100 ml at lightly used recreation al waters
576/100 ml at infrequently used recreational waters

The November 16, 2004 Federal Register (Volume 69, No. 220) contained information regarding the final rule for "Water Quality Standards for Costal and Great Lakes Recreational Waters". This rule includes a discussion on the use of the single season maximum (SSM). Specifically:

"EPA expects that the single season maximum values would be used for making beach notification and closure decisions. EPA recognizes however that States and Territories also use criteria in their water quality standards for other purposes under the Clean Water Act in order to protect and improve water quality. Other than in the beach notification and closure decision context, the geometric mean is the more relevant value for ensuring that appropriate actions are taken to protect and improve water quality because it is a more reliable measure, being less subject to random variation and more directly linked to the underlying studies on which the 1986 criteria were based.

Given this discussion and recommendation regarding the use of single season maximum in TMDLs and waterbody assessments, these TMDLs will focus on meeting the *E. coli* recreation season geometric mean of 126/100 ml.

2.2.2 Selection of Critical Environmental Conditions

The water quality criteria associated with the Primary Contact Recreation beneficial use only applies from May 1 through September 30. Therefore, the critical conditions for these TMDLs will be those occurring from May 1 through September 30.

2.2.3 Waterbody Pollutant Loading Capacity

Defining waterbody pollutant loading capacity implies a steady state. These TMDLs recognize loadings are dynamic and can vary with stream flow. As well, the above section indicates a wide range of environmental conditions that must be accounted for.

The method chosen to account for the variation in flow is based upon a load duration (TMDL) curve. TMDL curves are initiated by the development a stream's hydrograph using the long-term gage information. The flow information (curve) is then translated into a load curve by multiplying the flow values by the water quality standard (WQS) and a conversion factor (C). The acceptable "load" is then plotted graphically.

Therefore, the loading capacity for each of the segments will be defined by:

$$\text{Loading capacity} = \text{WQS} * \text{Flow} * \text{C}$$

2.3 Pollutant Source Assessment

For these TMDLs the source loading is based upon the position of the monitoring data points in relation to the boundary established on the TMDL curve between point source and nonpoint source influences. This process for selecting the load point is described in the document entitled Nebraska's Approach for Developing TMDLs for Streams Using the Load Duration Curve Methodology (NDEQ 2002d). In the situation where a boundary has not been included on a TMDL curve, the information indicates no point source facilities discharge to the contributing watershed. For these waterbodies, the pollutant will be considered derived from nonpoint and natural sources.

2.3.1 Existing Pollutant Conditions

The existing pollutant conditions are shown in the TMDL curves (Figure 2.3.1a through 2.3.1h) provided for each of the segments where a TMDL is being developed. The points plotted above the acceptable loading indicate a deviance from the water quality criteria.

Figure 2.3.1a. TMDL Curve for LP1-10000

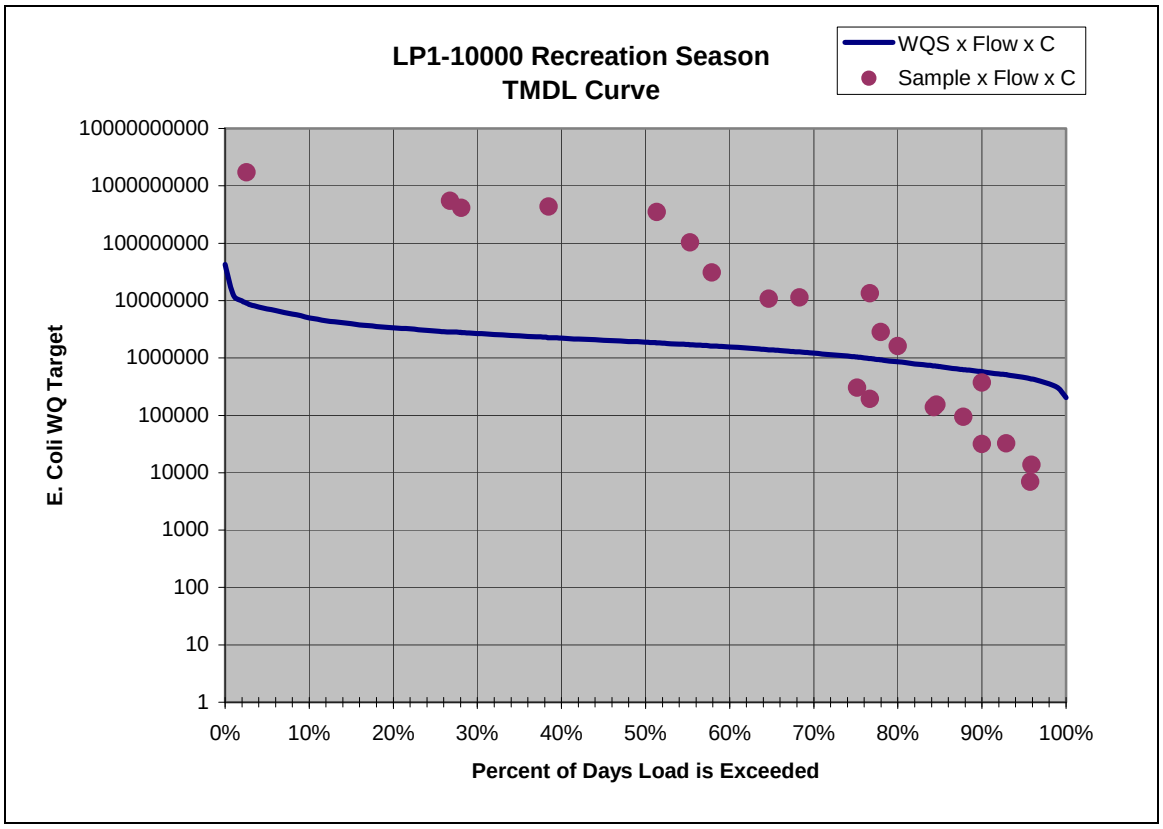


Figure 2.3.1b. TMDL Curve for LP1-20000

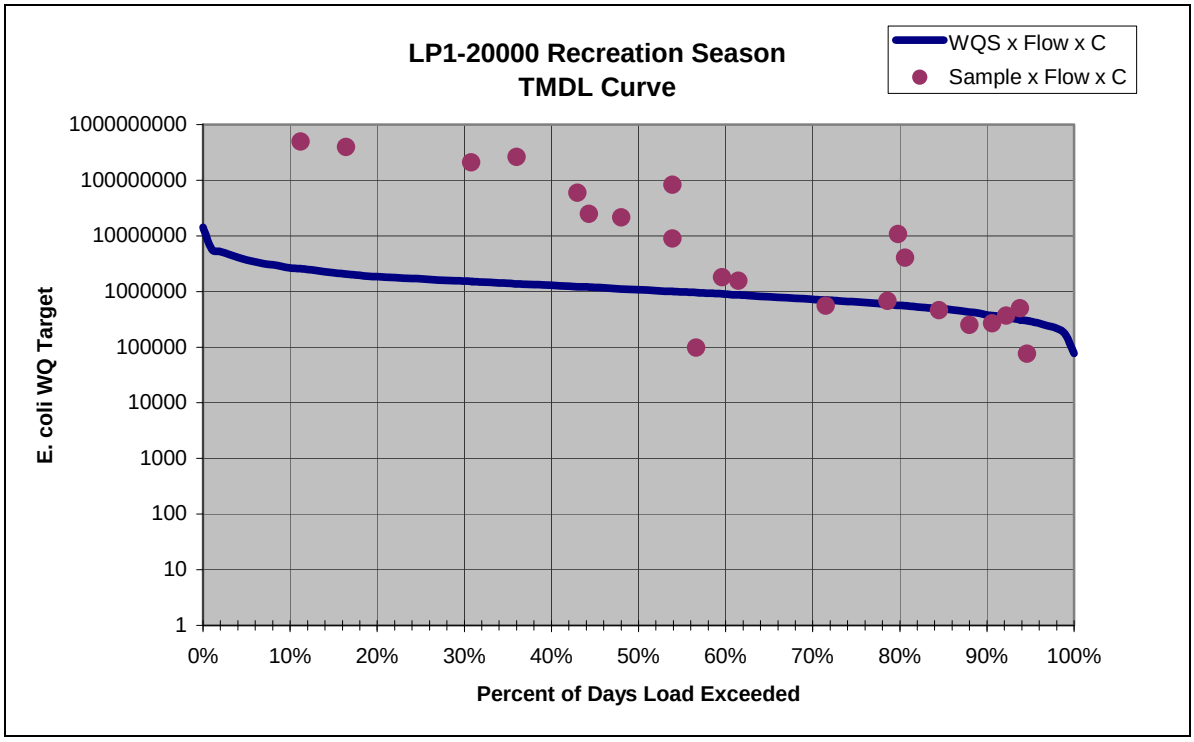


Figure 2.3.1c. TMDL Curve for LP2-10000

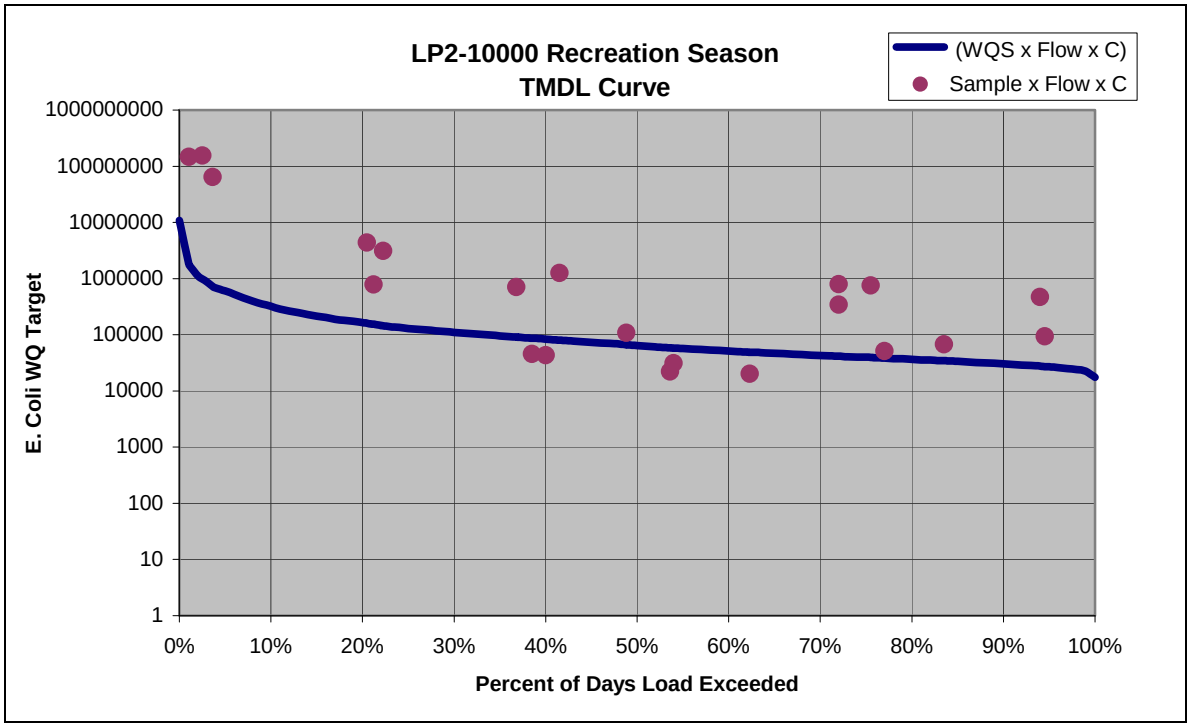


Figure 2.3.1d. TMDL Curve for LP2-10100

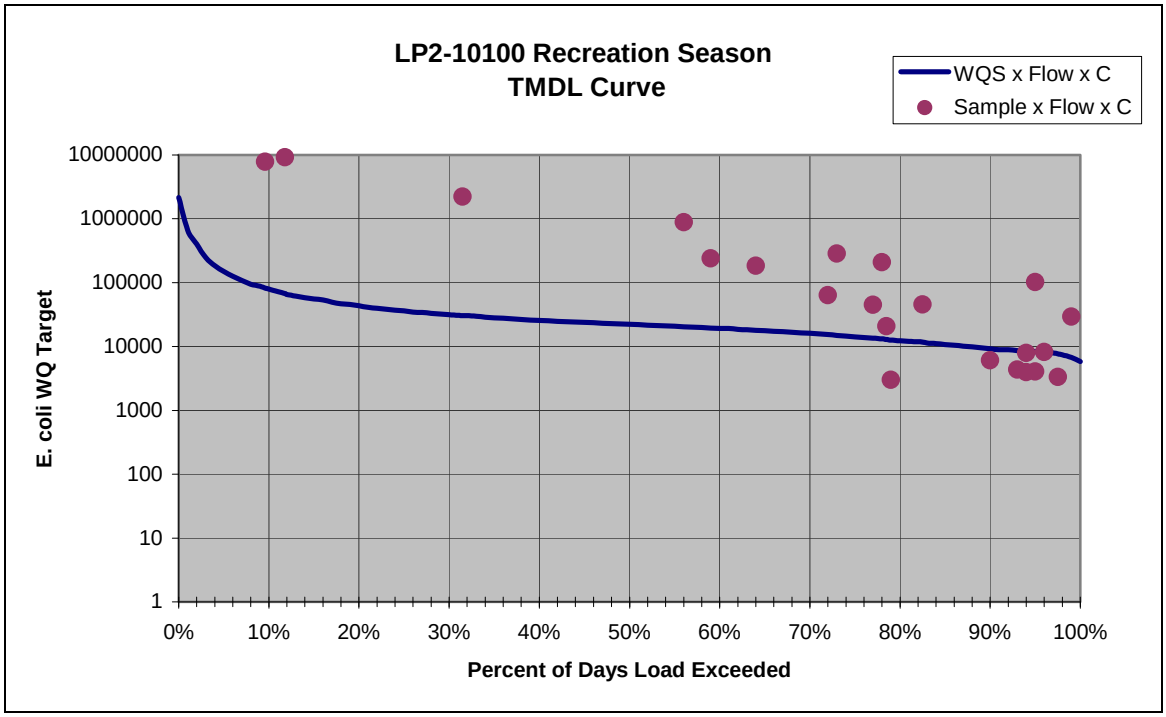


Figure 2.3.1e. TMDL Curve for LP2-20000

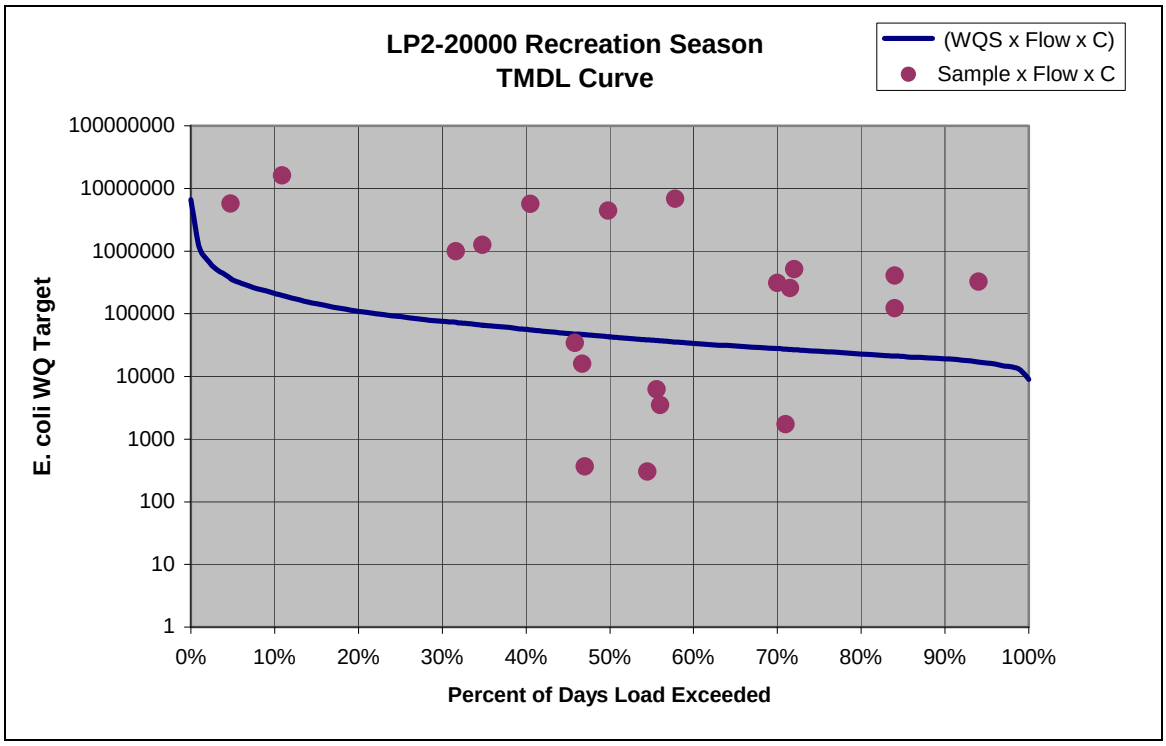


Figure 2.3.1f. TMDL Curve for LP2-20400

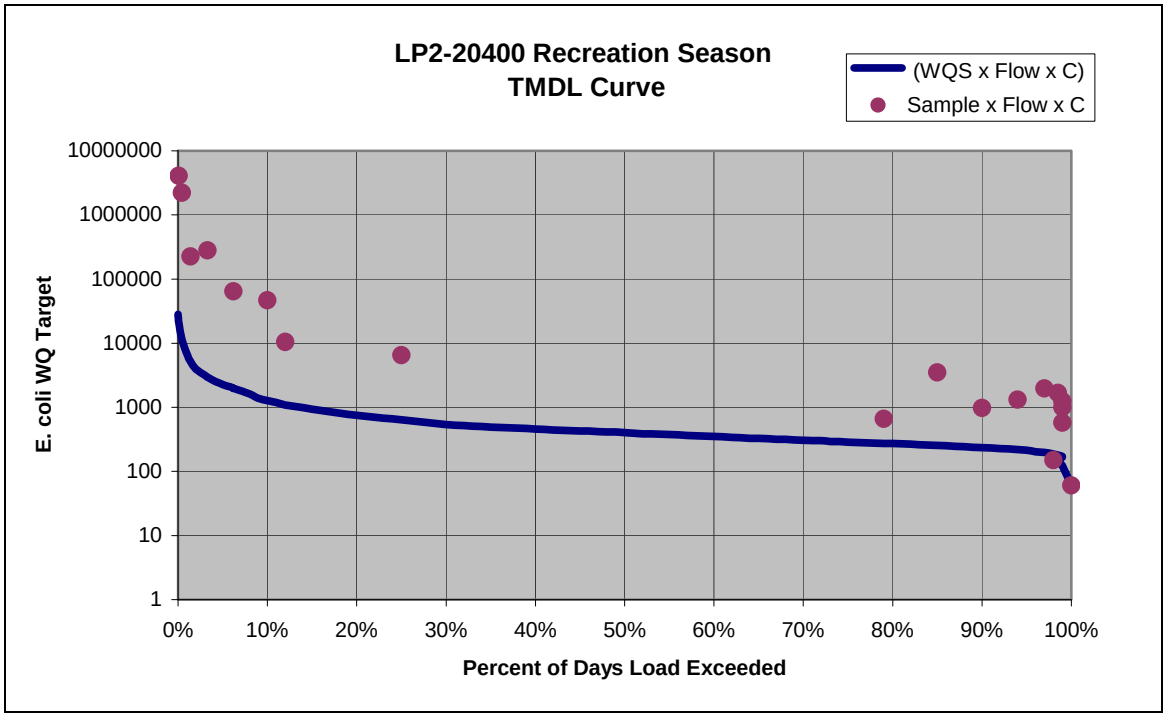


Figure 2.3.1g. TMDL Curve for LP2-20500

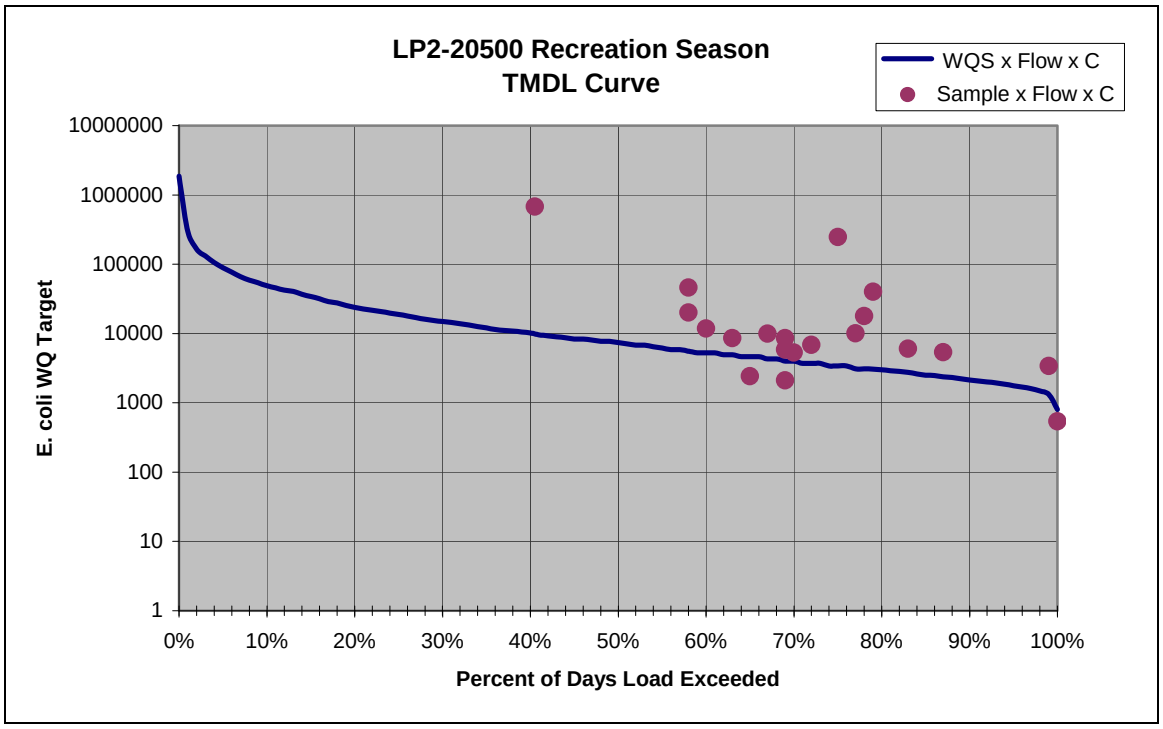
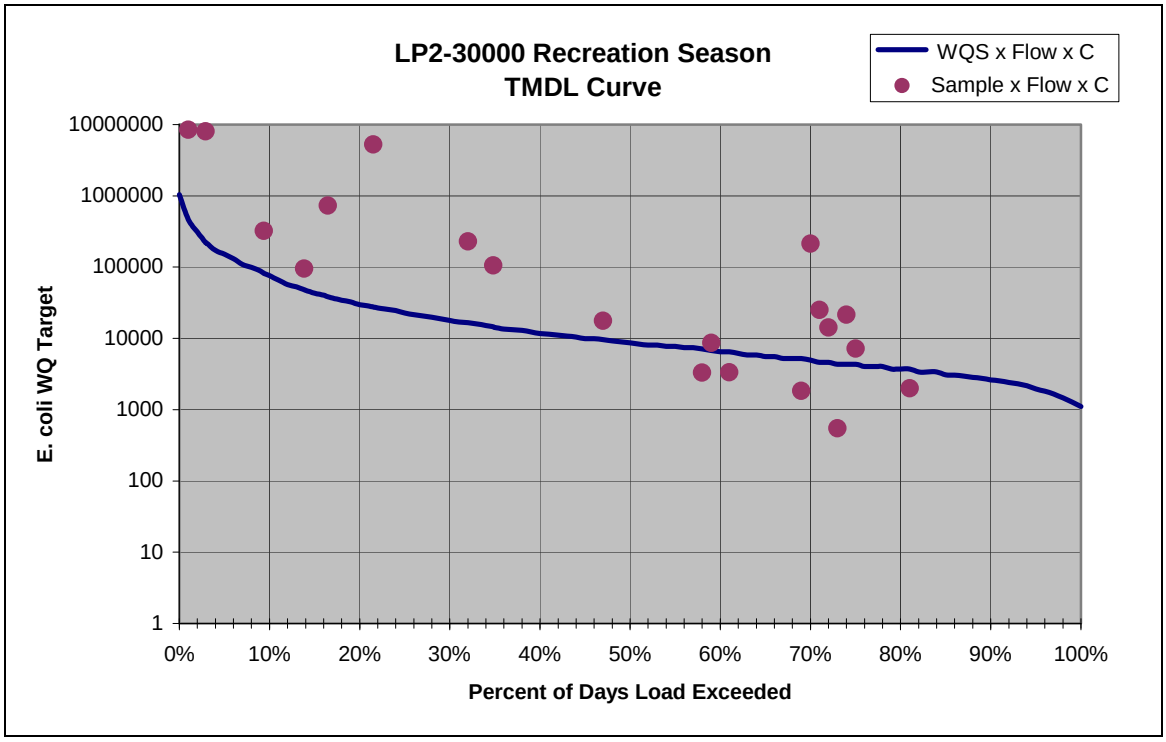


Figure 2.3.1h. TMDL Curve for LP2-30000



2.3.2 Deviation from Acceptable Pollutant Loading Capacity

Table 2.3.2 describes the deviation from the acceptable water quality standards based upon the 2004 *E. coli* monitoring information.

Table 2.3.2 Deviation From the Applicable Water Quality Criteria

Segment	Observed Season Geometric Mean (#/100 ml)	#/100 ml Above WQS
LP1-10000	314	188
LP1-20000	750	624
LP2-10000	718	592
LP2-10100	531	405
LP2-20000	432	306
LP2-20400	1,404	1,278
LP2-20500	389	263
LP2-30000	458	332

2.3.3 Identification of Pollutant Sources

Both point and nonpoint sources are known to exist along the segment and within the contributing watersheds. Due to the size of the watersheds, the somewhat limited data, the delivery methods and the location of the potential sources in relation to the impaired waterbody; it is difficult to definitively identify specific sources. It is important to note that all potential sources may not contribute to the water quality impairments and some sources may contribute at a greater degree than others.

The method utilized to determine the contributions of the sources will be based upon a demarcation where point source discharges are not expected to further impact the waterbody. That is, based on the concept of a continuous and relatively constant effluent volume, a dilution or flow value can be determined where point sources are no longer expected to contribute to water quality excursions. The process is explained in the document entitled Nebraska's Approach for Developing TMDLs for Streams Using the Load Duration Curve Methodology.

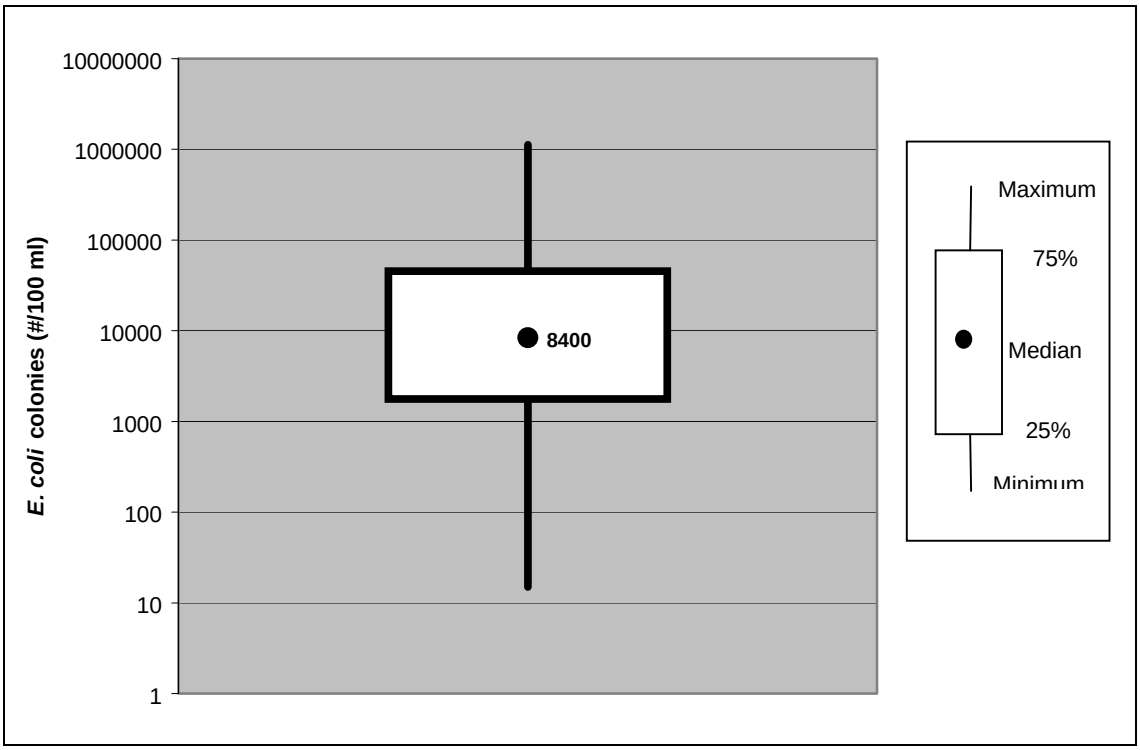
E. coli concentrations in wastewater can vary greatly, depending upon treatment technology, wastewater strength, industrial contributions, treatment efficiency and season. The selection of an all-encompassing effluent density value must then account for these and other variables. To that end, the NDEQ has collected effluent *E. coli* information from several facilities not providing disinfection of the wastewater discharge. The data was obtained from 24 facilities that include both mechanical and lagoon facilities and as seen in Figure 2.3.3a, exhibits a normal distribution. The median value was selected as the input for the "expected pollutant concentration". The equation to determine the point source/nonpoint source boundary then becomes:

$$Q_s = (8{,}400/100\text{ ml} * \Sigma Q_e)/126/100\text{ ml}$$

Where:

Q_s	= stream flow volume necessary to meet water quality standards
8,400/100 ml	= expected *E. coli* coliform density from point sources
ΣQ_e	= sum of **all** design flows from point sources discharging to the segment (direct or via tributaries)
126/100 ml	= water quality standard

Figure 2.3.3a. *E. coli* Data from 24 Wastewater Treatment Facilities



The values for ΣQ_e can be found in Table 2.3.3b as can the boundary flows.

Table 2.3.3 Sum of Wastewater Treatment Facility Design Flows in the Lower Platte River Basin

Segment	Total Number of Facilities	Sum of Contributing Facility Design Flows	Flow Value for Point vs. Nonpoint Boundary
LP1-10000	10	1.25 cfs	920 cfs*
LP1-20000	9	5.98 cfs	532 cfs*
LP2-10000	5	0.89 cfs	67 cfs*
LP2-10100	6	1.37 cfs	59 cfs
LP2-20000	8	61.2 cfs	2639 cfs
LP2-20400	0		
LP2-20500	1	0.05 cfs	4 cfs*
LP2-30000	2	0.3 cfs	13.1 cfs

* Recreation season 7q10 value

The identification of pollutant sources and impacts are shown in figures 2.3.3b-2.3.3d. No pollutant source chart will be presented for segment LP2-20400, as there are no point source discharges to the segment. As well, no chart will be presented for LP1-10000, LP1-20000 or LP2-10000, as there are no points that fall below the flow boundary. Finally, the boundary for LP2-20000 lies above all of the monitoring points, indicating potential point source influence throughout the hydrograph, therefore no chart will be provided for this segment.

Figure 2.3.3b. Identification of Pollutant Sources Using the TMDL Curve for LP2-10100

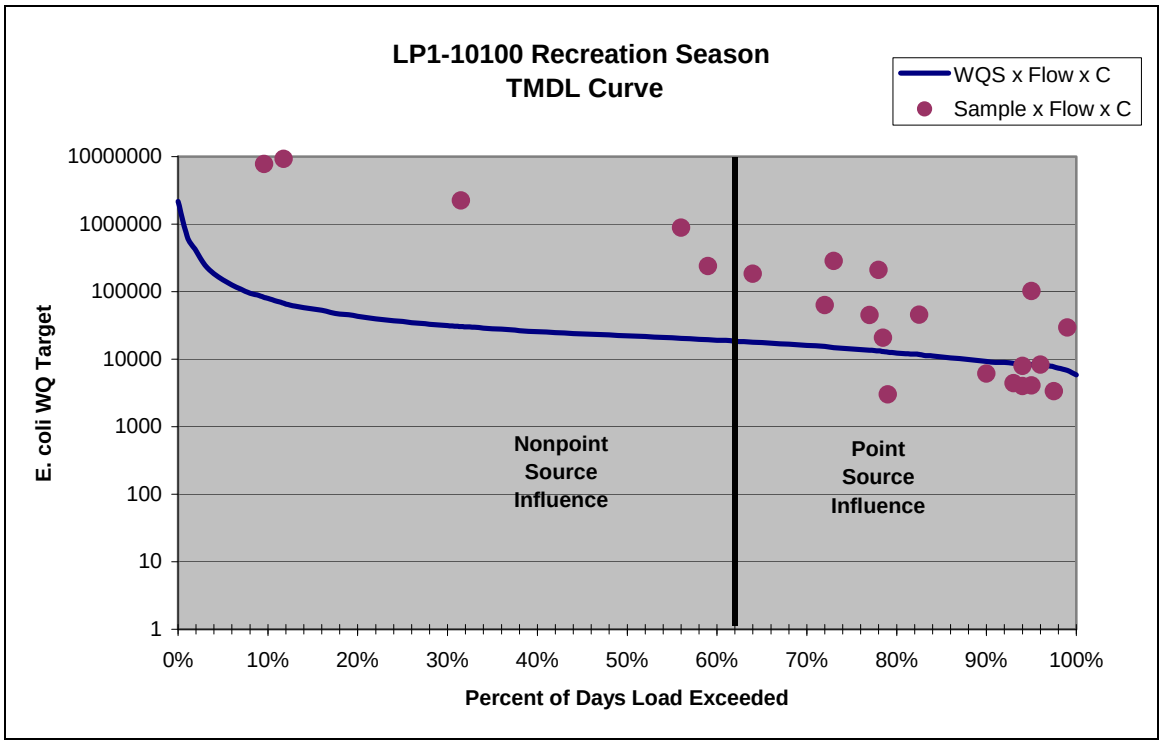


Figure 2.3.3c. Identification of Pollutant Sources Using the TMDL Curve for LP2-20500

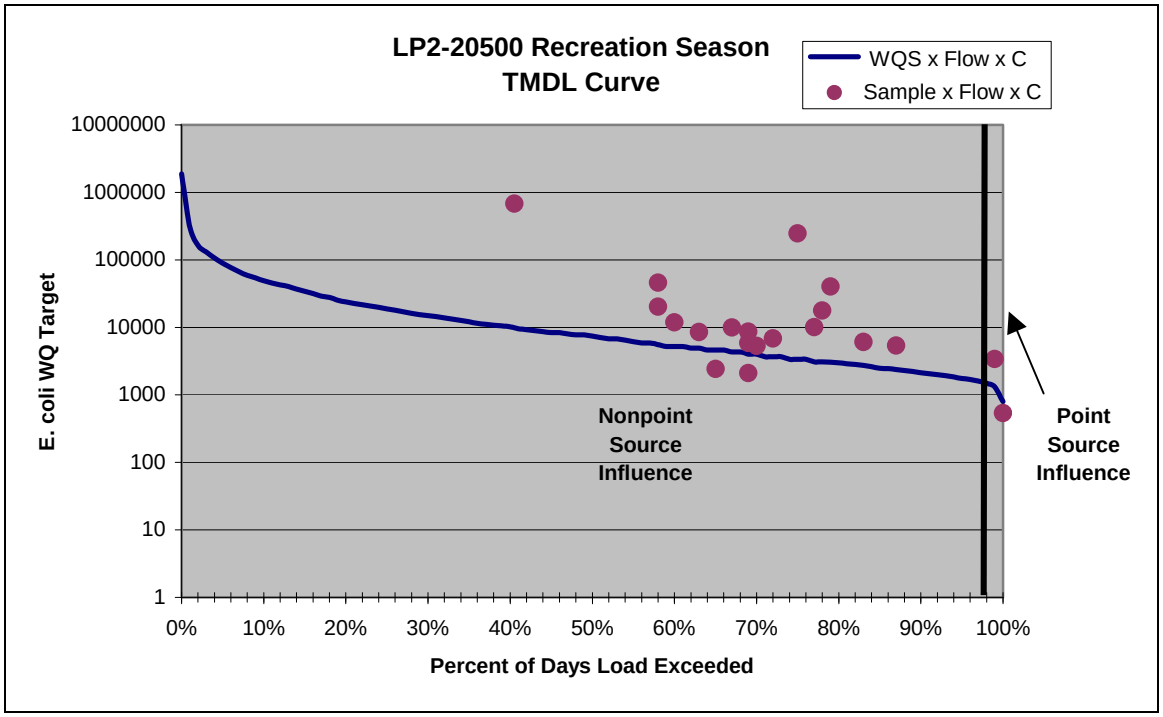
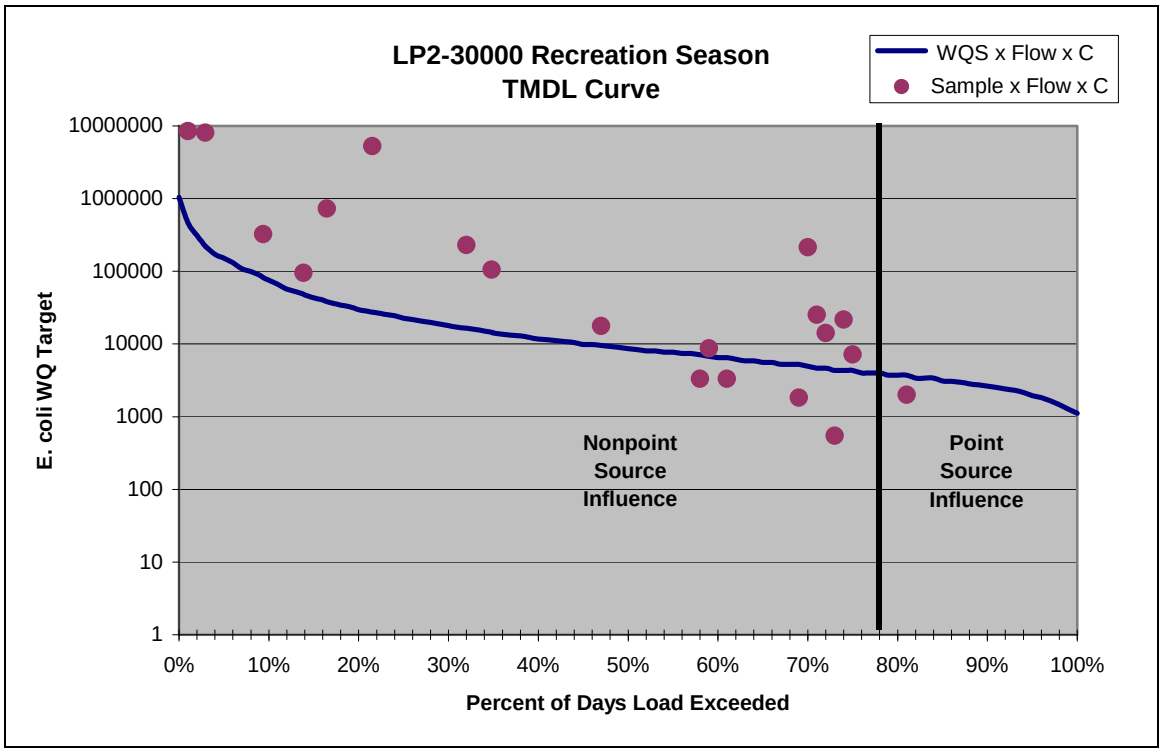


Figure 2.3.3d. Identification of Pollutant Sources Using the TMDL Curve for LP2-30000



2.3.3.1 Point Sources of *E. coli*: Based upon the TMDL curves and the position of the monitoring data points it appears point sources are contributing to the *E. coli* impairment within segments LP2-10100, LP2-20000, LP2-20500 and LP2-30000. The facilities that discharge either directly to or into a tributary of the Lower Platte River basin recreation segments and are potential sources of *E. coli* are listed in Table 2.3.3.1.

2.3.3.2 Nonpoint and Natural Sources of *E. coli*: Due to the diverse nature, distribution and delivery method, nonpoint and natural sources will not be separated. Therefore, the monitoring data that fall to the left of the boundary are considered to be the result of nonpoint and natural background sources.

The source identification process utilized was done so in order to get a general idea of the source category. This simplified numeric process should not be considered exclusive as an overlap of source contributions is recognized during periods where run-off is contributing to stream volume. In the future, expanded sampling may target specific source identification. Future monitoring and assessment will also take into account the controls (i.e. wastewater disinfection) that have been instituted. When considered, the demarcation may fluctuate and the source contributions re-evaluated.

2.4 Pollutant Allocation

A TMDL is defined as:

TMDL = Loading Capacity = WLA + LA + Background + MOS

As stated above, the loading capacity is based upon flow position in the hydrograph and is defined by:

Load Capacity = Flow x 126/100 ml x C

Where:

Flow = Stream flow volume (cubic feet per second)
126/100 ml = applicable/target water quality criteria for *E. coli* from Title 117
C = conversion factor.

By regulation, a TMDL requires a loading capacity value for the pollutant of concern. In the case of *E. coli*, a "load" (flow rate x concentration x time) could be calculated, but the approach may not be appropriate for expressing this non-conservative parameter. Therefore, for the purposes of these TMDLs, a loading capacity will not be "calculated" but will be expressed as the water quality standard. Because the water quality is expressed as a concentration, the LC will not equal the WLA + the LA.

The flow hydrographs (0-100th Percentile) used in the *E. coli* TMDL are provided in Table 2.4.

To achieve the desired loading capacities requires the following allocations:

2.4.1 Wasteload Allocations

2.4.1.1 NPDES Permitted Facilities: Title 117 does not allow for the application of a mixing zone for the initial assimilation of effluents in order to meet the criteria associated with the recreation beneficial use. Because of this, the water quality criteria are applied to the “end-of-pipe” concentrations and are applicable at all stream flows >7q10. Therefore, the *E. coli* wasteload allocation established by this TMDL will be a monthly geometric mean 126/100 ml.

Table 2.4 Recreation Season Hydrograph for Lower Platte TMDLs

	Flow Value (cfs)							
Percentile	LP1-10000	LP1-20000	LP2-10000	LP2-10100	LP2-20000	LP2-20400	LP2-20500	LP2-30000
0	658	250	57	19	29	0.2	2.6	4
10	1,860	1,230	98	35	62	0.8	7	9
20	2,770	1,820	119	42	74	0.9	10	12
30	3,930	2,360	139	48	90	1	13	16
40	5,042	2,910	166	54	109	1.1	17	21
50	6,080	3,490	208	63	138	1.3	24	28
60	7,160	4,190	272	74	183	1.5	33	38
70	8,672	4,970	355	84	245	1.8	48	58
80	10,900	6,000	534	103	355	2.4	77	96
90	16,200	8,630	1,040	160	681	4.1	159	245
100	138,000	46,000	35,000	7,000	21,300	91	6,070	3,380

The wasteload allocation will initially be applied to all facilities that discharge directly to a recreational segment. Future monitoring and evaluation will be utilized to determine if *E. coli* limitations are necessary for facilities discharging to the recreation segment's tributaries.

2.4.1.2 Dry Weather Discharges: Dry weather discharges can either be from illicit sources, cross-connections or mechanical failure and often exhibit the greatest influence on the base flow conditions of the stream. Thus, it is most appropriate to group these discharges and limit similarly to the WWTFs. Specifically, the wasteload allocations assigned to these discharges shall be a seasonal geometric mean of 126/100 ml.

2.1.4.3 Non-Discharging Facilities: Several facilities including confined animal feeding operations and lagoons are designed for "zero" discharge. In the case of animal feeding operations, discharges may only occur as the result of a 25 year 24 hour storm event or a chronic wet period with an accumulative precipitation equivalent to a 25 year 24 hour storm. Based on this permitting provision, the WLA for facilities classified as non-discharging will be zero (0).

2.4.2 Load Allocations

The load allocations assigned to these TMDLs will be based upon the stream flow volume and will be defined as:

$$LA_i = Q_i*126/100\ ml*C$$

Where:
LA_i = load allocations at the ith flow
Q_i = stream flow at the ith flow
126/100 ml = applicable/target water quality criteria for *E. coli* from Title 117
C = conversion factor

Table 2.3.3.1 NPDES Point Sources Discharging to the Lower Platte Basin

Recreation Segment	Receiving Water	Facility	NPDES Permit Number	Facility Design Flow (cfs)	Facility Discharge Directly to Recreation Segment?	Approximate Distance to Recreation Segment (stream miles)	*E. coli*/ Fecal coliform Limits in NPDES permit?
LP1-10000	LP1-10000	Johnson's Development	NE0114251	0.01	**Yes**		Yes
	LP1-10100	SID #5 Cass Co., Buccaneer Bay	NE0112437	0.19	No	0.5	Yes
	LP1-10000	SID #101 Sarpy Co., Hanson Lake	NE0132632	0.15	**Yes**		Yes
	LP1-10000	SID #97 Sarpy Co., Hawaiian Village	NE0113158	0.15	**Yes**		Yes
	LP1-10900	Springfield WWTF	NE0041343	0.34	No	1.6	No
	UD to LP1-11000	Nebraska Crossing	NE0127817	0.05	No	8.1	No
	UD to LP1-11000	Flying J Travel Plaza	NE0123862	0.02	No	9.5	Yes
	LP1-10000	Louisville WWTF	NE0024228	0.31	**Yes**		Yes
	LP1-11500	Simmons Safari Park WWTF	NE0132501	0.00	No	1.5	Yes
	LP1-10000	Nebraska National Guard Camp	NE0114286	0.04	**Yes**		**No**
LP2-20000	LP1-20200	Yutan WWTF	NE0024376	0.19	No	3.7	No
	LP1-20000	SID #8 Saunders Co., WWTF	NE0132608	0.05	**Yes**		Yes
	UD to LP1-20000	Valley View Homeowners Assn.	NE0113450	0.03	No	0.8	Yes
	LP1-20000	SID #3, Dodge Co., Lake Ventura	NE0113441	0.02	**Yes**		Yes
	LP1-20000	North Bend WWTF	NE0040924	0.28	**Yes**		Yes
	LP1-21000	Schuyler WWTF	NE0042358	1.08	No	3.8	Yes
	LP1-21010	Cargill Meats Solution Corp.	NE0000795	4.25	No	8.3	Yes
	UD to LP1-21700	Bellwood WWTF	NE0046094	0.06	No	5.3	Yes
	UD to LP1-21010	Richland WWTF	NE0132195	0.02	No	12.7	No
LP2-10000	LP2-10000	Ashland WWTF	NE0026107	0.46	**Yes**		Yes
	LP2-10700	SID #2 Cass Greenwood Interchange	NE0112950	0.08	No	2.4	No
	LP2-10000	Greenwood WWTF	NE0027367	0.14	**Yes**		Yes
	UD to LP2-11100	Ceresco WWTF	NE0046124	0.18	No	14.7	No
	LP2-11110	Davey WWTF	NE0024295	0.03	No	18.7	No

Recreation Segment	Receiving Water	Facility	NPDES Permit Number	Facility Design Flow (cfs)	Facility Discharge Directly to Recreation Segment?	Approximate Distance to Recreation Segment (stream miles)	*E. coli*/ Fecal coliform Limits in NPDES permit?
LP2-10100	LP2-10200	Wahoo WWTF	NE0021679	1.08	No	3.3	No
	UD to LP2-10140	Cedar Bluffs WWTF	NE0039888	0.09	No	26	No
	UD to LP2-10140	Colon WWTF	NE0033499	0.02	No	19.9	No
	UD to LP2-10121	Mead WWTF	NE0024309	0.08	No	11.7	No
	LP2-10200	Weston WWTF	NE0046337	0.04	No	13.1	No
	LP2-10111	Memphis WWTF	NE0029165	0.05	No	6.2	No
LP2-20000	UD to LP2-20000	Waverly WWTF	NE0024406	0.81	No	1.8	Yes
	LP2-20000	Lincoln NE WWTF	NE0112488	15.47	**Yes**		Yes
	UD to LP2-20000	NDOR Lincoln Solar WB RA	NE0113824	0.02	No	1.2	No
	UD to LP2-20200	Firethorn WWTF	NE0131547	0.00	No	11.3	No
	UD to LP2-20200	Sky Ranch Acres	NE0112780	0.01	No	6.9	No
	LP2-20000	Lincoln Theresa St. WWTF	NE0036820	44.87	**Yes**		Yes
	LP2-21300	Denton WWTF	NE0046141	0.04	No	8.7	No
	UD to LP2-21000	Shoemaker's Truck Station Inc.	NE0124401	0.02	No	4.4	Yes
LP2-20500	LP2-20520	Malcolm WWTF	NE0024261	0.05	No	5.0	No
LP2-30000	LP2-30100	LES Rokeby Peaking Unit	NE0123935	0.04	No	1	No
	LP2-30200	Hickman WWTF	NE0046183	0.26	No	3.6	No

2.4.2.1 Load Reduction to Meet Water Quality Criteria: It is important to report the reductions necessary to meet the water quality criteria. The necessary reductions were determined based upon the 2004 data, which is considered representative information. The targeted reductions found in Table 2.4.2.1 provide water quality managers with a quantitative endpoint by which implementation planning can be carried out. The noted reductions along including the application of point source controls if achieved should result in the waterbodies fully supporting the primary contact recreation beneficial use. The reductions stated in the table also include the margin of safety described below.

Table 2.4.2.1 Targeted Reductions

Segment	Targeted Reduction	Expected Season Geometric Mean
LP1-10000	64%	113/100 ml
LP1-20000	85%	113/100 ml
LP2-10000	85%	108/100 ml
LP2-10100	79%	111/100 ml
LP2-20000	74%	112/100 ml
LP2-20400	92%	112/100 ml
LP2-20500	71%	113/100 ml
LP2-30000	76%	110/100 ml

2.4.3 Margin of Safety

A margin of safety (MOS) must be incorporated into TMDLs in an attempt to account for uncertainty in the data, analysis or targeted allocations. The MOS can either be explicit or implicit and for these TMDLs are as follows:

- To account for uncertainty in the nonpoint source load reduction, the targeted reductions will be set at 90% of the water quality target (126/100 ml). Specifically the reductions shall be applied to meet a seasonal geometric mean of ≤113/100 ml.
- Decay and/or die off of *E. coli* were not accounted for in either the source assessment or in establishment of the load reduction. That is, the entire concentration/load from the source was assumed to be present within the waterbody and the reductions should focus on the load.
- These TMDLs assumed the effluents discharge the *E. coli* density allowed by the WLA or 126/100 ml. WWTF disinfection systems are often designed and operated to achieve 100% reduction in the indicator bacteria or 0/100ml. Thus, the actual NPDES permitted point source contribution is likely less than expected by the TMDL.

3.0 Implementation Plan

The implementation of controls to manage *E. coli* within the Lower Platte River Basin includes but is not limited to:

3.1 NPDES Permitted Point Sources

Facilities that discharge directly to all segments within the Papillion Creek basin designated with the primary contact recreation use will be required to meet the wasteload allocations – *E. coli* = 126/100 ml – at the end of the pipe. Facilities discharging to tributaries will be evaluated to determine the extent of the effluent's impact on the recreation segment. If deemed significant, a request will be made to limit the *E. coli* concentration discharged from these facilities in the NPDES permit.

In addition to the permits, in the course of compliance audits, deficiencies in the operation of the WWTF disinfection appurtenances and noncompliance with the NPDES permit limits should be noted and corrective action pursued.

Biosolids (sludge) generated by municipal and industrial facilities are regulated under 40 CFR Part 257 and 40 CFR Part 503, respectively. 40 CFR part 257 requires that facilities and practices not cause nonpoint source pollution of waters of the United States. Part 503 specifically requires that sludge applications be not less that 10 meters from waters of the United States and that the sludge not be applied to frozen, flooded or snow covered ground if the sludge can enter into waters of the United States.

Consistent with Section 3.4 below, a recommendation will be made that all NPDES permittees be required to adhere to items #1and #2 for land application activities taking place either during or 10 days prior to the recreation season (May 1 – September 30). In those areas where land slope or drainage is such where the application has a greater potential to run-off, or where application has been observed to have run-off, the recommendation will be consistent with #3

3.2 NPDES Storm Water Discharges

The WLA defined in section 2.4.1.1 will be applicable to all NPDES discharges including discharge from regulated stormwater outfall. The NDEQ is responsible for determining the applicability of NPDES stormwater permits for urbanized areas with populations >10,000 but <100,000. As well, other municipal or construction areas can be designated for coverage under an NPDES (stormwater) permit if the NDEQ determines control of the stormwater is necessary.

Facilities discharging stormwater under the authority of a NPDES permit are required to implement the minimum control measures. Facilities discharging stormwater under the authority of a NPDES permit are required to implement the minimum control measures and thus all permits will be consistent with applicable regulations.

Rather than apply numeric limitations on individual stormwater outfalls, the strategy will be to initially allow the municipalities sufficient opportunity to comply with the NPDES requirements; either voluntarily or under the authority of an NPDES permit. In the future, should additional monitoring data indicate the minimum control measures are inadequate or have not been incorporated; consideration will be given to application of wasteload allocations for the outfalls in the area of concern.

In situations where MS4 or other NPDES permits have been issued, during review and re-issuance of these permit, the NDEQ must incorporate the WLAs established in the TMDL. Incorporation of the WLAs in to the TMDL will be consistent with EPA guidance, specifically; the November 22, 2002 memorandum from Robert Wayland and James Hanlon (http://www.epa.gov/owow/tmdl/policy.html).

3.3 Combined Sewer Overflows

There are currently eleven combined sewer overflow (CSO) points discharging directly to or to a tributary of Papillion Creek. In October 2002 the City of Omaha was issued an NPDES permit and outlined specific nine minimum controls and long term control plan requirements (City of Omaha 2007).

3.4 Dry Weather Discharges

Title 119 – Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System, Chapter 2 states:

> "All persons discharging pollutants from a point source into any waters of the State are required to apply for and have a permit to discharge."

Discharges not permitted should be required to obtain the proper authorization to discharge. All discharges are then subject to the appropriate limitations consistent with the WLAs established by this TMDL. Elimination of the discharge should be undertaken in the event permitting and control is not feasible.

3.5 Animal Feeding Operations

Title 130 – Rules and Regulations Pertaining to Livestock Waste Control states:

> 001 A livestock waste control facility shall be required for an existing or proposed livestock operation of three hundred animal units or larger, when livestock wastes:
>
> > 001.01 Violate or threaten to violate Title 117 (Neb. Administrative Code (NAC)), Nebraska Surface Water Quality Standards;
> > 001.02 Violate or threaten to violate Title 118 (NAC), Ground Water Quality Standards and Use Classification;
> > 001.03 Discharge into waters of the State; or
> > 001.04 Violate The Nebraska Environmental Protection Act.
>
> 002 Any livestock operation less than three hundred animal units is exempt from the permitting process, including the requirement to request an inspection, unless there has been a confirmed discharge into waters of the State, or the Department has determined that because of conditions at the livestock operation there is a high potential for discharge into waters of the State in which case the Department shall notify the owner of the livestock operation by certified mail that the owner is subject to the Livestock Waste Management Act.

When a livestock waste control facility is required the owner/operator must also be issued a construction and/or a state-operating permit. State operating permits require facilities be properly operated and maintained to prevent water pollution and to protect the environment of the State.

Livestock waste control facilities for open lots, by regulation must be designed and constructed to contain all waste generated under conditions less than a 25 year 24 hour precipitation event. Confined animal feeding operations are required to maintain 180 days of storage or a lagoon to treat the waste products. Meeting these permit requirements should equate to "zero" discharge during conditions less than a 25 year 24 hour precipitation event, or a chronic wet period.

Wastewater and biosolids (manure) produced by the animal feeding operations are most often land applied for beneficial reuse. Permitted facilities are required to follow best management practices (BMPs) for the land application as defined in Title 130, Chapter 11. Those BMPs include:

1. Utilize application areas which are under proper conservation treatment to prevent run-off into waters of the State
2. Not apply waste within 30 feet of any stream, lake or impounded waters identified in Chapter 6 and Chapter 7 of Title 117, unless in accordance with an approved comprehensive nutrient management plan
3. When waste is applied within 100 feet of any streams, lakes an impounded waters identified in Chapter 6 and 7 of Title 117, the Department may also require additional buffer and/or vegetative buffers, and that the livestock waste be applied in a manner which reduces potential for run-off of nutrients or pathogens by incorporation, injection of waste or other approved practices.

Based upon the above, it shall be recommended that the NDEQ's Agriculture Section stipulate in the state operating or other permits, for facilities located in the Lower Platte River Basin, that the application of livestock waste occurring during or 10 days prior to the Recreation Season (May 1 – September 30) be consistent with the above #1 and #2 and the application setback be the minimum of 30 feet regardless of the status of the comprehensive nutrient management plan. In those areas where land slope or drainage is such where the application has a greater potential to run-off, or where application has been observed to have run-off, the recommendation will be consistent with the requirements of #3 with the minimum setback being 100 feet.

3.5 Exempt Facilities/Other Agricultural Sources

Animal feeding operations are exempt from regulations set forth in Title 130 if:

- The operation is less than 300 animal units
- There has not been a confirmed discharge to waters of the State, or
- The Department has determined that because of conditions at the livestock operation there is **not** a high potential for discharge to waters of the state.

Periodically, the NDEQ will receive a complaint on or a request for an inspection from a facility operating with <300 animal units. Should deficiencies be noted during the on-site visit, the owners/operator will often be given an opportunity to make corrections prior to enforcement or permit action being taken. In the event the efforts at voluntary compliance fail, civil enforcement or the issuance of a permit will be pursued to bring about the necessary corrective measures.

Because these facilities are "non-regulated", it is difficult to assess the impacts to the environment. As well, pastures or other temporary feeding practices may contribute to the *E. coli* impairments if conditions are such that run-off from the site occurs. In lieu of regulatory requirements, the NDEQ will first look to the USDA-Natural Resource Conservation Service for assistance utilizing programs under the control of the Service such as Conservation Reserve Program, Environmental Quality Incentives Program, Conservation Farm Option, Conservation of Private Grazing Land Initiative, the Wetlands Reserve Program and others that aid in the maintenance and improvement of water quality.

3.6 Section 319 – Nonpoint Source Management Program

The United States Environmental Protection Agency supplies grant funds to states to aid in managing nonpoint source pollution. When grant applications are submitted for review, an effort should be made to include the control of *E. coli* and surface run-off for the proposed projects in the Lower Platte River Basin. As well, an effort will be made to redirect applicants to develop proposals consistent with the goals of this TMDL. Preference may be given to those projects that will have a direct reduction in the *E. coli* contributions of nonpoint source discharges.

3.7 Non-Government Organizations

Several non-governmental organizations with an emphasis on agriculture disseminate information to their members on a regular basis. As well, some of the organizations have established environmental education programs to assist in the understanding of environmental regulations and topics. The NDEQ will communicate with these entities in an attempt to utilize the membership distribution process as a means of providing information on the water quality impairments, the TMDL and suggestions to assist in solving the identified problems.

3.8 Reasonable Assurances

The NDEQ is responsible for the issuance of NPDES or state operating permits for industrial and municipal wastewater discharges, regulated stormwater discharges and livestock operations (open lot or confined). Issued permits must be consistent with or more stringent then the wasteload allocations set forth by this TMDL. Compliance with the permit may require construction or modification of a facility and the issued permits may account for this through the inclusion of a compliance schedule or administrative order.

Effective management of nonpoint source pollution in Nebraska necessarily requires a cooperative and coordinated effort by many agencies and organizations, both public and private. Each organization is uniquely equipped to deliver specific services and assistance to the citizens of Nebraska to help reduce the effects of nonpoint source pollution on the State's water resources. While a few of the organizations have been previously identified, Appendix A is a more complete compilation of those entities that may be included in the implementation process. These agencies have been identified as being responsible for program oversight or fund allocation that may be useful in addressing and reducing *E. coli* contributions to the Lower Platte River. Participation will depend on the agency/organization's program capabilities.

4.0 Future Monitoring

Future monitoring will generally be consistent with the rotating basin monitoring scheme. That is, annually, two or three river basins in the same geographic location are the focus of the monitoring effort. The Lower Platte River Basin was monitored in 2004 and will again be targeted in 2009. An effort will be made to expand the monitoring to isolate areas of concern and to focus resources to address identified problems.

Periodically, compliance monitoring will be conducted at NPDES permitted facilities to verify permit limitations are being adhered to. Facilities are selected either randomly or in response to inspection or reported information.

As well, the NPDES permits require self-monitoring of the effluent by the permittee with the frequency of the monitoring being based on the discharge characteristics. The data is then reported to NDEQ quarterly, semiannually or annually and entered into the EPA's Permitting Compliance System. The compliance monitoring and self-monitoring information will be used in assessing the success of the TMDL.

Recently, analytical techniques have been introduced that may provide a greater level of confidence in the identification of pollutant sources. These techniques include microbial source tracking and specialized sampling the targets human wastewater. As the science progresses the application of these analytical techniques may become a valuable tool for source identification and pollutant reduction.

5.0 Public Participation

The availability of the TMDLs in draft form was published in the Columbus Telegram, Fremont Tribune and the Lincoln Journal Star with the public comment period running from approximately May 14, 2007 to June 18, 2007. These TMDLs were also made available to the public on the NDEQ's Internet site and interested stakeholders were informed via email of the availability of the draft TMDLs. No comments were received during the public participation period.

6.0 References

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NDEQ 2002. Nebraska's Approach for Developing TMDLs for Streams Using the Load Duration Curve Methodology. Nebraska Department of Environmental Quality. Lincoln, NE.

NDEQ 2005a. Title 130 – Rules and Regulations Pertaining to Livestock Waste Control. Nebraska Department of Environmental Quality. Lincoln, NE.

NDEQ 2005b. Title 119 – Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System. Nebraska Department of Environmental Quality. Lincoln, NE.

NDEQ 2006a. Title 117 – Nebraska Surface Water Quality Standards. Nebraska Department of Environmental Quality. Lincoln, NE.

NDEQ 2006b. Methodologies for Waterbody Assessments and Development the 2004 Integrated Report for Nebraska. Nebraska Department of Environmental Quality. Lincoln, NE.

NDEQ 2006c. 2004 Surface Water Quality Integrated Report. Nebraska Department of Environmental Quality. Lincoln, NE.

NNRC 1974. Lower Platte River Basin Water Quality Management Plan. Nebraska Natural Resources Commission. Lincoln, NE.

Appendix A – Federal, State Agency and Private Organizations Included in TMDL Implementation.

FEDERAL

- *Bureau of Reclamation*
- *Environmental Protection Agency*
- *Fish and Wildlife Service*
- *Geological Survey*
- *Department of Agriculture - Farm Services Agency*
- *Department of Agriculture - Natural Resources Conservation Service*

STATE

- Nebraska Association of Resources Districts
- Department of Agriculture
- Department of Environmental Quality
- Department of Roads
- Department of Water Resources
- Department of Health and Human Services
- Environmental Trust
- Game and Parks Commission
- Natural Resources Commission
- University of Nebraska Institute of Agriculture and Natural Resources (IANR)
- UN-IANR: Agricultural Research Division
- UN-IANR: Cooperative Extension Division
- UN-IANR: Conservation and Survey Division
- UN-IANR: Nebraska Forest Service
- UN-IANR: Water Center and Environmental Programs

LOCAL

- Natural Resources Districts
- County Governments (Zoning Board)
- City/Village Governments

NON-GOVERNMENTAL ORGANIZATIONS

- Nebraska Wildlife Federation
- Pheasants Forever
- Nebraska Water Environment Association
- Nebraska Corn Growers Association, Wheat Growers, etc.
- Nebraska Cattlemen's Association, Pork Producers, etc
- Other specialty interest groups
- Local Associations (i.e. homeowners associations)