
CURRENT AND EVOLVING REGULATIONS**6.1 CURRENT REGULATORY REQUIREMENTS****6.1.1 Surface Water Quality Standards**

Surface water quality in the state of Nebraska is governed by Title 117 of the Nebraska Surface Water Quality Standards. Surface water quality classifications for all surface waters in the state are established by the State of Nebraska Department of Environmental Quality (NDEQ) and the US Environmental Protection Agency (US EPA). The water quality classifications have been established to protect water uses associated with a given classification and directly affect the levels of wastewater treatment required for treated effluent discharge to surface waters of the State. Both the Theresa Street and Northeast wastewater treatment facilities discharge treated effluents to Segment LP2-20000 of Salt Creek located in the Lower Platte River basin. Segment LP2-20000 generally extends from Beal Slough to Rock Creek. Wastewater effluent quality requirements are dependent on stream classification, seasonal flow conditions, and secondary effluent standards set by National Pollutant Discharge Elimination System (NPDES) permits issued by the NDEQ.

The following water quality classifications have been established by the state of Nebraska.

Aquatic Life:

- Coldwater (Class A and B)
- Warm Water (Class A and B)

Recreation (Class A and B)

Water Supply

- Public Drinking Water
- Agricultural (Class A and B)
- Industrial

Aesthetics

Key Species

State Resource Water

Table 6.1 presents the classifications established by the state for the segment of Salt Creek where the Theresa Street WWTF and Northeast WWTF outfalls are located.

Table 6.1 Salt Creek Segment LP2-20000 Stream Classification Wastewater Facilities Master Plan Update - 2013 City of Lincoln, Nebraska	
Use Classification ⁽¹⁾	Category
State Resource Water	Not assigned
Aquatic Life	Warm water, Class A ⁽²⁾
Water Supply	Agricultural, Class B
Recreation	Primary contact ⁽³⁾
Aesthetics	Applies to all surface waters
Key Species	Channel catfish, walleye (Species code i, w)
Notes:	
1. Classification per Title 117, Chapter 5 of the Nebraska Department of Environmental Quality, Effective Date April 1, 2012	
2. Site specific water quality criteria for ammonia are assigned. See Tables 6.3 and 6.4.	
3. For Primary Contact, E. coli bacteria shall not exceed a geometric mean of 126/100ml based on a minimum of five samples within a 30-day period.	

The quality of all discharges into this segment of Salt Creek must be consistent with maintaining the water quality levels established by the stream classification.

6.1.2 Effluent Discharge Permitting System

Authorization to discharge wastewater effluent is provided by National Pollutant Discharge Elimination System (NPDES) permits issued by the NDEQ. NPDES permits identify wastewater effluent limitations, monitoring requirements, compliance schedule, influent monitoring requirements, and biosolids disposal requirements for WWTF discharge.

Table 6.2 presents NPDES permit monitoring requirements for the Theresa Street and Northeast WWTF facilities. Monitoring shall be conducted by sampling after all treatment processes and prior to discharge to the receiving stream unless otherwise indicated.

The NPDES permit requires that the 30-day average percent removal for CBOD₅ and TSS for both the Theresa Street WWTF and the Northeast WWTF shall not be less than 85-percent. The effluent discharge permits for both facilities are located in Appendix A.

6.1.2.1 Theresa Street WWTF NPDES Permit

The current Theresa Street WWTF NPDES permit, No. NE0036820, for discharge to Salt Creek has an effective date of April 1, 2009 and an expiration date of March 31, 2014. Table 6.3 presents NPDES permit requirements for wastewater effluent discharge from Theresa Street.

Table 6.2 NPDES Permit Monitoring Requirements for Both WWTF's Wastewater Facilities Master Plan Update - 2013 City of Lincoln, Nebraska			
Parameter	Monitoring Frequency	Sample Type	Limits
Influent Wastewater			
pH, S.U.	Weekly	Grab	
CBOD ₅ , mg/L	Weekly	24-hour Composite	
TSS, mg/L	Weekly	24-hour Composite	
Wastewater Effluent			
Effluent flow, MGD ⁽¹⁾	Daily	Meter	
CBOD ₅ , mg/L ⁽²⁾	Daily	24-hour composite	
TSS, mg/L ⁽³⁾	Daily	24-hour composite	
pH, S.U.	Daily	Grab	
NH ₃ -N, mg/L	Daily	24-hour composite	
E Coli, # mL	Daily	Grab	
Total Residual Chlorine, mg/L ⁽⁴⁾	Daily	Grab	
Dieldrin, mg/L	Annually	24-hour Composite	
Polychlorinated Biphenyls, mg/L	Annually	24-hour Composite	
Dissolved Cadmium, mg/l	Annually	24-hour Composite	
Dissolved Chromium, mg/L	Annually	24-hour Composite	
Dissolved Copper, mg/L	Annually	24-hour Composite	
Dissolved Iron, mg/L	Annually	24-hour Composite	
Dissolved Lead, mg/L	Annually	24-hour Composite	
Dissolved Mercury, mg/L	Annually	24-hour Composite	
Dissolved Nickel, mg/L	Annually	24-hour Composite	
Dissolved Silver, mg/L	Annually	24-hour Composite	
Dissolved Zinc, mg/L	Annually	24-hour Composite	
Acute Toxicity, TU	Annually	24-hour composite	
Notes:			
1. MGD - million gallons per day.			
2. CBOD ₅ - 5-day carbonaceous biochemical oxygen demand.			
3. TSS - Total suspended solids.			
4. Only when chlorine is used for disinfection.			

Table 6.3 Theresa Street WWTF Effluent NPDES Permit Limitations Wastewater Facilities Master Plan Update - 2013 City of Lincoln, Nebraska			
Parameter, Units	March 1 - May 31	June 1 - October 31	November 1 - February 28
pH, S.U.	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0
CBOD ₅ , mg/L (kg/day) ⁽¹⁾			
Monthly Average	25 (Report)	25 (Report)	25 (Report)
7-Day Average	40 (Report)	40 (Report)	40 (Report)
TSS, mg/L (kg/day) ⁽²⁾			
Monthly Average	30 (Report)	30 (Report)	30 (Report)
7-Day Average	45 (Report)	45 (Report)	45 (Report)
NH ₃ -N, mg/L (kg/day)			
Monthly Average	8.3 (619.3)	3.0 (243.6)	9.8 (787.6)
Daily Maximum	21.9 (1621.2)	7.9 (637.8)	25.7 (2061.8)
Acute Toxicity, TU ⁽³⁾			
Ceriodaphnia SP	3.33	2.34	2.80
Pimephales promelas	3.33	2.34	2.80
Total Residual Chlorine, mg/L (kg/day) [When Flow in Salt Creek is < 250 cfs]			
Monthly Average	0.010 (0.741)	0.008 (0.643)	0.009 (0.733)
Daily Maximum	0.026 (1.939)	0.020 (1.683)	0.023 (1.919)
Total Residual Chlorine, mg/L (kg/day) [When Flow in Salt Creek is > 250 cfs]			
Monthly Average	0.024 (1.834)	0.023 (1.876)	0.023 (1.872)
Daily Maximum	0.065 (4.802)	0.061 (4.911)	0.061 (4.900)
E Coli, #/100 mL	126 Monthly geometric Mean (May 1 through September 30)		
Notes:			
1. CBOD ₅ is 5-day carbonaceous biochemical oxygen demand			
2. TSS - Total Suspended Solids			
3. Perform testing once per year during alternate seasons			

6.1.2.2 Northeast WWTF NPDES Permit

The current Northeast WWTF NPDES permit, No. NE0112488, for discharge to Salt Creek has an effective date of April 1, 2009 and an expiration date of March 31, 2014. Table 8.4 presents NPDES permit requirements for wastewater effluent discharge at the Northeast WWTF.

Table 6.4 Northeast WWTF Effluent NPDES Permit Limitations Wastewater Facilities Master Plan Update - 2013 City of Lincoln, Nebraska			
Parameter, Units	March 1 - May 31	June 1 - October 31	November 1 - February 28
pH, S.U.	6.5 - 9.0	6.5 - 9.0	6.5 - 9.0
CBOD ₅ , mg/L (kg/day) ⁽¹⁾			
Monthly Average	25 (Report)	25 (Report)	25 (Report)
7-Day Average	40 (Report)	40 (Report)	40 (Report)
TSS, mg/L (kg/day) ⁽²⁾			
Monthly Average	30 (Report)	30 (Report)	30 (Report)
7-Day Average	45 (Report)	45 (Report)	45 (Report)
NH ₃ -N, mg/L (kg/day)			
Monthly Average	17.5 (408.8)	11.2 (243.9)	12.7 (283.1)
Daily Maximum	46.0 (1070.2)	29.3 (638.6)	33.2 (741.1)
Acute Toxicity, TU ⁽³⁾			
Ceriodaphnia SP	14.96	11.24	12.65
Pimephales promelas	14.96	11.24	12.65
Total Residual Chlorine, mg/L (kg/day) [When Flow in Salt Creek is < 259 cfs]			
Monthly Average	0.021 (0.484)	0.017 (0.379)	0.019 (0.428)
Daily Maximum	0.055 (1.267)	0.046 (0.993)	0.050 (1.121)
Total Residual Chlorine, mg/L (kg/day) [When Flow in Salt Creek is > 259 cfs]			
Monthly Average	0.050 (1.181)	0.053 (1.164)	0.052 (1.165)
Daily Maximum	0.133 (3.091)	0.140 (3.091)	0.137 (3.050)
E Coli, #/100 mL	126 Monthly geometric Mean (May 1 through September 30)		
Notes:			
1. CBOD ₅ is 5-day carbonaceous biochemical oxygen demand			
2. TSS - Total Suspended Solids			
3. Perform testing once per year during alternate seasons			

6.1.2.3 Future NPDES Permits

The current NPDES permits were issued with an effective date of April 1, 2009 and an expiration date of March 31, 2014. At this time there are no anticipated changes to the current NPDES permits for Theresa Street and Northeast WWTFs prior to the expiration date. The City believes that the next permit issued will likely remain the same for discharge limits but will likely include a monitoring requirement for total nitrogen (N) and total phosphorous (P). It should be noted that modifications to NPDES permits may be issued after public notice and opportunity for public hearing per NDEQ Title 119 - *Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System, Chapter 14.*

6.1.3 Residuals Disposal Regulations

The City of Lincoln and Lancaster County have entered into an agreement that covers the land application of treated Biosolids generated at the Cities WWTF's. Specific Responsibilities of the City include the following.

1. Biosolids production and application is in compliance with the Federal 503 regulations, including all requirements related to vector and pathogen control.
2. The City designates an authorized staff representative.
3. City coordinate hauling of the biosolids to the appropriate application or storage sites.
4. Assist in developing markets, public education and customer contracts negotiations as needed.
5. Obtain and comply with all regulations.
6. Provide physical and chemical analysis necessary for complying with EPA Part 503 regulations and other said laws.
7. Manage and fund the projects.
8. Maintain required insurance as stated in the agreement.

In addition to the City County agreement biosolids disposal is also covered in the following regulations:

1. NDEQ Title 119 -- *Rules and Regulations Pertaining to the Issuance of Permits Under the National Pollutant Discharge Elimination System.*
2. NDEQ Title 121 --*Effluent Guidelines and Standards.*
3. NDEQ Title 127 - *Rules and Regulations Governing the Nebraska Pretreatment Program.*
4. NDEQ Title 132 - *Integrated Solid Waste Management Regulations.*
5. *EPA Standards for the Use and Disposal of Sewage Sludge, 40 CFR Part 503.*
6. Federal Clean Water Act (CWA).
7. Resource Conservation and Recovery Act (RCRA) Subtitle D Municipal Solid Waste Regulations, 40 CFR Part 258.
8. RCRA Hazardous Waste Regulations, 40 CFR Part 261.
9. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Superfund requirements.

Residuals are generated from the following processes at the Theresa Street WWTF and the Northeast WWTF.

1. Influent screening
2. Grit removal
3. Primary clarification
4. Secondary treatment

Screenings and grit residuals are collected and hauled to the City's Bluff Road Municipal Solid Waste sanitary landfill for disposal. The governing regulation for screenings and grit landfill disposal is section Subtitle D of the Federal Resource Recovery Act (40 CFR 258 or RCRA). Subtitle D requires that materials are not "hazardous" and do not contain free water. The screenings and grit material at the Theresa Street and Northeast WWTFs are dewatered and meet the requirements of Subtitle D for landfill disposal.

Primary and secondary sludge disposal regulations are required under the Clean Water Act (40 CFR Part 503), commonly referred to as the “503 Regulations.” The 503 Regulations govern the disposal of wastewater sludge (biosolids) by land application, surface disposal, and incineration. Biosolids generated at the Theresa Street and Northeast WWTFs are land applied to agricultural land in the Lincoln area under the City/County Agreement. This agreement places several requirements on the biosolids including:

1. Biosolids application is in compliance with the Federal 503 regulations, including all requirements related to vector and pathogen control.
2. Biosolids are not applied within 200 feet of any actively used groundwater well, except for those used exclusively for irrigation.
3. Biosolids are not being applied within 1000 feet of any public drinking water supply well.
4. Application sites are not subject to public access.
5. Others.

6.1.4 Air Permits

The Theresa Street WWTF has a Class II Specific Operating Permit for the two engine generators. The permit has an expiration date of January 1, 2016. A copy of the permit is located in Appendix B.

6.1.5 Stormwater Permits

Both of the wastewater treatment facilities are also covered under the State of Nebraska’s General NPDES permit for industrial Stormwater permit Number NER9000000. This permit was signed on June 30, 2011. In addition to the general permit, each facility has an individual industrial storm water permit. The permit number for the Theresa Street and Northeast WWTF are NER900476 and NER900475, respectively. A copy of these permits can be found in Appendix B.

6.2 EVOLVING NUTRIENT CRITERIA REGULATIONS

6.2.1 Nutrient Criteria

In 2001, the U.S. Environmental Protection Agency published water quality criteria for total nitrogen, total phosphorus, chlorophyll a, and turbidity as called for in section 304(a) of the Clean Water Act. These criteria were developed as a starting point for states to develop criteria that would be appropriate for their own jurisdictions. This approach was due to the recognition that the determination of suitable limits for nutrients for water bodies is a highly complicated issue. It is governed by wide variation in local ecological conditions, as well as the uses placed upon the waters. Too much nutrient loading to a water body can cause rapid growth of algal blooms, organic enrichment and depletion of dissolved oxygen. Too little may result in insufficient enrichment of the aquatic food chain, which would be detrimental to a healthy aquatic biological community.

To date different states have taken varying approaches to meeting nutrient reduction criteria. Below is a summary of the approaches that are currently being used for the states of Missouri, Kansas, Iowa, and Nebraska.

6.2.2 State of Missouri

The Missouri Department of Natural Resources (MoDNR) has required total phosphorus limitations in NPDES permits for sensitive water bodies located in the SW area of the state since the mid 1990's. The limits were established at 0.5 mg/L total phosphorus for wastewater treatment plants located in the watersheds tributary to Lake Taneycomo, Table Rock Lake, and Bull Shoals Lake. Many facilities have utilized chemical addition and effluent filtration to achieve this total phosphorus limit.

More recently, MoDNR has begun to develop nutrient limitations based on water quality criteria. These nutrient limits would vary by ecological region as well as the uses placed upon specific waters. The state has initially focused on development of limitations for facilities which discharge into lakes and reservoirs. Nutrient criteria for these water bodies were adopted in October 2009. In August 2011, the Environmental Protection Agency (EPA) denied the approval of a substantial portion of these new rules. MoDNR is in the process of addressing the concerns expressed by EPA.

Stakeholder meetings on the development of nutrient criteria for rivers and streams have been suspended pending successful progress on the development of nutrient criteria for lakes and reservoirs. MoDNR is currently working to develop recommendations for rivers and streams that are scientifically defensible and sufficiently protective of the state's rivers and streams. It is anticipated that river and stream nutrient criteria will be based on a compilation of several lines of evidence, including a statistical review of available data, a USGS study of algae response to nutrients in the Ozarks, and analyses of macro-invertebrates and chlorophyll-a response variables.

6.2.3 State of Kansas

In December 2004, the Kansas Department of Health and Environment (KDHE) Bureau of Water prepared the Surface Water Nutrient Reduction Plan. The plan identified steps that must be taken to implement nutrient reduction in Kansas and protect the ecosystems in the Kansas River watershed and downstream water bodies. The plan indicated that nutrient reduction at wastewater treatment plants with a flow in excess of one (1) mgd would be required to achieve a specified level of nutrient reduction.

As part of plan implementation, KDHE requested that an analysis be performed for all new and expanded wastewater treatment plants to evaluate the impact of the new or expanded discharge on water quality and whether or not the impact to the community would be substantial and widespread. This analysis is required to include various nutrient reduction levels based on the scenarios listed below.

Table 6.5 State of Kansas Nutrient Reduction Levels Wastewater Facilities Master Plan Update - 2013 City of Lincoln, Nebraska		
Scenario	Total Nitrogen Limit	Total Phosphorus Limit
Biological Nutrient Removal (BNR)	8 mg/L	1.5 mg/L
Enhanced Nutrient Removal (ENR)	5 mg/L	0.5 mg/L
Limit of Technology (LOT)	3 mg/L	0.3 mg/L

To establish the affordability of each scenario, the procedures for determining substantial and widespread impacts analysis presented in EPA's Interim Economic Guidance for Water Quality Standards are utilized. These procedures provide guidance on using economic factors to develop appropriate water quality standards and allow consideration of pollution sources, economics, and antidegradation in the evaluation process.

Several wastewater treatment plants have been recently constructed or upgraded in the state to meet BNR criteria. Some of these facilities have produced inconsistent results for both total nitrogen and total phosphorus. KDHE now offers a community the option of complying with the BNR criteria listed above or an alternate limit of 10 mg/L total nitrogen and 1.0 mg/L total phosphorus.

6.2.4 Iowa

The Iowa Nutrient Reduction Strategy is a science and technology based approach to assess and reduce nutrients delivered to Iowa waterways and the Gulf of Mexico. This reduction strategy applies to major municipal and industrial wastewater facilities where economically and technically feasible, minor municipal wastewater facilities (< 1 mgd) when increasing design loadings, and are evaluated for major industrial wastewater treatment plants that do not have biological treatment during regularly scheduled permit renewals.

Implementation of the Nutrient Reduction Strategy will be concurrent with NPDES permit renewal. At permit renewal, the facility will be required to conduct a two-year study to evaluate the costs and feasibility of installing BNR facilities and to submit a proposed schedule for implementation. After the study is completed, the schedule will be incorporated into the facility's NPDES permit.

Since nutrient reduction is based on achieving BNR criteria, limits will be no more stringent than 10 mg/L total nitrogen and 1 mg/L for total phosphorus. After the upgraded facilities are operational, the facility will have one year to demonstrate performance prior to numeric limits being established in the NPDES permit. Nutrient limits will be based on annual performance, but no more than the values listed above. Plants will be protected from stricter limits being implemented for a period of 10 years, or two permit cycles, after the nutrient removal facilities are installed.

6.2.5 State of Nebraska

To date the State of Nebraska has implemented ammonia limits but has not set limits on total N or total P. At this time, NDEQ believes that the contribution of N and P from municipal wastewater treatment facilities is small compared to the N and P contributed by non point sources. Based on discussions with City and State staff, monitoring requirements for total N and total P will likely be included in the next NPDES permit. If the monitoring reveals that N and P have an adverse affect on water quality numeric limits would likely be developed and enforced through the permit process.