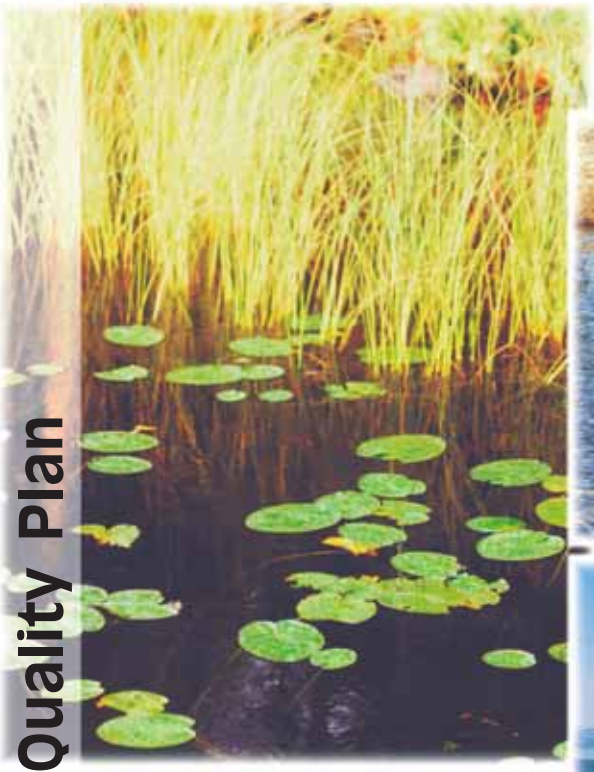
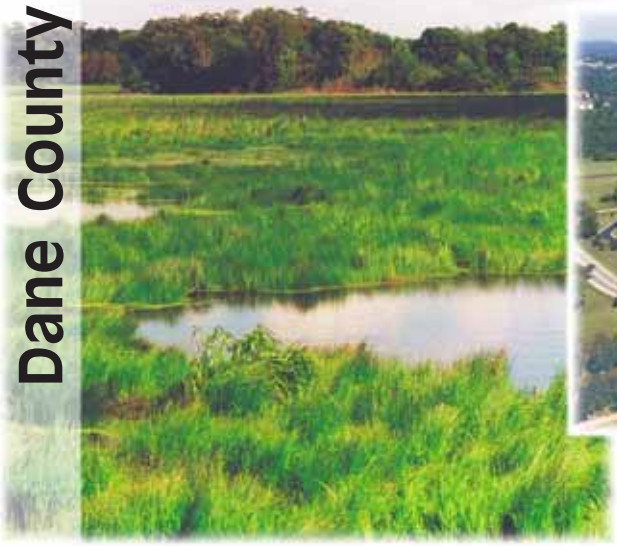
Dane County Water Quality Plan





Appendix C Update

Point Source Inventory and Analysis

Prepared by the
Capital Area Regional Planning Commission
2017

CAPITAL AREA REGIONAL PLANNING COMMISSION

Capital Area Regional Planning Commission

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Table of Contents

1. INTRODUCTION

Organization

The Point Source Inventory for Dane County lists all the wastewater discharges to ground and surface water that are regulated by Wisconsin Pollutant Discharge Elimination System (WPDES) permits. The inventory is generally arranged according to the four major river basins that receive the discharged effluent in the Capital Region. The four are: Wisconsin River basin, Sugar and Pecatonica River basin, Lower Rock River basin-Yahara River and Koshkonong Creek watersheds, and Upper Rock River basin-Maunesha River watershed.

This report is organized in four sections as follows:

Section 1 is an introduction to the surface waters of Dane County and a discussion of the point source pollution abatement measures, effluent limits, and policies enforced by the Wisconsin Department of Natural Resources (WDNR). Map 1, titled “Fish and Aquatic Life in Dane County Streams” has been included in this section to show the surface water bodies in the County and their official classification according to Wisconsin Administrative Code NR 102, and potential for water quality improvements (also see Table C-1).

Section 2 is a detailed inventory of the municipal point sources in the region, arranged by river basin. Map 2, titled "Existing Wastewater Discharges" has been included in this section to show the municipal and industrial point source wastewater discharges (also see Table C-4).

Each river basin discussion begins with a general description of the basin and a map showing major streams, urban service areas (USA), limited service areas (LSA), and discharges within the basin. The USAs and LSAs indicate areas of existing and currently planned urban development intended to be served with sanitary sewer throughout the planning period (year 2040) as of August 2016. In most instances, the USA boundary has been adopted by the local municipality, the Capital Area Regional Planning Commission (CARPC), and the WDNR. Lands which are environmentally unsuitable for development (environmentally sensitive areas) have been delineated as environmental corridors and are excluded from receiving sanitary sewer service. LSAs are areas which receive sewer service only. USAs and LSAs comprise sewer service areas for individual wastewater treatment plants (WWTP). Specific effluent limits and information on the receiving water, treatment process, performance, problem assessment, and recommendations are noted on separate pages for each municipal WWTP, and are accompanied by a map of the sewer service area contributing to the WWTP.

Section 3 is a detailed inventory of the individually permitted industrial discharges in the region, arranged by river basin. Industrial discharges include Concentrated Animal Feeding Operations (CAFO). These are discharges that are not treated by municipal WWTPs. Specific operation and effluent limits and recommendations have been noted for each discharge. In addition to individual industrial permits, a description of general permit types, along with quantities of each currently held within Dane County, in 2016, is also provided.

Section 4 presents a summary of findings and recommendations as well as discussion of several areas needing continuing efforts: phosphorus, chlorides, “one water”, and regionalization.

Residual waste management (sludge treatment, storage, and beneficial reuse) is discussed in this report where it relates to treatment plant performance or compliance with WPDES permit limits. Appendix F Residual and Solid Waste Disposal (1980) of the *Dane County Water Quality Plan* and the *Dane County Recycling Plan* (1988) also provide analyses and discussion of biosolid (sludge) management practices at WWTPs in the Capital Region. However, sludge treatment and recycling practices have changed since the publication of these reports.

Water Quality

The WDNR has established water quality standards intended to protect public rights and interest, *"which includes the protection of public health and welfare and the present and prospective uses of all waters of the state for public and private water supplies, propagation of fish and other aquatic life and wild and domestic animals, domestic and recreational purposes, and agricultural, commercial, industrial, and other legitimate uses"* (NR 102.01). It is in conjunction with these water quality standards that the WPDES has been designed to control discharges that may affect surface water quality. The discharge of water containing pollutants is regulated by the WDNR in Wisconsin Administrative Code NR 200. Depending on the volume and nature of the pollutant that is discharged, the prospective discharger may need no permit, a general permit without monitoring requirements, or a WPDES permit requiring the measurement and monitoring of several parameters and submission of periodic discharge monitoring reports (DMR).

The impact of any discharge depends on the following variables:

1. The characteristics of the receiving stream;
2. The nature of pollutants contained in the discharge; and
3. Site specific information such as wastewater flow, other dischargers nearby, and quantity of pollutants.

Receiving streams have been classified by WDNR according to hydrology and the type of aquatic life that the stream is capable of supporting. The classification system is summarized in Table C-1 and Map 1 titled "Fish and Aquatic Life in Dane County Streams."

Certain Wisconsin surface waters have been designated as *"outstanding resource waters"* (ORW) (NR 102.10). The anti-degradation rule (NR 207.03) asserts that effluent limits for a new or increased discharge are to be "set equal to the background levels of these substances, upstream of, or adjacent to, the discharge site." In Dane County, these ORW are Black Earth Creek, upstream of the easternmost crossing of County Highway (CTH) KP, and the Class I trout portion of Mt. Vernon Creek.

Some Wisconsin surface waters, which "provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities," have been designated as *"exceptional resource waters"* (ERW) in NR 102.11. The anti-degradation rule (NR 207.03) asserts that effluent limits for a new or increased discharge are to be set equal to the background levels of polluting substances, upstream of, or adjacent to, the discharge site, unless the discharge "is needed to correct or prevent an existing surface or groundwater contamination situation, or public health problem." In these cases, the rule provides for an evaluation process to determine the effluent limits for the discharge. The evaluation process includes allowances for economic and social benefits resulting from increased discharge, as well as the consideration of treatment and discharge location alternatives that could minimize the water quality impact of the discharge. In Dane County, NR 102.11 designates the following streams as *ERWs:*

Black Earth Creek (easternmost CTY KP crossing to Garfoot Creek)
Blue Mounds Branch

Deer Creek
Dunlap Creek
Elvers Creek (Bohn Creek)
Flynn Creek
Fryes Feeder Creek
Garfoot Creek
Little Sugar River (above New Glarus)
Milum Creek
Mt. Vernon Creek (Below S2 T5N R7E)
Rutland Branch
Ryan Creek
Schlapbach Creek
Six Mile Creek
Spring Creek (Lodi)
Story Creek (Tipperary)
Sugar River
Wisconsin River (below Prairie du Sac)

Certain receiving streams cannot support balanced aquatic life due to the following reasons (NR 104.01):

1. Presence of in-place pollutants;
2. Low natural stream flow;
3. Natural background conditions; and
4. Irretrievable cultural alterations.

These streams are granted a variance, since water quality criteria cannot be met at the plant outfall due to circumstances unrelated to the discharge. There are eight streams in Dane County that have been granted variances in NR 104.05 as follows:

Allen Creek (Brooklyn)
Badger Mill Creek (Verona)
Door Creek (Cottage Grove)[‡]
Koshkonong Creek (Sun Prairie)
Mud Creek and Tributary (Deerfield)
Oregon Branch of Badfish Creek (Oregon)
West Branch of Sugar River (Mt. Horeb)
Williams Creek (Blue Mounds)

The Madison Metropolitan Sewerage District (MMSD) effluent ditch from the outfall pipe to the Oregon Branch of Badfish Creek is also granted a variance; but, because it is not a natural stream, it does not appear in the list of "streams" above.

[‡] Door Creek no longer receives treatment plant discharges.

Table C-1
CLASSIFICATION OF RECEIVING STREAMS

HYDROLOGIC CLASSIFICATION (NR 104.02)	
Non-Continuous	Does not appear perpetually wet without wastewater discharge; $Q_{7,10}$[§] < 0.1 cfs
Continuous	Channel appears perpetually wet under natural conditions; $Q_{7,10}$[§] > 0.1 cfs
Wastewater Effluent Channel	A manmade channel constructed primarily for transporting wastewater from a facility to a point of discharge.
Diffused Surface Waters	Any water from rains, intermittent springs, or melting snow which flows on the land surface, through ravines, etc., which are usually dry except in time of runoff.
STREAM USE CLASSIFICATION FOR AQUATIC LIFE (NR 102.04)	
Cold	Cold Water Community; includes surface waters that are capable of supporting a community of cold water fish and other aquatic life, or serving as a spawning area for cold water fish species (e.g., trout).
WWSF	Warm Water Sport Fish Communities; includes surface water capable of supporting a community of warm water sport fish or serving as a spawning area for warm water sport fish (e.g., bass, pike).
WWFF	Warm Water Forage Fish Communities; includes surface waters capable of supporting an abundant diverse community of forage fish and other aquatic life (e.g., shiners, minnows).
LFF	Limited Forage Fishery (intermediate surface waters); includes surface waters of limited capacity because of low flow, naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of tolerant forage fish and aquatic life.
LAL	Limited Aquatic Life (marginal surface waters); includes surface waters severely limited because of low flow and naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of aquatic life.

Source: Wisconsin Department of Natural Resources

[§] $Q_{7,10}$ is the minimum 7-day average low stream flow which occurs once in ten years.

Effluent Limits

Pollutants that may be present in discharged water are heat (in cooling water), toxics or industrial chemicals, nutrients, and conventional pollutants. Toxic materials such as metals and organic chemicals are most efficiently removed or controlled with on-site pre-treatment by the industries using them. Industry-specific regulations are specified in Wisconsin Administrative Code NR 215 through NR 297. The small amounts of toxic materials reaching municipal WWTPs are more likely to be captured and detected in the sludge than in the treated effluent.

Conventional pollutants are biochemical oxygen demand (BOD), total suspended solids (TSS), pH, fecal coliforms, and oils and grease. For streams supporting full fish and aquatic life, the effluent limits are set at levels intended to allow the survival of the aquatic community even in the most extreme conditions. The determination of effluent limits is an important process that can protect water quality but can also require costly improvements or modifications in WWTPs.

There are three common ways of determining effluent limits:

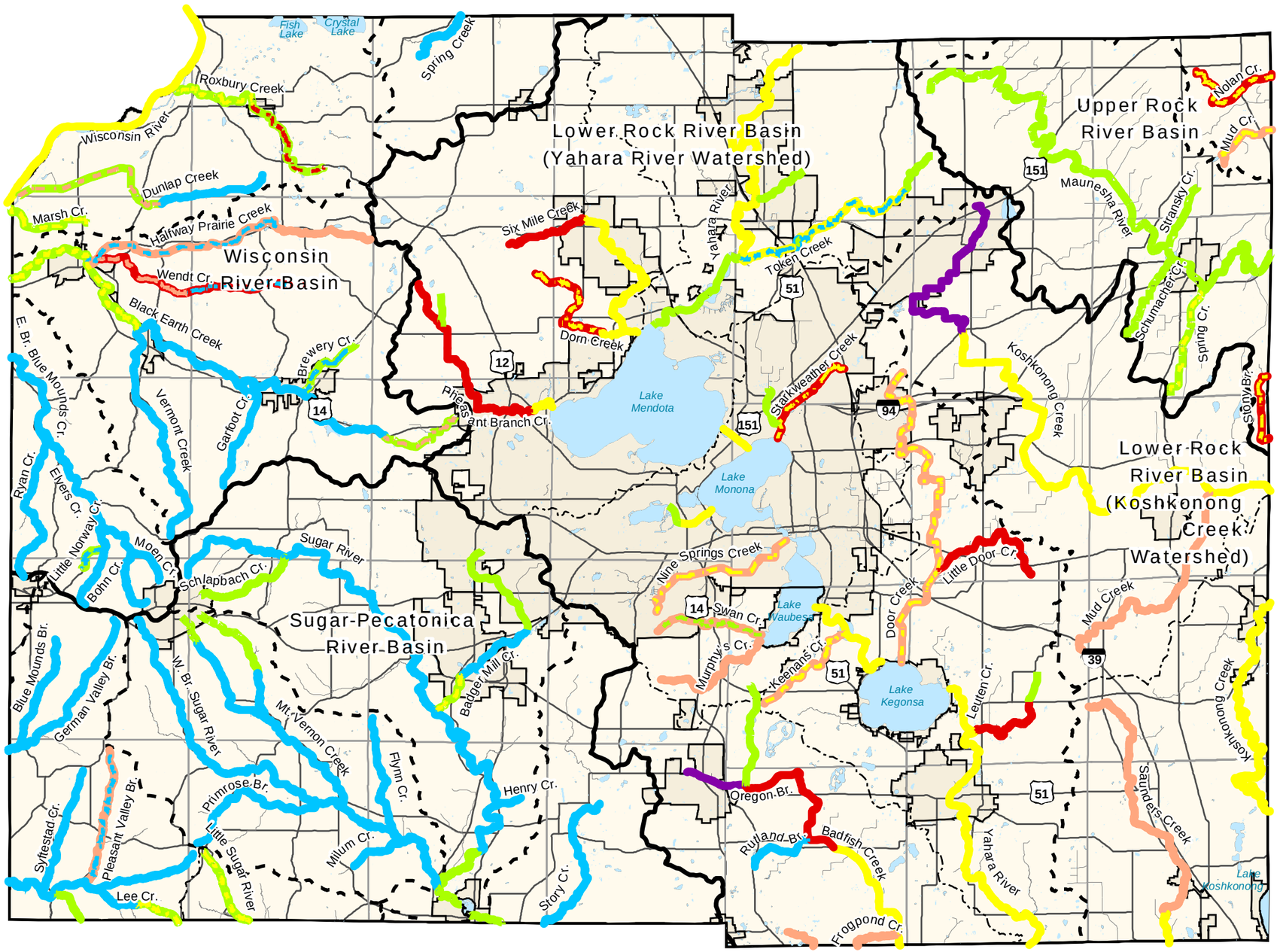
1. Simple calculations;
2. In-stream monitoring and computer simulation of low flow conditions; and
3. A waste load allocation study, when two or more discharges occur within a two-mile length of stream.

For discharges to intermediate and marginal streams (i.e., those streams that have been granted variances), the effluent limits have been specified in NR 104.02 and are listed in Table C-2.

Table C-2
WATER QUALITY CRITERIA AND EFFLUENT LIMITS

<table>
<tr><th>CLASS</th><th>CRITERIA AND LIMITS</th></tr>
<tr><td>Exceptional and Outstanding</td><td>No lowering of water quality.</td></tr>
<tr><td>Cold</td><td>D.O. ≥ 6 mg/l, D.O. ≥ 7 mg/l during spawning season.
No increase in temperature.
6.0 ≤ Ph ≤ 9.0 with no change greater than 0.5 units outside natural seasonal maximum and minimum.
No concentration of substances which are toxic to aquatic life.</td></tr>
<tr><td>WWSF and WWFF</td><td>D.O. ≥ 5 mg/l. No temperature change that may adversely affect aquatic life.
Temp ≤ 89 °F. Natural daily and seasonal temperature fluctuation maintained.
6.0 ≤ Ph ≤ 9.0 with no change greater than 0.5 units outside natural seasonal maximum and minimum.
No concentration of substances which are toxic to aquatic life.</td></tr>
<tr><td>LFF</td><td>D.O. ≥ 3 mg/l. Disinfectant use permitted; if chlorine is used, residual Cl ≤ 0.5 mg/l**
NH_3 ≤ 3 mg/l May 1-Oct. 31 and NH_3 ≤ 6 mg/l Nov. 1 - Apr. 30.
6.0 ≤ Ph ≤ 9.0
<table>
<tr><th></th><th>Monthly Avg.</th><th>Daily Max.</th></tr>
<tr><td>Effluent BOD (mg/l)</td><td>15</td><td>30</td></tr>
<tr><td>Effluent TSS (mg/l)</td><td>20</td><td>30</td></tr>
<tr><td>Effluent D.O. (mg/l)</td><td>≥ 4.0</td><td></td></tr>
</table></td></tr>
<tr><td>LAL</td><td>D.O. ≥ 1.0 mg/l; Disinfectant use permitted; if chlorine is used, residual Cl ≤ 0.5 mg/l**
6.0 ≤ Ph ≤ 9.0.
<table>
<tr><th></th><th>Monthly Avg.</th><th>Weekly Avg.</th></tr>
<tr><td>Effluent BOD (mg/l)</td><td>20</td><td>30</td></tr>
<tr><td>Effluent TSS (mg/l)</td><td>20</td><td>30</td></tr>
<tr><td>Effluent D.O. (mg/l)</td><td>≥ 4</td><td></td></tr>
</table></td></tr>
</table>

** See discussion on residual chlorine under “Other Effluent Requirements” in this section.



Map 1

Fish and Aquatic Life in Streams

Dane County, Wisconsin

Source: WDNR Surface Water Data Viewer and Basin Plan stream tables, June 2016

Current	Attainable	Subcategory
		Cold Water Fishery (COLD)
		Warm Water Sport Fishery (WWSF)
		Warm Water Forage Fishery (WWFF)
		Limited Forage Fishery (LFF)
		Limited Aquatic Life (LAL)
		Fish and Aquatic Life (FAL)

Major Basin Boundaries
Watershed Boundaries
Sub-Watershed Boundaries
Service Area Boundary

February, 2017

Prepared by: The Capital Area Regional Planning Commission

N

0 1.25 2.5 5 Miles

Other Effluent Requirements

In addition to pollutants routinely noted in effluent limits, substances which may degrade surface water quality and pose adverse impacts on aquatic life are monitored on a case-by-case basis and effluent limits imposed if necessary.

These substances include toxic substances, residual chlorine, and phosphorus.

Toxic Substances

Attention paid to potentially toxic substances in wastewater is generally based on the concern that:

a) toxic substances in the treatment plant influent could result in adverse effects on treatment plant performance where biological treatment is being used;
b) toxic substances in treatment plant effluent could result in short-term acute or long-term chronic toxicity to aquatic plants and animals in the receiving environment; and
c) toxic substances in treatment plant effluent could result in human health hazards to users of the receiving waters.

Direct monitoring for toxic substances is costly and complex. It is usually valuable to review and screen individual circumstances to determine which treatment plants or receiving environments are in sufficient risk or threat of toxic releases to warrant in-depth examination and monitoring. Reviewing the types of industries tributary to a treatment plant which may be discharging toxic substances is one initial step in this process. Surveys of receiving stream habitat and flora/fauna conditions can indicate the effects of toxic substances in effluents. Analyses of concentrations of toxic substances in wastewater sludge can also indicate where unusual contributions of toxic substances are occurring.

The toxic screening process used in this report has drawn upon all three sources of information, where available. Each WWTP description includes information regarding major industrial contributors in the sewer service area, as well as information required by WDNR on the concentration of specific toxic substances in the sewage sludge. Concentrations found in sludge are compared with the Environmental Protection Agency's (EPA) risk-based "safe" concentrations noted in "Standards for the Use or Disposal of Sewage Sludge" (40 CFR, Part 503). Recommendations made in this inventory are based on these data and indicators. In most cases, a more in-depth toxic evaluation and monitoring are eventually included in the WPDES permit for the treatment plant to determine a mitigation strategy.

Ammonia

NR 105.06 establishes in-stream toxicity criteria for ammonia. Different criteria are applied to different categories of streams based on the supported fishery.

Acute toxicity is inversely related to the logarithm of the acidity (pH) of the water. Chronic toxicity is inversely related to the logarithm of the acidity (pH) of the water and directly related to the logarithm of the water temperature. Effluent standards are established based on effluent flow, stream flow, and background in-stream levels of ammonia to protect receiving stream fisheries from acute or chronic toxicity.

Residual Chlorine

Chlorine is toxic to living organisms, and Wisconsin Administrative Code NR 105 establishes chronic and acute toxicity criteria for total residual chlorine. Some wastewater treatment processes, however, use chlorine as a disinfectant. A total residual chlorine effluent limit is established and used in WPDES permits for treatment plants using chlorination to disinfect effluent before discharge. For these plants, the concentration of chlorine in the effluent is limited to a daily maximum of 38 µg/L. This limit is based on the acute toxicity criterion for chlorine of 19.03 µg/L (Table 1, NR 105).

Phosphorus

Phosphorus acts as a food source for algae and has long been recognized as the controlling factor in plant and algae growth in Wisconsin lakes and streams. Small increases in phosphorus can fuel substantial increases in aquatic plant and algae growth, which in turn can have a negative effect on recreational use, property values, and public health. Excessive aquatic plant and algae growth can also encourage eutrophication, reduce biodiversity, and reduce dissolved oxygen in surface waters. Twenty-seven water bodies in the region are either already on the 303(d) list of impaired waters due to total phosphorus or have been proposed for addition to the list in 2016. Phosphorus in surface waters originates from natural as well as point and nonpoint pollution sources. To protect human health and welfare, revisions to Wisconsin's Phosphorus Water Quality Standards for surface waters were adopted on December 1, 2010. These revisions:

- Created water quality standards that set maximum thresholds for phosphorus in Wisconsin's surface waters (NR 102).
- Set procedures to implement these phosphorus standards in WPDES permits issued to point sources discharging to surface waters of the state (NR 217).
- Helped to reduce nonpoint sources of excess phosphorus by tightening agricultural and non-agricultural (urban) performance standards for runoff management (NR 151).

The maximum allowable phosphorus concentrations established in NR 102.06, which vary based on water body type, are:

- Rivers: 100 µg/L
- Streams: 75 µg/L
- Reservoirs:
  - ≥ 5 acres: 30 – 40 µg/L
  - < 5 acres: Case-by-case determination
- Lakes:
  - ≥ 5 acres: 15 - 40 µg/L
  - < 5 acres: Case-by-case determination
- Limited aquatic life systems (defined in NR 104): Case-by-case determination
- Ephemeral streams: Case-by-case determination
- Wetlands and bogs: Case-by-case determination

The effluent standard for phosphorus is applied to municipal WWTPs, industrial point sources, and animal feeding operations according to separate criteria:

- 1 mg/L of total phosphorus as a monthly average for WWTPs discharging more than 150 pounds of total phosphorus per month
- 1 mg/L of total phosphorus as a monthly average for industrial discharges of more than 60 pounds of total phosphorus per month
- Runoff to surface waters from animal feeding operations shall be controlled using best management practices to reduce the amount of phosphorus discharged to surface waters.

NR 217 also establishes water quality based effluent limitations (WQBEL) for phosphorus. WQBEL can be used in WPDES permits in cases where discharges at the 1 mg/L effluent standard would exceed the water quality standards for phosphorus or the designated use of a specific water body. All WPDES permit reissued after December 2010 have been evaluated by WDNR for phosphorus water quality-based effluent limits.

There are a number of options available for WWTPs to meet their phosphorus limits:

- Optimization: Facilities can conduct a phosphorus operational evaluation to optimize their wastewater treatment plant to increase the removal of total phosphorus. While this is a good first step it is unlikely to result in the required reductions in most cases.
- Facility Upgrades: Facilities can choose to add treatment technology to their plant to comply with the new phosphorus limits. This is the traditional method used to comply with permit limits, but is typically very costly for phosphorus removal.
- Water Quality Trading: Water quality trading allows point sources to offset their pollution load, and comply with phosphorus limits, by taking credit of other phosphorus reductions, typically from non-point sources, within the watershed.
- Adaptive Management: Similar to water quality trading, adaptive management allows a point source to reduce other sources of phosphorus pollution within a watershed to achieve compliance with phosphorus requirements. Unlike water quality trading, however, adaptive management focuses on improving water quality, rather than simply offsetting a permit limit. MMSD has been leading efforts on piloting adaptive management for phosphorus in the Yahara Watershed since 2012, and is currently beginning full scale implementation of this approach. The Yahara WINS Pilot Project Final Report prepared by MMSD staff in 2016 documents this project.

In recognition of the potentially high costs of phosphorus removal (An estimated $6 billion state-wide over a 20-year period according to the WDNR and Department of Administration), WDNR has submitted to EPA for approval a multi-discharger variance (MDV) for phosphorus. The MDV provides an option to extend the timeline for complying with low-level phosphorus limits. In exchange, point sources commit to step-wise reductions of phosphorus within their effluent, as well as, to help implement projects to reduce nonpoint sources of phosphorus in rural and urban areas. The EPA approved the MDV for phosphorus in February of 2017. Of note, municipalities within Dane County are not included as part of

the MDV application to the EPA.

Based on efforts in the region to date, adaptive management and water quality trading appear to offer a cost effective means of meeting the phosphorus reductions required for improved water quality.

Compliance Maintenance Annual Report

Since 1987, an annual report called the Compliance Maintenance Annual Report (CMAR) has been required from each domestic wastewater treatment facility. The CMAR program is based on three general goals:

1. To protect the past investment in treatment facilities by ensuring adequate maintenance;
2. To anticipate wastewater treatment problems, including the need for expansion; and
3. To improve communication and cooperation between community officials and wastewater treatment professionals.

This report monitors and evaluates the performance and physical state of each facility by assigning demerit points to the following list of parameters:

- Influent flow and BOD loading;
- Effluent quality;
- Age of the facility (discontinued in 2004);
- Incidence of untreated wastewater bypass;
- Biosolid (sludge) management;
- Pond and aerated lagoon liner integrity (for pond and lagoon systems);
- Land disposal system operation (for groundwater disposal systems);
- Significant increases in flow and loading from new development; and
- Operator certification and education

Subjective evaluation of the wastewater collection system, the plant maintenance, and the financial status of the plant are also included in the CMAR. WDNR district engineers review the CMAR for each plant. CMAR sections are assigned points based on monitoring data and other information provided by each WWTP. The point score for each section is then subtracted from 100 to determine the applicable grade and response action by the WWTP as seen in Table C-3. A grade point average is then determined for each WWTP by dividing the summation of the section grade points multiplied by a section weighting factor by the summation of the section weighting factors. For WWTPs receiving a grade of A or B, the owner may voluntarily provide information on improving treatment or collection system management and performance. For WWTPs receiving a grade of C, the owner shall recommend steps or actions that have been or may be taken to address problems or deficiencies identified in that CMAR section. For WWTPs receiving a grade of D or F, the owner shall submit an action response plan and shall state what sections will be taken to address and correct problems identified in that CMAR section.

Table C-3
SECTION SCORES, GRADES, AND RESPONSE RANGES

Score	Grade	Grade Points	Grade Meaning	Response Range
91-100	A	4	Good	Voluntary
81-90	B	3	Satisfactory	Voluntary
71-80	C	2	Marginal	Recommendation
61-70	D	1	Poor	Action
<61	F	0	Fail	Action

The information in Section 2 regarding the present operating conditions of WWTPs has been obtained from CMAR reports through 2015.

Capacity, Management, Operation, and Maintenance Program

As part of a 2013 rule change to Wisconsin Administrative Code 205 and 210, all publicly owned treatment works and satellite sewage collection systems must develop a Capacity, Management, Operation, and Maintenance (CMOM) program by August 1, 2016. Without proper maintenance of the sewage system, conveyance infrastructure can become less effective at conveying flow due to settling pipes, broken pipes, root intrusion, sediment accumulation, and other causes. In addition, deteriorating systems can allow infiltration of ground water into the system, known as infiltration/inflow (I/I), further exacerbating the reduced conveyance capacity. As infrastructure degenerates, the risk of sewage flow backing up in the system increases until untreated sewage discharges to the surface, referred to as a sanitary sewer overflow (SSO). SSO discharges of untreated sewage are a potential hazard to human health and can have significant impacts on water quality of adjacent waterbodies. All sanitary sewer overflows must be reported to the WDNR within 24 hours of the event and followed by a written report documenting the location, cause and remediation action necessary to reduce risks of further overflows. The CMOM Program is intended to assure that a sewage system is properly managed, operated and maintained at all times; has adequate capacity to convey peak flows; and all feasible steps are taken to eliminate excessive infiltration and inflow from the system.

The CMOM contains eight sections including the following:

1. Goals
2. Organization
3. Legal Authority
4. Maintenance Activities
5. Design and Performance Provisions
6. Overflow Emergency Response Plan
7. Capacity Assurance
8. Annual Self-Audit

Effective management and maintenance of wastewater utilities can extend the service life of sewage infrastructure, decreasing life cycle costs. The CMOM program helps to optimize maintenance activities and rehabilitation projects the extend the life and performance of the system.

2. MUNICIPAL POINT SOURCES

Organization

This section is divided into five river watersheds:

1. Wisconsin River Basin
2. Sugar and Pecatonica River Basin
3. Upper Rock River Basin-Maunesha River Watershed
4. Lower Rock River Basin-Koshkonong Creek Watershed
5. Lower Rock River Basin-Yahara River Watershed

Each section begins with a brief description of the basin and the surface water resources, as documented by the WDNR Surface Water Data Viewer, and the municipal WWTP and industrial discharges located in the basin. A map of the basin showing surface waters, sewer service areas, and municipal WWTP and industrial discharges accompanies each basin description to assist the reader in locating and retrieving information. Each discharge has been labeled on the basin map with a discharge number followed by a letter "i" or "m." Numbers with "i" indicate separate industrial discharges, including CAFOs, which are not served by municipal WWTPs. Numbers with "m" indicate municipal WWTP discharges.

Detailed information on municipal discharges located in each basin follow the basin description. Information pertaining to each municipal discharge has been presented in numerical order according to the discharge number. An adjoining map shows the municipal WWTP, discharge location, and service area. The receiving water, effluent limits, and operating conditions are described. Conclusions of the I/I analyses are given, where available, and major wastewater contributors to the treatment plant are listed.

For detailed descriptions of industrial discharges not served by municipal WWTPs, refer to Section 3 of this report.

Table C-4 and adjoining map (map 2) summarize the existing municipal and industrial wastewater discharges in Dane County, their operation, and anticipated future expansion and improvement needs.

Method

To predict needs for plant upgrading and/or expansion, future wastewater flows to the treatment plant have been forecast through the year 2040. Approved population forecasts for each sewer service area provide the basis for the flow forecasts. A future per capita flow contribution, estimated as the five year average per capita flow centered around the year 2010 (2008-2012), was applied to the forecasted population increase between 2010 and 2040. This projected flow increase was added to the existing average annual flow (2008-2012) to derive the year 2040 flow forecast. Current effluent limits were assumed to apply throughout the planning period, unless otherwise noted. For municipalities with major industrial contributors, the industrial wastewater flow was assumed to be stable, unless noted otherwise.

The analysis and problem assessment focuses on projected flows in relation to plant capacity and on present plant performance in meeting effluent limits. The recommendations which have been made for each treatment plant are also based on present plant performance and effluent limits. Many factors affect the operating conditions of a treatment plant. Consequently, a treatment plant may require expansion or upgrading sooner or later depending on changes in one or more of these factors. For some municipalities, plant expansion may be postponed through the reduction of I/I and through water conservation measures. Changes in industrial wastewater flow may also affect the need for expansion and upgrading. Since population forecasts are based on historic trends and patterns, an extraordinary and sustained increase in the rate of growth may result in an earlier need for plant expansion.

Changes in effluent standards or operational requirements can also trigger the need for an earlier plant or process upgrade. The revision of phosphorus standards, mentioned in Section 1, is a case in point. Limitations imposed on the beneficial land application of biosolids (sewage sludge), requiring 180 days of sludge storage, is another example of plant upgrading triggered by new operational requirements.

Table C-4 Municipal Wastewater Discharges					
Map #	**Permit Holder**	**Receiving Water (Classification)**	**Annual Average Design Flow (MGD)**	**Treatment Process**	**Anticipate Future Needs**
1m	Village of Belleville	Sugar River (WWSF)	0.346	OD, AS	2,3,4,8
2m	Village of Blue Mounds	Williams-Barneveld Creek (LFF)	0.075	OD, AS	6,8
3m	Village of Brooklyn	Allen Creek (LFF)	0.2	OD, AS	2,3,6,7,8
4m	Cambridge Oakland Wastewater Commission	Koshkonong Creek (WWSF)	0.571	AB, AS	2,3,8
5m	Village of Cross Plains	Black Earth Creek (COLD, ERW)	0.593	OD, AS	1,2,3,4,6,7,8
6m	Dane Iowa Wastewater Commission	Black Earth Creek (WWSF)	0.693	OD, AS	7,8
7m	Village of Deerfield	Tributary of Mud Creek (LAL, LFF, FAL)	0.393	AB, AS	6,8
8m	Madison Metropolitan Sewerage District	Badger Mill Creek (LFF)	3.6	AB, AS	1,2,3,5,6,8
9m	Madison Metropolitan Sewerage District	Badfish Creek (WWSF)	50	AB, AS	1,2,3,5,6,8
10m	Village of Marshall	Maunesha River (WWSF)	0.57	AB, OD	6,8
11m	Village of Mount Horeb	West Branch of Sugar River (LFF)	0.609	AB, AS	1,2,6,8
12m	Village of Oregon	Oregon Branch Badfish Creek (LAL)	1.8	AS	1,3,6,8
13m	Village of Rockdale	Koshkonong Creek (WWSF)	0.03	SF	8
14m	Roxbury Sanitary District #1	Roxbury Creek (LFF)	0.038	SF	1,2,3,8
15m	City of Stoughton	Yahara River (WWSF)	1.65	AS	2,3,5,6,8
16m	City of Sun Prairie	Koshkonong Creek (LAL)	4.4	AS	1,2,3,5,6,7,8

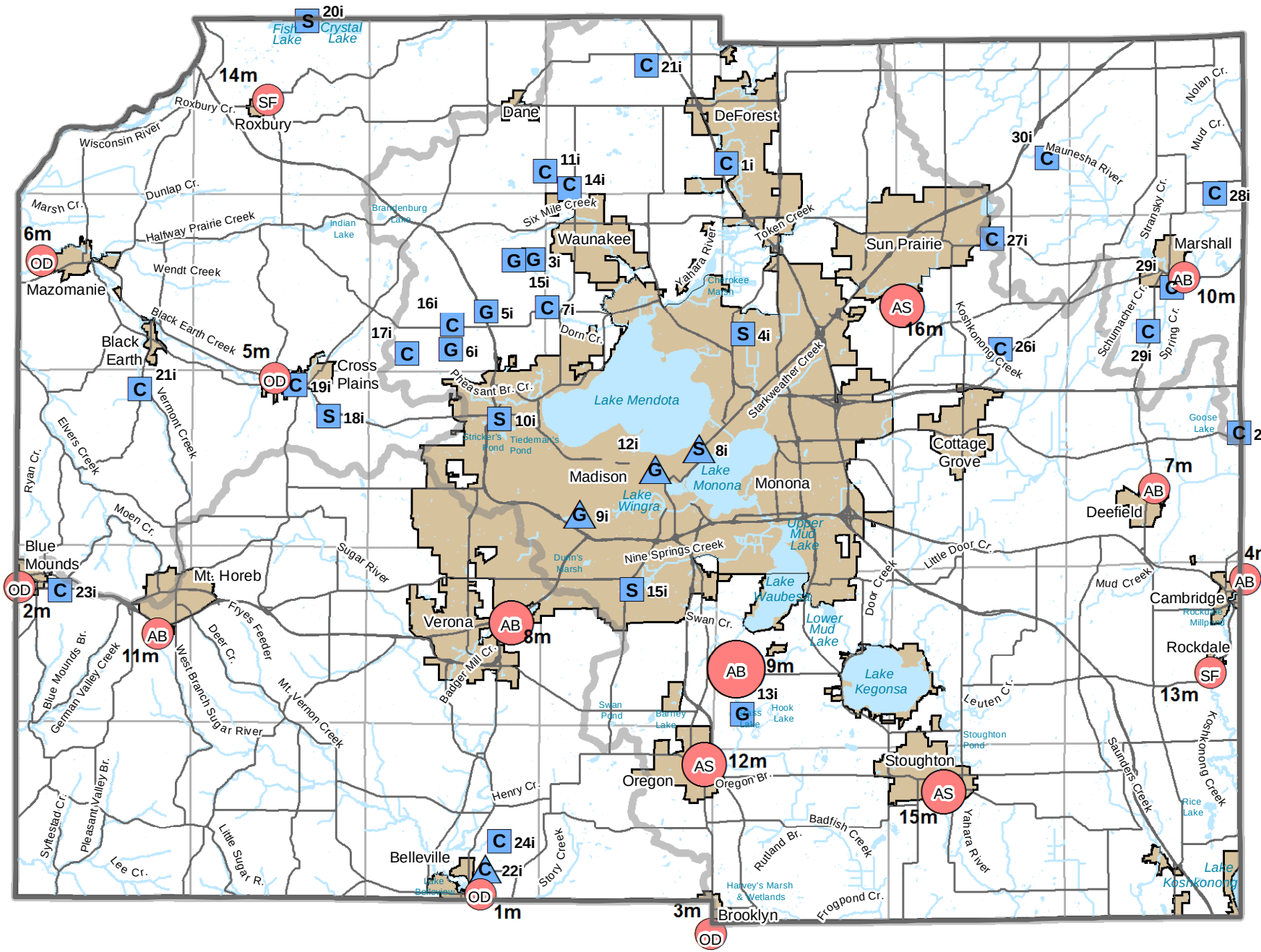
NOTES:

Receiving Water Classifications		Anticipated Future Needs	Treatment Process
COLD:	Cold Water Community; I, II, III refers to class of trout stream	1 = Capacity Expansion	AB: Aeration Basin
WWSF:	Warm Water Sport Fishery, which is also the default classification	2 = Process or Treatment Level Upgrading	AS: Activated Sludge/Biosolids
WWFF:	Warm Water Forage Fish	3 = Clear Water Inflow Management	OD: Oxidation Ditch
LFF:	Limited Forage Fishery	4 = 180-Day Onsite Biosolids Storage	SF: Sand Filter
LAL:	Limited Aquatic Life	5 = Industrial Loading Management	
ORW:	Outstanding Resource Water	6 = Toxics Monitoring	
ERW:	Exceptional Resource Water	7 = Temperature Monitoring	
		8 = Phosphorus Removal	

Table C-5 Industrial Wastewater Discharges			
Map #	**Permit Holder**	**Discharge To**	**Type of Discharge**
1i	ABS Global Inc. * (Genus Inc. DBA)	surface and groundwater within Six Mile/Pheasant Branch Creek and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
2i	Blue Star Dairy Farms *	surface and groundwater within Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
3i	Clean Fuel Partners (Clear Horizons Dane LLC)	groundwater within Six Mile/Pheasant Branch Creek subwatershed	landspreading of manure and process centrate to permitted source farms
4i	Dane County Regional Airport	surface water within the West Branch of Starkweather Creek	direct discharge of stormwater containing deicing and anti-icing chemicals, petroleum products, suspended solids, and traces of toxic materials
5i	Don's Mobile Manor	groundwater within the Lower Rock River Basin	wastewater that Is pumped to an in-ground soil absorption drip disposal system
6i	GL Dairy Biogas LLC	groundwater within the Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds	landspreading of digestate, centrate, fibers to permitted source farms
7i	Kippley Farms *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
8i	Madison Gas & Electric (Blount Station)	Lake Monona	pumped direct discharge of cooling water
9i	Madison Gas & Electric Compensatory Recharge (Odana)	groundwater	concentrated infiltration of filtered pond water
10i	City of Middleton Tiedeman Pond	Lake Mendota via storm sewers	direct discharge of excess pond water
11i	Ripp's Dairy Valley LLC *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
12i	UW Madison Charter Street Heating Plant	Lake Monona, via storm sewers,	pumped direct discharge of cooling water
13i	Waste Management City Disposal Landfill (Superfund Site)	Badfish Creek	pumped direct discharge of treated groundwater
14i	White Gold Dairy LLC *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
15i	Wisconsin Department of Natural Resources - Nevin Fish Hatchery	Nine Springs Creek	pumped direct discharge of process water from hatchery tanks and raceways
16i	Ziegler Dairy Farms *	surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds	landspreading of manure and process water
17i	Wagner Dairy Farm *	surface and groundwater within Six Mile Creek, Black Earth Creek and Roxbury Creek, and Upper Sugar River subwatersheds	landspreading of manure and process water
18i	Capitol Sand & Gravel Co. Inc.	Black Earth Creek	pumped direct discharge of untreated gravel pit effluent
19i	Fish, Crystal and Mud Lake Rehabilitation District	Fish Lake go to Wisconsin River and Crystal Lake go to Roxbury Creek	pumped direct discharge of excess lake water
20i	Wisconsin Department of Natural Resources - Black Earth	surface and groundwater	landspreading of wash water and sludge from equipment cleaning
21i	Anderson Custom Processing	surface and groundwater within Sugar River subwatershed	direct discharge of non-contact cooling water and landspreading mixture of corn starch process water and softener regeneration water
22i	Dairyfood USA Inc. (Lactoprot USA)	groundwater within the Pecatonica River Basin	landspreading of process water and onsite discharge of wastewater associated with well water treatment; sanitary wastewater is hauled to the Blue Mounds WWTP
23i	Prairieland Dairy LLC *	surface and groundwater within Story Creek/Sugar River subwatersheds	landspreading of manure and process water
24i	Daybreak Foods, Inc. *	surface and groundwater	landspreading of manure and process water

Table C-5 Industrial Wastewater Discharges			
Map #	**Permit Holder**	**Discharge To**	**Type of Discharge**
25i	R Acres Rademacher *	surface and groundwater discharges within Maunesha River subwatershed	landspreading of manure and process water
26i	Statz Brothers, Inc. *	surface and groundwater within Maunesha River and Koshkonong Creek subwatersheds	landspreading of manure and process water
27i	Jim Herman Inc. *	groundwater within Upper/Lower Koshkonong Creek and Maunesha/Lower Crawfish River subwatersheds	landspreading of manure and process water
28i	Kersten Farms LLC *	surface and groundwater within Maunesha River and Upper and Lower Koshkonong Creek subwatersheds	landspreading of manure and process water
29i	Maunesha River Dairy *	groundwater within Maunesha River and Upper/Lower Crawfish River subwatersheds	landspreading of manure and process water

* Denotes Concentrated Animal Feeding Operation (CAFO)



Existing Wastewater Discharges

Dane County, Wisconsin

Map 2

Municipal (m)

Treatment Type
- AB Aeration Basin
- AS Activated Sludge
- OD Oxidation Ditch
- SF Sand Filter

Treatment Capacity
- <1 mgd
- 1 - 10 mgd
- >10 mgd

Industrial (i)
- C Discharge Ground & Surface Water
- G Discharge to Groundwater
- S Discharge to Surface Water
- Process Water Discharge
- Mixed Process and Cooling

Sewer Service Area

Sub Watershed

Prepared by the Capital Area Regional Planning Commission
July 2016

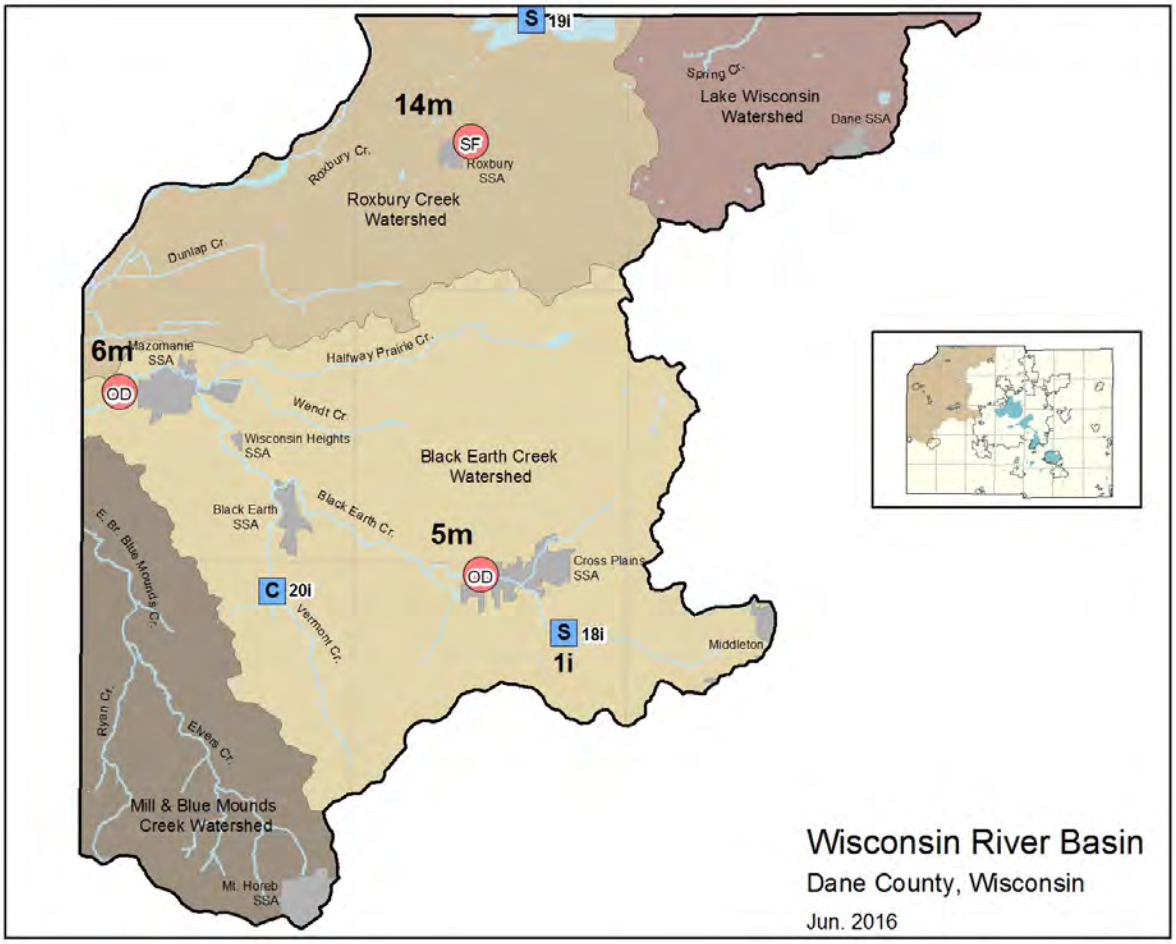
0 1 2 4 Miles

N

Wisconsin River Basin

Basin Description

The northwest portion of Dane County drains to the Wisconsin River. The northern part of this basin is dominated by the bottomlands and floodplains of the Wisconsin River valley and the glacial moraines, drumlins, and marshes to the east. The southern part of the basin is in the unglaciated "driftless" area of the county. This area is characterized by thin soils over bedrock and steep, wooded slopes. Land use in the Wisconsin River basin is predominantly rural and agricultural. Cropland occupies most of the acreage in the northern part of the basin, while steep wooded slopes along with cropland predominate the southern portion.



Streams and Stream Classifications

Mill and Blue Mounds Creeks Subwatershed

The 187 square mile (sq mi) subwatershed is in the southwest portion of the Wisconsin River Basin within Dane County draining from Mt. Horeb to the northwest. It contains 383 miles of streams with 60 miles of ORW/ERW, 67 trout miles and 33 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW/ ERW	General Condition
Blue Mounds Cr. (E. Br.)	LW15	1.2 mi.	N	Class II Trout	Class II Trout	Cold		Unknown
	LW15	4.0 mi.	N	Class III Trout#	FAL	DEF		Unknown
Bohn Cr.	LW15	2.0 mi.	N	Class II Trout	Class II Trout	Cold		Unknown
	LW15	1.5 mi.	N	Class II Trout	Class II Trout	Cold		Unknown
Elvers Cr.	LW15	10.1 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Unknown
Little Norway Cr.	LW15	1.3 mi.	N	FAL	Cold	DEF		Unknown
Moen Cr.	LW15	1.6 mi.	N	Class II Trout	Class I Trout	DEF		Unknown
Ryan Cr.	LW15	4.0 mi.	N	FAL	FAL	DEF		Unknown
	LW15	6.4 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Excellent
Stewart Lake (T6N R6E S2)	LW15	7 ac.	N	Small	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Black Earth Creek Subwatershed

The 105 sq mi subwatershed is in the southcentral portion of the Wisconsin River Basin within Dane County draining from Middleton to the west. It contains 197 miles of streams with 15 miles of ORW/ERW, 27 trout miles and 20 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Black Earth Cr.	LW17	7.0 mi.	PA	FAL	WWSF	DEF		Poor
	LW17	4.1 mi.	PA	FAL	WWSF	DEF		Poor
	LW17	5.8 mi.	PA	Class II Trout	Class II Trout	Cold		Poor
	LW17	2.5 mi.	N	Class I Trout	Class I Trout	Cold	ERW	Good
	LW17	4.6 mi.	N	Class I Trout	Class I Trout	Cold	ORW	Unknown
	LW17	3.1 mi.	N	FAL	WWFF	DEF	ORW	Unknown
Brewery Cr.	LW17	0.7 mi.	N	FAL	FAL Cold	DEF		Poor
	LW17	2.0 mi.	N	FAL	FAL Cold	DEF		Good
	LW17	2.6 mi.	N	FAL	FAL	DEF		Unknown
Garfoot Cr.	LW17	4.3 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
Halfway Prairie Cr.	LW17	8.0 mi.	Y	WWFF	Class III Trout	DEF		Poor
	LW17	3.6 mi.	N	WWFF	WWFF	DEF		Unknown
Vermont Cr.	LW17	3.5 mi.	Y	Class III Trout#	Cold	DEF		Poor
	LW17	6.1 mi.	N	Class II Trout	Class II Trout	Cold		Good
Wendt Cr.	LW17	3.6 mi.	Y	LFF	WWFF	DEF		Poor
	LW17	4.6 mi.	Y	LFF	Class III Trout#	DEF		Poor
Carl Buechner Pond (T8N R8E S19)	LW17	12 ac.	N	FAL	FAL	DEF		Unknown
Indian Lake (T8N R7E S11)	LW17	66 ac.	N	Shallow Seepage	FAL	DEF		Fair
Meier Pond (T8N R8E S18)	LW17	9 ac.	N	Small	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Roxbury Creek Subwatershed

The 71 sq mi subwatershed is in the northwest portion of the Wisconsin River Basin within Dane County draining north and west into the Wisconsin River. It contains 112 miles of streams with 43 miles of ORW/ERW, 4 trout miles and 33 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Dunlap Cr.	LW18	6.1 mi.	N	FAL	WWFF	DEF	ERW	Unknown
	LW18	4.0 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Unknown
Marsh Cr.	LW18	1.0 mi.	N	FAL	WWSF	DEF		Unknown
	LW18	3.0 mi.	N	FAL	WWSF	DEF		Good
Roxbury Cr.	LW18	4.0 mi.	Y	FAL	WWSF	LFF		Poor
	LW18	4.0 mi.	N	FAL	LFF	DEF		Unknown
Wisconsin River	LW18	33.3 mi.	Y	WWSF	WWSF	DEF	ERW	Fair
Crystal Lake (T9N R7E S1)	LW18	526 ac.	PA	Shallow Seepage	FAL	DEF		Poor
Fish Lake (T9N R7E S3)	LW18	216 ac.	PA	Two-Story	FAL	DEF		Poor
Fishers Lake (T9N R6E S32)	LW18	3.9 ac.	N	Small	FAL	DEF		Unknown
Mud Lake (T9N R7E S4)	LW18	54 ac.	N	Shallow Seepage	FAL	DEF		Poor

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Lake Wisconsin Subwatershed

The 215 sq mi subwatershed is in the northeast portion of the Wisconsin River Basin within Dane County draining north into Columbia County. It contains 300 miles of streams with 14 miles of ORW/ERW, 56 trout miles and 36 impaired miles. The portion of the subwatershed within Dane County represents only 10 percent of the total basin draining to Lake Wisconsin.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Spring (Lodi) Cr.	LW19	3.6 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Unknown

*303(d) status: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Municipal Discharges

In the northern part of the Wisconsin River Basin, the only municipal wastewater discharge is from the Roxbury Sanitary District #1 WWTP to Roxbury Creek.

In the southern portion of the basin, the Cross Plains WWTP discharges to Black Earth Creek. This reach of the creek is classified Class I trout. Farther downstream the creek receives treated effluent from the Dane-Iowa Wastewater Commission WWTP. This is a regional WWTP located in the Village of Mazomanie that treats wastewater generated in the Villages of Black Earth, Mazomanie and Arena (Iowa County) and the Wisconsin Heights High School complex, halfway between the Villages of Black Earth and Mazomanie.

Separate Industrial Discharges

1. Capitol Sand and Gravel Company discharges quarry groundwater, rainwater, and process water to Black Earth Creek upstream of the Village of Cross Plains.
2. Fish, Crystal and Mud Lake Rehabilitation District regulates discharge of excess water from Mud and Fish Lake to the Lower Wisconsin River.
3. The WDNR Black Earth Processing Facility landspreads wash water and sludge from equipment cleaning within the approved sites in the Lower Wisconsin River Basin.

For detailed information on separate industrial discharges not served by a municipal WWTP, refer to Section 3 of this report.

Village of Cross Plains WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
1000 Main St., Cross Plains	SE 1/4, NE 1/4, Section 4, T7N, R7E	WI-0020788-09-0	10/01/15	09/30/20	Black Earth Creek	Cold Water, Exceptional Resource Water	4.6

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

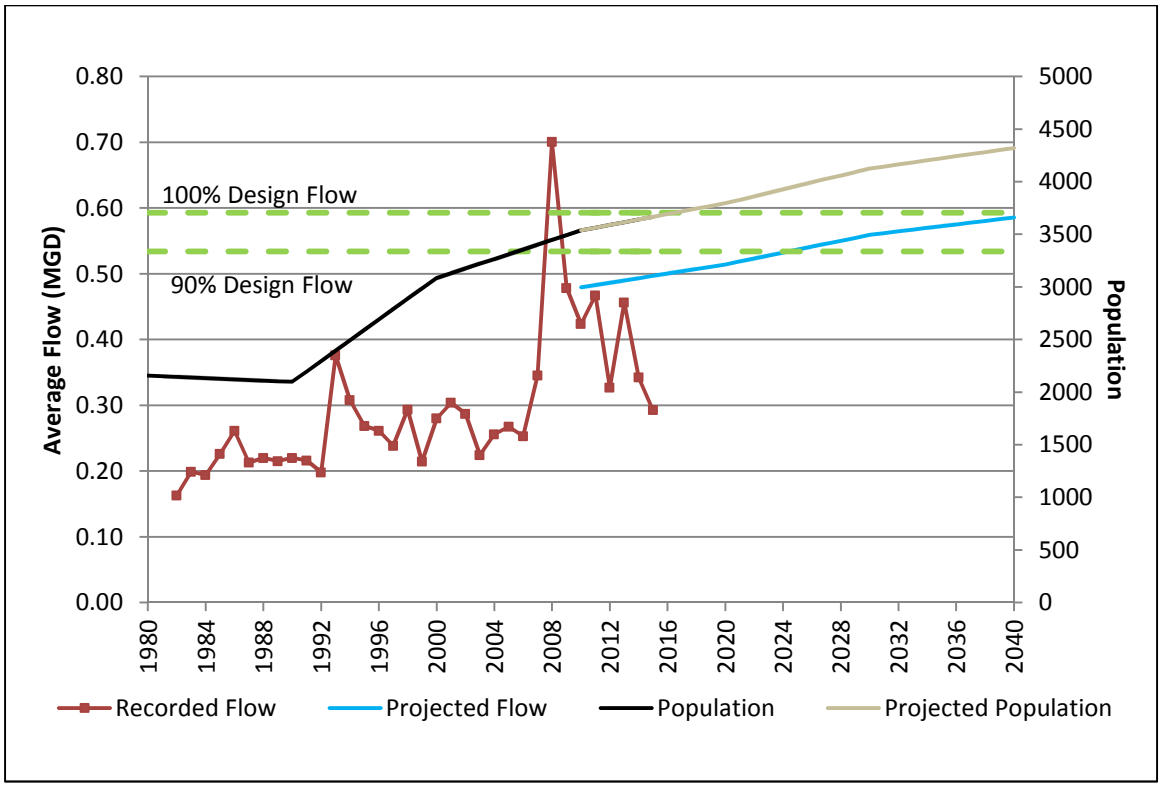
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
1386 lbs/day (1247 lbs/day)	**0.593 MGD (0.534 MGD)**	**0.593 MGD (0.534 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
7.0 mg/L	6 - 9	--	1.5 mg/L	30 mg/L (34 mg/L)[1] 23 mg/L (23 mg/L)[2]	30 mg/L (34 mg/L)[1] 23 mg/L (23 mg/L)[2]	168.9 lbs/day[1] 112.5 lbs/day[2]	168.9 lbs/day[1] 112.5 lbs/day[2]	Fecal Coliform, NH3-N, Temperature

1. Applies November through April 2. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	102	90	136

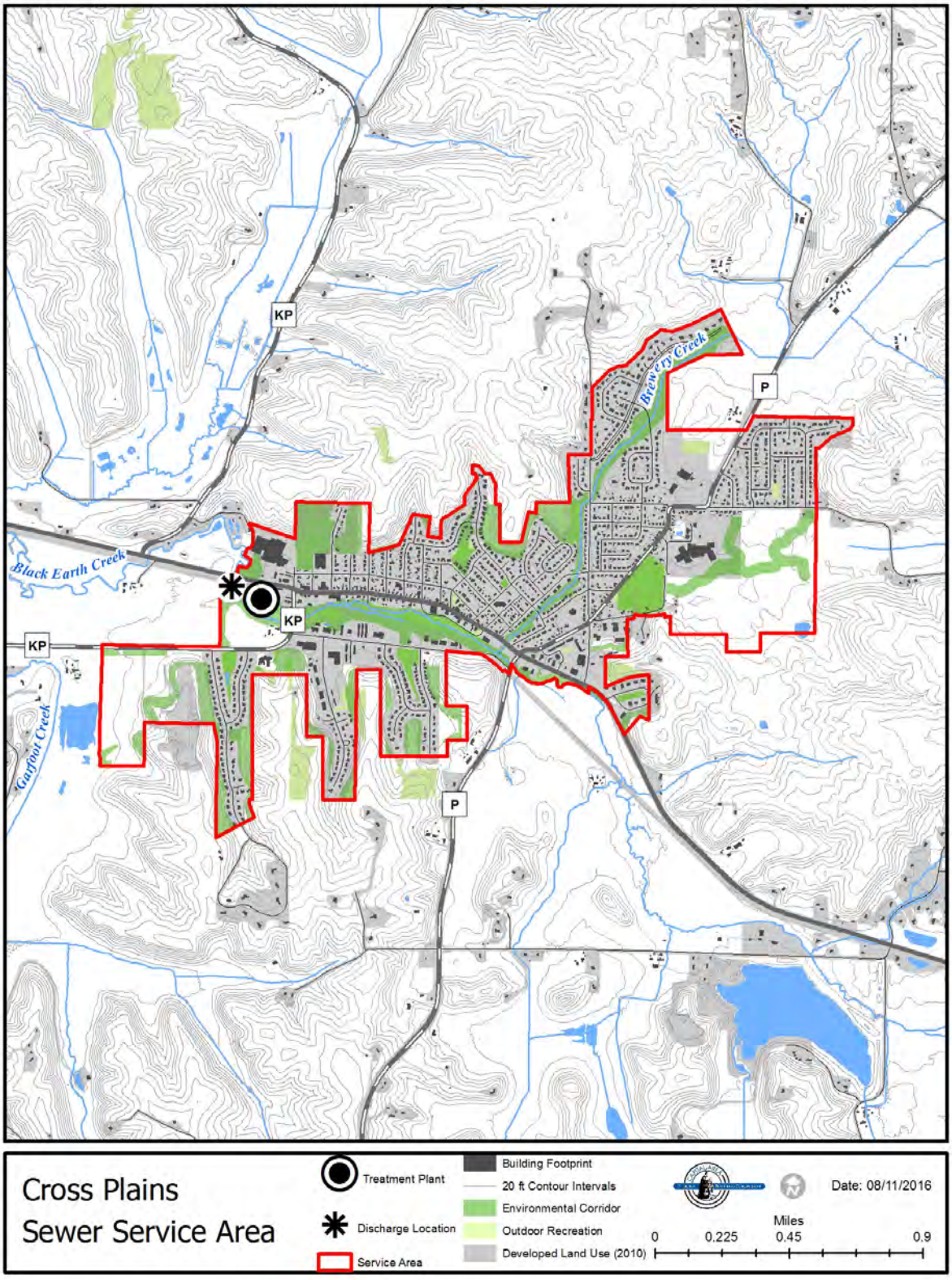
Treatment Process

Treatment consists of mechanical influent step screening, selector basins to enhance biological phosphorus removal, two oxidation ditches for activated sludge secondary treatment, final clarification, and seasonal UV disinfection and effluent diffused and cascade aeration prior to discharge to Black Earth Creek. The facility is designed to treat an annual average design flow of 0.593 Million Gallons per Day (MGD) and presently treats approximately 0.343 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 20 mg/L, well below the 23 to 30 mg/L permit limit. The effluent monthly average Total Suspended Solids ranged from 3 to 7 mg/L, well below the 23 to 30 mg/L permit limit. The effluent monthly average phosphorus ranged from 0.1 to 1.2 mg/L, below the current 1.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. Monthly chloride monitoring requirements were maintained for the latter portion of the current permit. Monthly temperature limitations were added to the current permit for the months of August through November. A temperature WQBEL compliance schedule detailing required actions is outlined within the current permit. It is recommended that the Village of Cross Plains conduct a phosphorus and temperature operational evaluation and develop an optimization report. It is also recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 1342 lbs/day and the projected 2040 annual average flow is 0.586 MGD. Biological loading is expected to reach 90 percent of design capacity by 2027 and could reach full design capacity near 2040, based on population projections and estimated wastewater generation rates. Hydraulic capacity is expected to reach 90 percent of design capacity by 2025 and could reach full design capacity near 2040, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2025 to either reduce source contributions or increase plant treatment and flow capacity. The collection system appears to have areas of high infiltration and inflow (I/I). The Village is commended for undertaking repairs on Main Street and Lagoon Street, and is recommended to continue to identify and repair areas with clear water intrusion to improve operational efficiency and reduce cost. Continued efforts to reduce I/I could extend the time for when a capacity evaluation and needs assessment study is needed. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


KP
KP
KP
P
P
Brewery Creek
Black Earth Creek
Garfoot Creek
Cross Plains
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.225
0.45
0.9

Dane-Iowa Wastewater Commission WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
5745 Mahocker Road, Mazomanie	SE 1/4, NE 1/4, Section 18, T8N, R6E	WI-0049816-03-0	08/01/12	06/30/17	Black Earth Creek	Warm Water Sport Fishery	17

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

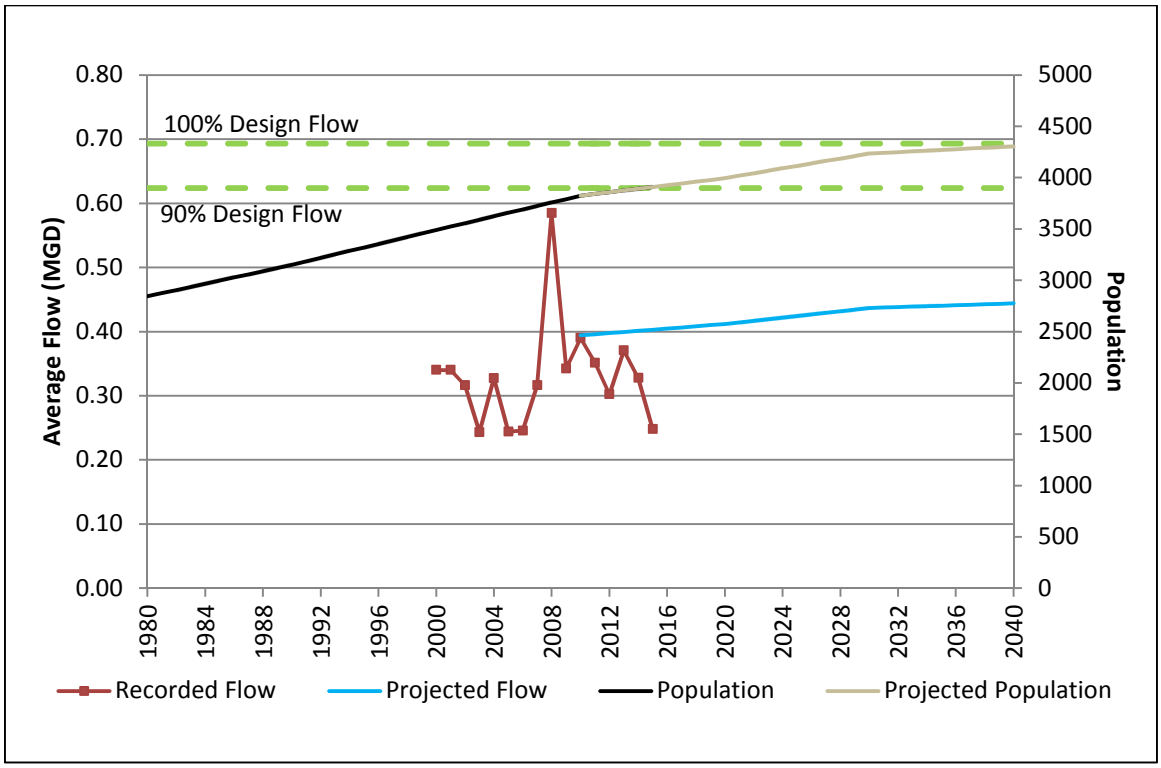
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
1369 lbs/day (1232 lbs/day)	**0.693 MGD (0.624 MGD)**	**0.693 MGD (0.624 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
6.0 mg/L	6 - 9	--	1.5 mg/L	25 mg/L[1] (40 mg/L)[2] (30 mg/L)[3]	30 mg/L[1] (45 mg/L)[2] (30 mg/L)[3]	170 lbs/day[2]	--	Fecal Coliform, NH3-N, Temperature

1. Applies year-round 2. Applies November through April 3. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	NA	96	104

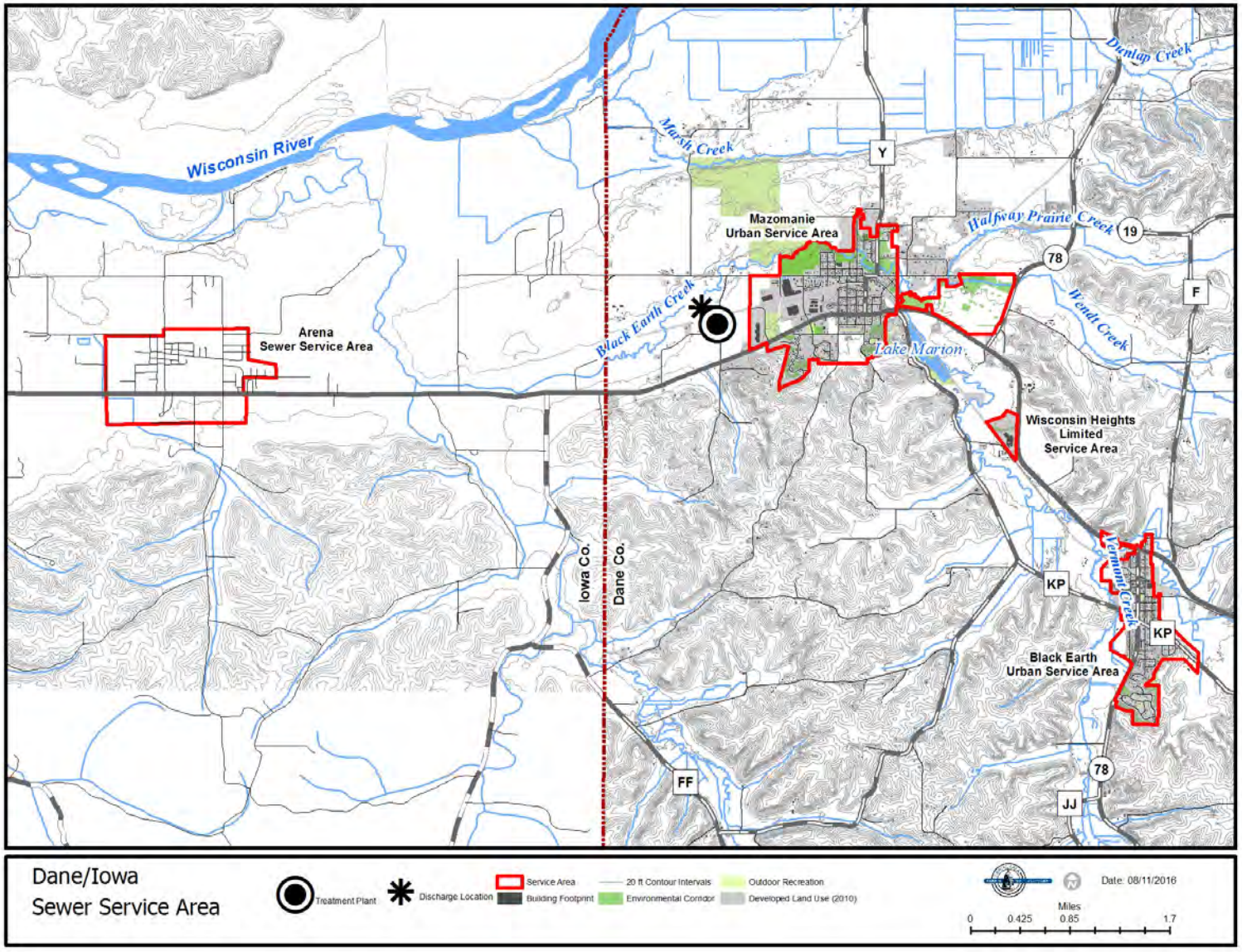
Treatment Process

Treatment consists of mechanical screening, an orbital oxidation ditch, final clarification and biological phosphorus removal. Effluent is disinfected seasonally via UV light and further aerated prior to discharge to the Black Earth Creek. Primary and waste activated sludge is thickened by a gravity belt prior to lime stabilization. The resulting Class A sludge is publically distributed and normally land applied on agricultural sites. Sludge from the Cross Plains WWTP is also treated by this process onsite and land applied. The facility has an annual average design flow of 0.693 Million Gallons per Day (MGD) and treated approximately 0.382 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 0 to 5 mg/L, well below the 25 mg/L permit limit. The effluent monthly average Total Suspended Solids ranged from 1 to 9 mg/L, well below the 30 mg/L permit limit. The effluent monthly average Ammonia was recorded for April only and was 0.792 mg/L, well below the permit limit of 15 mg/L. The effluent monthly average phosphorus ranged from 0.2 to 1.2 mg/L, below the current 1.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. The Dane-Iowa Wastewater Commission has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan was submitted in 2016.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 997 lbs/day and the projected 2040 annual average flow is 0.444 MGD. No biological loading or hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Wisconsin River
Marsh Creek
Dunlap Creek
Halfway Prairie Creek
Mazomanie
Urban Service Area
Y
19
78
F
Arena
Sewer Service Area
Black Earth Creek
Lake Marion
Wendt Creek
Wisconsin Heights
Limited
Service Area
Iowa Co.
Dane Co.
Vermont Creek
KP
KP
Black Earth
Urban Service Area
78
FF
JJ
Dane/Iowa
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.425
0.85
1.7

Roxbury Sanitary District #1 WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
7318 Inama Road, Roxbury	NE 1/4, SE 1/4, Section 16, T9N, R7E	WI-0028975-08-1	10/01/13	09/30/18	Roxbury Creek	Limited Forage Fishery	0.03

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

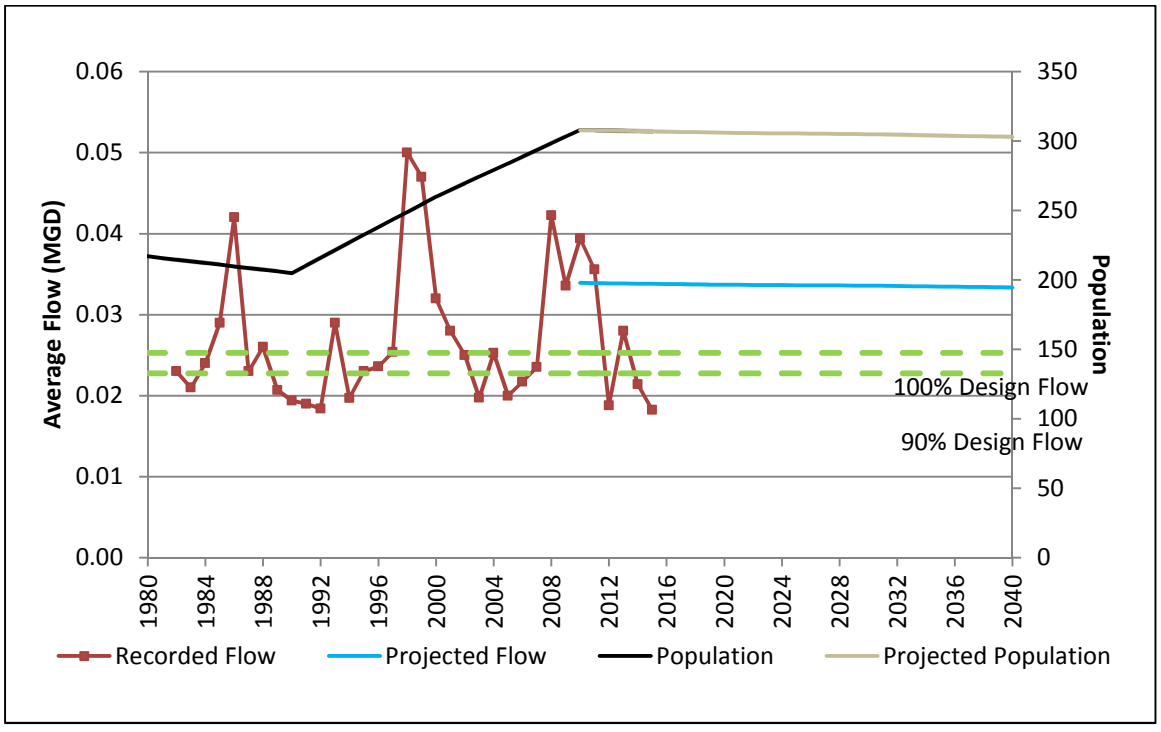
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
44.0 lbs/day (39.6 lbs/day)	**0.0253 MGD (0.0228 MGD)**	**0.049 MGD (0.044 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
4.0 mg/L	6 - 9	--	4.8 mg/L	15 mg/L (30 mg/L)	20 mg/L (30 mg/L)	--	--	NH3-N, Temperature

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	101	140	111

Treatment Process

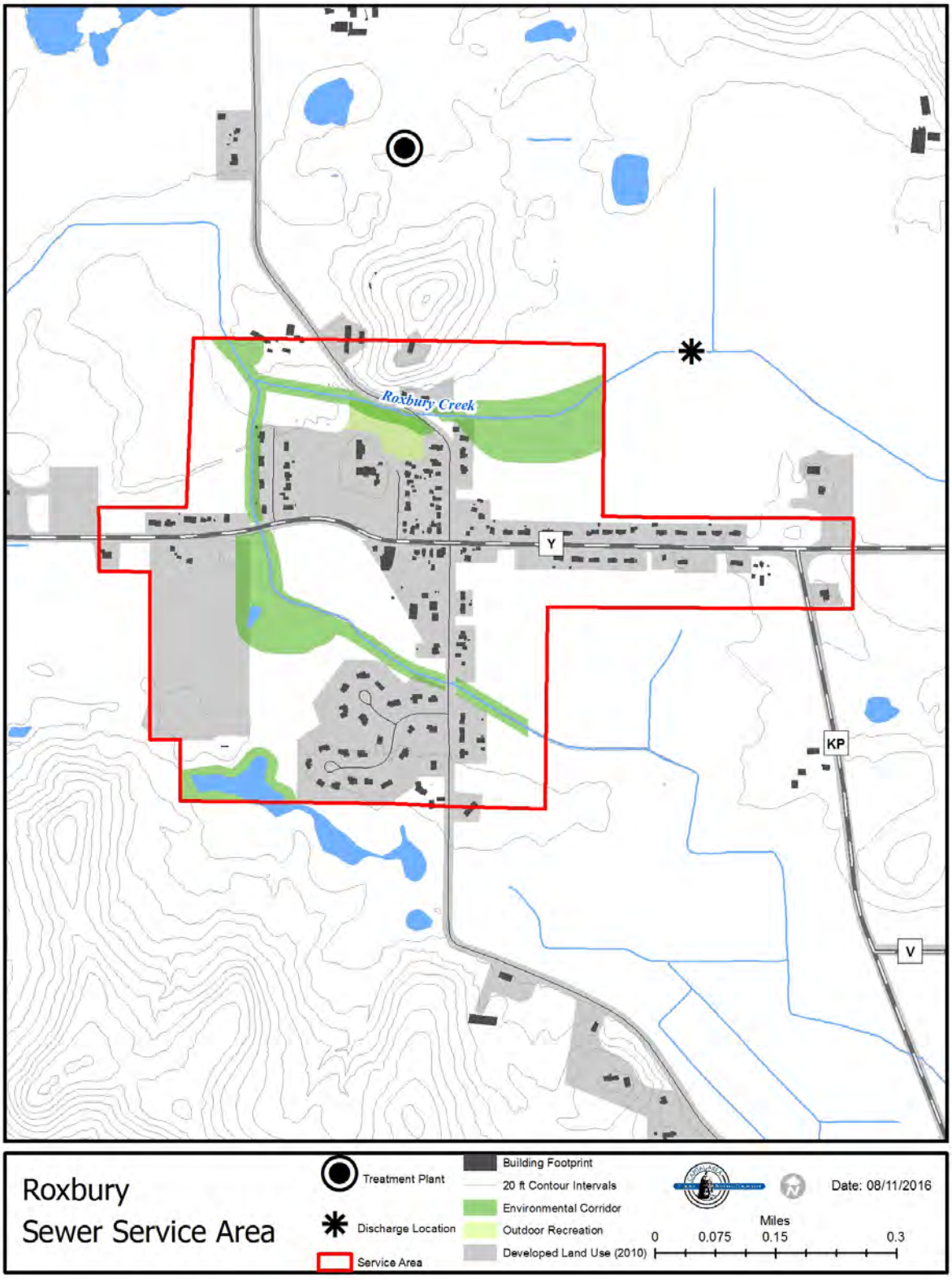
Treatment consists of two parallel septic tanks with two chamber each followed by a dosing chamber and then a four bed recirculating sand filter. A portion of filtered effluent (0-80%) can be returned to the dosing chamber to be reapplied to the filter beds. Treated effluent is discharged to Roxbury Creek. The facility has an annual average design flow of 0.0253 Million Gallons per Day (MGD) and treated approximately 0.028 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 4 to 13 mg/L, below the 15 mg/L permit limit. The effluent monthly average Total Suspended Solids also ranged from 2 to 9 mg/L, well below the 20 mg/L permit limit. In 2015, between October to March, the effluent monthly average Ammonia ranged from 2.3 to 20.79 mg/L, exceeding the 7.7 to 15 mg/L permit limit three months of the period. In 2014, between October to March, the effluent monthly average Ammonia ranged from 1.75 to 16.55 mg/L, exceeding the 7.7 to 15 mg/L permit limit two months of the period. The effluent monthly average phosphorus ranged from 3.1 to 8.0 mg/L, exceeding the current 4.8 mg/L permit limit 11 months of the year. It is recommended that the Roxbury Sanitary District #1 conduct an operational evaluation and develop an optimization report for ammonia treatment to consistently meet effluent limits. In 2015, the total phosphorus monthly limit of 4.8 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. This facility is not designed to remove phosphorus. It is recommended that the Roxbury Sanitary District #1 WWTP conduct a phosphorus and temperature operational evaluation and develop an optimization report. It is recommended that the WWTP evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 49 lbs/day and the annual average flow is and 0.0334 MGD. In 2014, influent (C)BOD loading was greater than 90% of design 5 months of the year and exceeded 100% of design loading four months. In 2015, influent (C)BOD loading was greater than 90% of design 2 months of the year and did not exceed 100% of design loading. However, the plant effluent has been consistently well below its discharge permit limit for (C)BOD. Between 2004 and 2015 average annual flow exceeded plant full design flow 6 of the 12 years and exceeded the maximum monthly design flow multiple times throughout that time span. The treatment plant is consistently operating at design loadings and flows, therefore it is recommended that a capacity evaluation and needs assessment be conducted for the facility.

The Sanitary District has identified areas of infiltration and inflow, but currently lacks the funding to make necessary repairs. It is recommended that the Roxbury Sanitary District develop a Capacity, Management, Operation, and Maintenance program for the collection system and start planning the replacement of the affected mains. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.

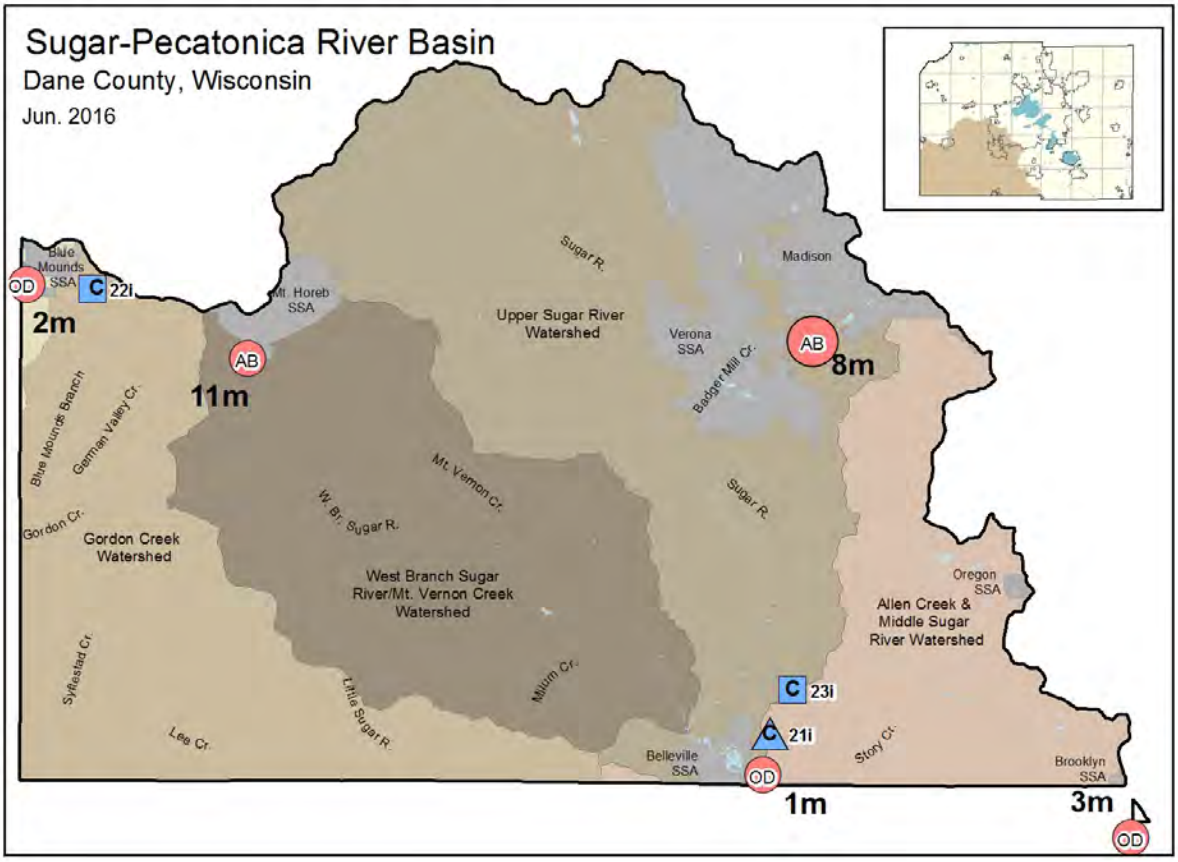

Roxbury Creek
Y
KP
V
Roxbury
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.075
0.15
0.3

Sugar and Pecatonica River Basin

Basin Description

Separated from the Wisconsin River basin by a row of hills called Military Ridge, the southwest corner of Dane County is in the Sugar and Pecatonica River basin. Most of the basin escaped the most recent period of Wisconsin Glaciation, has a valley and ridge physiography, and is in the "driftless" area of Dane County. This area is characterized by thin soils over bedrock, steep, wooded slopes, and narrow stream valleys with alluvial deposits. Some areas along the eastern edge of the basin show evidences of glaciation and have a morainal physiography.

Land use in the Sugar-Pecatonica River basin is mostly rural and agricultural, although extensive urban growth is occurring on the eastern edge of the basin, where the Cities of Verona, Madison, and Fitchburg are located.



Streams and Stream Classifications

Gordon Creek Subwatershed

The 77 sq mi subwatershed is in the southwest portion of Dane County draining west. It contains 206 miles of streams with 8 miles of ORW/ERW, 41 trout miles and 19 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
German Valley Branch	SP05	7.6 mi.	D	Class II Trout	Class II Trout	FAL Cold		Good
Gordon Cr.	SP05	8.2 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
Jeglum Valley Cr.	SP05	1.5 mi.	N	FAL	FAL	DEF		Good
Kittleson Valley Cr.	SP05	3.9 mi.	N	Class III Trout#	FAL	Cold		Poor
	SP05	6.1 mi.	N	Class II Trout	Class II Trout	Cold		Good
Lee (York Valley) Cr.	SP05	2.0 mi.	N	Cold	Cold	FAL Cold		Excellent
	SP05	1.0 mi.	N	FAL	WWSF	DEF		Good
Pleasant Valley Br.	SP05	5.9 mi.	D	WWFF	Cold	WWSF		Good
Syftestad Cr.	SP05	5.2 mi.	D	Cold	Cold	DEF		Good

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Upper East Branch Pecatonica River Subwatershed

The 140 sq mi subwatershed is located in the northwest portion of the Sugar and Pecatonica River Basin within Dane County. It contains 396 miles of streams with no ORW/ERW, 63 trout miles and 23 impaired miles. The portion of the subwatershed within Dane County represents only 1 percent of the Upper East Branch of the Pecatonica River.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Williams-Barneveld Creek	SP06	1.1 mi.	N	FAL	FAL	LLF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Allen Creek and Middle Sugar River Subwatershed

The 154 sq mi subwatershed is in the eastern portion of the Sugar and Pecatonica River Basin and drains from the east side of Fitchburg, south to Green County. It contains 263 miles of streams with 92 miles of ORW/ERW, 31 trout miles and no impaired waters.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Allen Creek	SP13	4.0 mi.	PA	FAL	FAL	DEF		Poor
Story (Tipperary) Cr.	SP13	6.8 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
Lake Harriett (T5N R9E S9)	SP13	35 ac.	N	Shallow Lowland	FAL	DEF		Fair
Maher Pond (T5N R9E S9)	SP13	6 ac.	N	Small	FAL	DEF		Unknown
Mortenson Pond (T5N R9E S26)	SP13	11 ac.	N	FAL	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Little Sugar River Subwatershed

The 133 sq mi subwatershed is in south central portion of the Sugar and Pecatonica River Basin. It contains 352 miles of streams with 46 miles of ORW/ERW, 33 trout miles and 27 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Hustad Valley Creek	SP14	4.0 mi.	N	FAL	WWSF	DEF		Good
Little Sugar River	SP14	3.9 mi.	N	FAL	WWSF	DEF	ERW	Unknown
Spring Valley Creek	SP14	1.5 mi.	N	FAL	WWFF	DEF		Unknown
Ward Creek	SP14	1.6 mi.	N	FAL	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Upper Sugar River Subwatershed

The 106 sq mi subwatershed is in north and east central portion of the Sugar and Pecatonica River Basin draining the east side of Mt. Horeb and the south west corner of Madison. It contains 184 miles of streams with 74 miles of ORW/ERW, 25 trout miles and 4 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Badger Mill Cr.	SP15	2.0 mi.	D	FAL	WWSF	FAL Cold		Good
	SP15	3.0 mi.	D	Class II Trout	Class II Trout	FAL Cold		Fair
	SP15	4.4 mi.	N	FAL	FAL	DEF		Unknown
Henry Cr.	SP15	1.0 mi.	D	Class II Trout	Class II Trout	FAL Cold		Unknown
Schlapbach Cr.	SP15	3.0 mi.	N	FAL	FAL	DEF	ERW	Good
	SP15	1.0 mi.	N	FAL	FAL	DEF	ERW	Good
Sugar River	SP15	45.2 mi.	Y	FAL	FAL	DEF	ERW	Poor
	SP15	20.1 mi.	N	Class II Trout	Class II Trout	FAL Cold	ERW	Good
	SP15	4.6 mi.	N	Class II Trout	Class II Trout	FAL Cold	ERW	Good
Lake Belle View	SP15	88 ac.	PA	Shallow Headwater	FAL	DEF		Poor
Goose Lake (T6N R8E S13)	SP15	12 ac.	PA	Deep Seepage	FAL	DEF		Poor
Morse Pond (T6N R8E S3)	SP15	13 ac.	N	Shallow Seepage	FAL	DEF		Unknown
Verona Gravel Pit (T6N R8E S22)	SP15	9 ac.	N	Small	FAL	DEF		Good

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Badger Mill Creek is a tributary to the Sugar River. Badger Mill Creek has been granted a variance under NR 104.05. In 1998, after extensive studies and public input, the MMSD constructed an effluent return pipe from its Nine Springs Wastewater Treatment Facility to Badger Mill Creek. This action was taken to reverse Badger Mill Creek baseflow loss which occurred as a result of the inter-basin transfer of groundwater from the Sugar River Basin to the Rock River Basin by the sewerage system. Badger Mill Creek has potential to support trout.

West Branch Sugar River and Mount Vernon Creek Subwatershed

The 67 sq mi subwatershed is in north and west central portion of the Sugar and Pecatonica River Basin draining from the south side of Mt. Horeb south and east to Belleville where it meets with the Upper Sugar River. It contains 157 miles of streams with 65 miles of ORW/ERW, 46 trout miles and 19 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Deer Cr.	SP16	4.7 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
	SP16	1.1 mi.	N	FAL	FAL	DEF	ERW	Unknown
Flynn Cr.	SP16	4.6 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
Fryes Feeder	SP16	2.0 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
	SP16	3.3 mi.	N	FAL	FAL	DEF	ERW	Good
Milum Cr.	SP16	2.0 mi.	N	Cold	FAL Cold	FAL Cold	ERW	Fair
Mount Vernon Cr.	SP16	3.5 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
	SP16	2.4 mi.	N	Class I Trout	Class I Trout	Cold	ORW	Good
Primrose Br.	SP16	6.3 mi.	N	Class II Trout	Class II Trout	Cold		Good
West Branch Sugar River	SP16	7.6 mi.	Y	Class II Trout	Class II Trout	Cold		Poor
	SP16	11.2 mi.	D	Class II Trout	Class II Trout	FAL Cold		Unknown
	SP16	3.5 mi.	N	Class II Trout	Class II Trout	Cold		Good

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Municipal Discharges

In the Pecatonica River headwaters, the only municipal point source is the Blue Mounds WWTP discharge to Williams Creek.

In the Sugar River watershed, there are four municipal WWTP discharges:

1. The Mt. Horeb WWTP discharge is to the West Branch Sugar River, a variance stream
2. The MMSD discharges to Badger Mill Creek, which flows to the main branch of Sugar River
3. The Belleville wastewater treatment discharge is to Sugar River, south of Lake Belle View
4. The Brooklyn WWTP discharge is to Allen Creek, a tributary of Sugar River located in Green County.

A facilities plan, completed in 1994, resulted in the abandonment of the Verona WWTP, which had discharged to the main branch of the Sugar River. Verona wastewater is pumped to the MMSD Nine Springs Wastewater Treatment Facility in the Yahara River watershed, and highly treated effluent is returned to the Sugar River watershed (via Badger Mill Creek) to mitigate the adverse impacts of interbasin transfer on stream baseflow.

Separate Industrial Discharges

1. Anderson Custom Processing directly discharges non-contact cooling water and landspreads a mixture of corn starch process water and softener regeneration water to Sugar River.
2. Dairyfood USA, formerly Lactoprot USA, landspreads process water and onsite discharge of wastewater associated with well water treatment; sanitary wastewater is hauled to the Blue Mounds. The landspreading fields are located in the Town of Blue Mounds, in the Gordan Creek watershed.
3. Prairieland Dairy LLC is a dairy operation that discharges to Story Creek in the Village of Belleville.

For detailed information on separate industrial discharges, refer to Section 3 of this report.

Village of Belleville WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
105 Remy Road, Belleville	SE 1/4, SE 1/4, Section 34, T5N, R8E	WI-0023361-09-0	04/01/16	03/31/21	Sugar River	Warm Water Sport Fishery	34

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

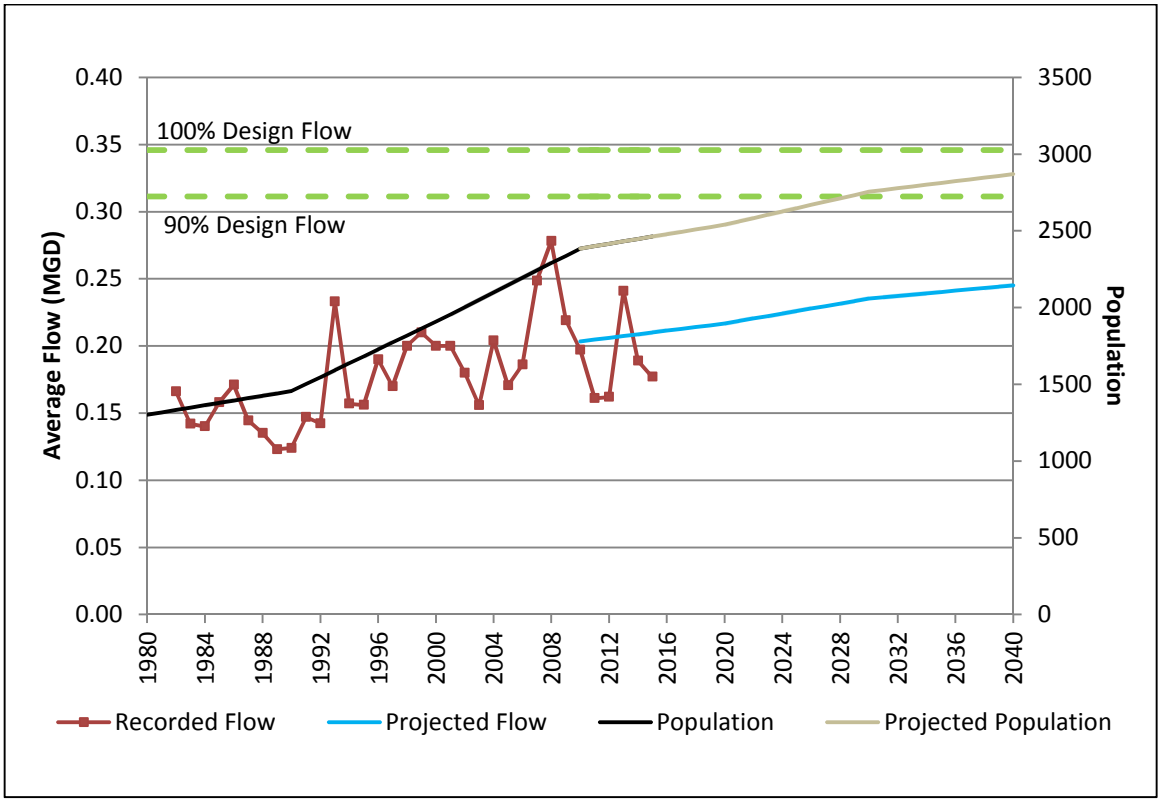
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
663 lbs/day (597 lbs/day)	**0.346 MGD (0.311 MGD)**	**0.696 MGD (0.626 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
--	6 - 9	0.038 mg/L	0.8 mg/L	30 mg/L (45 mg/L)	30 mg/L (45 mg/L)	--	--	Fecal Coliform, NH3-N*

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	93	104	86

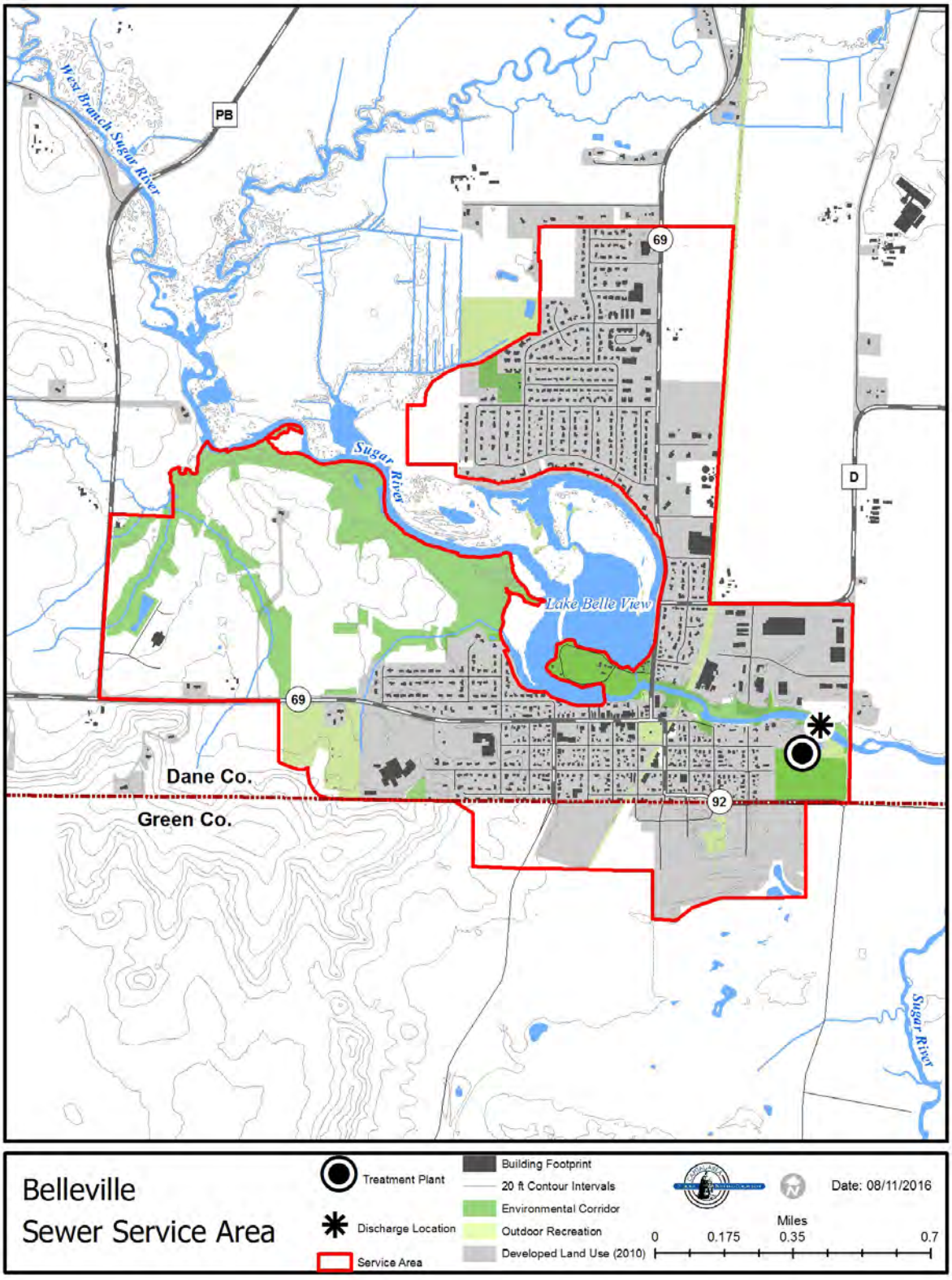
Treatment Process

Treatment consists of preliminary treatment (bar screen, grit removal and cleaning), secondary treatment (activated sludge oxidation ditches), chemical phosphorus treatment (alum), chlorine disinfection/dechlorination and post aeration prior to discharge to the Sugar River. Biosolids are aerobically digested and stored in an aerated storage tank. Minimal sludge storage is available on site (30 days) so sludge is regularly hauled to the Madison Metropolitan Sewerage District Wastewater Treatment Plant for additional treatment or land applied by a contractor on approved agricultural fields at acceptable agronomic rates. The facility is designed to treat an average daily flow of 0.346 Million Gallons per Day (MGD) and treated approximately 0.20 MGD annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 0 to 10 mg/L, well below the 30 mg/L permit limit. The effluent monthly average Total Suspended Solids also ranged from 3 to 9 mg/L, well below the 30 mg/L permit limit. The effluent monthly average phosphorus ranged from 0.2 to 0.4 mg/L, below the current 0.8 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 0.8 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. It is recommended that the Village of Belleville conduct a phosphorus operational evaluation and develop an optimization report. It is also recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 602 lbs/day and the projected 2040 annual average flow is 0.245 MGD. No hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. Biological loading is expected to reach 90 percent of design capacity by the year 2038 based on current population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2038 to either reduce source contributions of (C)BOD or increase biological treatment plant capacity. Collection system appears to have areas of high infiltration and inflow. It is recommended that areas of clear water intrusion be located and repaired to achieve improved operational efficiency and reduce cost. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


West Branch Sugar River
PB
69
Sugar River
D
Lake Belle View
69
Dane Co.
Green Co.
92
Sugar River
Belleville
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.175
0.35
0.7

Village of Blue Mounds WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
10961 CTH "ID", Blue Mounds	SW 1/4, NW 1/4, Section 7, T6N, R6E	WI-0031658-07-1	01/01/14	12/31/18	Headwaters of Williams-Barneveld Creek	Limited Forage Fishery	0

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

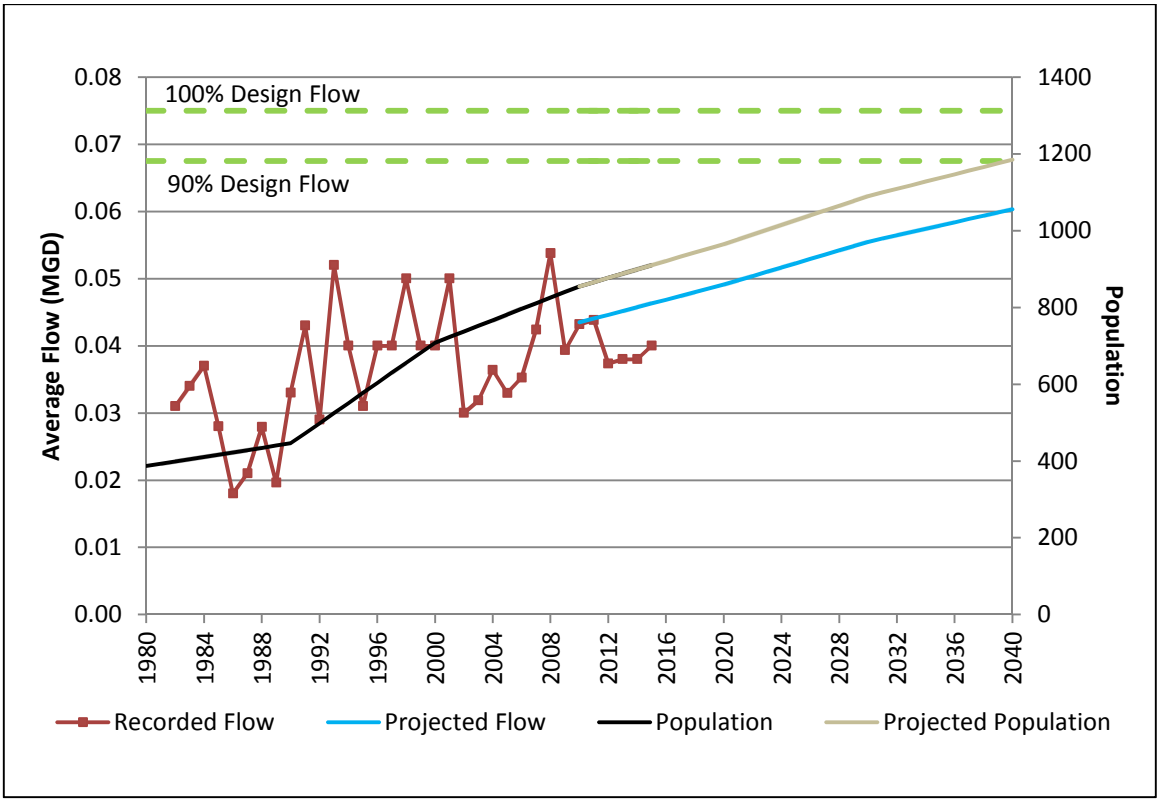
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
238 lbs/day (214 lbs/day)	**0.075 MGD (0.068 MGD)**	**0.075 MGD (0.068 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Weekly Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
4.0 mg/L	6 - 9	470 mg/L	7.5 mg/L	15 mg/L (30 mg/L)	20 mg/L (30 mg/L)	--	--	NH3-N, Chloride, Temperature

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	69	60	51

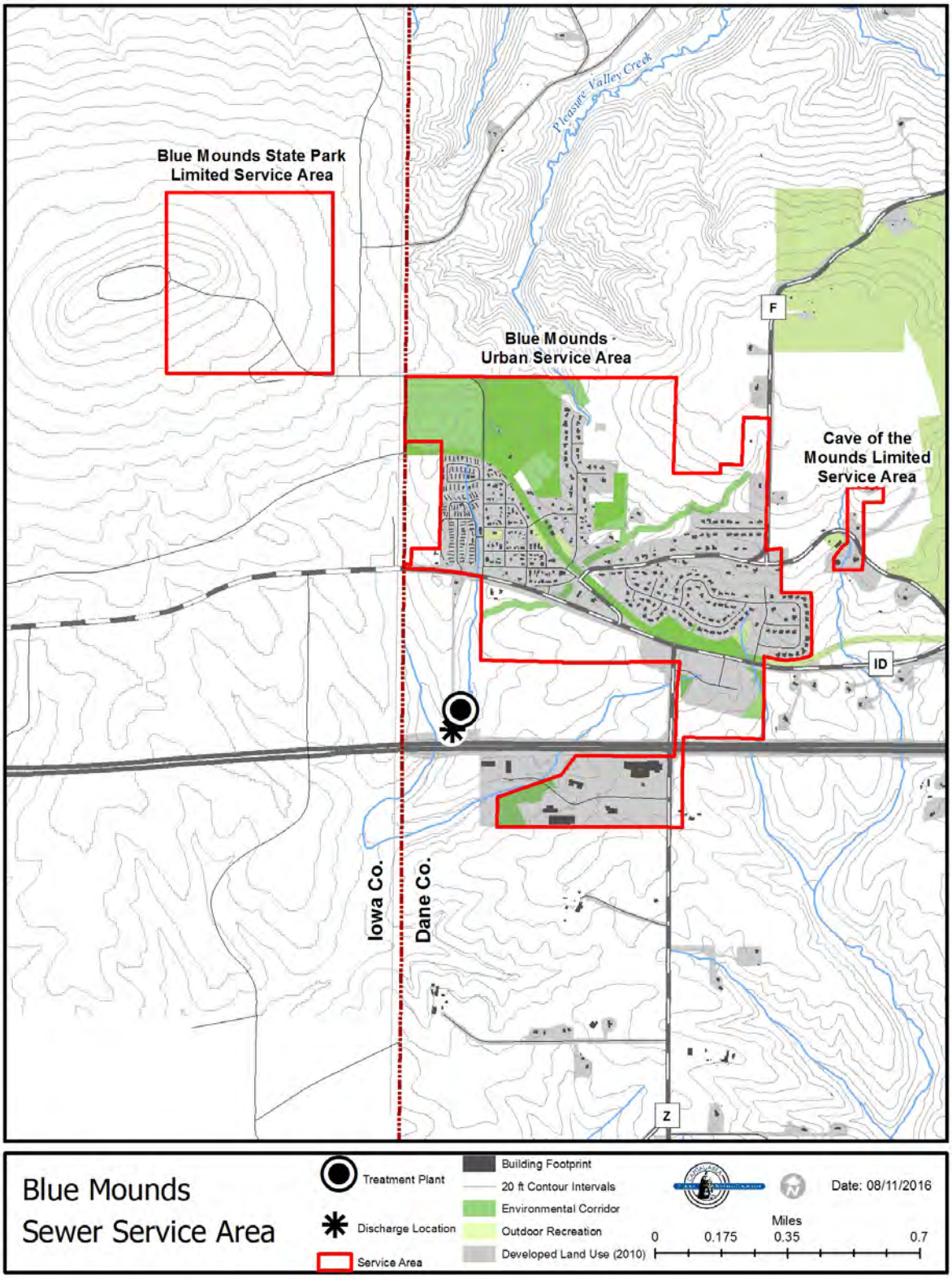
Treatment Process

Treatment consists of activated sludge-oxidation ditch and final clarification. Treated effluent is discharged to the headwaters of the Williams-Barneveld Creek. Sludge handling and treatment consists of gravity settling, aerobic digestion, and 180-day storage. The facility is designed to treat an average daily flow of 0.075 Million Gallons per Day (MGD) and treated approximately 0.031 MGD annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 4 to 13 mg/L, below the 15 mg/L permit limit but nearing the 90% permit limit of 13.5 mg/L. The effluent monthly average Total Suspended Solids ranged from 2 to 13 mg/L, well below the 20 mg/L permit limit. The effluent monthly average Ammonia ranged from 0.136 to 0.823 mg/L, well below the temporally variable permit limit ranging from 5.5 mg/L in the summer months to 21 mg/L in the winter months. The effluent monthly average phosphorus ranged from 1.9 to 7.2 mg/L, below the current 7.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 7.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. The total chloride monthly limit of 470 mg/L is an interim limit and will be lowered to 400 mg/L. A chloride WQBEL compliance schedule detailing required actions is outlined within the current permit. The Village of Blue Mounds has conducted a phosphorus operational evaluation and developed optimization report. The Village has also conducted a chloride pollutant minimization plan and developed a management report. It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary. It is also recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 139 lbs/day and the projected 2040 annual average flow is 0.060 MGD. No biological loading or hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Blue Mounds State Park
Limited Service Area
Pleasure Valley Creek
Blue Mounds
Urban Service Area
Cave of the
Mounds Limited
Service Area
F
ID
Z
Iowa Co.
Dane Co.
Blue Mounds
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.175
0.35
0.7

Village of Brooklyn WWTP

General Info

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
102 Windy Lane, Brooklyn	SE 1/4, NW 1/4, Section 6, T4N, R10E	WI-0023485-08-0	04/01/13	03/31/18	Allen Creek	Limited Forage Fishery	0.27

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

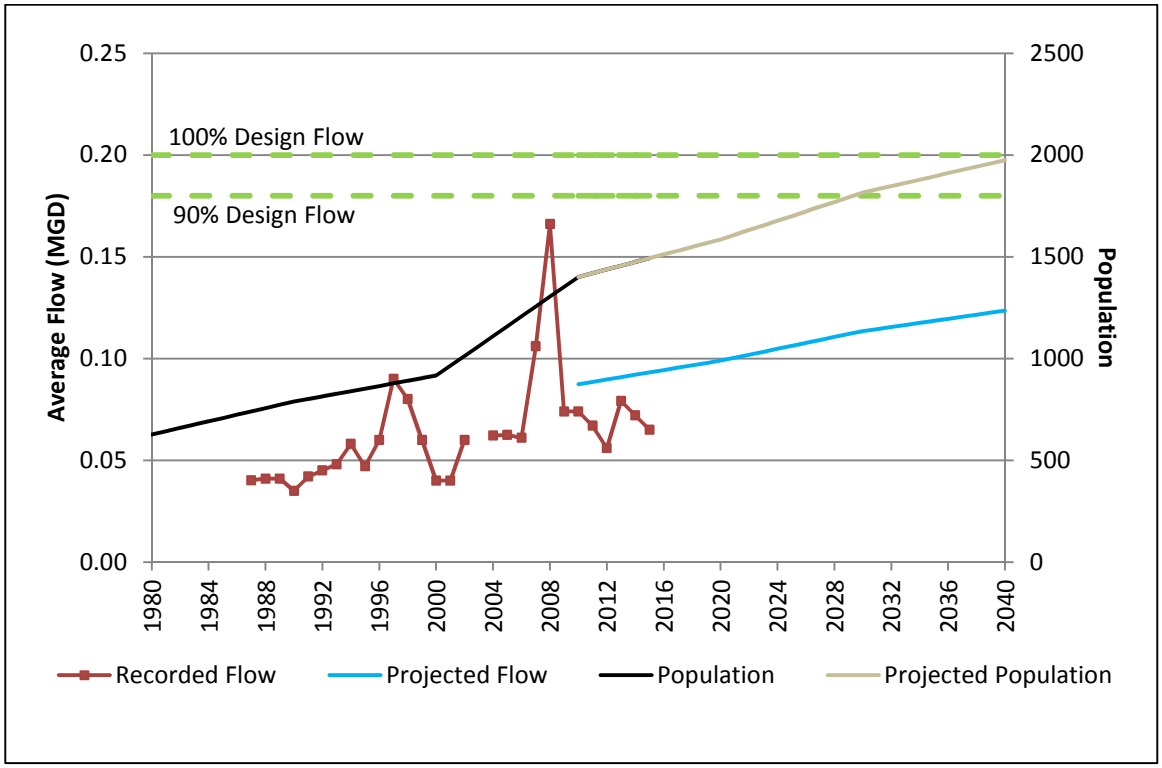
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
290 lbs/day (261 lbs/day)	**0.200 MGD (0.180 MGD)**	**0.116 MGD (0.104 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
4.0 mg/L	--	--	7.9 mg/L	15 mg/L (30 mg/L)	20 mg/L (30 mg/L)	--	--	NH3-N, Temperature

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	52	62	63

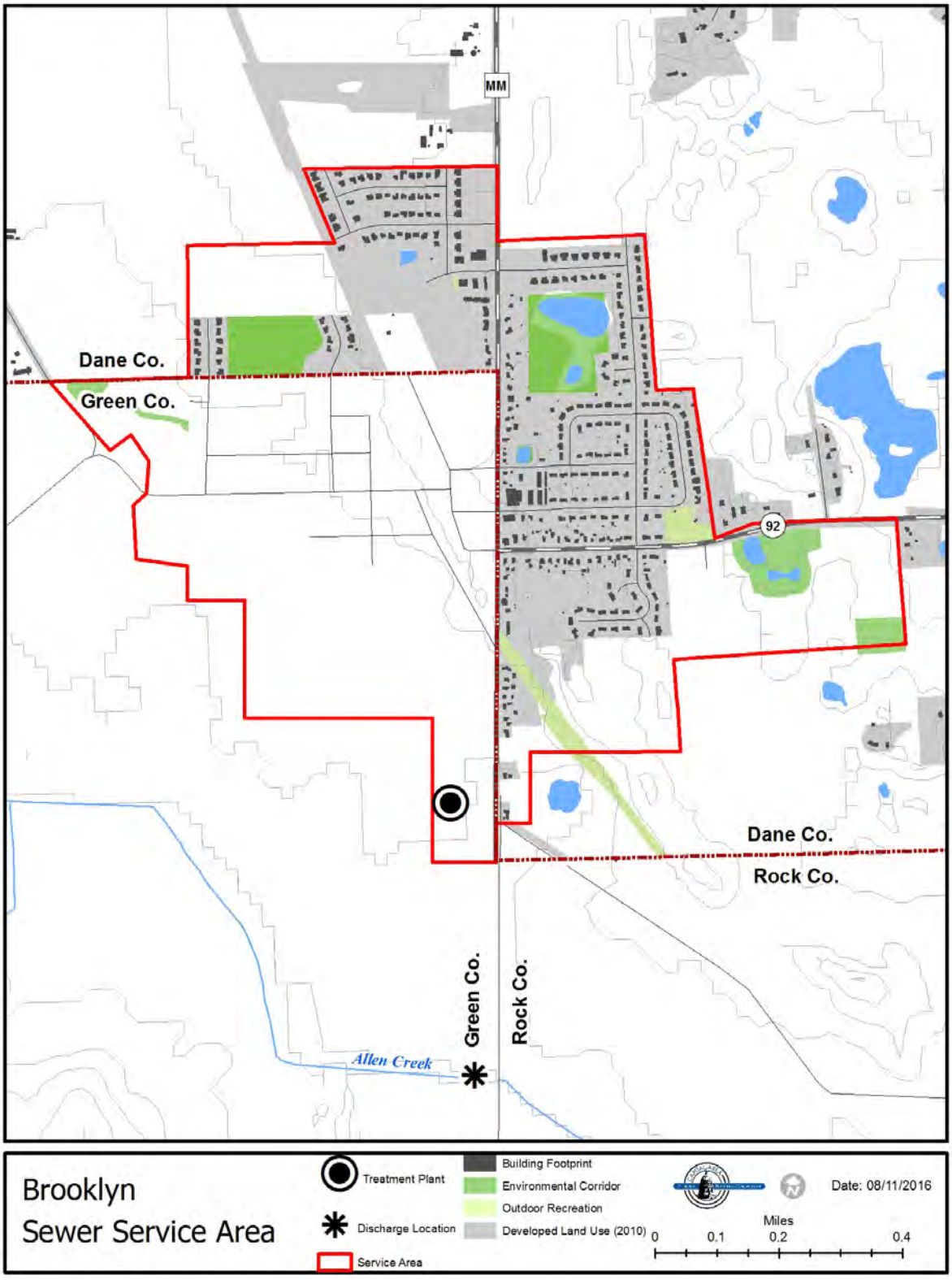
Treatment Process

Treatment consists of activated sludge (oxidation ditch) wastewater treatment facility. Preliminary treatment of fine screening precedes the oxidation ditch. The clarified effluent discharges to Allen Creek. The clarifier underflow (sludge) is returned to the head of the plant but a portion is stored in an on-site storage facility. Waste sludge is currently hauled and land applied under Brooklyn permit by Bytec Recourse Management with some sludge hauled to Madison Metropolitan Sewage District Wastewater Treatment Plant. The facility is designed to treat an average daily flow of 0.20 Million Gallons per Day (MGD) and treated approximately 0.007 MGD annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 16 mg/L, exceeding the 15 mg/L permit limit in 1 month of the year. The effluent monthly average Total Suspended Solids ranged from 3 to 18 mg/L, below the 20 mg/L full permit limit but matching/exceeding the 90% permit limit of 18 mg/L in 1 month of the year. The effluent monthly average Ammonia ranged from 0.045 to 0.607 mg/L, well below the temporally variable permit limit ranging from 3.7 mg/L in the summer months to 6.5 mg/L in the winter months and 6.9 in April. The effluent monthly average phosphorus ranged from 4.0 to 8.9 mg/L, exceeding the current 7.9 mg/L permit limit 3 months of the year and not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 7.9 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. Monthly chloride and weekly temperature monitoring requirements were added to the current permit. The Village of Brooklyn conducted a phosphorus operational evaluation and developed an optimization report. Brooklyn has evaluated adaptive management and water quality trading and decided upon participating in water quality trading. This trading plan is expected to be submitted in 2017. It is recommended that the Village of Brooklyn conduct a chloride pollutant minimization plan and a temperature operational evaluation and develop optimization reports for each.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 264 lbs/day and the projected 2040 annual average flow is 0.124 MGD. No hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. Biological loading is expected to reach 90 percent of design capacity by the year 2037 based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2037 to either reduce source contributions of (C)BOD or increase biological treatment plant capacity. Village is commended for undertaking sewer main repairs in 2013 to reduce infiltration and inflow. Continued maintenance measures to control clear water intrusion will serve to improve operational efficiency and reduce cost. It is recommended that the Capacity, Management, Operation, and Maintenance program, which was to be completed for the facility in 2016, be updated annually as needed.


MM
Dane Co.
Green Co.
92
Dane Co.
Rock Co.
Green Co.
Rock Co.
Allen Creek
Brooklyn
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.1
0.2
0.4

Village of Mount Horeb WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
2247 Sand Rock Road, Mt. Horeb	NE 1/4, NE 1/4, Section 23, T6N, R6E	WI-0020281-07-0	11/01/02	09/30/07	West Branch Sugar River	Limited Forage Fishery	0.28

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

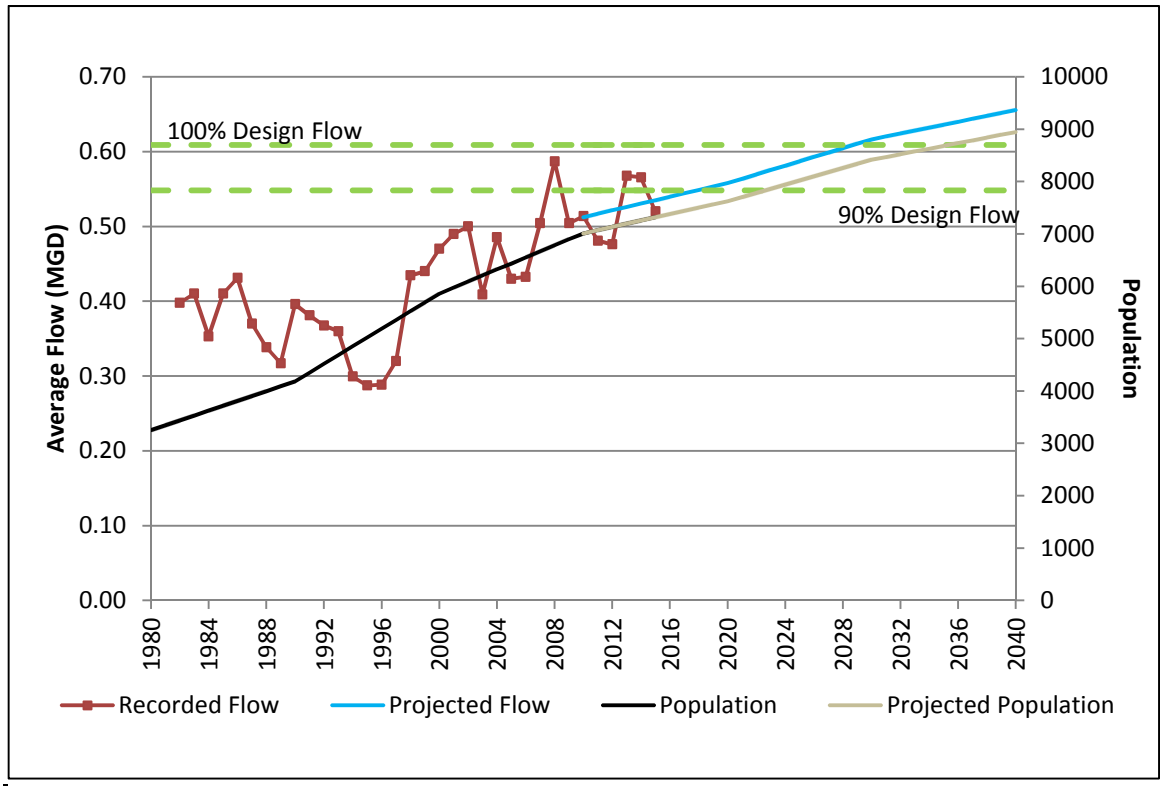
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
1500 lbs/day (1350 lbs/day)	**0.609 MGD (0.548 MGD)**	**0.609 MGD (0.548 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
6.0 mg/L	6 - 9	38 mg/L[2]	1.0 mg/L	22 mg/L (22 mg/L)[1] 15 mg/L (15 mg/L)[2]	22 mg/L (22 mg/L)[1] 15 mg/L (15 mg/L)[2]	--	--	Fecal Coliform, NH3-N, Chloride

1. Applies October through April 2. Applies May through September

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	87	80	74

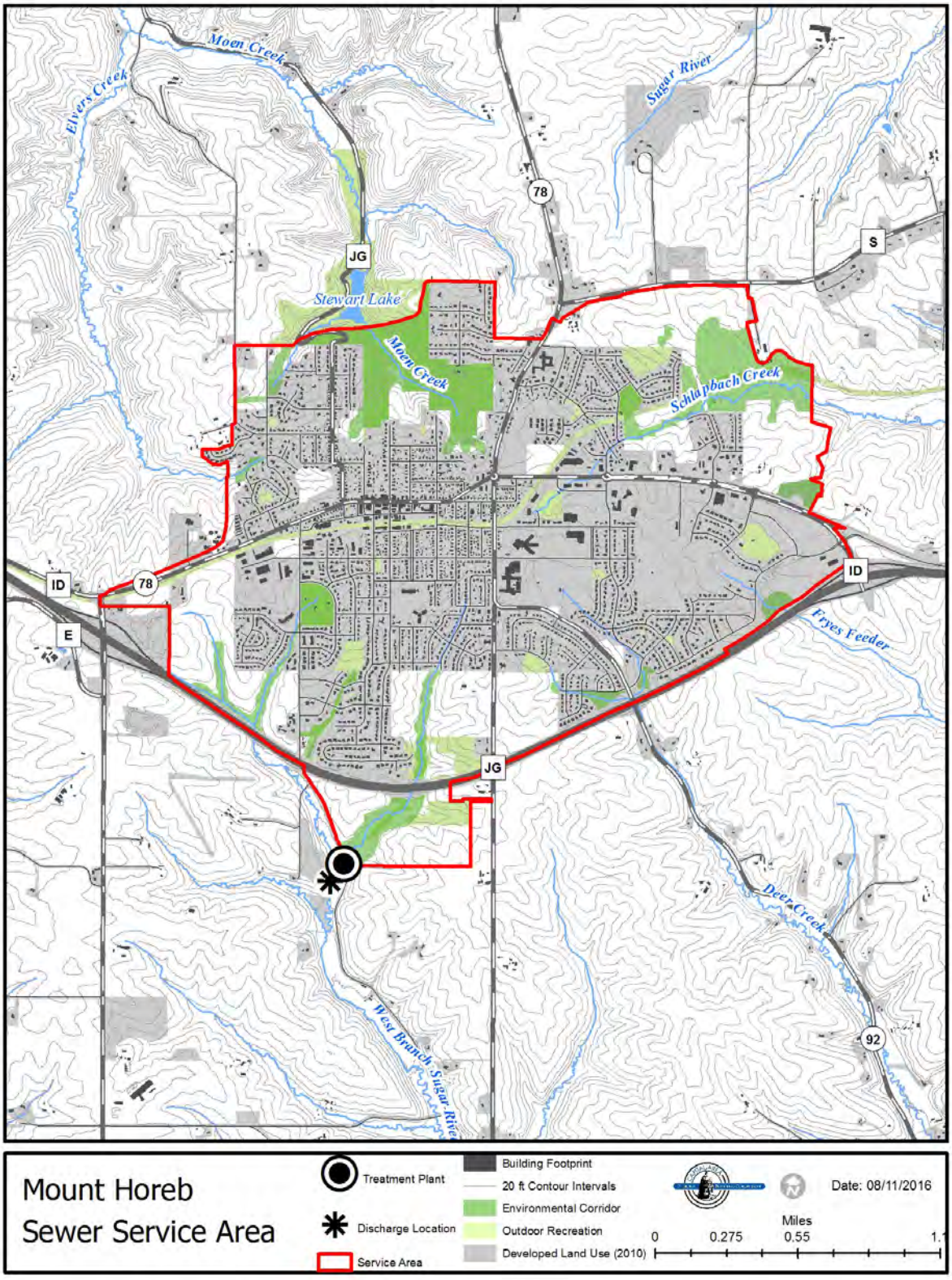
Treatment Process

Treatment consists of a stair screen and grit removal. Primary clarification is provided prior to the extended air activated sludge basins. Activated sludge effluent is settled in final clarifiers and then filtered in movable bed sand filters. Chlorine is added and wastewater flows through the chlorine contact tank and on to post aeration and a cascade aerator prior to discharging to the Sugar River. Ferric Chloride is added to remove phosphorus. Excess sludge is wasted to aerobic digesters and then to a gravity belt thickener and sludge storage. Sludge is landspread on approved agricultural sites. The facility has an annual average design flow of 0.609 Million Gallons per Day (MGD) and treated approximately 0.476 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 0 to 4 mg/L, well below the temporally variable permit limit ranging from 15 mg/L in the summer months up to 22 mg/L in the winter months. The effluent monthly average Total Suspended Solids ranged from 1 to 4 mg/L, well below the temporally variable permit limit ranging from 15 mg/L in the summer months to 22 mg/L in the winter months. The effluent weekly average Ammonia ranged from 0.01 to 0.803 mg/L, well below the temporally variable permit limit ranging from 1 mg/L in the summer months to 4 mg/L in the winter months. The effluent monthly average phosphorus ranged from 0.4 to 1.0 mg/L, below the current 1.0 mg/L permit limit in all months. The interim weekly average chloride limit is 660 mg/L and the plant is required to achieve 450 mg/L. A chloride WQBEL compliance schedule detailing required actions is outlined within the current permit. The Village of Mount Horeb has conducted a chloride pollutant minimization plan and developed an optimization report.

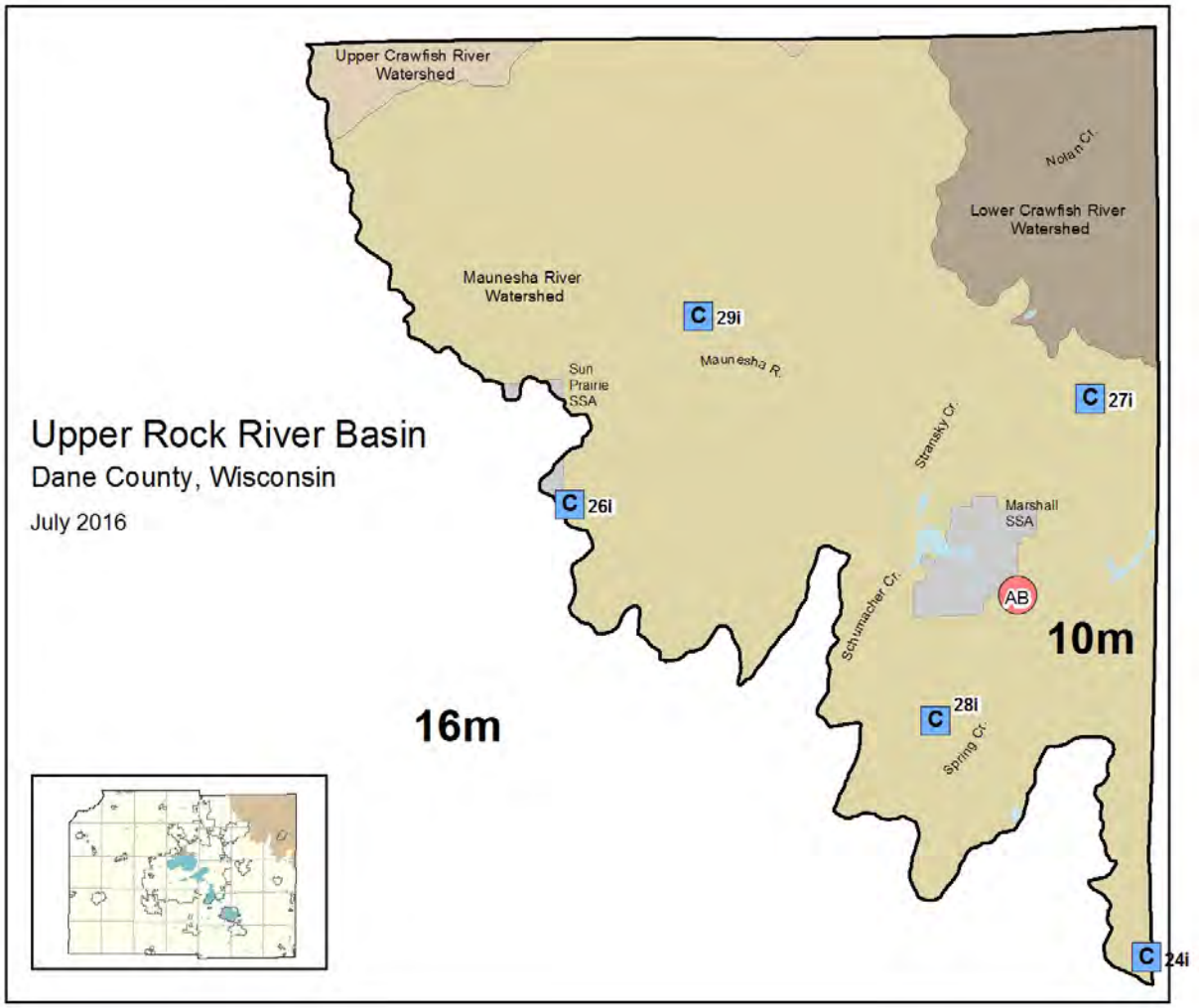
Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 1540 lbs/day and the projected 2040 annual average flow is 0.656 MGD. Biological loading is expected to reach 90 percent of design capacity by 2023 and is expected to reach full design capacity by 2036, based on population projections and estimated wastewater generation rates. Hydraulic capacity exceeded 90 percent of the design capacity in 2013 and 2014 and is expected to reach full design capacity by 2029, based on population projections and estimated wastewater generation rates. It is the intent of the Village to have an upgraded facility by the end of 2019. As multiple monthly flow and (C)BOD limits were exceeded in 2015 and a new plant will not be available until 2019, it is recommended that a source analysis study of influent quantity and quality be conducted and appropriate source reductions be identified or interim treatment processes be put in place to reduce risk of permit exceedances prior to the planned upgrade. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Moen Creek
Elvers Creek
Sugar River
78
JG
S
Stewart Lake
Moen Creek
Schlapbach Creek
ID
78
E
ID
Fryes Feeder
JG
Deer Creek
West Branch Sugar River
92
Mount Horeb
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.275
0.55

Upper Rock River Basin-Maunesha River Watershed

Description

The eastern portion of Dane County drains into three major streams. The Upper Rock River Basin is the northern portion of the area and is dominated by the Maunesha River, which flows south and east through a corner of Jefferson County to join the Crawfish River in Dodge County and flow into the Rock River farther downstream. Eastern Dane County has a drumlin and marsh physiography. The area is characterized by large interconnected wetlands drained by sluggish streams and bounded by low hills of glacial till.



Streams and Stream Classifications

Lower Crawfish River Subwatershed

The 178 sq mi subwatershed is in the northwest corner of the Upper Rock River Basin. It contains 332 miles of streams with no ORW/ERW, no trout streams and 22 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Mud Cr. (T9N R12E S26)	UR02	10.8 mi.	Y	WWFF	WWSF	DEF		Poor
Nolan Cr.	UR02	10.0 mi.	N	LFF	WWSF	DEF		Unknown

*303(d) status: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Upper Crawfish River Subwatershed

The 161 sq mi subwatershed is in the northeast corner of the Upper Rock River Basin. It contains 228 miles of streams with no ORW/ERW, trout or impaired streams. There are no named stream reaches in the subwatershed within Dane County.

Maunesha River Subwatershed

The 126 sq mi subwatershed makes up the remainder of the Upper Rock River Basin in the northeast corner of Dane County. It contains 214 miles of streams with no ORW/ERW, no trout streams and 47 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Maunesha River	UR05	7.7 mi.	Y	FAL	FAL	DEF		Poor
	UR05	18.6 mi.	Y	FAL	FAL	DEF		Poor
Schumacher Cr.	UR05	3.0 mi.	N	FAL	FAL	DEF		Unknown
Spring Cr.	UR05	4.0 mi.	N	FAL	WWSF	DEF		Unknown
Stony Brook Cr.	UR05	15.0 mi.	Y	LFF	WWSF	DEF		Poor
Stransky Cr.	UR05	2.0 mi.	N	FAL	FAL	DEF		Unknown
Marshall Millpond (T8N R12E S9)	UR05	185 ac.	N	Impounded Flowing Water	FAL	DEF		Poor
Maunesha Flowage (Waterloo Millpond) (T8N R12E S13)	UR05	79 ac.	N	Impounded Flowing Water	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Municipal Discharges

The only municipal discharge on the Maunesha River in Dane County is the Marshall WWTP.

Separate Industrial Discharge

1. Jim Herman Inc. is a large beef farm facility with discharges to the Upper and Lower Koshkonong Creek and Maunesha and Lower Crawfish River watersheds.
2. Kersten Farms LLC is a large dairy farm comprised of four facilities with discharges to the Maunesha River and the Upper and Lower Koshkonong Creek subwatershed.
3. Maunesha River Dairy is a large dairy farm with discharges to the Maunesha River and Upper and Lower Crawfish River watersheds.

For details on separate industrial discharges, refer to Section 3 of this report.

Village of Marshall WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
616 West Karem Drive, Marshall	SE 1/4, NE 1/4, Section 15, T8N, R12E	WI-0024627-08-0	04/01/14	03/31/19	Maunesha River	Warm Water Sport Fishery	1.0

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

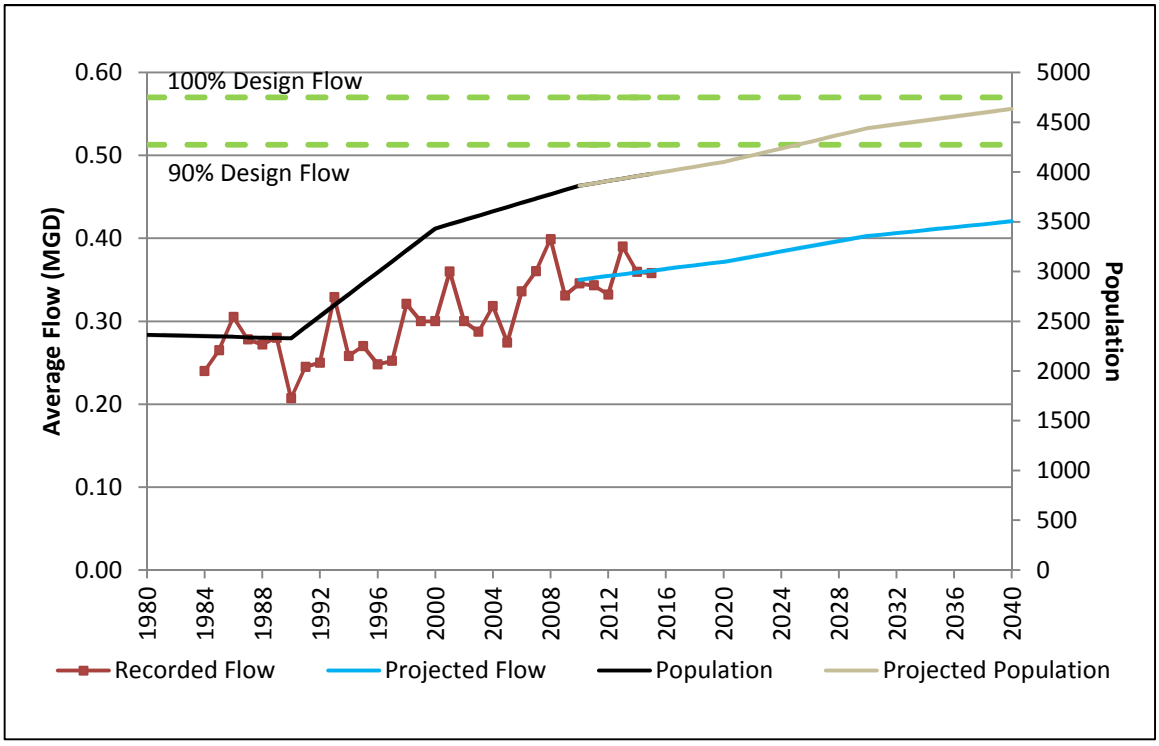
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
850 lbs/day (765 lbs/day)	**0.570 MGD (0.513 MGD)**	**1.10 MGD (0.99 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
7.0 mg/L	6 - 9	--	1.3 mg/L	22 mg/L (22 mg/L)[1] 11 mg/L (11 mg/L)[2]	22 mg/L (22 mg/L)[1] 11 mg/L (11 mg/L)[2]	110 lbs/day[1] 51 lbs/day[2]	See permit	Fecal Coliform, NH3-N, Chloride

1. Applies November through April 2. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	108	93	91

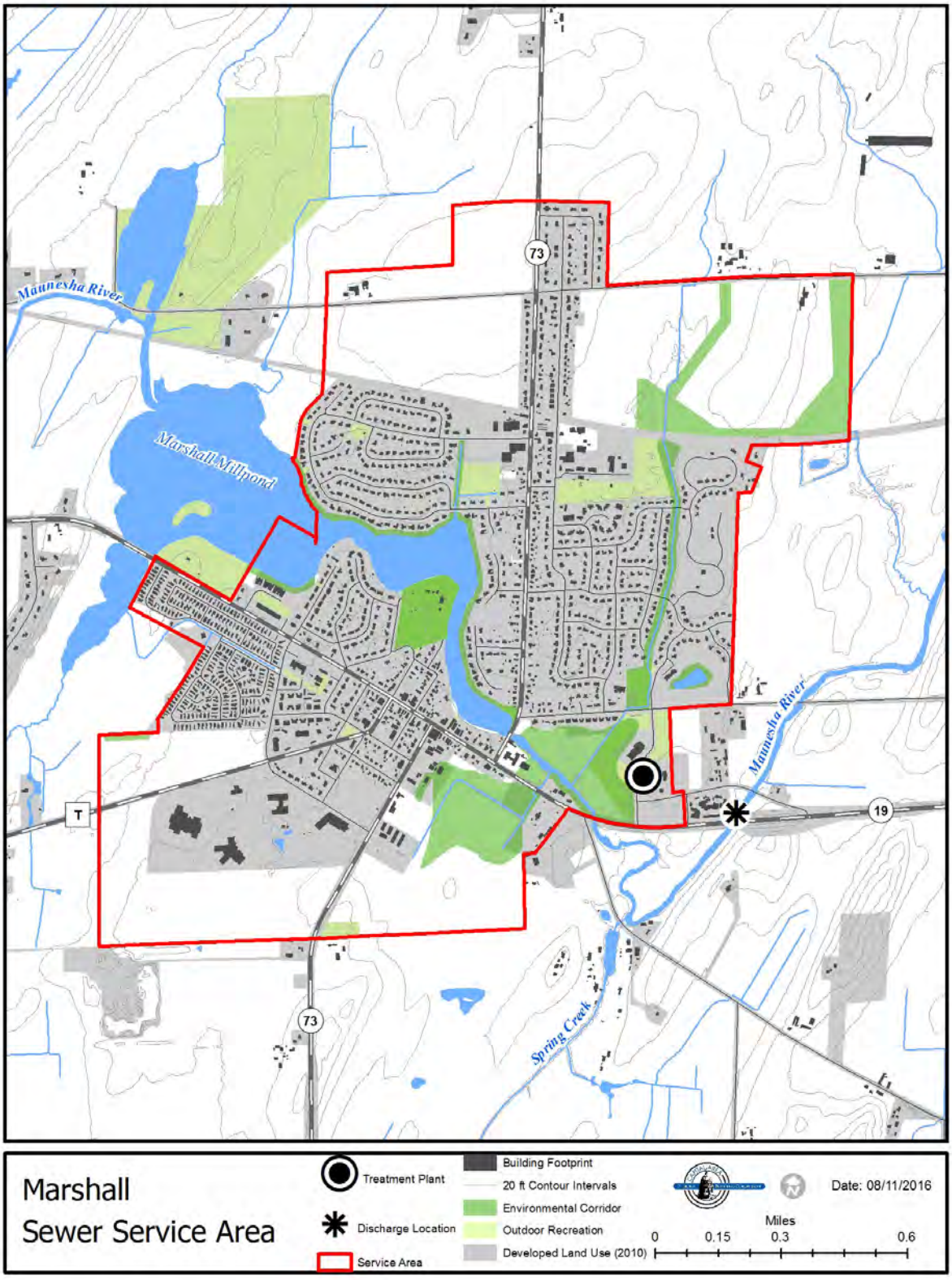
Treatment Process

Treatment consists of a raw influent lift station, a mechanical bar screen and grit removal, a three channel extended aeration oxidation ditch, two final clarifiers, UV disinfection and step aeration prior to discharge to the Maunesha River. Ferric is added to remove phosphorus chemically. Biosolids are digested aerobically, concentrated on a gravity belt thickener and stored in a liquid sludge storage tank prior to land application on approved farmland. The facility has an annual average design flow of 0.570 Million Gallons per Day (MGD) and treated approximately 0.348 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 9 mg/L, well below the temporally variable permit limit ranging from 11 mg/L in the summer months up to 22 mg/L in the winter months. The effluent monthly average Total Suspended Solids ranged from 2 to 9 mg/L, well below the temporally variable permit limit ranging from 11 mg/L in the summer months to 22 mg/L in the winter months. The effluent monthly average Ammonia ranged from 0.0236 to 0.0893 mg/L, well below the temporally variable permit limit ranging from 4.7 mg/L in the summer months up to 7.6 mg/L in the winter months. The effluent monthly average phosphorus ranged from 0.1 to 0.3 mg/L, well below the current 1.3 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.3 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2014 permit includes a TMDL derived monthly average TSS effluent limit of 50.0 to 58.6 lbs/day and a monthly average Total Phosphorous Effluent Limit of 2.72 to 4.04 lbs/day. Based on the CMAR data, the TMDL derived TSS and Total Phosphorous limits are consistently met. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. It is recommended that the Village of Marshall conduct a phosphorus operational evaluation and develop an optimization report. It is also recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

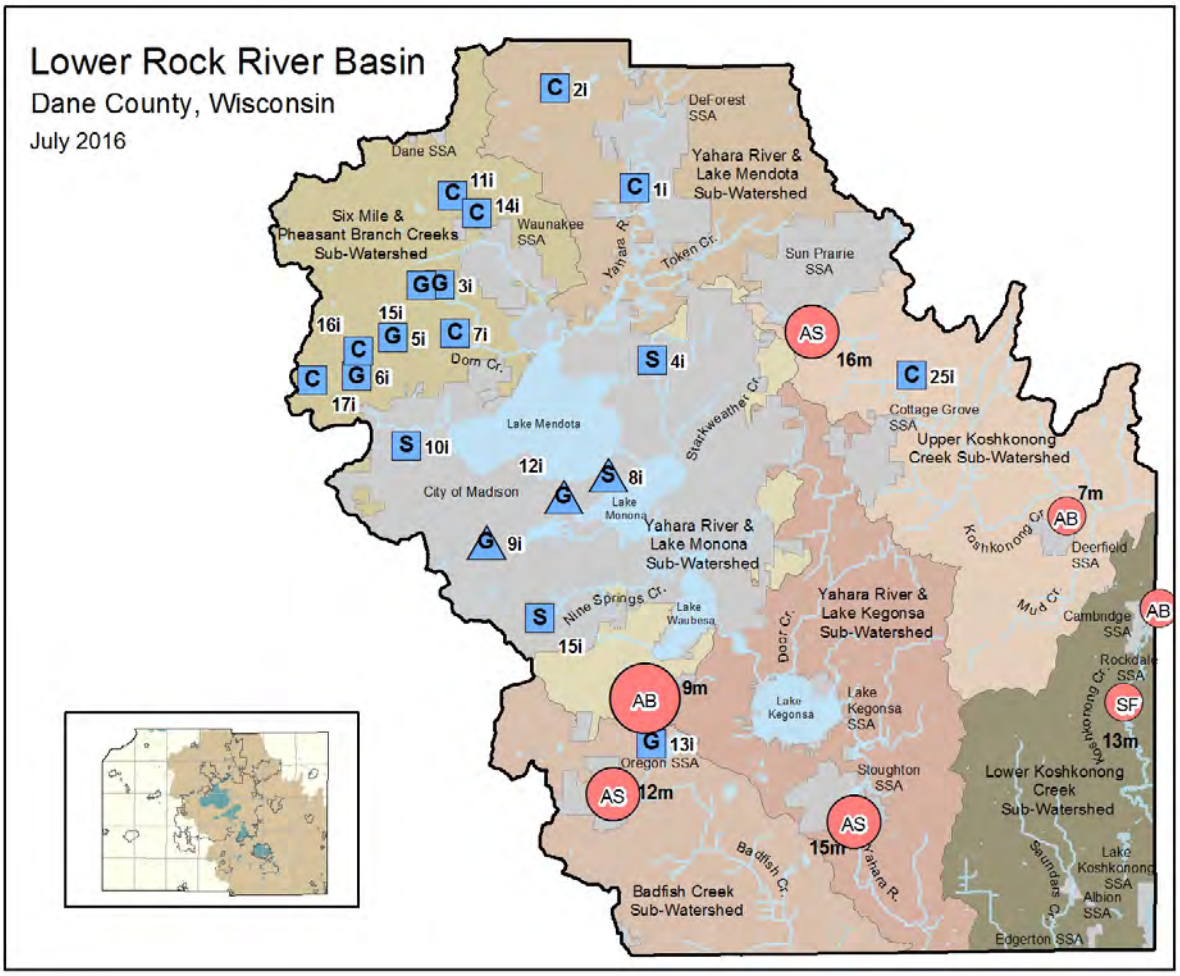
Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 710 lbs/day and the projected 2040 annual average flow is 0.420 MGD. No biological loading or hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Maunesha River
Marshall Millpond
73
T
19
Maunesha River
Spring Creek
73
Marshall
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.15
0.3
0.6

Lower Rock River Basin-Koshkonong Creek Watershed:

Description

The eastern portion of Dane County drains into three major streams. The central and southeastern portions of the area drain to Koshkonong Creek, which flows southeast to join the Rock River at Lake Koshkonong. The southwestern part of the area drains to Saunders Creek, which flows south and joins the Rock River in Rock County south of Edgerton. Eastern Dane County has a drumlin and marsh physiography. The area is characterized by large interconnected wetlands drained by sluggish streams and bounded by low hills of glacial till.



Streams and Stream Classifications

Upper Koshkonong Creek Subwatershed

The 104 sq mi subwatershed drains the northern portion of the Lower Rock River Basin-Koshkonong Creek Watershed draining the south portion of Sun Prairie and western portion of Cottage Grove east and south. It contains 176 miles of streams with no ORW/ERW, trout or impaired streams.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Koshkonong Cr. Upper	LR12	21.2 mi.	Y	WWSF	WWSF	LAL		Poor
	LR12	6.0 mi.	N	LAL	LAL	LAL		Unknown
Mud Cr. (T6N R11E S13)	LR12	9.0 mi.	N	WWFF	WWFF	WWFF		Good
Brazee Lake (Patrick Marsh) (T9N R11E S34)	LR12	0.8 ac.	N	FAL	FAL	DEF		Unknown
Goose Lake (T7N R12E S2)	LR12	61 ac.	N	Shallow Headwater	FAL	DEF		Unknown
Mud Lake (T7N R12E S2)	LR12	34 ac.	N	Shallow Seepage	FAL	DEF		Good

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Lower Koshkonong Creek Subwatershed

The 266 sq mi subwatershed drains the southern portion of the Lower Rock River Basin-Koshkonong Creek Watershed draining the west portion of Cambridge south. It contains 283 miles of streams with 8 miles of ORW/ERW, no trout streams and 49 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Koshkonong Cr. Lower	LR11	27.3 mi.	Y	WWSF	WWSF	WWSF		Poor
Saunders Cr.	LR11	5.0 mi.	N	WWSF	FAL	DEF		Unknown
	LR11	11.8 mi.	N	WWFF	WWFF	WWSF		Fair
Lake Koshkonong	LR11	10596 ac.	Y	Shallow Lowland	WWSF	DEF		Poor
Rice Lake (T5N R12E S14)	LR11	170 ac.	N	Shallow Seepage	FAL	DEF		Poor
Sweet Lake (T5N R12E S23)	LR11	27 ac.	N	Shallow Headwater	FAL	DEF		Poor
Turtle Lake (T5N R12E S24)	LR11	21 ac.	N	FAL	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Municipal Discharges

In the Lower Rock River Basin-Koshkonong Creek watershed, there are four municipal WWTP discharges:

1. The City of Sun Prairie WWTP discharges treated effluent to the upper reaches of Koshkonong Creek
2. The Village of Deerfield WWTP discharges treated effluent to Mud Creek, a variance stream
3. The Cambridge Oakland Wastewater Commission WWTP discharges treated effluent to the Koshkonong Creek in the southern part of the watershed
4. The Rockdale WWTP discharges treated effluent to the Koshkonong Creek in the southern part of the watershed

The Consolidated Koshkonong Sanitary District, which serves the development around Lake Koshkonong and the hamlet of Albion, discharges treated effluent to the Rock River in Rock County and is not included in this inventory.

Separate Industrial Discharge

1. Daybreak Foods Inc. landspreads manure in the Upper Rock River Basin and Upper Koshkonong Creek subwatersheds.
2. R Acres Rademacher is a large dairy farm comprised of four facilities with discharges to the Maunesha River watershed.
3. The Statz Brothers Farm is a large dairy farm comprised of nine facilities landspreads livestock manure on fields in the Maunesha River Watershed and Upper Koshkonong Creek subwatersheds

For details on separate industrial discharges, refer to Section 3 of this report.

Cambridge Oakland Wastewater Commission WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
301 Lagoon Road, Cambridge	NW 1/4, SW 1/4, Section 6, T6N, R13E	WI-0026948-09-0	01/01/15	12/31/19	Koshkonong Creek	Warm Water Sport Fishery	9.2

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

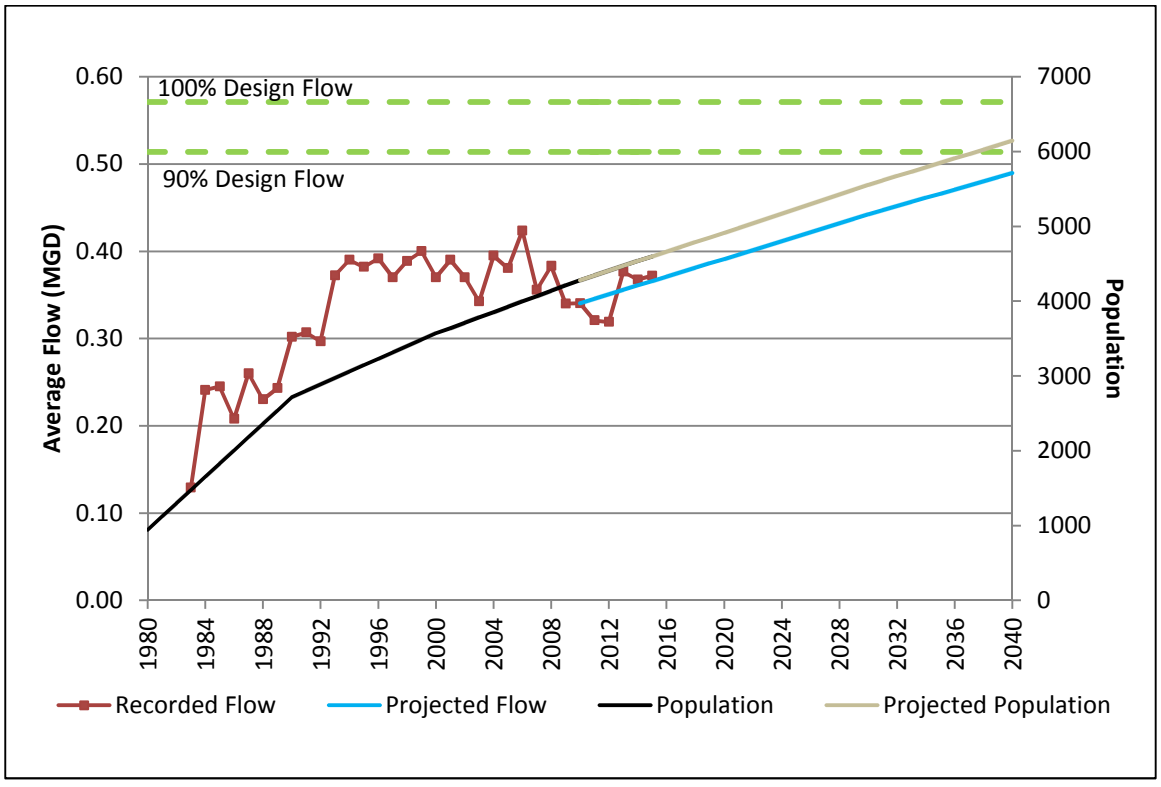
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
870 lbs/day (783 lbs/day)	**0.571 MGD (0.514 MGD)**	**0.571 MGD (0.514 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
--	6 - 9	--	1.4 mg/L	30 mg/L (45 mg/L)	30 mg/L (45 mg/L)	--	106-218 lbs/day See permit	Fecal Coliform, NH3-N

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	102	108	80

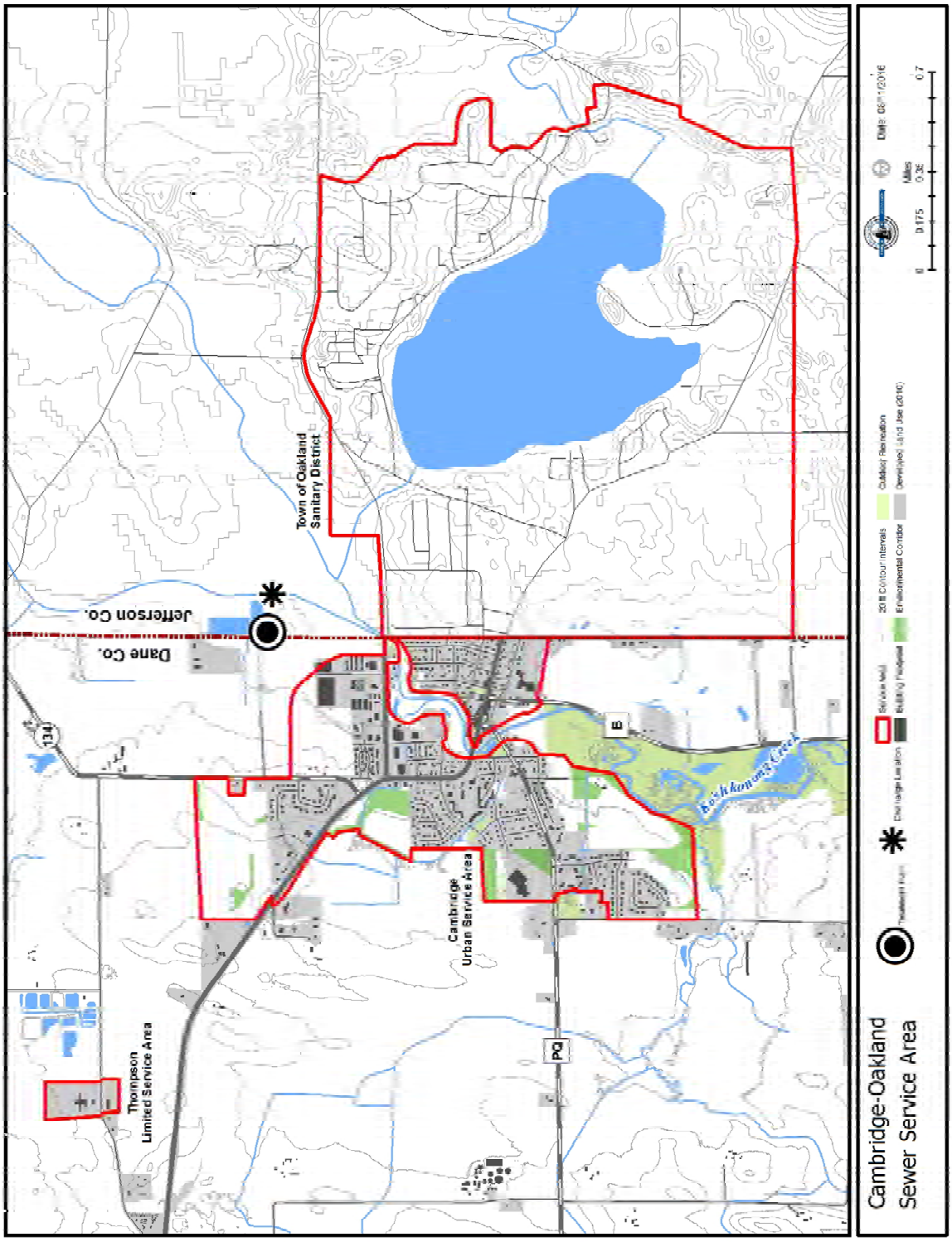
Treatment Process

Treatment consists of two sequencing batch reactor and biological phosphorus removal. Disinfection is accomplished using an UV mechanism prior to discharging to Koshkonong Creek. Biosolids are thickened with a gravity belt thickener and stored in a liquid storage facility with a capacity of 180 days. The facility is designed to treat an average daily flow of 0.571 Million Gallons per Day (MGD) and treated approximately 0.364 MGD annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 4 to 20 mg/L, well below the 30 mg/L permit limit. The effluent monthly average Total Suspended Solids ranged from 3 to 8 mg/L, well below the 30 mg/L permit limit. The effluent monthly average Ammonia ranged from 0.045 to 6.749 mg/L, well below the temporally variable permit limit ranging from 16 mg/L in the summer months and 13 mg/L in April. The effluent monthly average phosphorus ranged from 0.4 to 1.2 mg/L, below the current 1.4 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.4 mg/L is an interim limit with a recommended limit of 1.2 mg/L. The phosphorus monthly limit will be further reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2015 permit includes a TMDL derived monthly average TSS effluent limit of 106.0 to 155.0 lbs/day and a monthly average Total Phosphorous Effluent Limit of 2.18 to 5.03 lbs/day. Based on the CMAR data, the TMDL derived TSS limits are consistently met, but the Total Phosphorus limits are only met 9 of 12 months. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. Cambridge Oakland Wastewater Commission has conducted a phosphorus operational evaluation and developed an optimization report. It is recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 911 lbs/day and the projected 2040 annual average flow is 0.455 MGD. No hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. Biological loading is expected to reach 90 percent of design capacity by 2024 and reach full design capacity by 2034, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2024 to either reduce source contributions of (C)BOD or increase biological treatment plant capacity. The Cambridge Oakland Wastewater Commission has undertaken some sewer main lining to reduce clear water intrusion into the collections system, and plans to undertake an infiltration and inflow (I/I) study. I/I reduction will result in operational efficiencies and cost reduction. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Cambridge-Oakland
Sewer Service Area
Service Area
Discharge Location
Treatment Plant
Existing Parkland
2016 Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Miles
0 0.175 0.35 0.7
Date: 08/1/2016
Town of Oakland
Sanitary District
Jefferson Co.
Dane Co.
Cambridge
Urban Service Area
Thompson
Limited Service Area
Rockdale Creek
134
B
PQ

Village of Deerfield WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
201 Industrial Park Drive, Deerfield	SW 1/4, SW 1/4, Section 22, T7N, R12E	WI-0023744-08-0	10/01/13	09/30/18	Tributary of Mud Creek	Limited Aquatic Life (trib), Limited Forage Fishery (Mud Cr.), Fish & Aquatic Life (Koshkonong Cr.)	0.0 cfs (trib), 1.0 cfs (Mud Cr.), 3.4 cfs (Koshkonong Cr.)

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

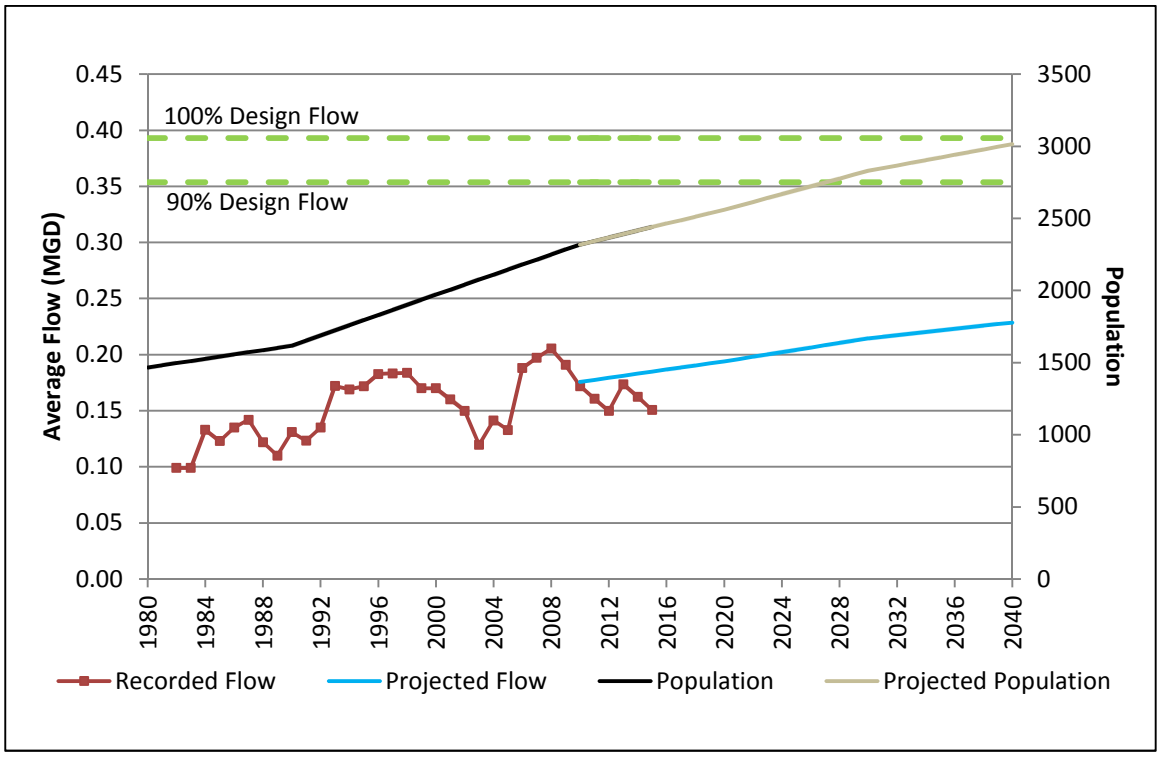
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
1060 lbs/day (954 lbs/day)	**0.393 MGD (0.354 MGD)**	**0.393 MGD (0.354 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
4.0 mg/L	6 - 9	460 mg/L	1.5 mg/L	20 mg/L (30 mg/L)	20 mg/L (30 mg/L)	--	49-100 lbs/day See permit	Chloride, NH3-N

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	77	85	76

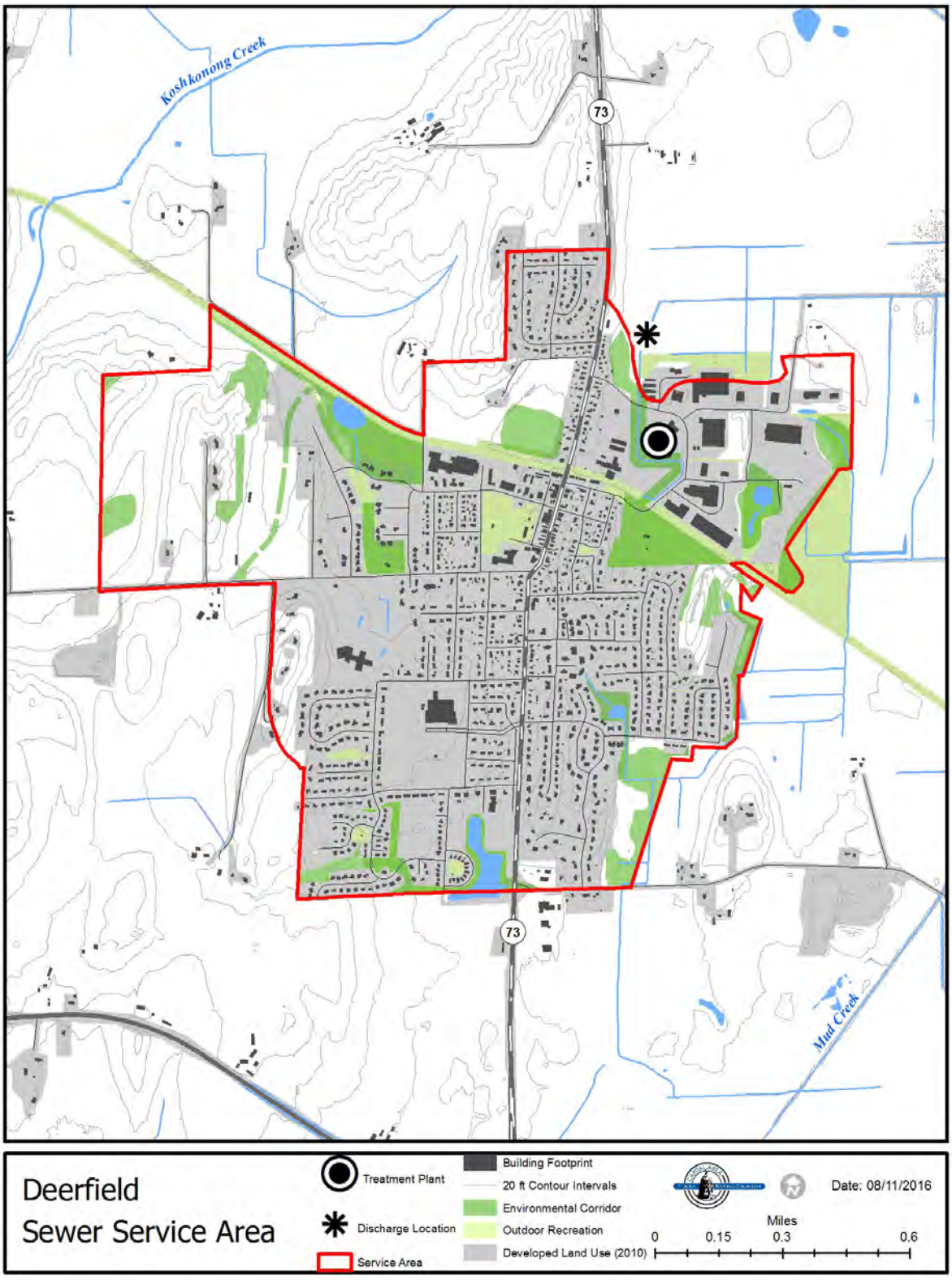
Treatment Process

Treatment consists of raw wastewater screening, biological phosphorus removal units, two aeration basins - activated sludge treatment, final clarifiers and effluent post aeration prior to discharge to Mud Creek. Sludge produced is treated in two aerobic digesters and thickened prior to land application on approved farmland. The facility has an annual average design flow of 0.393 Million Gallons per Day (MGD) and treated approximately 0.197 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 6 mg/L, well below the 20 mg/L permit limit. The effluent monthly average Total Suspended Solids ranged from 3 to 7 mg/L, well below the 20 mg/L permit limit. The effluent monthly average Ammonia ranged from 0.09 to 6.06 mg/L, well below the temporally variable permit limit ranging from 9.5 mg/L in the summer months and 23 mg/L in the winter months. The effluent monthly average phosphorus ranged from 0.1 to 0.8 mg/L, below the current 1.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2013 permit includes a TMDL derived monthly average TSS effluent limit of 49.0 to 71.0 lbs/day and a monthly average Total Phosphorous Effluent Limit of 1.50 to 3.46 lbs/day. Based on the CMAR data, the TMDL derived TSS and Total Phosphorous limits are consistently met. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. The weekly average chloride limit of 460 mg/L, which was exceeded in July of 2014, is an interim limit with a recommended limit of 400 mg/L. A chloride WQBEL compliance schedule detailing required actions is outlined within the current permit. The Village of Deerfield has conducted a chloride pollutant minimization plan and developed a management report. It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary. The Village has also developed a phosphorus optimization report. The Village has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan is expected to be submitted in 2017.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 692 lbs/day and the projected 2040 annual average flow is 0.229 MGD. No biological loading or hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Koshkonong Creek
73
73
Mud Creek
Deerfield
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.15
0.3
0.6

Village of Rockdale WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
CTH "B", Rockdale	NE 1/4, SE 1/4, Section 23, T6N, R12E	WI-0026352-08-0	10/01/13	09/30/18	Koshkonong Creek	Warm Water Sport Fishery	10

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

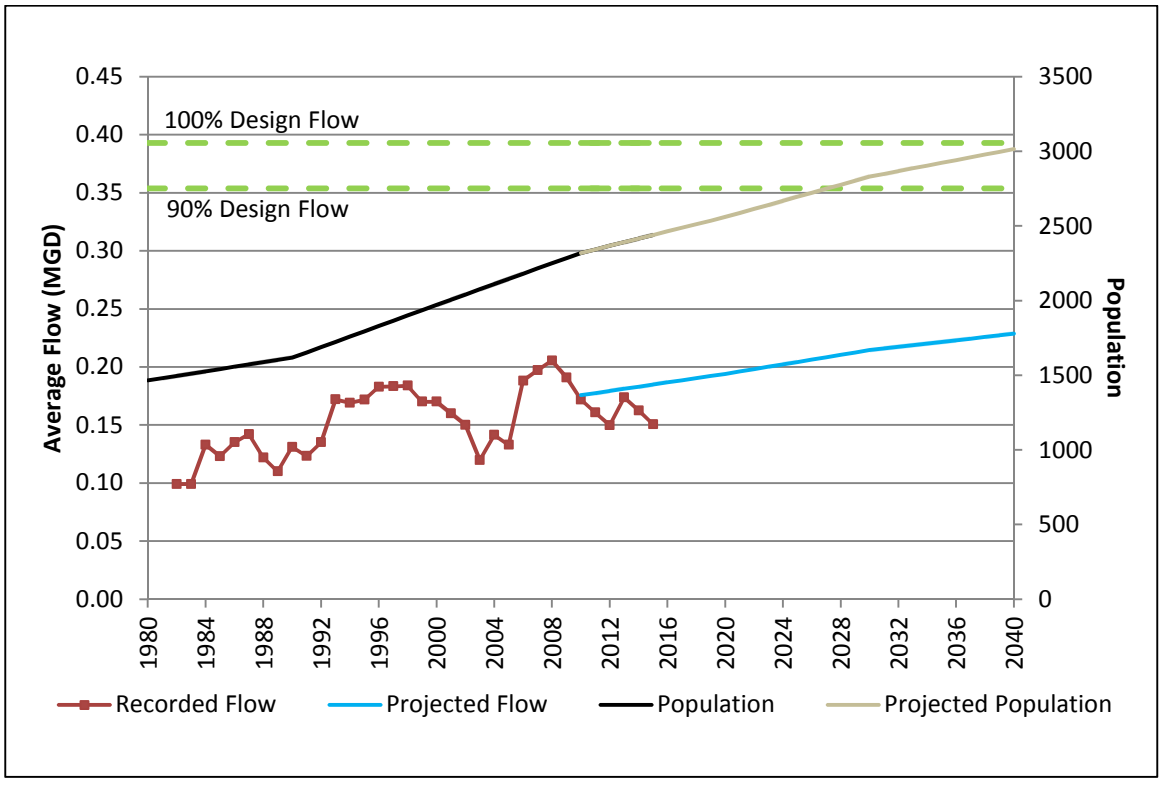
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
42.0 lbs/day (37.8 lbs/day)	**0.030 MGD (0.027 MGD)**	**0.025 MGD (0.023 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
--	6 - 9	--	7.5 mg/L	30 mg/L (45 mg/L)	30 mg/L (45 mg/L)	--	See permit	Fecal Coliform

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	60	80	56

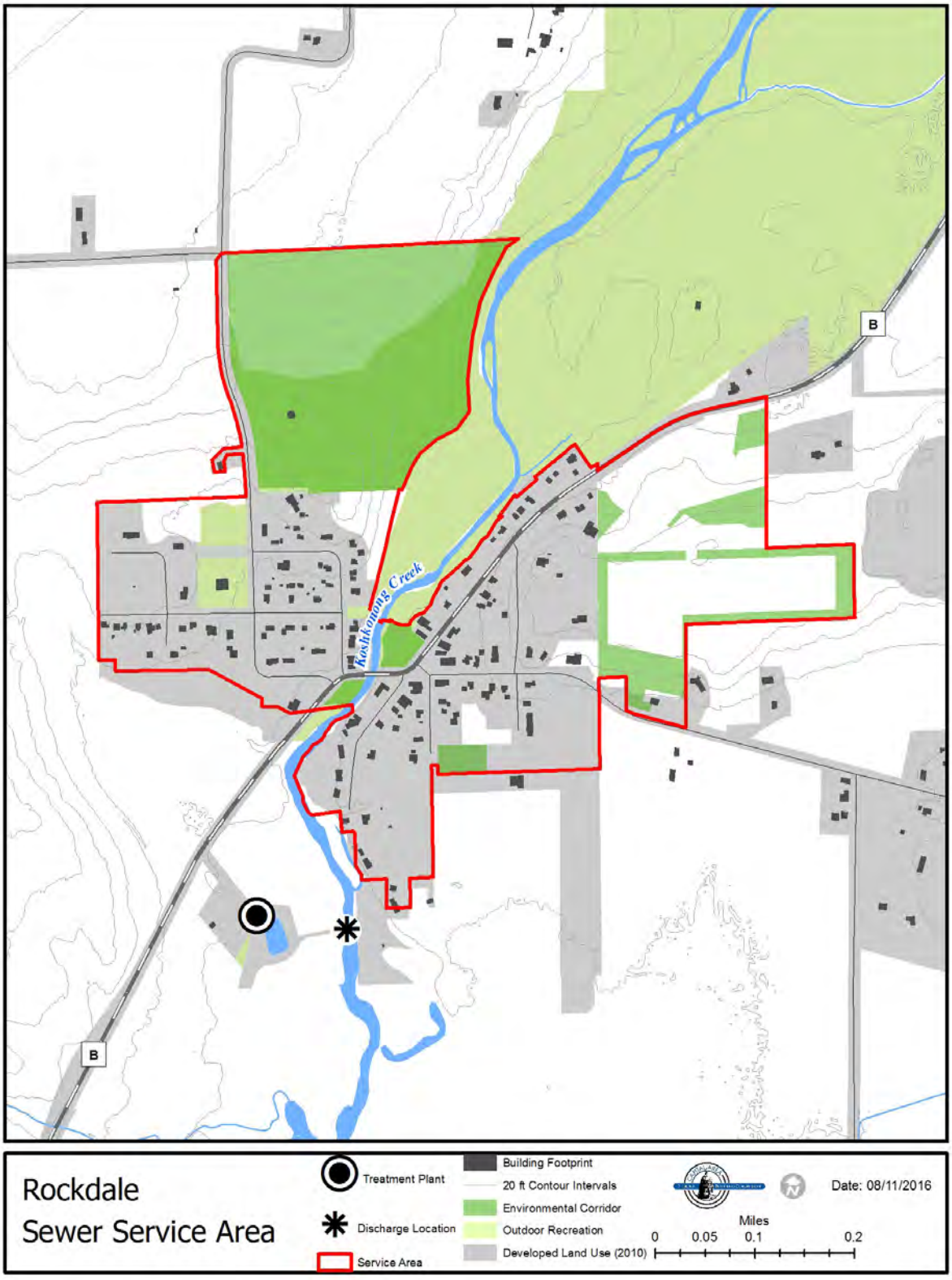
Treatment Process

Treatment consists of a two-train septic tank with 3 compartments in each train. Effluent from this unit is pumped to the sand filters. There are three filter beds with recirculation of sand filter effluent being provided. Effluent disinfection is provided seasonally using UV disinfection prior to discharge to Koshkonong Creek. The facility has an annual average design flow of 0.03 Million Gallons per Day (MGD) and treated approximately 0.0113 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 2 to 9 mg/L, well below the permit limit of 30 mg/L. The effluent monthly average Total Suspended Solids ranged from 1 to 2 mg/L, well below the permit limit of 30 mg/L. The effluent monthly average phosphorus ranged from 2.7 to 5.5 mg/L, below the current 7.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 7.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2013 permit includes a TMDL derived monthly average TSS effluent limit of 191 to 277 lbs/day and a monthly average Total Phosphorous Effluent Limit of 0.096 to 0.220 lbs/day. Based on the CMAR data, the TMDL derived TSS limits are consistently met, but the Total Phosphorus limits are not met in any month. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. The Village of Rockdale has conducted a phosphorus operational evaluation and developed an optimization report. It is recommended that the Village evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 31 lbs/day and the projected 2040 annual average flow is 0.014 MGD. No biological loading or hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. The treatment plant was completed in 2008. Village is commended for undertaking sewer main lining in 2014 to reduce infiltration and inflow. Continued maintenance measures to control clear water intrusion will serve to improve operational efficiency and reduce cost. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


B
B
Koshkonong Creek
Rockdale
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Miles
0
0.05
0.1
0.2
Date: 08/11/2016

City of Sun Prairie WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
3040 Bailey Road, Sun Prairie	SE 1/4, SW 1/4, Section 18, T8N, R11E	WI-0020478-09-0	10/01/13	09/30/18	Koshkonong Creek	Limited Aquatic Life at outfall, Fish & Aquatic Life at CTH "T"	0.07

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

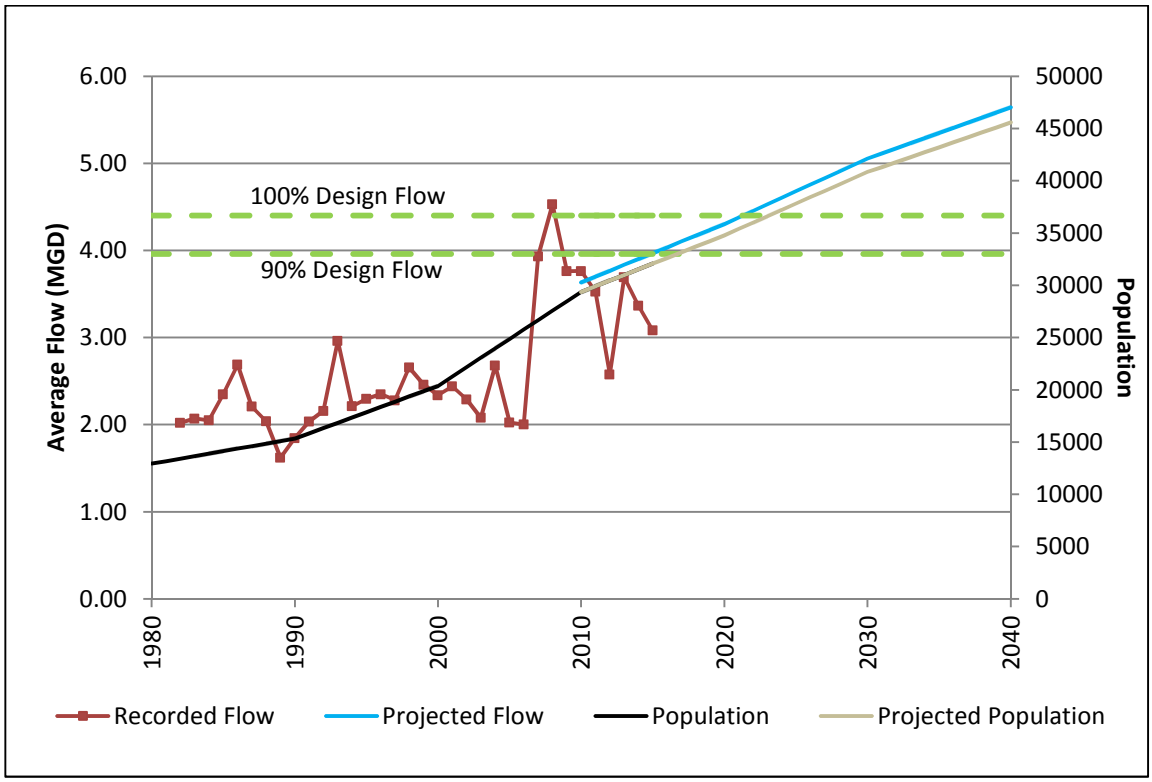
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
11,250 lbs/day (10,125 lbs/day)	**4.40 MGD (3.96 MGD)**	**6.20 MGD (5.58 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
7.0 mg/L	6 - 9	--	1.4 mg/L	10 mg/L[1] 5 mg/L[2]	10 mg/L	--	See permit	Fecal Coliform, NH3-N, Chloride, Temperature

1. Applies November through April 2. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	127	120	124

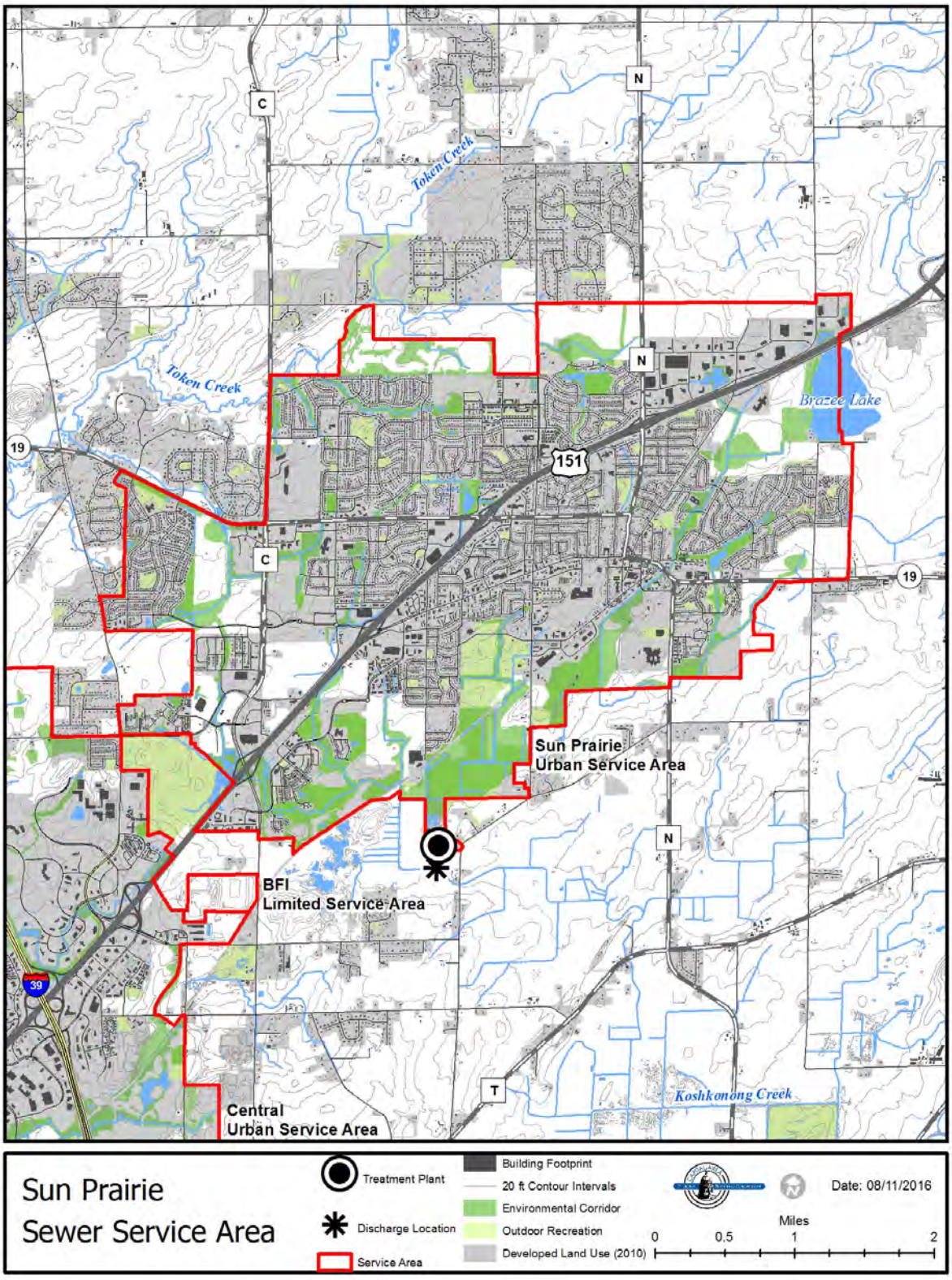
Treatment Process

Treatment consists of activated sludge treatment process with biological phosphorus removal, step screen, vortex grit removal system, primary and secondary clarifiers, influent and intermediate pump station, tertiary filtration and UV disinfection prior to discharge to Koshkonong Creek. Reaeration is accomplished with a cascade aerator and coarse bubble diffused aeration. Sludge is anaerobically digested, gravity belt pressed and stored as a cake in a sludge storage building and ultimately landspread on DNR approved sites. The facility has an annual average design flow of 4.4 Million Gallons per Day (MGD) and treated approximately 3.44 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 1 to 7 mg/L, below the temporally variable permit limit ranging from 5 mg/L in the summer months up to 10 mg/L in the winter months. The effluent monthly average Total Suspended Solids ranged from 1 to 5 mg/L, well below the permit limit of 10 mg/L. The effluent monthly average Ammonia ranged from 0.0168 to 0.372 mg/L, well below the temporally variable permit limit ranging from 1.1 mg/L in the summer months up to 4.5 mg/L in the winter months. The effluent monthly average phosphorus ranged from 0.2 to 1.0 mg/L, below the current 1.4 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.4 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2013 permit includes a TMDL derived monthly average TSS effluent limit of 191 to 277 lbs/day and a monthly average Total Phosphorous Effluent Limit of 11.7 to 27.0 lbs/day. Based on the CMAR data, the TMDL derived TSS limits are consistently met, but the Total Phosphorus limits are only met 6 of 12 months. The interim weekly average chloride limit is 500 mg/L and the plant is required to achieve 425 mg/L. A phosphorous and chloride WQBEL compliance schedule detailing required actions is outlined within the current permit. Weekly temperature monitoring requirements were added to the current permit and a compliance schedule is included within the current permit. The City of Sun Prairie has conducted a phosphorus operational evaluation and a chloride pollutant minimization plan and developed optimization reports for each. It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary. It is recommended that the City of Sun Prairie conduct a temperature operational evaluation and develop an optimization report. The City evaluated the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction and chose to install phosphorus reducing technology at the WWTP in place of the other approaches.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 10,370 lbs/day and the projected 2040 annual average flow is 5.643 MGD. Biological loading is expected to reach 90 percent of design capacity by 2038 but will not exceed full design capacity before 2040, based on population projections and estimated wastewater generation rates. The treatment plant currently is operating near 90 percent of the hydraulic capacity and is expected to reach full design capacity by 2022, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2018 to either reduce source contributions or increase plant flow capacity. The City has developed a plan to reduce clear water intrusion into the collection system. Implementing measures to reduce infiltration and inflow (I/I) will improve operational efficiency and reduce cost. It is recommended that a capacity evaluation and needs assessment be conducted as part of preparations for meeting new phosphorus standards. It is also recommended that the City work to reduce per capita water use across the service area. Continued efforts to reduce per capita water use and I/I could reduce risk of permit exceedances. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Sun Prairie
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.5
1
2
Sun Prairie
Urban Service Area
BFI
Limited Service Area
Central
Urban Service Area
Token Creek
Token Creek
Brazee Lake
Koshkonong Creek
C
N
19
151
39
T

Lower Rock River Basin-Yahara River Watershed

Description

The Lower Rock River Basin - Yahara River Watershed drains the central area of Dane County, where most of the county population lives and most urbanization has occurred. The physiography of the basin is generally comprised of deep glacial deposits in large preglacial valleys forming glacial lakes and wetlands. The Yahara River drains one-third of all of Dane County. It begins at the northern edge of the county near Morrisonville and flows south to connect the four largest lakes in the county: Mendota, Monona, Waubesa, and Kegonsa. Locks at the outlets of Lakes Mendota, Waubesa, and Kegonsa control water levels and outflows of the four lakes. Downstream from Lake Kegonsa, the Yahara River flows south through Stoughton and continues into Rock County where it joins the Rock River.

The land use in the portion of the basin north of Lake Mendota is primarily agricultural. In the central portion of the basin, urban development associated with the Central Urban Service Area (CUSA) dominates the land use. The portion of the basin around Lake Kegonsa and to the south is predominantly agricultural. The communities of Oregon and Stoughton represent the most significant urban land use in this part of the basin.

Streams and Stream Classifications

Yahara River and Lake Kegonsa Subwatershed

The 126 sq mi subwatershed makes up the southeastern portion of the Lower Rock River Basin-Yahara River Watershed and drains the southeast portion of Madison and East side of Cottage Grove south to Rock County. It contains 146 miles of streams with no ORW/ERW, no trout streams and 34 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Door Cr.	LR06	14.0 mi.	Y	WWFF	WWSF	LFF		Poor
Keenans Cr.	LR06	2.0 mi	N	WWFF	WWSF	WWSF		Good
	LR06	2.1	N	WWFF	WWSF	WWSF		Good
Leutens Cr.	LR06	3.0 mi.	N	LFF	LFF	WWSF		Unknown
	LR06	1.0 mi.	N	FAL	FAL	DEF		Unknown
Little Door Cr.	LR06	5.0 mi.	N	LFF	LFF	WWSF		Unknown
Yahara River, Lower	LR06	9.0 mi.	Y	WWSF	WWSF	DEF		Poor
	LR06	5.7 mi.	Y	WWSF	WWSF	DEF		Poor
	LR06	6.9 mi.	N	WWSF	WWSF	WWSF		Good
Dunkirk Millpond (T5N R11E S21)	LR06	17 ac.	N	FAL	FAL	DEF		Unknown
Lake Kegonsa	LR06	3,209 ac.	Y	Shallow Lowland	FAL	DEF		Good
Lower Mud Lake	LR06	195 ac.	N	Shallow Lowland	FAL	DEF		Good
Stoughton Millpond (T5N R11E S8)	LR06	82 ac.	N	Small	FAL	DEF		Unknown
Virgin Lake (T5N R11E S6)	LR06	0.6 ac.	N	Small	FAL	DEF		Unknown

*303(d) status: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Badfish Creek Subwatershed

The 84 sq mi subwatershed makes up the southwestern portion of the Lower Rock River Basin-Yahara River Watershed and drains the southeast portion of Fitchburg and Oregon south to Rock County. It contains 79 miles of streams with 3 miles of ORW/ERW, 6 trout miles and 17 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Badfish Cr.	LR07	12.3 mi.	Y	WWSF	WWSF	WWSF		Poor
	LR07	0.9 mi.	Y	LFF	LFF	LFF		Poor
Frog Pond Cr.	LR07	7.0 mi.	N	WWFF	WWFF	WWSF		Unknown
MMSD Ditch to Oregon Br.	LR07	3.6 mi.	Y	FAL	FAL	LAL		Unknown
Oregon Br.	LR07	4.7 mi.	Y	LFF	LFF	LFF		Fair
	LR07	1.4 mi.	N	LAL	LAL	LAL		Unknown
Rutland Br. (Anthony Br.)	LR07	2.6 mi.	N	Class II Trout	Class II Trout	Cold	ERW	Good
Lake Barney (T6N R9E S34)	LR07	27 ac.	N	Shallow Seepage	FAL	DEF		Poor
Bass Lake (T5N R10E S24)	LR07	69 ac.	N	FAL	FAL	DEF		Unknown
Grass Lake (T5N R10E S30)	LR07	48 ac.	N	Shallow Seepage	FAL	DEF		Unknown
Grass Lake (T6N R11E S18)	LR07	10 ac.	N	Small	FAL	DEF		Unknown
Hook Lake (T6N R10E S29)	LR07	125 ac.	N	Small	FAL	DEF		Unknown
Island Lake (T5N R10E S3)	LR07	20 ac.	N	Small	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Yahara River and Lake Monona Subwatershed

The 94 sq mi subwatershed makes up the south central portion of the Lower Rock River Basin-Yahara River Watershed and drains primarily to Lake Monona and Lake Waubesa. It contains 102 miles of streams with no ORW/ERW, no trout streams and 11 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Murphys Cr.	LR08	4.7 mi.	N	WWFF	WWFF	DEF		Good
Nine Springs Cr.	LR08	6.2 mi.	Y	WWFF	WWSF	DEF		Poor
Starkweather Cr. (East Br.)	LR08	3.7 mi.	Y	LFF	WWSF	DEF		Poor
Starkweather Cr. (West Br.)	LR08	2.6 mi.	Y	FAL	FAL	DEF		Poor
Swan Cr.	LR08	4.4 mi.	N	WWFF	FAL	WWSF		Good
Wingra (Murphy) Cr.	LR08	1.2 mi.	Y	WWSF	WWSF	DEF		Poor
Wingra Cr.	LR08	0.8 mi.	N	FAL	FAL	DEF		Good
Yahara River, Central	LR08	2.0 mi.	N	WWSF	WWSF	WWSF		Good
Odana Pond	LR08	14 ac.	Y	FAL	FAL	DEF		Poor
Lake Monona	LR08	3,358 ac.	Y	Two-Story	WWSF	FAL Warm		Poor
Lake Waubesa	LR08	2,075 ac.	Y	Deep Lowland	WWSF	DEF		Poor
Lake Wingra	LR08	345 ac.	Y	Shallow Lowland	FAL	DEF		Good
Tenney Park Lagoon (T7N R9E S12)	LR08	25 ac.	N	Small	FAL	DEF		Unknown
Upper Mud Lake	LR08	223 ac.	N	Shallow Lowland	FAL	DEF		Good

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Yahara River and Lake Mendota Subwatershed

The 113 sq mi subwatershed makes up the northeast portion of the Lower Rock River Basin-Yahara River Watershed and drains the east portion of the Town of Vienna, the west portion of the Village of Windsor, and the northwest portion of Sun Prairie south to the northeast corner of Lake Mendota. It contains 107 miles of streams with no ORW/ERW, 4 trout miles and 7 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Token Cr.	LR09	2.9 mi.	N	WWSF	Class III Trout#	DEF		Good
	LR09	3.5 mi.	Y	Class III Trout#	FAL	Cold		Poor
	LR09	0.6 mi.	Y	WWSF	Cold	DEF		Poor
	LR09	2.6 mi.	Y	WWSF	Cold	DEF		Poor
	LR09	1.8 mi.	PA	FAL	FAL	DEF		Poor
Yahara River, Upper	LR09	4.4 mi.	PA	FAL	FAL	DEF		Poor
	LR09	15.9 mi.	Y	WWSF	WWSF	WWSF		Poor
Yahara River - Windsor Channel	LR09	2.3 mi.	N	FAL	FAL	DEF		Unknown
Yahara River - Unnamed Trib	LR09	2.5 mi.	Y	FAL	FAL	DEF		Poor
Cherokee Lake (T8N R9E S24)	LR09	80 ac.	N	FAL	FAL	DEF		Unknown
Lake Windsor (T9N R10E S31)	LR09	9 ac.	N	Small	FAL	DEF		Poor

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Six Mile and Pheasant Branch Creeks Subwatershed

The 119 sq mi subwatershed makes up the northwest portion of the Lower Rock River Basin-Yahara River Watershed and drains the east portion of the Town of Dane and the west portion of the Town of Vienna south to Lake Mendota. It contains 146 miles of streams with 12 miles of ORW/ERW, no trout streams and 15 impaired miles.

Stream Name	Watershed	Water Size	303(d) List*	Current Use	Attainable Use	Designated Use	ORW / ERW	General Condition
Dorn Cr.	LR10	1.0 mi.	N	WWSF	WWSF	WWSF		Good
	LR10	5.5 mi.	Y	LFF	WWSF	DEF		Poor
Pheasant Branch Cr.	LR10	1.0 mi.	Y	WWSF	WWSF	DEF		Poor
	LR10	1.1 mi.	N	FAL	FAL	DEF		Unknown
	LR10	8.1 mi.	Y	LFF	LFF	DEF		Poor
Sixmile Cr.	LR10	8.5 mi.	PA	WWSF	WWSF	DEF	ERW	Poor
	LR10	3.6 mi.	N	LFF	LFF	WWSF	ERW	Fair
Barbian Pond (T8N R8E S2)	LR10	11 ac.	N	Small	FAL	DEF		Unknown
Brandenburg Lake (T8N R8E S62)	LR10	38 ac.	N	Shallow Seepage	FAL	DEF		Fair
Dahmen Pond (T8N R8E S16)	LR10	6 ac.	N	FAL	FAL	DEF		Unknown
Diedrich Pond (T8N R8E S4)	LR10	19 ac.	N	FAL	FAL	DEF		Unknown
Esser Pond (T7N R8E S10)	LR10	25 ac.	N	FAL	FAL	DEF		Unknown
Graber Pond (T7N R8E S2)	LR10	10 ac.	N	FAL	FAL	DEF		Unknown
Kalscheur Pond (T8N R8E S8)	LR10	11 ac.	N	Small	FAL	DEF		Unknown
Louis Buechner Pond (T8N R8E S8)	LR10	9 ac.	N	FAL	FAL	DEF		Unknown
Lake Mendota	LR10	9,781 ac.	Y	Two-Story	WWSF	DEF		Poor
Springfield Pond (T8N R8E S5)	LR10	3 ac.	N	Small	FAL	DEF		Unknown
Strickers Pond (T7N R8E S14)	LR10	15 ac.	N	Small	FAL	DEF		Unknown
Tiedemans Pond (T7N R8E S13)	LR10	15 ac.	N	Small	FAL	DEF		Unknown

*303(d) List: D-Delisted, N-Not Listed, PA-Proposed to be Added, PD-Proposed to be Delisted, Y-Listed

Municipal Discharges

All of the communities in the northern and central portions of the watershed are served by MMSD. The MMSD Nine Springs WWTP discharges highly treated effluent through an outfall pipe and ditch to the Oregon Branch of Badfish Creek.

Concern for protecting the Yahara River lakes from the adverse effects of poorly treated wastewater is the historical reason for the diversion of all wastewater around the lakes via Badfish Creek. This diversion has substantially reduced low flows in the affected reaches of the Yahara River. Improvements in modern wastewater treatment technologies have made the need for this diversion unnecessary. The Oregon WWTP also discharges treated effluent to the Oregon Branch of Badfish Creek. The creek flows southeast and joins the Yahara River in Rock County.

The City of Stoughton WWTP, located in the southern part of the watershed, discharges treated effluent directly to the Yahara River.

Separate Industrial Discharges

There are eleven industrial dischargers in the northern part of the Yahara River Watershed:

1. ABS Global Inc. (formerly Genus Inc. DBA) landspreads livestock manure on fields in the Six Mile and Pheasant Branch Creek subwatershed, as well as the Yahara River and Lake Mendota Subwatershed.
2. Blue Star Dairy Farms landspreads livestock manure, which enters the groundwaters of the Yahara River and Lake Mendota subwatershed.
3. Clean Fuel Partners (formerly Clear Horizons Dane LLC) facility consists of three waste digesters to digest manure from local farms and food processing substrate.
4. Don's Mobile Manor discharges waste water from the community's septic system to the groundwater of the Six Mile Creek and Pheasant Branch Creek subwatershed.
5. GL Dairy Biogas LLC facility operates the Dane County Manure Handling Facility and serves as a manure digester facility.
6. Kippley Farms is comprised of four facilities and serves as a crop and livestock operation with discharges to the Six Mile and Pheasant Branch Creeks and the Yahara River and Lake Mendota watersheds.
7. Ripp’s Dairy Valley LLC is a dairy farm that landspreads its livestock manure to the Six Mile and Pheasant Branch Creek and the Yahara River/Lake Mendota subwatersheds.
8. Wagner Dairy Farm is a large dairy farm comprised of four facilities that landspreads its livestock manure with Six Mile Creek, Black Earth Creek and Roxbury Creek subwatersheds.
9. Waste Management City Disposal Landfill (Superfund Site) pumps treated groundwater to the Badfish Creek subwatershed.
10. White Gold Dairy LLC is a farm that landspreads solid and liquid manure and digestate to the Six Mile and Pheasant Branch Creek and the Yahara River/Lake Mendota subwatersheds.
11. Zeigler Dairy Farms is a dairy farm that landspreads its livestock manure to the Six Mile and Pheasant Branch Creek and the Yahara River/Lake Mendota subwatersheds.

There are five industrial dischargers in the central part of the Yahara River Watershed:

1. Dane County Regional Airport runoff water comes in contact with pollutants including deicing and anti-icing chemicals, petroleum products, suspended solids, and traces of toxic materials before treatment and discharge into the West branch of Starkweather Creek.
2. Madison Gas and Electric (Blount Station) discharges roof drain water, turbine sump water, and cooling water to Lake Monona.
3. Madison Gas and Electric (Odana) provides compensatory concentrated infiltration of filtered pond water at the Odana Hills Golf Course.
4. University of Wisconsin Charter Street Heating Plant discharges cooling water containing chlorine additives to Lake Monona.
5. WDNR Nevin Fish Hatchery discharges supply water to Nine Springs Creek.
6. The City of Middleton Tiedeman Pond has an outlet to pump water out of the pond utilized during times of high water directed towards Lake Mendota via a ditch.

For detailed information on separate industrial discharges, refer to Section 3 of this report.

Madison Metropolitan Sewerage District WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
1610 Moorland Road, Madison	SW 1/4, NE 1/4, Section 19, T6N, R10E … SW 1/4, Section 14, T6N, R8E	WI-0024597-08-0	10/01/10	09/30/15	Badfish Creek, Badger Mill Creek	Badfish Creek: Warm Weather Sport Fishery Badger Mill Creek: Limited Forage Fishery	Badfish Creek: 5.7 Badger Mill Creek: 0.18

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
112,590 lbs/day (101,331 lbs/day)	**53.60 MGD (48.24 MGD)**	**56.0 MGD (50.4 MGD)**

Effluent Limits to Badfish Creek:

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
5.0 mg/L	6 - 9	430 mg/L	1.5 mg/L	19 mg/L (20 mg/L)	20 mg/L (23 mg/L)	7923 lbs/day (8340 lbs/day)	8340 lbs/day (9591 lbs/day)	Fecal Coliform, NH3-N, Mercury, Chloride

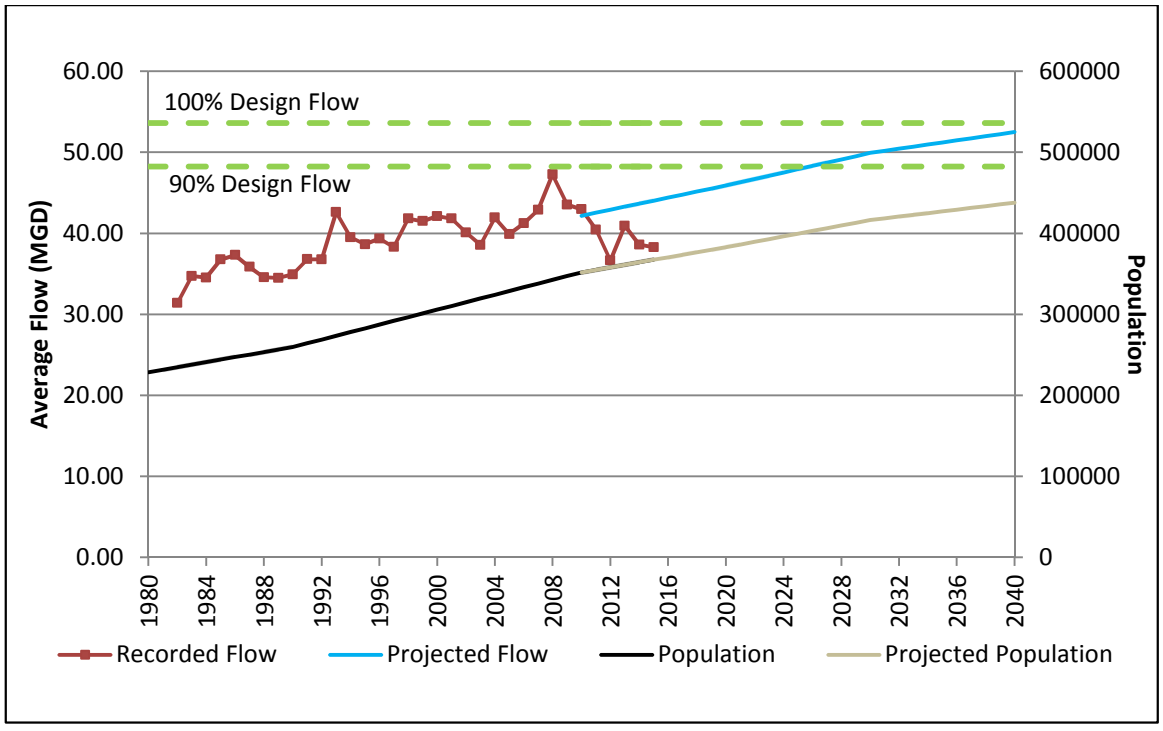
*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia

Effluent Limits to Badger Mill Creek:

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
5.0 mg/L	6 - 9	430 mg/L	1.5 mg/L	16 mg/L[1] 7 mg/L[2]	16 mg/L[1] 10 mg/L[2]	--	--	Fecal Coliform, NH3-N, Mercury, Chloride

1. Applies November through April 2. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	137	136	120

Treatment Process

Treatment begins with fine screening of inorganic solids and separation of grit in vortex grit tanks. Inorganic solids and grit are disposed of in a sanitary landfill. Primary settling tanks remove settleable solids. The primary sludge is thickened in two gravity thickener tanks. Advanced secondary treatment using biological nutrient removal is performed in a system of aeration tanks and clarifiers. Following final clarification, treated wastewater is UV disinfected on a seasonal basis from April 15th to October 15th. Effluent is cascade aerated prior to discharge to Badger Mill Creek and Badfish Creek. Waste activated sludge (WAS) is combined with a small amount of acid phase sludge to allow for phosphorus release from the microbial cells. The WAS is then thickened on gravity belt thickeners with the thickened sludge then being pumped into an acid phase anaerobic digester and the liquid being pumped to a struvite harvesting system. The primary sludge is also pumped to the acid phase digester. Following a short time in that digester, the sludge is pumped to mesophilic digesters. Most of the digested sludge is thickened on a gravity belt thickener and stored in large tanks before being reused as a fertilizer on area farmland. A portion of the mesophilicly digested sludge is further treated at thermophilic temperatures to produce a Class A biosolids that can be centrifuged and recycled to non-agricultural markets. The struvite harvesting facility recovers phosphorus and ammonia from the filtrates of the gravity belt thickeners. The struvite prills that are formed are sold to a company that reuses the material outside of the local watersheds. The facility has an annual average design flow of 53.6 Million Gallons per Day (MGD) and treated approximately 43.53 MGD of wastewater annually at the time of permit acceptance.

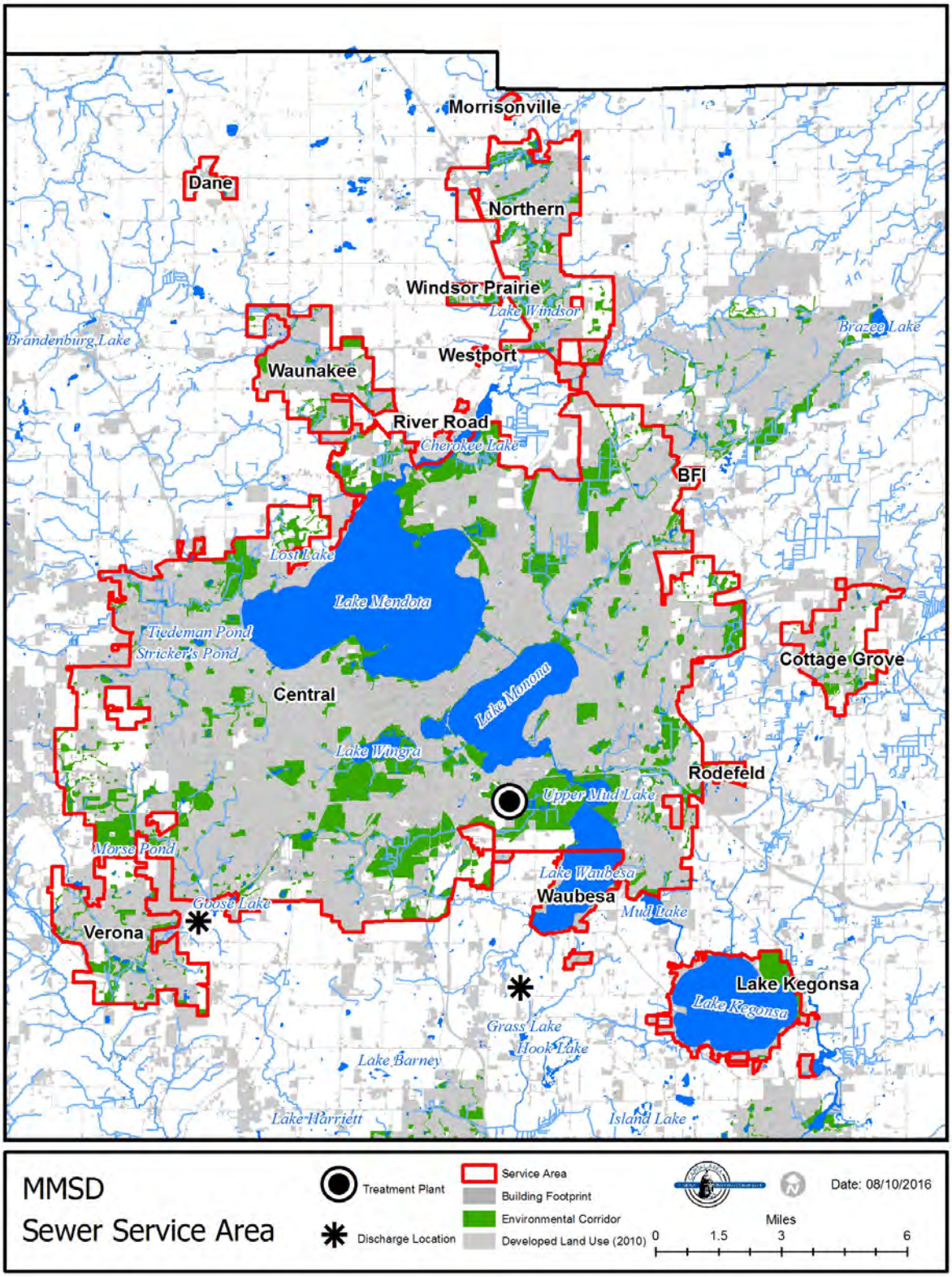
Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 11 mg/L, below the 19 mg/L permit limit for Badfish Creek and the 16 mg/L permit limit for Badger Mill Creek. The effluent monthly average Total Suspended Solids ranged from 4 to 5 mg/L, well below the 20 mg/L permit limit for Badfish Creek and the 10 to 16 mg/L permit limit for Badger Mill Creek. The effluent monthly average ammonia ranged from 0.08 to 1.36 mg/L, below the 1.8 to 4.1 mg/L permit limit for Badfish Creek and the 1.1 to 3.8 mg/L permit limit for Badger Mill Creek. The effluent monthly average phosphorus ranged from 0.2 to 0.5 mg/L, below the current 1.5 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.5 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL has been developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, TSS and phosphorus mass limits were calculated for the WWTP to comply with the TMDL. Madison Metropolitan Sewerage District (MMSD) has implemented a Watershed Adaptive Management approach, leading a diverse group of partners called Yahara Watershed Improvement Network (Yahara WINs) in implementing phosphorus reducing practices in the watershed. The interim weekly average chloride limit of 481 mg/L, which was exceeded in February of 2014, expired on 9/30/15 and the plant is now required to achieve 430 mg/L. MMSD has been granted a variance to the water quality based effluent limits for chloride, provided that it meets this effluent limit and implements chloride source reduction measures. The daily maximum variance limit for mercury is 5.7 ng/L and a pollutant minimization program has been in effect since issuance of the last permit. MMSD has conducted a mercury pollutant minimization plan and developed a management report.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 104,619 lbs/day and the projected 2040 annual average flow is 52.49 MGD. Biological loading is expected to reach 90 percent of design capacity by 2031 and could approach full capacity near 2040, based on population projections. Hydraulic capacity is expected to reach 90 percent of design capacity by 2026 and could approach full capacity near 2040, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2026 to either reduce

source contributions or increase plant treatment and flow capacity. MMSD Wastewater Treatment Plant and the municipalities that are served by the district, have made significant progress in reducing per capita wastewater generation across the service area and identifying and repairing clear water intrusion into the collection system to improve operational efficiency and reduce cost. Continued efforts to reduce per capita water use and infiltration and inflow could extend the time when a capacity evaluation and needs assessment study is needed. It is recommended that the Capacity, Management, Operation, and Maintenance program completed in 2014 for the facility be updated annually as needed.

The use of groundwater as the sole water supply source combined with regionalization of wastewater treatment and the diversion of treated effluent around the Yahara Lakes has resulted in groundwater table recession and a loss of stream baseflow. It is recommended that MMSD continue to collaborate with regional partners to investigate and identify approaches of recycling of highly treated wastewater in order to mitigate the adverse impacts of groundwater withdrawals in ways that that are cost-effective and environmentally sound.


Morrisonville
Dane
Northern
Windsor Prairie
Lake Windsor
Brandenburg Lake
Brazeel Lake
Westport
Waunakee
River Road
Cherokee Lake
BFI
Lost Lake
Lake Mendota
Tiedeman Pond
Strickers Pond
Cottage Grove
Central
Lake Monona
Lake Wingra
Rodefeld
Upper Mud Lake
Morse Pond
Lake Waubesa
Waubesa
Goose Lake
Mud Lake
Verona
Lake Kegonsa
Lake Kegonsa
Grass Lake
Hook Lake
Lake Barney
Lake Harriett
Island Lake
MMSD
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
Environmental Corridor
Developed Land Use (2010)
Date: 08/10/2016
Miles
0
1.5
3
6

Village of Oregon WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
101 North Perry Parkway, Oregon	NE 1/4, NW 1/4, Section 12, T5N, R9E	WI-0020681-08-0	07/01/14	06/30/19	Oregon Branch Badfish Creek	Limited Aquatic Life	0.01

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

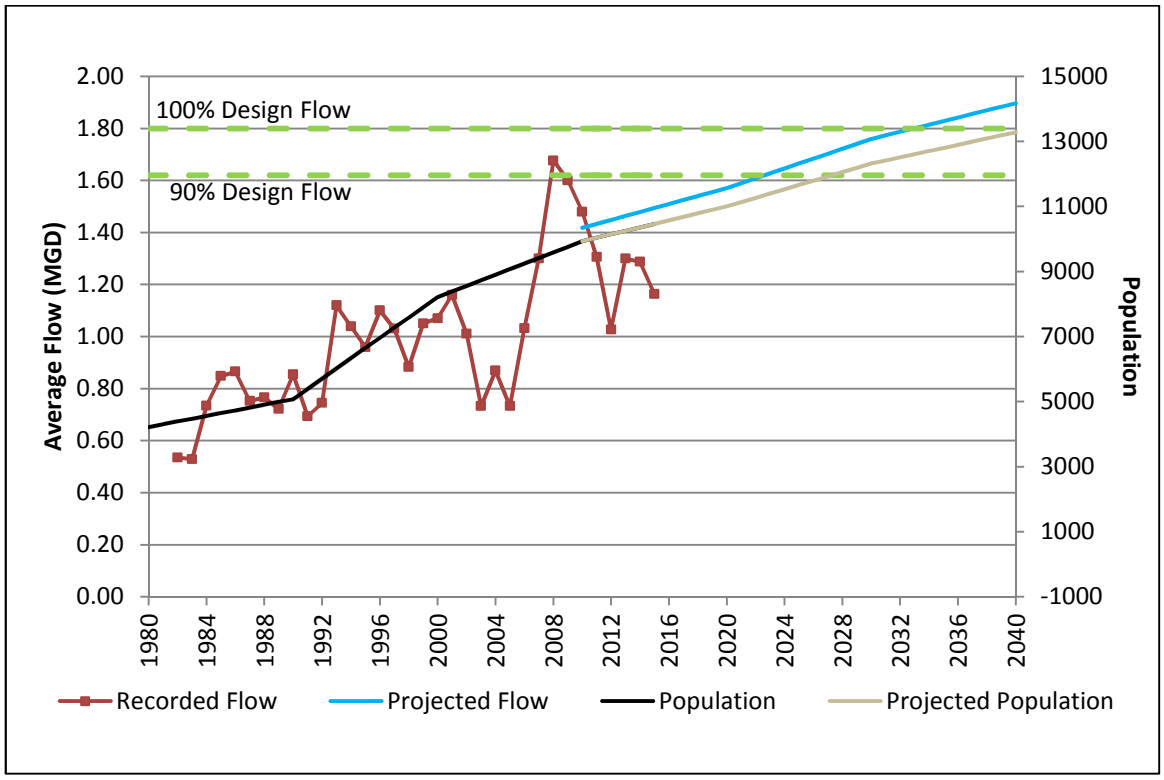
Rated Design Capacity

Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
2882 lbs/day (2594 lbs/day)	**1.80 MGD (1.62 MGD)**	**1.80 MGD (1.62 MGD)**

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
4 mg/L	6 - 9	--	1.1 mg/L	20 mg/L (30 mg/L)	20 mg/L (30 mg/L)	--	See permit	NH3-N, Mercury

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	149	126	143

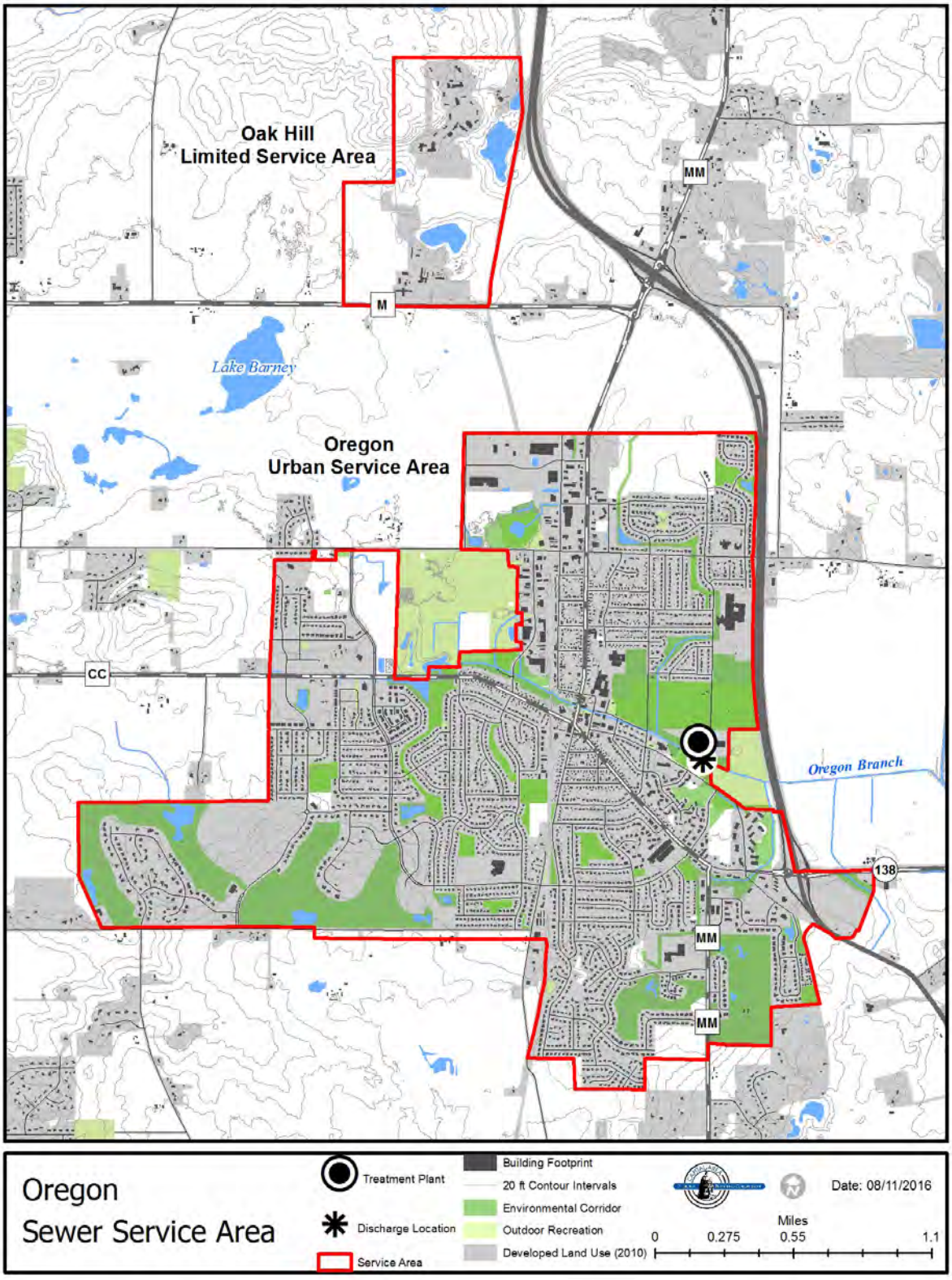
Treatment Process

Treatment consists of activated sludge treatment system with grit removal and automated fine screens as preliminary treatment. Wastewater passes through four final clarifiers for final settling before discharge to the Oregon Branch. Biological phosphorus removal is used and chemical phosphorus treatment backup is available primarily to treat side streams from sludge processing as necessary. Sludge is aerobically digested, thickened with a gravity belt thickener, and stored in a sludge storage tank during months when land spreading is not allowed by law or is impractical due to weather conditions or land availability. Biosolids are ultimately landspread on DNR approved agricultural fields. The facility has an annual average design flow of 1.8 Million Gallons per Day (MGD) and treated approximately 1.28 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 6 mg/L, well below the permit limit of 20 mg/L. The effluent monthly average Total Suspended Solids ranged from 3 to 9 mg/L, well below the permit limit of 20 mg/L. The effluent monthly average Ammonia ranged from 0 to 0.07 mg/L, well below the temporally variable permit limit ranging from 2.7 mg/L in the summer months up to 14 mg/L in the winter months. The effluent monthly average phosphorus ranged from 0.3 to 1.0 mg/L, below the current 1.1 mg/L permit limit but not low enough to meet future water quality based effluent limits (WQBEL) for phosphorus. The total phosphorus monthly limit of 1.1 mg/L is an interim limit and will be reduced to 0.075 mg/L on a six month average and 0.225 mg/L on a monthly average. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2014 permit includes a TMDL derived monthly average TSS effluent limit of 166 to 305 lbs/day and a monthly average Total Phosphorous Effluent Limit of 1.95 to 2.43 lbs/day. Based on the CMAR data, the TMDL derived TSS limits are consistently met, but the Total Phosphorus limits are not met in any month. Oregon Utilities is participating in MMSD's Watershed Adaptive Management approach, called Yahara WINs, to implement phosphorus reducing practices in the watershed. A phosphorus WQBEL compliance schedule detailing required actions is outlined within the current permit. Pending EPA approval, the daily maximum variance limit for mercury is 3.6 ng/L with a goal to achieve 1.3 ng/L. A mercury pollutant minimization program has been in effect since issuance of the last permit. It is recommended that the Village of Oregon follow their mercury operational evaluation optimization report and update it as necessary to achieve mercury reductions. The Village conducted a phosphorus operational evaluation report. The Village has evaluated options of watershed adaptive management and water quality trading for achieving phosphorus reduction and has selected the Yahara WINs watershed adaptive management program as its phosphorus compliance option.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 2524 lbs/day and the projected 2040 annual average flow is 1.897 MGD. No biological loading problems are expected through 2040 based on population projections and estimated wastewater generation rates. Hydraulic capacity is expected to reach 90 percent of design capacity by 2023 and is expected to reach full design capacity by 2033, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2023 to either reduce source contributions or increase plant flow capacity. It is also recommended that the Village work to reduce per capita water use across the service area and continue to identify areas of high clear water intrusion into the collection system and address infiltration and inflow (I/I) to improve operational efficiency and reduce cost. Continued efforts to reduce per capita water use and I/I could extend the time when a capacity evaluation and needs assessment study is needed. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Oak Hill
Limited Service Area
Lake Barney
Oregon
Urban Service Area
Oregon Branch
MM
M
CC
138
MM
MM
Oregon
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.275
0.55
1.1

City of Stoughton WWTP

General Information

WWTP Location	Discharge Location	Permit #	Effective Date	Expiration Date	Receiving Water	Classification	$Q_{7,10}$* (cfs)
700 Mandt Parkway, Stoughton	NE 1/4, SE 1/4, Section 8, T5N, R11E	WI-0020338-08-0	07/01/14	06/30/19	Yahara River	Warm Water Sport Fishery	21

*$Q_{7,10}$: is the minimum 7-day average low stream flow which occurs once in ten years.

Rated Design Capacity

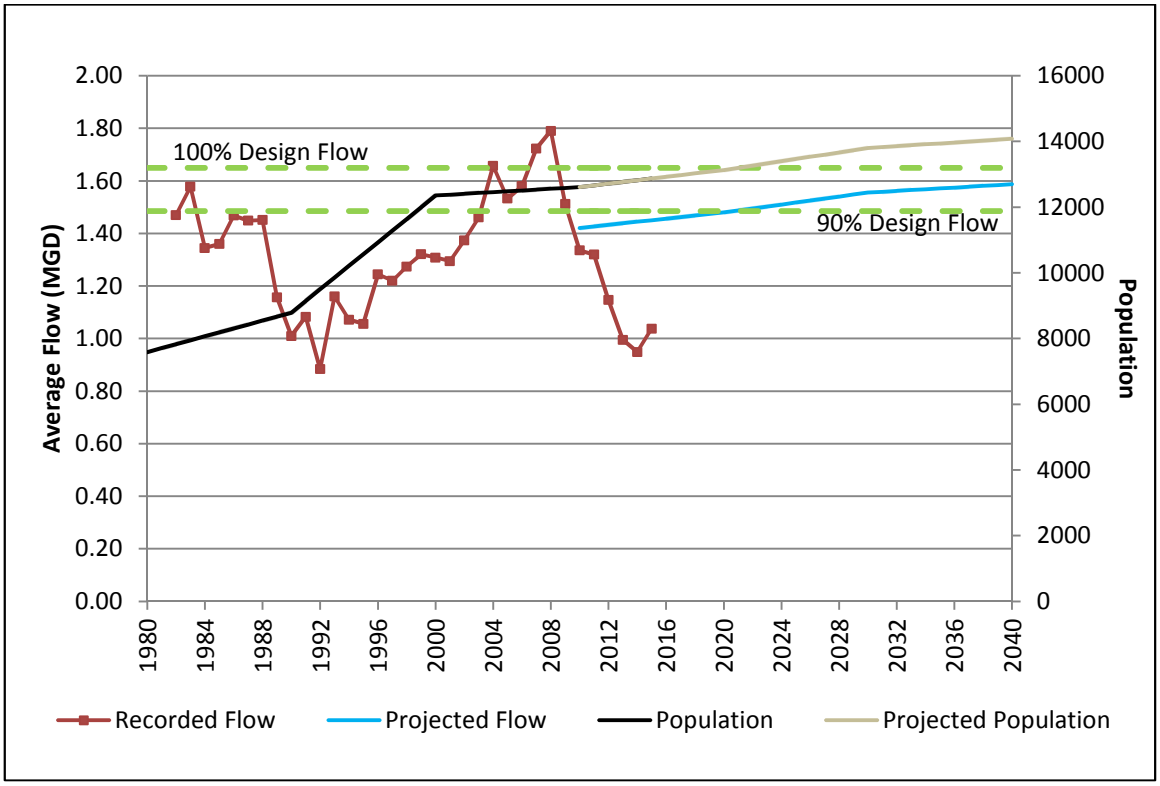
Design (C)BOD (90%)	Average Annual Design Flow (90%)	Maximum Month Design Flow (90%)
2655 lbs/day (2390 lbs/day)	1.65 MGD (1.49 MGD)	2.06 MGD (1.85 MGD)

Effluent Limits

Daily Minimum DO*	pH	Chlorine Daily Max	Phosphorus Monthly Average	Sampled BOD_5*Monthly (Weekly)	Sampled TSS Monthly (Weekly)	Calculated BOD_5*	Calculated TSS*	Other Limits
6 mg/L	6 - 9	--	1.3 mg/L	25 mg/L (40 mg/L)[1] (33 mg/L)[2]	30 mg/L (40 mg/L)	454 lbs/day[2]	See permit	NH3-N, Fecal Coliform, Mercury

1. Applies November through April, 2. Applies May through October

*DO: Dissolved Oxygen, BOD_5: 5 day Biochemical Oxygen Demand, TSS: Total Suspended Solids, NH3-N: Ammonia



See table below of 5 year average per capita flow centered on the census year. The 2010 per capita flow was used to project the future average flow.

Year	1990	2000	2010
Per Capita Flow (gal/day)	128	107	113

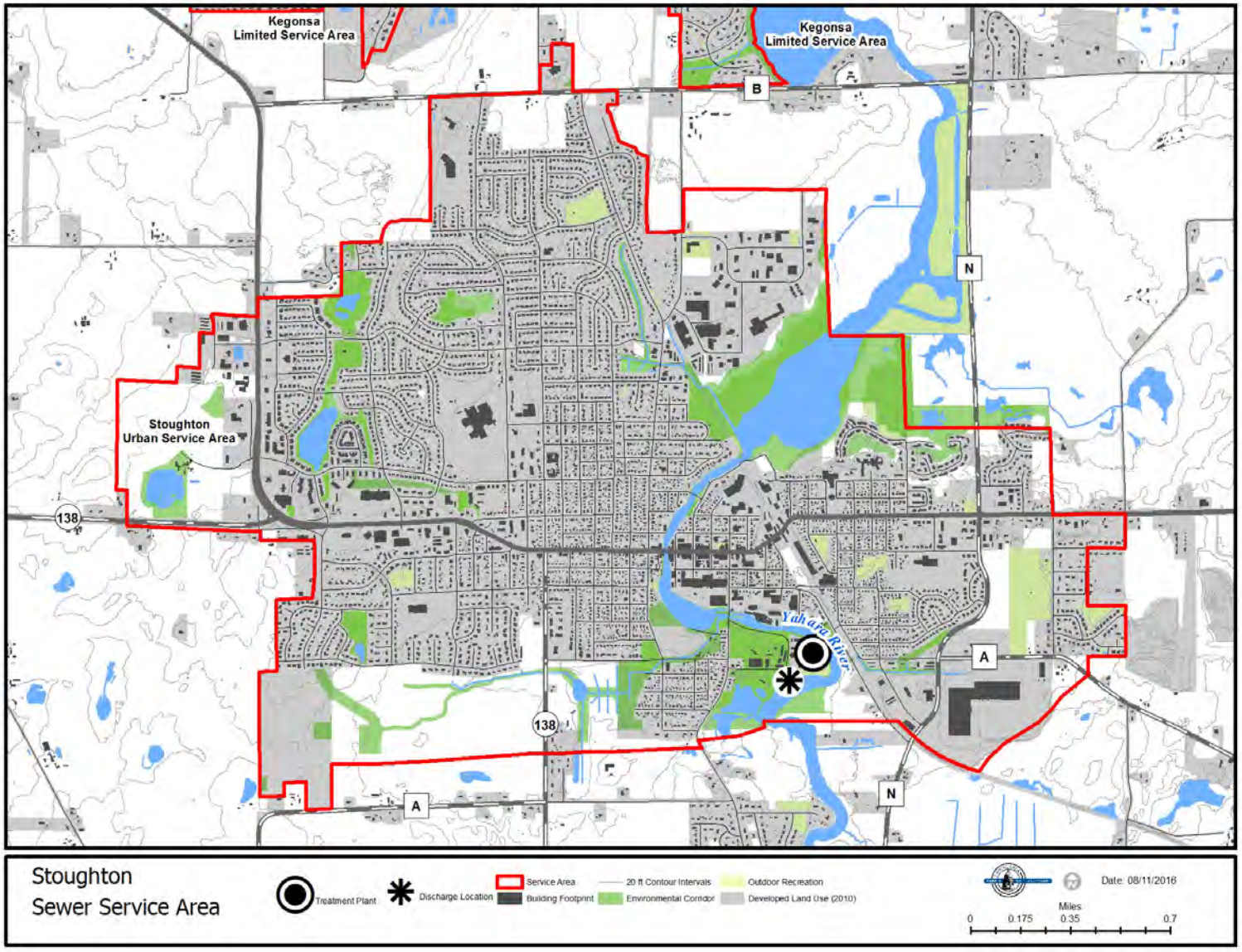
Treatment Process

Treatment consists of screening, grit removal, primary settling, activated sludge aeration, final clarification and UV disinfection prior to discharge to the Yahara River. Primary sludge and dissolved air floatation thickened waste activated sludge are anaerobically digested. The digested sludge is thickened on a gravity belt thickener before storage. Land spreading on approved farmland is the final disposal option for the stored bio-solids. Biological phosphorus removal is used and chemical phosphorus treatment backup is available primarily to treat side streams from sludge processing as necessary. The facility has an annual average design flow of 1.65 Million Gallons per Day (MGD) and treated approximately 0.949 MGD of wastewater annually at the time of permit acceptance.

Analysis and Recommendations

In 2015, the effluent monthly average (C)BOD ranged from 3 to 5 mg/L, well below the 25 mg/L permit limit. The effluent monthly average Total Suspended Solids (TSS) also ranged from 5 to 13 mg/L, well below the 30 mg/L permit limit. The effluent monthly average phosphorus ranged from 0.3 to 0.6 mg/L, below the previous 1.3 mg/L permit limit. The total phosphorus monthly limit of 1.3 mg/L is an interim limit. In addition, a TMDL was developed for the Rock River Basin to determine the maximum amounts of phosphorus and sediment that can be discharged to protect and improve water quality. As the plant discharges to a tributary to the Rock River, the TSS and phosphorus mass limits were calculated to comply with the TMDL. The 2014 permit includes a TMDL derived monthly average TSS effluent limit of 402 to 444 lbs/day and a monthly average Total Phosphorous Effluent Limit of 3.9 to 5.3 lbs/day. Based on the CMAR data, the TMDL derived TSS limits are consistently met, but the Total Phosphorus limits are only met 5 of 12 months. Stoughton Utilities is participating in MMSD's Watershed Adaptive Management approach, called Yahara WINs, to implement phosphorus reducing practices in the watershed. The daily maximum variance limit for mercury is 3.3 ng/L. A mercury pollutant minimization program has been in effect since issuance of the last permit. A phosphorous and mercury WQBEL compliance schedule detailing required actions is outlined within the current permit. The City of Stoughton conducted a phosphorus operational evaluation report in 2015 and is currently implementing its mercury pollutant minimization program. The City has evaluated options of watershed adaptive management and water quality trading for achieving phosphorus reduction and has selected the Yahara WINs watershed adaptive management program as its phosphorus compliance option.

Based on population projections and estimated wastewater generation rates, the forecasted 2040 (C)BOD loading is 3553 lbs/day and the annual average flow is 1.587 MGD. No hydraulic capacity problems are expected through 2040 based on population projections and estimated wastewater generation rates. The treatment plant currently is near full design biological loading capacity. In 2015, influent (C)BOD loading was greater than 90% of design 6 months of the year and exceeded 100% of design loading in 1 month. However, the plant effluent has been consistently well below its discharge permit limit for (C)BOD. The City has been working with industrial customers to reduce BOD loads. Hydraulic capacity is expected to reach 90 percent of design capacity by 2020 and is expected to approach full capacity shortly after 2040, based on population projections and estimated wastewater generation rates. The City's engineering consultant prepared a long range strategic plan in 2015 to evaluate plant operations, including loadings. It is recommended that the City implement the recommendations of that report. The City is commended for undertaking infrastructure repair and it is recommended that they continue to identify and repair areas with clear water intrusion as well as work to reduce per capita water use across the service area to improve operational efficiency and reduce cost. It is recommended that the Capacity, Management, Operation, and Maintenance program, completed for the facility in 2016, be updated annually as needed.


Kegonsa
Limited Service Area
Kegonsa
Limited Service Area
B
N
Stoughton
Urban Service Area
138
Yahara River
A
138
A
N
Stoughton
Sewer Service Area
Treatment Plant
Discharge Location
Service Area
Building Footprint
20 ft Contour Intervals
Environmental Corridor
Outdoor Recreation
Developed Land Use (2010)
Date: 08/11/2016
Miles
0
0.175
0.35
0.7

3. INDUSTRIAL POINT SOURCES

Organization

This section presents discharge details for those industries that are not served by a municipal WWTP. These separate industrial discharges are listed as part of each basin introduction in Section 2 of this report.

Industrial discharges can be classified into the following four general categories:

1. Process Water. This category includes discharges of process water resulting from industrial processing and manufacturing activities. This wastewater requires treatment before discharge to surface or ground water because it usually contains high concentrations of chemicals and/or BOD. Several land application operations, where process wastewater and solids are applied to agricultural land as soil fertilizer and conditioner, fall in this category.

2. Contaminated Cooling Water. This category includes discharges that have the potential for being contaminated. Contact cooling water, where water used to cool industrial operations comes in contact with the product, and non-contact cooling water containing additives, such as chloride, fall into this category. These discharges are monitored for key pollutants as a safeguard, and appropriate treatment provided before release to surface water. High temperature cooling water discharge also falls in this category because of the adverse impacts of such a discharge on fisheries. This category would include temporary discharges from groundwater remediation operations, where gasoline-tainted groundwater is treated and discharged to surface water, and stormwater runoff from areas such as oil depots, where the runoff has the likelihood of carrying contaminants. Discharge permits are required for both of these situations.

3. Non-Contact Cooling Water. This category includes water used to cool offices or industrial operations and does not contain contaminants or additives. The only pollution caused by this type of discharge is thermal pollution, critical in temperature-sensitive habitats such as trout streams. Non-contact cooling water discharges and discharges of clean industrial stormwater are monitored by WDNR through general discharge permits.

4. Concentrated Animal Feeding Operation. This category includes rainfall induced discharges of from agricultural lands that have been applied with liquid and solid manure originating from CAFOs.

Method

Descriptions of the individually permitted industrial operation, treatment process, and recommendations related to the treatment process are presented according to the basin in which the discharge is located, in numerical order of the discharge number shown on Table C-4 and adjoining map (map 2). Following the individual WPDES permits is a summary of the WDNR maintained general permits, along with quantities of each currently held within Dane County in 2016.

Industrial Discharges with Individual Permits in the Lower Rock River Basin

Map #	Permit Information
1i	**ABS Global Inc. (formerly Genus Inc. DBA)** WPDES Permit #WI-0059099-03-0 Permit Effective Date: 08/01/2012, Permit Expiration Date: 06/30/2017 1525 River Road, Deforest, WI This facility is a large bull rearing facility, housing 915 bulls, or 1281 animal units at the time of permit issuance. There are no plans for expansion within the current permit period. Point source discharges include landspreading of manure and process water. ABS Global estimates that their annual manure production is approximately 15,000 tons of heavily bedded solid manure and 30,000 gallons of very diluted liquid manure. Discharge occurs at permittee's address and is discharged to surface and groundwater within Six Mile/Pheasant Branch Creek and Yahara River/Lake Mendota subwatersheds of the Lower Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.
2i	**Blue Star Dairy Farms** WPDES Permit #WI-0058815-04-0 Permit Effective Date: 06/01/2013, Permit Expiration Date: 03/31/2018 7502 Patton Road, Deforest, WI This facility is a large dairy operation with 2680 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 2974 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 20.4 million gallons of liquid manure and process wastewater and 2075 tons of solid manure will be produced per year. Discharge occurs at permittee's address and is discharged to surface and groundwater within Yahara River/Lake Mendota subwatersheds of the Lower Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management

Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information

3i **Clean Fuel Partners (formerly Clear Horizons Dane LLC)**
WPDES Permit #WI-0064530-02-0
Permit Effective Date: 01/01/2016, Permit Expiration Date: 01/31/2020
6321 Cuba Valley Road, Vienna, WI

This facility consists of three waste digesters to digest manure from 3 local farms and a food processing substrate for the purpose of methane production. Point source discharges include landspreading of manure and process centrate to permitted source farms. Centrate is pumped back to source farm for landspreading and is discharged to groundwater within Six Mile/Pheasant Branch Creek subwatershed of the Lower Rock River Basin.

Permit Limits:
Sampling Point 703 - Weekly Average Phosphorus Load

Digestate Phosphorus removal (Weekly Avg)	60%	(year 1)
Digestate Phosphorus removal (Weekly Avg)	70%	(year 2)
Digestate Phosphorus removal (Weekly Avg)	80%	(year 3)
Digestate Phosphorus removal (Weekly Avg)	90%	(year 4)
Digestate Phosphorus removal (Weekly Avg)	100%	(year 5 and on)

4i **Dane County Regional Airport**
WPDES Permit #WI-0048747-04-0
Permit Effective Date: 01/01/2015, Permit Expiration Date: 12/31/2019
4000 International Lane, Madison, WI

This facility is a 2150 acres airport with 14 miles of storm drain, 25% of which are perforated underdrains, and 32 outfalls into Starkweather creek. The permitted facility includes a glycol (deicer) recovery system. Point source discharges include direct discharge of stormwater containing deicing and anti-icing chemicals, petroleum products, suspended solids, and traces of toxic materials. Discharge occurs at permittee's address and is discharged to surface water within the West Branch of Starkweather Creek of the Lower Rock River Basin.

Permit Limits:
Sampling Point 101 - Air National Guard and 102 - Army National Guard

In Plant

Oil & Grease (Daily Max)	15	mg/L
Suspended Solids (Daily Max)	40	mg/L
BOD_5 (Monthly Avg)	20	mg/L
BETX (Monthly Avg)	750	µg/L
PAHs (Monthly Avg)	0.1	µg/L
Benzo(a)pyrene (Monthly Avg)	0.1	µg/L
Naphtalene (Monthly Avg)	70.0	µg/L

Sampling Point (Outfall) 001 - Storage Tank Bypass and 034 - Storage Tank Uncontaminated

Surface	BOD_5 (Weekly Avg)	13.9	lbs/day	(March-May)
Water	BOD_5 (Weekly Avg)	8.4	lbs/day	(June-August)
	BOD_5 (Weekly Avg)	11.7	lbs/day	(Sept-Nov))
	BOD_5 (Weekly Avg)	16.4	lbs/day	(Dec-Feb)
	Suspended Solids (Daily Max)	50	mg/L	
	pH (Weekly Max)	9.0	su	
	pH (Weekly Min)	6.0	su	

Sampling Point 601 - Stream Monitoring

Flow River (Daily Min)	1.0	cfs
Dissolved Oxygen (Daily Min)	7.0	mg/L

Map #	Permit Information
5i	**Don's Mobile Manor** WPDES Permit #WI-0062316-02-0 Permit Effective Date: 01/01/2015, Permit Expiration Date: 12/31/2019 6928 Fisher Road, Waunakee, WI

A mobile home community that operates its own WWTF designed to treat a daily maximum of 25,600 gpd and 14,000 gpd on an annual average basis. Point source discharges include wastewater that Is pumped to an in-ground soil absorption drip disposal system. Discharge occurs at permittee's address and is discharged to groundwater within the Lower Rock River Basin of the Lower Rock River Basin.

Permit Limits:

Sampling Point 701 - INFLUENT

BOD_5 (Monthly Avg)	50	mg/L

Sampling Point (Outfall) 001 - EFFLUENT, Subsurface Absorption (Drip Irrig)

BOD_5 (Monthly Avg)	50	mg/L
Chloride (Daily Max)	250	mg/L/month
Chloride (Daily Max)	250	mg/L/quarter

Groundwater Monitoring System for a drip irrigation system
MW1 (801) WELL, MW2 (802) DOWNGRADIENT WELL, MW3 (803) DOWNGRADIENT WELL

	Unit	Preventative Action Limit	Enforcement Standard
Nitrogen, Nitrite+Nitrate, Total	mg/L	30	30
Chloride Dissolved	mg/L	125	250
pH Field	su	8.7	N/A
Nitrogen, Ammonia Dissolved	mg/L	0.97	9.7
Nitrogen, Organic Dissolved	mg/L	2.4	N/A
Solids, Total Dissolved	mg/L	1890	N/A

Map # Permit Information

6i **GL Dairy Biogas LLC**
WPDES Permit #WI-0065099-01-0
Permit Effective Date: 06/30/2013, Permit Expiration Date: 03/13/2018
1900 South Avenue, La Crosse, WI

This facility, located at 7167 Schneider Rd., Middleton, consists of three anaerobic digesters to digest manure pumped and hauled from Hensen Brothers Dairy, Ziegler Dairy, and Blue Star Dairy for the purposes of methane production. Point source discharges include landspreading of digestate, centrate, fibers to permitted source farms. Centrate is pumped back to source farm for landspreading and is discharged to surface and groundwater within the Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds of the Lower Rock River Basin.

Permit Limits:
Sampling Point 102 - Centrate from Solids Removal

Minimum Required Removal	Manure % Phosphorus	Substrate % Phosphorus
Year 1	60%	60%
Year 2	60%	70%
Year 3	60%	80%
Year 4	60%	90%
Year 5	60%	100%

7i **Kippley Farms**
WPDES Permit #WI-0062201-02-0
Permit Effective Date: 09/01/2010, Permit Expiration Date: 08/31/2015
6137 County Highway K, Waunakee, WI

Kippley Farms is a crop and beef livestock operation currently 2094 animals units at the time of permit issuance and capacity for 2460 animal units. Cattle are located at 3 locations including Home Farm, Randy's Farm and the Endres Farm. At the time of

publication, Kippley Farms was in the process of reducing the herd below 1000 animal units and had requested to not reissue their permit as a result. Point source discharges include landspreading of manure and process water. It is estimated that approximately 6204 tons of manure and process wastewater will be produced per year. Discharge occurs at Home Farm-permittee's address; Endres Farm-Endres Drive, Waunakee, WI; Randy's Farm-5429 CTH Q, Waunakee, WI and is discharged to surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds of the Lower Rock River Basin.

Permit Limits:
Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information
8i	**Madison Gas & Electric (Blount Station)** WPDES Permit #WI-0001961-08-0 Permit Effective Date: 10/01/2012, Permit Expiration Date: 09/30/2017 717 E. Main St., Madison, WI

MG&E Blount Station has nine boilers and five active steam turbines. The facility draws cooling water from Lake Menona and returns it back to the lake through two water systems. Point source discharges include pumped direct discharge of cooling water. Discharge occurs at outfalls on Blount Street and Livingston Street and is discharged to Lake Monona of the Lower Rock River Basin.

Permit Limits:
Sampling Point (Outfall) 002 - Roof Drains (uncontrolled flow from storm water)

Temperature Max (Daily Max)	120 deg F

Sampling Point (Outfall) 003 - Cooling Water (Turb. 6 & 7)

Temperature Max (Daily Max)	120 deg F

Sampling Point (Outfall) 008 - WW Treatment Plant Effluent

pH (Min)	6.0	su	
pH (Max)	9.0	su	
Suspended Solids (Daily Max)	100	mg/L	
Suspended Solids (Monthly Avg)	30	mg/L	
Oil & Grease (Daily Max)	20	mg/L	
Oil & Grease (Monthly Avg)	15	mg/L	
Phosphorus (6-Month Avg)	30	µg/L	Applicable to the six month periods of May-Oct and Nov-April
Phosphorus (Monthly Avg)	90	µg/L	
Phosphorus (Monthly Avg)	1.4	lbs/day	(January)
Phosphorus (Monthly Avg)	0.52	lbs/day	(February)
Phosphorus (Monthly Avg)	0.43	lbs/day	(March)
Phosphorus (Monthly Avg)	0.21	lbs/day	(April)
Phosphorus (Monthly Avg)	0.28	lbs/day	(May)
Phosphorus (Monthly Avg)	0.48	lbs/day	(June)
Phosphorus (Monthly Avg)	0.23	lbs/day	(July)
Phosphorus (Monthly Avg)	0.32	lbs/day	(August)
Phosphorus (Monthly Avg)	0.29	lbs/day	(September)
Phosphorus (Monthly Avg)	0.37	lbs/day	(October)
Phosphorus (Monthly Avg)	1	lbs/day	(November)
Phosphorus (Monthly Avg)	0.61	lbs/day	(December)
Suspended Solids (Daily Max)	140	lbs/day	(January, November)
Suspended Solids (Daily Max)	80	lbs/day	(February, May, December)
Suspended Solids (Daily Max)	100	lbs/day	(March, June)
Suspended Solids (Daily Max)	60	lbs/day	(April, July, August, October)
Suspended Solids (Daily Max)	40	lbs/day	(September)
Suspended Solids (Monthly Avg)	57	lbs/day	(January)
Suspended Solids (Monthly Avg)	32	lbs/day	(February)
Suspended Solids (Monthly Avg)	39	lbs/day	(March)
Suspended Solids (Monthly Avg)	22	lbs/day	(April)
Suspended Solids (Monthly Avg)	30	lbs/day	(May)
Suspended Solids (Monthly Avg)	43	lbs/day	(June)
Suspended Solids (Monthly Avg)	24	lbs/day	(July, August)
Suspended Solids (Monthly Avg)	15	lbs/day	(September)
Suspended Solids (Monthly Avg)	28	lbs/day	(October)
Suspended Solids (Monthly Avg)	57	lbs/day	(November)
Suspended Solids (Monthly Avg)	36	lbs/day	(December)

Map #	Permit Information

9i **Madison Gas & Electric Compensatory Recharge (Odana)**
WPDES Permit #WI-0063088-02-1
Permit Effective Date: 04/01/2014, Permit Expiration Date: 03/31/2019
4635 Odana Road, Madison, WI

Surface water from Odana Hills Golf Course pond is withdrawn and filtered before being pumped to an infiltration gallery located within the golf course. Point source discharges include concentrated infiltration of filtered pond water. Discharge occurs at permittee's address and is discharged to groundwater of the Lower Rock River Basin.

Permit Limits:
NA

Groundwater Monitoring System for Infiltration Area Monitoring System
MW-1 Infiltration Area Well (801), MW-2 Background Well (802), MW-3 Downgradient Well (803), MW-4 Downgradient Well (804), MW-5 Downgradient Piezometer (805), & MW-6 Downgradient Piezometer (806)

	Unit	Preventative Action Limit	Enforcement Standard
Nitrogen, Nitrite+Nitrate, Total	mg/L	2.0	10
Chloride Dissolved	mg/L	125	250
Manganese, Dissolved	mg/L	0.21	0.21
Sodium, Total Recoverable	mg/L	136	N/A
Solids, Total Dissolved	mg/L	940	N/A

10i **City of Middleton Tiedeman Pond**
WPDES Permit #WI-0049956-01-0
Permit Effective Date: unknown, Permit Expiration Date: 06/30/2007
7426 Hubbard Ave, Middleton, WI

Tiedeman Pond discharges excess water to Lake Mendota seasonally to relieve foundation problems to adjacent buildings. Tiedeman Pond is covered under their expired permit. Point source discharges include direct discharge of excess pond water. Discharge occurs at Gammon Road at Tiedeman Pond, Middleton, WI and is discharged to Lake Mendota via storm sewers of the Lower Rock River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - Tiedeman Pond Discharge

Phosphorus (Monthly Avg)	1.0	mg/L
Suspended Solids (Monthly Avg)	30	mg/L

11i **Ripps Dairy Valley LLC**
WPDES Permit #WI-0062529-03-0
Permit Effective Date: 06/01/2015, Permit Expiration Date: 03/31/2020
6626 Ripp Drive, Dane, WI

This facility is a large dairy farm with 1494 animal units. There are no plans for expansion within the current permit period. Point source discharges include landspreading of manure and process water. It is estimated that approximately 11.6 million gallons manure and process wastewater will be produced per year. Discharge occurs at permittee's address and is discharged to surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds of the Lower Rock River Basin.

Permit Limits:
Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information
12i	**UW Madison Charter Street Heating Plant** WPDES Permit #WI-0038296-08-0 Permit Effective Date: 07/01/2014, Permit Expiration Date: 06/30/2019 117 North Charter Street, Madison, WI

Cogeneration power plant uses water from Lake Monona for non-contact cooling water. Water is filtered prior to use and is cleaner when discharged than when received. Point source discharges include pumped direct discharge of cooling water. Discharge occurs at east side of North Charter Street, between West Dayton and Spring Streets and is discharged to Lake Monona, via storm sewers, of the Lower Rock River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - Optional NCCW outfall 2MH011

Oil & Grease (Daily Max)	10	mg/L

Sampling Point (Outfall) 004 - Primary NCCW outfall at 2MH013

Oil & Grease (Daily Max)	10	mg/L	
Temperature Max (Weekly avg)	75	deg F	(April starting 2019)
Temperature Max (Weekly avg)	74	deg F	(October starting 2018)

13i **Waste Management City Disposal Landfill (Superfund Site)**
WPDES Permit #WI-0061450-01-0
Permit Effective Date: unknown, Permit Expiration Date: 13/31/2015
West 24 N9335 Boundary Road, Menominee Falls, WI

A 38-acre closed landfill, located near 1843 Sand Hill Rd., Oregon, that operated from 1960 to 1977. Contaminated groundwater is pumped from an extraction well to a fixed

film biological treatment system and discharges through a wetland area to a swale to Badfish Creek. Waste Management is covered under their expired permit. Point source discharges include pumped direct discharge of treated groundwater. Discharge occurs at City Disposal Landfill, Town of Dunn, WI and is discharged to Badfish Creek of the Lower Rock River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - Treated Groundwater

pH (Min)	6.0	su
pH (Max)	9.0	su
Suspended Solids (Daily Max)	40	mg/L
Tetrahydrofuran (Monthly Avg)	100	µg/L
Acetone	25	µg/L
Methyl Ethyl Ketone	25	µg/L
Arsenic (Daily Max)	680	µg/L
Arsenic (Daily Max)	0.25	lbs/day
Zinc (Daily Max)	690	µg/L
Zinc (Daily Max)	0.25	lbs/day
Toluene (Monthly Avg)	25	µg/L
Chloride (Daily Max)	1500	mg/L
Chloride (Daily Max)	540	lbs/day

Map #	Permit Information
14i	**White Gold Dairy LLC** WPDES Permit #WI-0064025-01-0 Permit Effective Date: 08/01/2010, Permit Expiration Date: 06/20/2015 6200 Maier Road, Waunakee, WI

This facility is a large dairy farm with 994 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 2188 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 17.0 million gallons of manure and process wastewater will be produced per year. Discharge occurs at permittee's address and is discharged to surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds of the Lower Rock River Basin.

Permit Limits:
Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information
15i	**Wisconsin Department of Natural Resources – Nevin Fish Hatchery** WPDES Permit #WI-0002585-09-0 Permit Effective Date: 10/01/2015, Permit Expiration Date: 09/30/2020 3911 Fish Hatchery Road, Madison, WI

This facility is a cold water fish rearing station which draws fresh water from wells and springs. Point source discharges include pumped direct discharge of process water from hatchery tanks and raceways. Discharge occurs at NW 1/4 of the NE 1/4 of Section 10, T6N, R9E and is discharged to Nine Springs Creek of the Lower Rock River Basin.

Permit Limits:

Sampling Point (Outfall) 001 - Hatchery Effluent

BOD_5 (Weekly Avg)	7.7	mg/L	(November-April)
BOD_5 (Weekly Avg)	9.4	mg/L	(May - October)
Suspended Solids (Daily Max)	167	lbs/day	(January, November, December)
Suspended Solids (Daily Max)	192	lbs/day	(February)
Suspended Solids (Daily Max)	143	lbs/day	(March)
Suspended Solids (Daily Max)	109	lbs/day	(April)
Suspended Solids (Daily Max)	84	lbs/day	(May)
Suspended Solids (Daily Max)	75	lbs/day	(June)
Suspended Solids (Daily Max)	50	lbs/day	(July, August)
Suspended Solids (Daily Max)	67	lbs/day	(September)
Suspended Solids (Daily Max)	92	lbs/day	(October)
Suspended Solids (Monthly Avg)	400	lbs/day	(January, November, December)
Suspended Solids (Monthly Avg)	460	lbs/day	(February)
Suspended Solids (Monthly Avg)	340	lbs/day	(March)
Suspended Solids (Monthly Avg)	260	lbs/day	(April)
Suspended Solids (Monthly Avg)	200	lbs/day	(May)
Suspended Solids (Monthly Avg)	180	lbs/day	(June)
Suspended Solids (Monthly Avg)	120	lbs/day	(July, August)
Suspended Solids (Monthly Avg)	160	lbs/day	(September)
Suspended Solids (Monthly Avg)	220	lbs/day	(October)
Phosphorus Total (Monthly Avg)	0.076	mg/L	(Interim limit)

Sampling Point (Outfall) 002 - Fish manure landspread on site

Total Kjeldahl Nitrogen (site)	165	lb/acre/yr	
Chloride	340	lb/acre/2yr	(October starting 2018)

Map #	Permit Information
16i	**Ziegler Dairy Farms** WPDES Permit #WI-0065188-01-0 Permit Effective Date: 06/01/2013, Permit Expiration Date: 03/31/2018 4985 Church Road, Middleton, WI This facility is a large dairy farm with 972 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 2045 animal units. It is estimated that approximately 20.7 million gallons of liquid manure and 500 tons of solid manure and process wastewater will be produced per year. Point source discharges include landspreading of manure and process water. Discharge occurs at 5025 Church Rd, Middleton, WI; 1/4 Mile west of 7153 Schneider Rd, Middleton, WI and is discharged to surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds of the Lower Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Industrial Discharges with Individual Permits in the Lower Rock River, Lower Wisconsin River, and Sugar-Pecatonica River Basins

Map #	Permit Information
17i	**Wagner Dairy Farm** WPDES Permit #WI-0058751-03-0 Permit Effective Date: 01/01/2014, Permit Expiration Date: 12/31/2018 7262 Schneider Road, Middleton, WI Wagner Farm is a large dairy farm at multiple locations with 3905 animal units at the time of permit issuance. There are no plans for expansion within the current permit period. Point source discharges include landspreading of manure and process water. It is estimated that approximately 26.6 million gallons of manure and process wastewater and 13,591 tons of solid manure will be produced per year. Discharge occurs at Main Home Farm-7262 Schneider Rd, Middleton, WI; Beuthin Farm-5848 Beuthin Rd, Mazomanie, WI; Zander Farm-9327 Hwy KP, Cross Plains, WI; Bollenbeck Farm-8067 Hwy 14, Middleton, WI and is discharged to surface and groundwater within Six Mile Creek, Black Earth Creek and Roxbury Creek, and Upper Sugar River subwatersheds of the Lower Rock River Basin, Lower Wisconsin River Basin, Sugar-Pecatonica River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Industrial Discharges with Individual Permits in the Lower Wisconsin River Basin

Map # | Permit Information

18i **Capitol Sand & Gravel Co. Inc.**
WPDES Permit #WI-0033286-08-0
Permit Effective Date: 12/01/2013, Permit Expiration Date: 09/30/2018
8355 Stagecoach Road, Cross Plains, WI

This facility is a gravel and sand processing operation. The mining has formed a gravel pit filled with groundwater and precipitation. Point source discharges include pumped direct discharge of untreated gravel pit effluent. Discharge occurs 100 feet south of Stagecoach Road bridge on Black Earth Creek and is discharged to Black Earth Creek of the Lower Wisconsin River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - Gravel Pit Effluent

Temperature Max (Weekly Avg)	53	deg F	(October beginning 10/01/2017)
Temperature Max (Weekly Avg)	49	deg F	(November beginning 11/01/2017)
Dissolved Oxygen (Daily Min)	7.0	mg/L	(November through April)
Dissolved Oxygen (Daily Min)	6.0	mg/L	(April through October)

19i **Fish, Crystal and Mud Lake Rehabilitation District**
WPDES Permit #WI-0049964-03-0
Permit Effective Date: 12/01/2013, Permit Expiration Date: 09/30/2018
W12367 Padley Road, Lodi, WI

Fish Lake and Crystal Lake discharge excess water to remove risk of septic tank flooding and lower risk of health concerns related to drinking water, wastewater disposal, electric safety and problems with mold and bacteria growth. Point source discharges include pumped direct discharge of excess lake water. Discharges occurs at Fish Lake to SE 1/4, NW 1/4, Section 6, T9N-R7E, Crystal Lake to NE 1/4, NE 1/4, Section 15, T9N-R7E and is discharges from Fish Lake go to Wisconsin River and Crystal Lake go to Roxbury Creek of the Lower Wisconsin River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - Fish Lake Drawdown

Fish Lake

Flow Rate (Daily Max)	1.5	MGD
BOD_5 (Weekly Avg)	20	mg/L
Suspended Solids (Weekly Avg)	40	mg/L
Dissolved Oxygen (Daily Min)	7.0	mg/L
pH (Min)	6.0	su
pH (Max)	9.0	su

Sampling Point (Outfall) 004 - Crystal Lake Drawdown

Crystal Lake	BOD_5 (Weekly Avg)	3.0	mg/L	(April-October)
	Suspended Solids (Monthly Avg)	10	mg/L	
	Dissolved Oxygen (Daily Min)	7.0	mg/L	
	pH (Min)	6.0	su	
	pH (Max)	9.0	su	
	Phosphorus (6-Month Avg)	0.1	mg/L	
	Phosphorus (6-Month Avg)	0.6	lbs/day	
	Phosphorus (Monthly Avg)	0.225	mg/L	
	Temperature Max (Weekly Avg)	50	deg F	(January)
	Temperature Max (Weekly Avg)	51	deg F	(February)
	Temperature Max (Weekly Avg)	52	deg F	(March)
	Temperature Max (Weekly Avg)	55	deg F	(April)
	Temperature Max (Weekly Avg)	61	deg F	(October)
	Temperature Max (Weekly Avg)	49	deg F	(November-December)
	Temperature Max (Daily Max)	77	deg F	(January-February)
	Temperature Max (Daily Max)	78	deg F	(March)
	Temperature Max (Daily Max)	80	deg F	(April)
	Temperature Max (Daily Max)	81	deg F	(October)
	Temperature Max (Daily Max)	78	deg F	(November)
	Temperature Max (Daily Max)	77	deg F	(December)

Map #	Permit Information
20i	**Wisconsin Department of Natural Resources – Black Earth** WPDES Permit #WI-0063452-02-0 Permit Effective Date: 10/01/2012, Permit Expiration Date: 09/30/2017 4738 Highway 78, Black Earth, WI This facility is a deer tissue processing laboratory focused on chronic wasting disease. Point source discharges include landspreading of wash water and sludge from equipment cleaning. Discharge occurs at DNR land near County Highway Y north of the Village of Mazomanie, WI and is discharged to surface and groundwater within the Lower Wisconsin River Basin. <u>Permit Limits:</u> Sampling Point (Outfall) 001 - Lab wastewater holding tank

Frozen Site Application Rate	6,800	gal/acre/day
Unfrozen Site Application Rate	13,500	gal/acre/day
Total Chloride Per Site	340	pounds/acre/2 years
Total Kjeldahl Nitrogen Per Site	165	pounds/acre/year

Industrial Discharges with Individual Permits in the Sugar-Pecatonica River Basin

Map #	Permit Information

21i **Anderson Custom Processing**
WPDES Permit #WI-0065455-01-0
Permit Effective Date: 01/01/2015, Permit Expiration Date: 12/31/2019
220 Serv-Us Street, Belleville, WI

This facility provides custom spray drying services for food, beverage, infant formula, pharmaceuticals, as wells as hair care, cosmetic and paper products industries. Point source discharges include direct discharge of non-contact cooling water and landspreading mixture of corn starch process water and softener regeneration water. Discharge occurs at end of pipe on the north bank of the Sugar River in the NW 1/4 of the SE 1/4 of Section 34, T5N, R8E and is discharged to surface and groundwater within Sugar River subwatershed of the Sugar-Pecatonica River Basin.

Permit Limits:
Sampling Point (Outfall) 002 - Land Application Outfall

Frozen Site Application Rate	6,800	gal/acre/day
Unfrozen Site Application Rate	13,500	gal/acre/day
Total Chloride Per Site	340	pounds/acre/2 years
Total Kjeldahl Nitrogen Per Site	165	pounds/acre/year

22i **Dairyfood USA Inc. (formerly Lactoprot USA)**
WPDES Permit #WI-004600-06-0
Permit Effective Date: 01/01/2017, Permit Expiration Date: 12/31/2021
2819 County Road F, Blue Mounds, WI

This facility produces specialty processed cheese from purchased, natural cheese which it blends, cooks in batches and packages. Point source discharges include landspreading of process water and onsite discharge of wastewater associated with well water treatment; sanitary wastewater is hauled to the Blue Mounds WWTP. Discharge occurs at permittee's address and is discharged to surface and groundwater within the Pecatonica River Basin of the Sugar-Pecatonica River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - process wastewater

Frozen Site Application Rate	6,800	gal/acre/day
Unfrozen Site Application Rate	13,500	gal/acre/day
Total Chloride Per Site	340	pounds/acre/2 years
Total Kjeldahl Nitrogen Per Site	165	pounds/acre/year

Map #	Permit Information
23i	**Prairieland Dairy LLC** WPDES Permit #WI-0064661-01-0 Permit Effective Date: 07/01/2013, Permit Expiration Date: 06/30/2018 364 Remy Road, Belleville, WI This facility is a large dairy operation with 963 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 1835 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 12.2 million gallons of liquid manure and process wastewater and 800 tons of solid manure will be produced per year. Discharge occurs at Main Dairy Site-424 Remy Rd, Belleville, WI; Heifer Facility-6736 Frenchtown Rd, Belleville, WI and is discharged to surface and groundwater within Story Creek/Sugar River subwatersheds of the Sugar-Pecatonica River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Industrial Discharges with Individual Permits in the Upper and Lower Rock River Basins

Map #	Permit Information

24i **Daybreak Foods, Inc.**
WPDES Permit #WI-0057550
Permit Effective Date: 07/01/2012, Permit Expiration Date: 06/30/2017
N6680 Highway O, Marshall, WI

Daybreak Foods owns and operates one egg laying farm (Lake Mills Complex) with a capacity of 1,015,000 hens and one pullet growing farm with a capacity of 214,000 pullets (Aztalan) at the time of permit issuance. Point source discharges include landspreading of manure and process water. It is estimated that approximately 2.0 million gallons and 5000 tons of manure will be produced per year. Discharge occurs at Lake Mills Complex-N6680 Hwy O, Marshall, WI; Aztalan Pullet Barns-W6178 Hwy B, Jefferson, WI and is discharged to surface and groundwater of the Upper and Lower Rock River Basin.

Permit Limits:
Sampling Point (Outfall) 001 - process wastewater

Frozen Site Application Rate	6,800	gal/acre/day
Unfrozen Site Application Rate	13,500	gal/acre/day
Total Chloride Per Site	340	pounds/acre/2 years
Total Kjeldahl Nitrogen Per Site	165	pounds/acre/year

25i **R Acres Rademacher**
WPDES Permit #WI-0065323-01-0
Permit Effective Date: 07/01/2015, Permit Expiration Date: 06/30/2020
5010 Town Hall Drive, Cottage Grove, WI

R Acres Radmacher operates a large dairy farm at multiple locations with combined animal units of 1895. Planned expansion after the date of permit issuance will bring the total to 2181 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 10.8 million gallons of manure and process wastewater and 1530 tons of solid manure will be produced per year. Discharge occurs at Main Farm-4930 Town Hall Rd, Cottage Grove, WI; Alice Farm-1794 Cty Hwy T, Marshall, WI; Veith Farm-5593 Cty Hwy TT, Marshall, WI; Lange Farm-5273 Oak Park Rd, Marshall, WI and is discharged to surface and groundwater discharges within Maunesha River subwatershed of the Upper and Lower Rock River Basin.

Permit Limits:
Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management

Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information
26i	**Statz Brothers, Inc.** WPDES Permit #WI-0056791-04-0 Permit Effective Date: 11/01/2013, Permit Expiration Date: 09/30/2018 5707 County Road VV, Marshall, WI Statz Bothers operates a large dairy farm at multiple locations with 6083 total animal units at the time of permit issuance. Future expansion will bring the capacity to 8161 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 47.0 million gallons of manure and process wastewater will be produced per year. Discharge occurs at Main Farm-2108 SR 19, Marshall, WI; Long-1926 SR 19, Marshall, WI; Jerome Blaska-2213 SR 19, Marshall, WI; Schuster, 2296 SR 19, Marshall, WI; Lloyd Krebs, 6059 Cty Rd VV, Marshall, WI; Rich's-6402 Twin Lane Rd, Marshall, WI; Oberst-1648 Meadow Rd, Sun Prairie, WI; B Dairy-5707 Cty Rd VV, Marshall, WI; B Shop-5875 Cty Rd VV, Marshall, WI and is discharged to surface and groundwater within Maunesha River and Koshkonong Creek subwatersheds of the Upper and Lower Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Industrial Discharges with Individual Permits in the Upper Rock River Basin

Map #	Permit Information
27i	**Jim Herman Inc.** WPDES Permit #WI-0064220-02-0 Permit Effective Date: 11/01/2015, Permit Expiration Date: 09/30/2020 233 East Main St., Marshall, WI This facility is a large beef farm with 1604 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 2250 animal units. Point source discharges include landspreading of manure and process water. It is estimated that approximately 2.4 million gallons of manure and process wastewater and 13275 tons of solid manure will be produced per year. Discharge occurs at 450 Canal Rd, Marshall, WI and is discharged to surface and groundwater within Upper/Lower Koshkonong Creek and Maunesha/Lower Crawfish River subwatersheds of the Upper Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.
28i	**Kersten Farms LLC** WPDES Permit #WI-0063274-01-0 Permit Effective Date: 04/04/2011, Permit Expiration Date: 03/31/2016 5519 Hwy 73, Marshall, WI Kersten Farms LLC is a large dairy farm at several locations with 994 animal units and at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 1451 animal units. Kersten Farms is covered under the WDNR Large Dairy Concentrated Animal Feeding Operation General Permit. Point source discharges include landspreading of manure and process water. It is estimated that more than 8 million gallons of manure and process wastewater will be produced per year. Discharge occurs at Main Farm-5367 State Hwy 73, Marshall, WI; Tim's Farm-permittee's address; Darren's Farm-5376 State Hwy 73, Marshall, WI; Farm #3- 5039 State Hwy 73, Marshall, WI and is discharged to surface and groundwater within Maunesha River and Upper and Lower Koshkonong Creek subwatersheds of the Upper Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to

navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Map #	Permit Information
29i	**Maunesha River Dairy** WPDES Permit #WI-0063991-01-0 Permit Effective Date: 11/01/2010, Permit Expiration Date: 09/30/2015 6790 Twin Lane Road, Sun Prairie, WI This facility is a large dairy farm with 1081 animal units at the time of permit issuance. Planned expansion after the date of permit issuance will bring the total to 2243 animal units. Maunesha River Dairy is covered under their expired permit and is working towards reissuance at the time of publication. Point source discharges include landspreading of manure and process water. It is estimated that approximately 12.0 million gallons of manure, feed storage runoff and process wastewater will be produced per year. Discharge occurs at permittee's address and is discharged to surface and groundwater within Maunesha River and Upper/Lower Crawfish River subwatersheds of the Upper Rock River Basin. <u>Permit Limits:</u> Production areas such as manure storage areas, outdoor animal lots, composting and leachate containment systems, milking center wastewater treatment/containment systems, and raw material storage areas, are not allowed to discharge pollutants to navigable waters, except during rainfall events equal to or larger than the 25-year, 24-hour rainfall event. Land spreading operations of manure and process water must be completed in accordance with the WDNR approved site specific Nutrient Management Plan. Application rates must be adjusted on a field by field basis reflecting determined nutrient budgets.

Industrial and Municipal Wastewater General Discharge Permits

WPDES general permits are issued by the WDNR for specific categories of industrial, municipal and other wastewater discharges. The WDNR also issues stormwater runoff permits for construction site, industrial facilities and municipalities, however these permits are not addressed within this document. Following is a listing of each of the Industrial and Municipal general permits issued by the WDNR along with a description of each and the number of each within Dane County in 2016.

Ballast Water Discharge (WI-0063835-2) - Discharge of ballast water from vessels into Lake Michigan, Lake Superior or other waters where a vessel may transit located within the boundaries of Wisconsin and meeting the applicability criteria listed in this permit. This permit type does not apply to the Dane County region but was included for comprehensiveness.

Carriage and Interstitial Water from Dredging Operations (WI-0046558-5) - Dredging operations where carriage water or interstitial water from sediment dredging projects is discharged to surface waters or seepage systems. In 2016, 5 such permits are active within Dane County.

Concrete Products Operations (WI-0046507-5) - Concrete products operations (excluding concrete asphalt) where washwater, boiler blowdown, non-contact cooling water, and dust control wastewater are discharged to surface waters or seepage systems. In 2016, 1 such permit is active within Dane County.

Contaminated Groundwater from Remedial Action Operations (WI-0046566-6) - Wastewater from soil and groundwater remediation projects involving organic contaminants (primarily hydrocarbons and solvents) discharged to surface waters or seepage systems. The permit also contains requirements for infiltration discharges to enhance in-situ bioremediation. In 2016, 22 such permits are active within Dane County.

Domestic Wastewater to a Subsurface Soil Absorption System (WI-0062901-2) - Discharge of domestic wastewater into a subsurface soil absorption system. The facility may consist of a large Private Onsite Wastewater Treatment System that is approved by the Department of Safety and Professional Services. In 2016, no such permits are active within Dane County.

Hydrostatic Test Water and Water Supply System Water (WI-0057681-4) - Discharges of hydrostatic test water and water supply system water to surface waters or seepage systems. In 2016, 19 such permits are active within Dane County.

Land Application of By-Product Solids (WI-0057665-5) - Discharges of by-product solids to land spreading sites. By-product solids are waste materials from the animal or food processing industry including, but not limited to: vegetable waste leaves, cuttings, peelings, husks and sweet corn cobs; animal paunch manure (stomach contents); and waste fruit and pits. In 2016, 1 such permit is active within Dane County.

Land Application of Industrial Sludge (WI-0057657-5) - Application of industrial sludges to landspreading sites regulated under chapter NR 214, Wisconsin Administrative Code. These sludges

must not have detrimental effects on soils, crops or groundwater, and have beneficial properties as a soil conditioner or fertilizer. These sludges are typically from the treatment of food processing wastewaters. In 2016, 2 such permits are active within Dane County.

Land Application of Liquid Industrial Wastes (WI-0055867-6) - Discharges of liquid wastes to landspreading sites from, but not limited to, food processing facilities (including fruit, vegetable, dairy products, meat, fish, and poultry processing facilities), mink raising operations, and aquaculture operations. The wastes will typically contain biodegradable pollutants with annual limitations on the application of nitrogen and chlorides. In 2016, 2 such permits are active within Dane County.

Non-Contact Cooling Water, or Condensate and Boiler Blowdown (WI-0044938-5) - Non-contact cooling water, air conditioning condensate and boiler blowdown (with no additives or nontoxic additives) discharges to Wisconsin surface waters or seepage systems. In 2016, 16 such permits are active within Dane County.

Nondomestic Wastewater to a Subsurface Absorption System (WI-0055611-6) - Discharges of liquid industrial wastes containing biodegradable pollutants discharged to subsurface absorption systems (septic tanks followed by subsurface drainfield systems). Typical wastewaters will come from, but not be limited to, food processing facilities (including fruit, vegetable, meat, fish and poultry processing facilities), mink raising operations, and aquaculture operations. In 2016, 1 such permit is active within Dane County.

Nonmetallic Mining Operations (WI-0046515-5) - Sand, gravel, dimension stone, rotten granite, clay pit, and crushed stone operations where wash water, pit dewatering, dust control and non-contact cooling wastewaters are discharged to surface waters or seepage systems. The permit also contains stormwater requirements in accordance with Wisconsin Administrative Code NR 216. In 2016, 63 such permits are active within Dane County.

Outside Washing of Vehicles, Equipment and Other Objects (WI-0059153-3) - Covers a variety of facilities that wash equipment, vehicles and other objects outside and cannot direct the wastewater to sanitary sewage facilities. Discharges from these washing operations typically contain contaminants (suspended solids and foam) that can be addressed by implementing Best Management Practices. Occasional residential and non-profit vehicle washing is exempt. In 2016, 14 such permits are active within Dane County.

Pesticide Pollutant Discharges - Authorize point source discharge of a biological pollutant, an excess chemical pollutant, and a residual chemical pollutant directly into waters of the state. The pollutant discharge can result from control activities for the following types of organisms:

> ***Aquatic Plants, Algae and Bacteria (WI0064556-1)*** - In 2016, 5 such permits are active within Dane County.
> ***Detrimental or Invasive Aquatic Animals (WI0064564-1)*** - In 2016, no such permits are active within Dane County.
> ***Forest Canopy Pests (WI0064572-1)*** - In 2016, no such permits are active within Dane County.

***Mosquitoes or Other Flying Insects (WI0064581-1*)** - In 2016, 1 such permit is active within Dane County.

Petroleum Contaminated Water (WI-0046531-5) - Petroleum contaminated water from fueling areas (auto, rail, airport, etc.) and petroleum storage tank farms discharged to surface waters or seepage systems. In 2016, 8 such permits are active within Dane County.

Pit/Trench Dewatering (WI-0049344-4) - Covers construction site pit and trench dewatering wastewater discharges to surface waters or seepage systems. In 2016, 45 such permits are active within Dane County.

Potable Water Treatment and Conditioning (WI-0046540-5) - Covers iron filter, lime softener, alum coagulation, granular media filter and reverse osmosis facilities where backwash, regeneration, and rinse water are discharged to surface waters or seepage systems. In 2016, 4 such permits are active within Dane County.

Satellite Sewage Collection Systems (WI-0047341-5) - Municipal and non-municipal entities that own a sewage collection system that is tributary to a regional wastewater treatment facility that provides treatment. The permit includes reporting requirements for sanitary sewer overflows if they occur, and a CMAR. Sanitary sewer overflows are prohibited. Sewage collection system owners must implement a new requirement for a capacity, management, operation and maintenance program. In 2016, 35 such permits are active within Dane County.

Short Duration Discharge (WI-0059137-4) - Discharges that occur infrequently, are relatively short in duration (90 days or less), and do not represent an environmental concern. The discharge may be to a land application site or a discharge to a surface water. In 2016, such permits are active within Dane County.

Swimming Pool Facilities (WI-0046523-5) - Covers pool cleaning, pool drainage and pool filter backwash wastewaters that are discharged to surface waters or seepage. In 2016, 30 such permits are active within Dane County.

4. SUMMARY OF FINDINGS AND RECOMMENDATIONS

Background

The *Dane County Water Quality Summary Plan*, published in 1990, included an inventory of municipal and industrial wastewater discharges in the county. The summary inventory contained recommendations based on changing regulations regarding sludge storage, groundwater quality standards, and ongoing monitoring of wastewater treatment operations in the county.

In 1993, a more thorough needs assessment was conducted for municipal WWTPs in Dane County. This assessment updated the 1990 Summary based on new population and flow forecasts made available as the result of the 1990 Census, the most recent CMARs, and newly reissued WPDES permits. The updated information was reflected in the 1995 update of the *Dane County Water Quality Summary Plan*. The point-source inventory and the *Dane County Water Quality Summary Plan* were updated again in 2004 based on the 2000 Census data, revised population projections, and new CMAR and WPDES information.

The present inventory updates and builds upon all of these previous reports. This inventory includes all existing point sources in Dane County except municipal separate storm sewer systems (MS4) which are discussed in the 2011 update of *Appendix D: Urban Nonpoint Source Analysis of the Dane County Water Quality Plan*. Urban and rural non-point sources of pollution remain the most challenging to control due to the dispersed nature of stormwater runoff.

Findings

Tables C-4 and C-5 and the adjoining map summarize the existing municipal and industrial wastewater discharges in Dane County, their operation, and anticipated future expansion and improvement needs. The analysis presented in Section 2 indicates that nearly all municipal wastewater discharges in Dane County are consistently meeting effluent limits, and basic water quality standards are being satisfied.

Ten municipal treatment plants can be expected to require modifications or expansion within the planning period ending in 2040. Based on population projections and estimated wastewater generation rates the following WWTPs will need upgrades to account for biological loading, hydraulic capacity, or both: Belleville, Brooklyn, Cambridge Oakland Wastewater Commission, Cross Plains, MMSD, Mt. Horeb, Oregon, Roxbury Sanitary District #1, Stoughton, and Sun Prairie. Mount Horeb has started facility planning in preparation for expansion by 2019. Approximate facilities planning starting dates have been suggested for the remaining treatment plants.

Table C-4 Municipal Wastewater Discharges					
Map #	Permit Holder	Receiving Water (Classification)	Annual Average Design Flow (MGD)	Treatment Process	Anticipate Future Needs
1m	Village of Belleville	Sugar River (WWSF)	0.346	OD, AS	2,3,4,8
2m	Village of Blue Mounds	Williams-Barneveld Creek (LFF)	0.075	OD, AS	6,7,8
3m	Village of Brooklyn	Allen Creek (LFF)	0.2	OD, AS	2,3,6,7,8
4m	Cambridge Oakland Wastewater Commission	Koshkonong Creek (WWSF)	0.571	AB, AS	2,3,8
5m	Village of Cross Plains	Black Earth Creek (COLD, ERW)	0.593	OD, AS	1,2,3,4,6,7,8
6m	Dane Iowa Wastewater Commission	Black Earth Creek (WWSF)	0.693	OD, AS	7,8
7m	Village of Deerfield	Tributary of Mud Creek (LAL, LFF, FAL)	0.393	AB, AS	6,8
8m	Madison Metropolitan Sewerage District	Badger Mill Creek (LFF)	3.6	AB, AS	1,2,3,5,6,8
9m	Madison Metropolitan Sewerage District	Badfish Creek (WWSF)	50	AB, AS	1,2,3,5,6,8
10m	Village of Marshall	Maunesha River (WWSF)	0.57	AB, OD	6,8
11m	Village of Mount Horeb	West Branch of Sugar River (LFF)	0.609	AB, AS	1,2,6,8
12m	Village of Oregon	Oregon Branch Badfish Creek (LAL)	1.8	AS	1,3,6,8
13m	Village of Rockdale	Koshkonong Creek (WWSF)	0.03	SF	8
14m	Roxbury Sanitary District #1	Roxbury Creek (LFF)	0.038	SF	1,2,3,7,8
15m	City of Stoughton	Yahara River (WWSF)	1.65	AS	2,3,5,6,8
16m	City of Sun Prairie	Koshkonong Creek (LAL)	4.4	AS	1,2,3,5,6,7,8

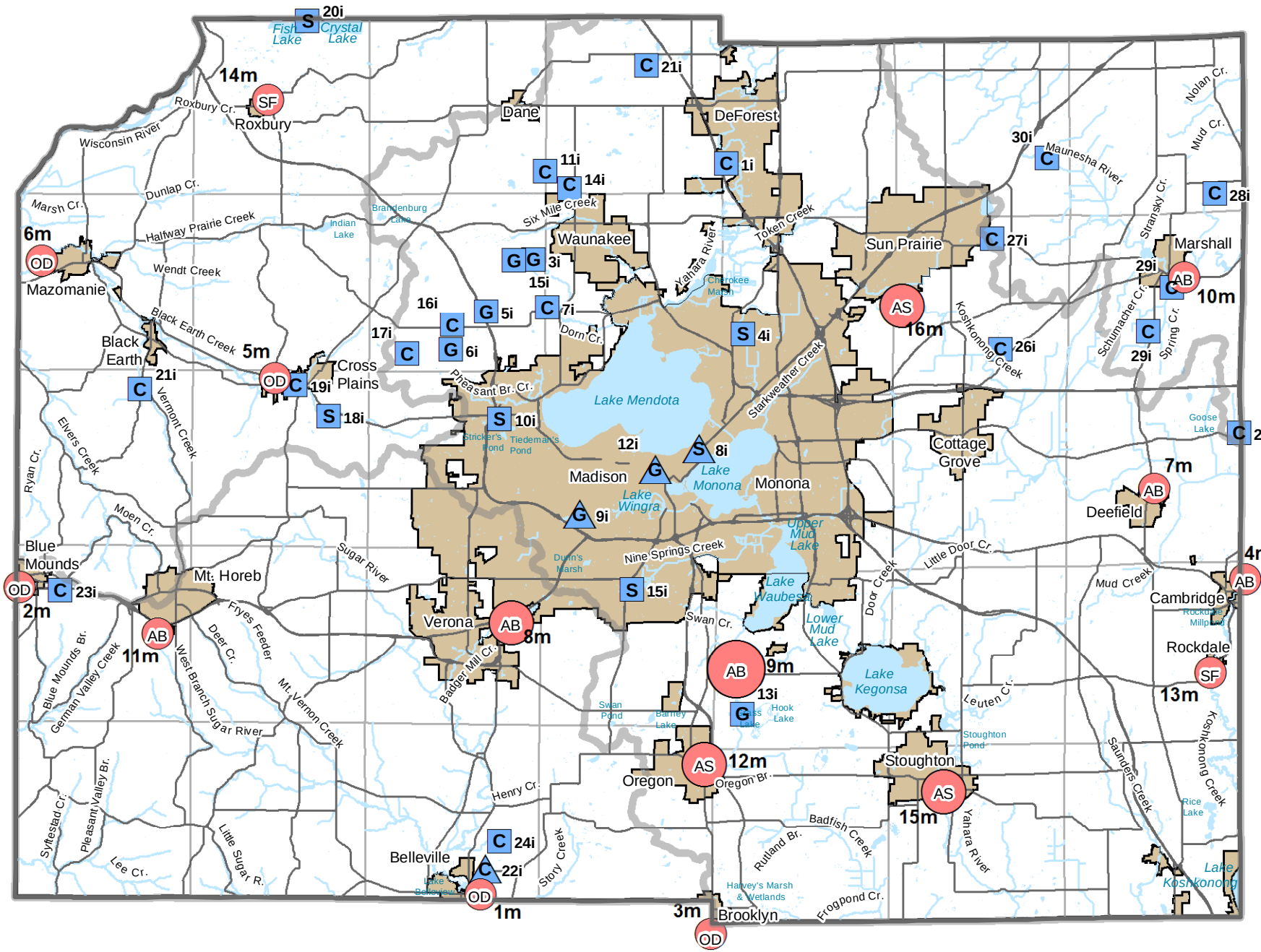
NOTES:

Receiving Water Classifications		Anticipated Future Needs	Treatment Process	
COLD:	Cold Water Community; I, II, III refers to class of trout stream	1 = Capacity Expansion	AB:	Aeration Basin
WWSF:	Warm Water Sport Fishery, which is also the default classification	2 = Process or Treatment Level Upgrading	AS:	Activated Sludge/Biosolids
WWFF:	Warm Water Forage Fish	3 = Clear Water Inflow Management	OD:	Oxidation Ditch
LFF:	Limited Forage Fishery	4 = 180-Day Onsite Biosolids Storage	SF:	Sand Filter
LAL:	Limited Aquatic Life	5 = Industrial Loading Management		
ORW:	Outstanding Resource Water	6 = Toxics Monitoring		
ERW:	Exceptional Resource Water	7 = Temperature Monitoring		
		8 = Phosphorus Removal		

Table C-5 Industrial Wastewater Discharges			
Map #	**Permit Holder**	**Discharge To**	**Type of Discharge**
1i	ABS Global Inc. * (Genus Inc. DBA)	surface and groundwater within Six Mile/Pheasant Branch Creek and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
2i	Blue Star Dairy Farms *	surface and groundwater within Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
3i	Clean Fuel Partners (Clear Horizons Dane LLC)	groundwater within Six Mile/Pheasant Branch Creek subwatershed	landspreading of manure and process centrate to permitted source farms
4i	Dane County Regional Airport	surface water within the West Branch of Starkweather Creek	direct discharge of stormwater containing deicing and anti-icing chemicals, petroleum products, suspended solids, and traces of toxic materials
5i	Don's Mobile Manor	groundwater within the Lower Rock River Basin	wastewater that Is pumped to an in-ground soil absorption drip disposal system
6i	GL Dairy Biogas LLC	groundwater within the Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds	landspreading of digestate, centrate, fibers to permitted source farms
7i	Kippley Farms *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
8i	Madison Gas & Electric (Blount Station)	Lake Monona	pumped direct discharge of cooling water
9i	Madison Gas & Electric Compensatory Recharge (Odana)	groundwater	concentrated infiltration of filtered pond water
10i	City of Middleton Tiedeman Pond	Lake Mendota via storm sewers	direct discharge of excess pond water
11i	Ripp's Dairy Valley LLC *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
12i	UW Madison Charter Street Heating Plant	Lake Monona, via storm sewers,	pumped direct discharge of cooling water
13i	Waste Management City Disposal Landfill (Superfund Site)	Badfish Creek	pumped direct discharge of treated groundwater
14i	White Gold Dairy LLC *	groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota subwatersheds	landspreading of manure and process water
15i	Wisconsin Department of Natural Resources - Nevin Fish Hatchery	Nine Springs Creek	pumped direct discharge of process water from hatchery tanks and raceways
16i	Ziegler Dairy Farms *	surface and groundwater within Six Mile/Pheasant Branch Creeks and Yahara River/Lake Mendota/Lake Monona subwatersheds	landspreading of manure and process water
17i	Wagner Dairy Farm *	surface and groundwater within Six Mile Creek, Black Earth Creek and Roxbury Creek, and Upper Sugar River subwatersheds	landspreading of manure and process water
18i	Capitol Sand & Gravel Co. Inc.	Black Earth Creek	pumped direct discharge of untreated gravel pit effluent
19i	Fish, Crystal and Mud Lake Rehabilitation District	Fish Lake go to Wisconsin River and Crystal Lake go to Roxbury Creek	pumped direct discharge of excess lake water
20i	Wisconsin Department of Natural Resources - Black Earth	surface and groundwater	landspreading of wash water and sludge from equipment cleaning
21i	Anderson Custom Processing	surface and groundwater within Sugar River subwatershed	direct discharge of non-contact cooling water and landspreading mixture of corn starch process water and softener regeneration water
22i	Dairyfood USA Inc. (Lactoprot USA)	groundwater within the Pecatonica River Basin	landspreading of process water and onsite discharge of wastewater associated with well water treatment; sanitary wastewater is hauled to the Blue Mounds WWTP
23i	Prairieland Dairy LLC *	surface and groundwater within Story Creek/Sugar River subwatersheds	landspreading of manure and process water
24i	Daybreak Foods, Inc. *	surface and groundwater	landspreading of manure and process water

Table C-5 Industrial Wastewater Discharges			
Map #	**Permit Holder**	**Discharge To**	**Type of Discharge**
25i	R Acres Rademacher *	surface and groundwater discharges within Maunesha River subwatershed	landspreading of manure and process water
26i	Statz Brothers, Inc. *	surface and groundwater within Maunesha River and Koshkonong Creek subwatersheds	landspreading of manure and process water
27i	Jim Herman Inc. *	groundwater within Upper/Lower Koshkonong Creek and Maunesha/Lower Crawfish River subwatersheds	landspreading of manure and process water
28i	Kersten Farms LLC *	surface and groundwater within Maunesha River and Upper and Lower Koshkonong Creek subwatersheds	landspreading of manure and process water
29i	Maunesha River Dairy *	groundwater within Maunesha River and Upper/Lower Crawfish River subwatersheds	landspreading of manure and process water

* Denotes Concentrated Animal Feeding Operation (CAFO)



Existing Wastewater Discharges

Dane County, Wisconsin

Map 2

Municipal (m)

Treatment Type
- AB Aeration Basin
- AS Activated Sludge
- OD Oxidation Ditch
- SF Sand Filter

Treatment Capacity
- <1 mgd
- 1 - 10 mgd
- >10 mgd

Industrial (i)
- C Discharge Ground & Surface Water
- G Discharge to Groundwater
- S Discharge to Surface Water
- Process Water Discharge
- Mixed Process and Cooling

Sewer Service Area

Sub Watershed

Prepared by the Capital Area Regional Planning Commission
July 2016

0 1 2 4 Miles

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General Point Source Control Program Recommendations

The following general recommendations are intended to apply to all point source discharges. They represent the proposals and minimum standards needed to achieve the overall water quality goals and objectives of the *Dane County Water Quality Plan*. The majority of the recommendations were made as the general point source control recommendations in the 2004 *Summary Plan Update of the Dane County Water Quality Plan* (plan 2004a) and the 2004 *Point Source Inventory and Analysis of the Dane County Water Quality Plan* (plan 2004b) report. History refers to the numbering of the recommendations in the previous plans. Each recommendation is followed by information on the general current status of implementation. Most of the recommendations previously put forth in the 2004 publications have generally been followed and implemented.

1. *All municipal wastewater discharges should receive adequate secondary treatment as a basic minimum year round requirement.* (History: 2004b-1)

   This recommendation has been implemented. All of the municipal WWTP in the region currently provide at least secondary treatment.

2. *Additional treatment beyond the secondary level for removal of pollutants such as phosphorus, micropollutants, and bacteria and pathogens, should be provided for all municipal wastewater discharges where it is required to achieve general water quality standards for recreation and fish and aquatic life during periods of low streamflow.* (History: 2004b-2, 2004a-P-1)

   This recommendation has been implemented. All of the municipal WWTP in the region currently provide additional treatment as required by their WPDES permit, which is specific to character and need of the receiving body that the WWTP discharges to.

3. *Biological treatment processes which conserve energy and support maximum recycling of organic materials to the land should be preferred when considering treatment plant modifications or expansion.* (History: 2004b-3, 2004a-P-2)

   The status of implementation of this recommendation is unknown.

4. *The extension of public sewer service should be limited to those areas designated as USAs or LSAs.* (History: 2004b-4, 2004a-P-4)

   This recommendation has been implemented. NR 110 (Sewerage Systems), requires that all sewer extensions be in conformance with areawide water quality management plans.

5. *Designated local management and planning agencies should jointly investigate problems and alternative solutions for existing concentrations of development on on-site systems in unincorporated areas.* (History: 2004b-5, 2004a-O-2)

   As reported in the 2013 Appendix I (Private On-Site Wastewater Treatment Systems) of the *Dane County Water Quality Plan*, according the to the Department of Public Health, who oversees on-site

systems in our region, less than 0.1% of systems were identified with a failure or other maintenance problem requiring system modification.

6. *Large (over 8,000 gallons/day) on-site wastewater systems should be regulated as wastewater treatment facilities under the WPDES program.* (History: 2004b-6)

   This recommendation has been implemented. Private onsite wastewater treatment systems where the design flow is close to 12,000 gpd are subject to a joint plan review conducted by the WDNR and the Department of Safety and Profession Services, and require a WPDES permit.

7. *Municipal WWTPs should include provisions for receiving and treating holding tank wastes and septage generated within a reasonable service area or distance. Point source management agencies and the WDNR should cooperate in expanding the availability of authorized septage discharge points to municipal wastewater treatment systems.* (History: 2004b-7, 2004a-P-8)

   This recommendation has largely been implemented. If septage receiving facilities are added at the Cross Plains and Belleville treatment plants, any parcel in Dane County would be within 10 miles of a septage discharge point.

8. *All point source management agencies should provide adequate funds and personnel for operation and maintenance of municipal WWTPs.* (History: 2004b-8, 2004a-P-9)

   This recommendation is currently implemented to varying degrees, depending on the WWTP.

9. *The WDNR should maintain its program of operator training and increase technical assistance to point source management agencies.* (History: 2004b-9, 2004a-O-5)

   In 2015, WDNR revised NR 114 (Certification Requirements For Waterworks, Wastewater Treatment Plant, Septage Servicing And Water System Operators) based on workgroup recommendations for improving the wastewater operator certification program. Certified WWTP operators must pass an exam and complete continuing education requirements.

10. *The performance and loading and operating trends of WWTPs should continue to be regularly monitored through the Compliance Maintenance Annual Review (CMAR) program in order to identify and avoid potential problems or permit violations before they occur.* (History: 2004b-10)

    Annual submittal of an electronic CMAR to WDNR is required by NR 208 (Compliance Maintenance).

11. *The WPDES discharge permit program, as administered by the WDNR, should continue to be the primary vehicle for enforcement, monitoring and surveillance of municipal and industrial point source discharges.* (History: 2004b-11)

    This recommendation has been implemented.

12. *Point source management agencies should reduce potentially toxic and hazardous substances in wastewater discharges to levels compatible with water quality standards for the receiving water*

uses. Primary emphasis in most instances should be directed at reducing or removing toxic/hazardous materials at the source, rather than treatment or removal at the treatment plant. (History: 2004b-12, 2004a-P-7)

This recommendation is currently implemented to varying degrees, depending on the WWTP.

13. *Point source management agencies should pursue source control and flow management strategies, including correction of excessive I/I problems, where cost-effective, to most efficiently conserve and utilize the capacity of wastewater collection and treatment facilities.* (History: 2004b-13, 2004a-P-6)

    This recommendation is currently implemented to varying degrees, depending on the WWTP.

14. *Point source management agencies should conduct, or participate in, and support comprehensive public information and education programs directed at household water conservation and hazardous waste issues.* (History: 2004b-14, 2004a-P-10)

    This recommendation is currently implemented to varying degrees, depending on the WWTP.

15. *All significant industrial discharges, including cooling water discharges, should be regulated through the WPDES permit program. WDNR should continue to seek review and comment from CARPC staff regarding land application permit renewals.* (History: 2004b-15)

    This recommendation has been implemented.

16. *Potentially toxic or hazardous substances in industrial discharges should be reduced, and eliminated where possible, by modifying production or manufacturing processes, by recovering and recycling toxic materials, or by pretreating wastes before discharge to remove such materials. The WDNR and the University of Wisconsin - Extension System should continue to provide technical assistance to businesses and industries to help reduce toxic materials in industrial discharges.* (History: 2004b-16)

    The Solid and Hazardous Waste Education Center's (SHWEC), provides pollution prevention information and technical assistance to businesses and industries.

17. *All industrial point source discharges which discharge directly to the environment, should receive "best available treatment," as currently required by federal law.* (History: 2004b-17)

    This recommendation has been implemented. The EPA has developed national wastewater discharge standards on an industry-by-industry basis. These are technology-based regulations, and are intended to represent the greatest pollutant reductions that are economically achievable for an industry. These standards are incorporated into the WPDES permits issued to industrial point sources by the WDNR.

18. *Industrial point sources which discharge to municipal WWTPs should be required, where needed, to provide pretreatment and/or flow-leveling programs in order to maximize compatibility of the waste discharge with the municipal collection and treatment system.* (History: 2004b-18)

Pretreatment of certain industrial discharges is a requirement of the federal Clean Water Act. As a designated authority the WDNR has established pre-treatment requirements in NR 211 (General Pretreatment Requirements), and for specific industries in NR 220 through 297. Most WWTPs have also developed pre-treatment requirements for use of their facilities through their sewer use ordinances.

19. *Water quality effects of phosphorus removal on receiving waters should be evaluated, and an appropriate level of phosphorus removal should be established for each municipal wastewater discharge based on background stream phosphorus concentrations to provide the basis for establishing effluent limits.* (History: 2004b-19)

    This recommendation is being implemented through the revisions to Wisconsin's phosphorus water quality standards for surface waters that were adopted in December 2010 and the related revisions to NR 102 (Water Quality Standards For Wisconsin Surface Waters), NR 217 (Effluent Standards And Limitations For Phosphorus), and NR 151 (Runoff Management).

20. *Sites for land application of wastewater should be carefully located and designed to avoid groundwater contamination, and should not be located in areas of greatest groundwater pollution hazard or municipal well protection zones as shown in Appendix G (Groundwater Protection Plan) of the Dane County Water Quality Plan. WDNR should continue to seek review and comment from CARPC staff regarding land application permit renewals.* (History: 2004b-20)

    This recommendation is being implemented through the WPDES permit program, including the general permit for Land Application of Liquid Industrial Wastes (WI-0055867-6).

21. *Wastewater facilities planning and improvements should be conducted in the context of comprehensive areawide and watershed plans for pollution control and resource protection.* (History: 2004a-P-3)

    This recommendation has been implemented. NR 110 (Sewerage Systems), requires that all WWTP facilities plans be in conformance with areawide water quality management plans.

22. *Wastewater facilities planning should address the land use and hydrologic effects of proposals, particularly where regionalization or interconnection of service areas is being considered. The adverse impacts of interbasin transfer on stream baseflow should be specifically addressed.* (History: 2004a-P-5)

    This has been effectively done in for Badger Mill Creek by MMSD. Additional evaluation for other areas is needed.

23. *All wastewater facilities should evaluate adaptive management and water quality trading as a means of complying with required phosphorus reductions.* (new recommendation)

MMSD, Stoughton and Oregon have evaluated adaptive management and water quality trading and decided upon participating in an adaptive management project together. This Adaptive Management

Plan was submitted in 2016. Dane-Iowa has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan was submitted in 2016. Deerfield has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan is expected to be submitted in 2017. Brooklyn has evaluated adaptive management and water quality trading and decided upon participating in water quality trading. This trading plan is expected to be submitted in 2017. The City of Sun Prairie evaluated the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction and chose to install phosphorus reducing technology at the WWTP in place of the other approaches.

Short-Term Priority Actions

Following the general point source control program recommendations is a list of specific short-range priority actions for the designated point-source management agencies. These include actions and studies which should be initiated in the near future (within 5-6 years) to address immediate needs and concerns. The recommendation to evaluate the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions has been made for all WWTPs that are not currently doing so.

Wisconsin River Basin

Cross Plains WWTP (discharge no. 5m)

Continue efforts to reduce I/I to achieve improved operational efficiency and reduce cost. It is recommended that the Village work to reduce per capita water use across the service area. Include septage receiving station and provide for a minimum 180-day storage of biosolids onsite in future treatment plant upgrades. It is recommended that the Village conduct a temperature operational evaluation and develop an optimization report. It is also recommended that the WWTP conduct a phosphorus operational evaluation and develop an optimization report. Explore options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Dane-Iowa Wastewater Commission WWTP (discharge no. 6m)

The Dane-Iowa Wastewater Commission has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan was submitted in 2016. No recommendations.

Roxbury Sanitary District #1 WWTP (discharge no. 14m)

The WWTP is consistently operating at design loadings and flows, therefore it is recommended that a capacity evaluation and needs assessment be conducted for the facility. It is recommended that the WWTP conduct an operational evaluation and develop an optimization report for ammonia treatment to consistently meet effluent limits. The Sanitary District has identified areas of infiltration and inflow, but currently lacks the funding to make necessary repairs. It is recommended that the WWTP development of a CMOM program for the collection system and start planning the replacement of the affected mains. It is also recommended that the WWTP conduct a phosphorus operational evaluation and develop an optimization report. Explore options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Sugar-Pecatonica River Basin

Belleville WWTP (discharge no. 1m)

It is recommended that areas of clear water intrusion be located and repaired to achieve improved operational efficiency and reduce cost. Provide for a minimum 180-day storage of biosolids onsite in future treatment plant upgrades. It is also recommended that the WWTP conduct a phosphorus

operational evaluation and develop an optimization report. Explore options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Blue Mounds WWTP (discharge no. 2m)

It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary. Explore options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Brooklyn WWTP (discharge no. 3m)

It is recommended that the Village of Brooklyn conduct a chloride pollutant minimization plan and a temperature operational evaluation and develop optimization reports for each. Continue efforts to reduce I/I to achieve improved operational efficiency and reduce cost. Brooklyn has evaluated adaptive management and water quality trading and decided upon participating in water quality trading. This trading plan is expected to be submitted in 2017.

Mt. Horeb WWTP (discharge no. 11m)

Hydraulic capacity exceeded 90 percent of the design capacity in 2013 and 2014 and is expected to reach full design capacity by 2029, based on population projections and estimated wastewater generation rates. It is the intent of the Village to have an upgraded facility by the end of 2019. As multiple monthly flow and (C)BOD limits were exceeded in 2014 and a new plant will not be available until 2019, it is recommended that a source analysis study of influent quantity and quality be conducted and appropriate source reductions be identified or interim treatment processes be put in place to reduce risk of permit exceedances prior to the planned upgrade. It is also recommended that the WWTP conduct a phosphorus operational evaluation and develop an optimization report. Evaluate options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions while planning for the upgraded facility.

Lower Rock River Basin- Koshkonong Creek Watershed

Cambridge Oakland Wastewater Commission WWTP (discharge no. 4m)

The Cambridge Oakland Wastewater Commission has undertaken some sewer main lining to reduce clear water intrusion into the collections system, and plans to undertake an I/I study. Continue efforts to reduce I/I to achieve improved operational efficiency and reduce cost. It is also recommended that the WWTP evaluate options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Deerfield WWTP (discharge no. 7m)

Deerfield has evaluated adaptive management and water quality trading and decided upon participating in their own adaptive management project. This Adaptive Management Plan is expected to be submitted in 2017. It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary.

Rockdale WWTP (discharge no. 13m)

It is recommended that the WWTP evaluate options of a watershed adaptive management and water quality trading approach to achieving phosphorus reductions.

Sun Prairie WWTP (discharge no. 16m)

The treatment plant currently is operating near 90 percent of the hydraulic capacity and is expected to reach full design capacity by 2022, based on population projections and estimated wastewater generation rates. It is recommended that a capacity evaluation and needs assessment study be conducted by 2018 to either reduce source contributions or increase plant flow capacity. Continue efforts to reduce I/I to extend the time of a plant capacity expansion, improve operational efficiency and reduce cost. It is recommended that the City work to reduce per capita water use across the service area. It is recommended that the WWTP continue implementation of the chloride pollutant minimization program and update it as necessary. It is also recommended that the City conduct a temperature operational evaluation and develop an optimization report. The City evaluated the options of a watershed adaptive management and water quality trading approach to achieving phosphorus reduction and chose to install phosphorus reducing technology at the WWTP in place of the other approaches.

Lower Rock River Basin- Yahara River Watershed

MMSD Nine Springs WWTP (discharge no. 8m & 9m)

Continue to investigate and correct areas of high I/I in the collection system as well as reduced per capita water use across the service area. Continue to evaluate and institute industrial loading management measures. It is recommended that the WWTP continue implementation of the chloride source reduction and mercury pollutant minimization programs and update them as necessary. Continue leading the Yahara Watershed Improvement Network in implementing phosphorus reduction practices within the watershed. Continue to collaborate with regional partners to investigate and identify approaches of recycling of highly treated wastewater in order to mitigate the adverse impacts of groundwater withdrawals in ways that that are cost-effective and environmentally sound.

Oregon WWTP (discharge no. 12m)

Continue efforts to reduce I/I to achieve improved operational efficiency and reduce cost. Work to reduce per capita water use across the service area. It is recommended that the WWTP continue implementation of the mercury operational evaluation optimization report and update it as necessary to achieve mercury reductions. Continue participating with the Yahara Watershed Improvement Network in implementing phosphorus reduction practices within the watershed.

Stoughton WWTP (discharge no. 15m)

The WWTP is consistently operating near full design biological loadings and the City has been working with industrial customers to reduce BOD loads. In addition, the WWTP is expected to reach 90 percent of the design capacity by 2020. The City's engineering consultant prepared a long range strategic plan in

2015 to evaluate plant operations, including loadings. It is recommended that the City implement the recommendations of that report. Continue efforts to reduce I/I to achieve improved operational efficiency and reduce cost and work to reduce per capita water use across the service area. It is recommended that the WWTP continue implementation of the mercury operational evaluation optimization report and update it as necessary to achieve mercury reductions. Continue participating with the Yahara Watershed Improvement Network in implementing phosphorus reduction practices within the watershed.

Need For Continuing Efforts

Phosphorus

Nutrient enrichment of surface water results in excessive growth of aquatic plants which in turn can negatively affect recreational use, property values, and public health. Phosphorus is often found to be the growth-limiting factor, and reducing phosphorus concentrations in the water below 10 µg/L has been shown to strongly reduce growth and respiration in some aquatic plants. Recognition of the importance of controlling phosphorus pollution is growing, with 27 water bodies in the region on the 303(d) list of impaired waters due to total phosphorus in 2016. In-stream sources of phosphorus can be traced to nonpoint pollution sources (i.e., agricultural and urban runoff) and streambed mineral sources, as well as point sources.

Reducing phosphorus discharge in WWTP effluent may require significant expenditures. A more cost-effective approach has been demonstrated by MMSD and their collaborative partners with the Yahara WINs adaptive management pilot. While these efforts are still in their infancy, they show great potential for reducing phosphorus from non-point sources, which will be required to achieve improved water quality. Based on efforts to date, adaptive management and water quality trading appear to offer a cost effective means of achieving phosphorus reductions. However much more work is needed to expand these efforts as well as to evaluate their potential application in other watersheds.

Chlorides

Chlorides are a growing concern for both the groundwater and surface waters in the region. Wastewater can have high concentrations of chlorides from sources such as water softeners, industry, and deicers. In a typical WWTP, the chlorides pass through the plant untreated. Freshwater organisms cannot tolerate high levels of chlorides. Water quality standards for chloride in Wisconsin, set based on aquatic life toxicity, are 395 mg/L (chronic) and 757 mg/L (acute). In 2015, AECOM prepared a Chloride Compliance Study for MMSD's Nine Springs Wastewater Treatment Plant which estimated that it could cost from $300-million to $2.3-billion to remove the required amount of chloride. Source reduction programs are one potentially cost-effective approach to this problem. However, more attention and effort is needed to address this important issue.

Micropollutants

Micropollutants are an emerging concern for both groundwater and surface waters. Micropollutants include pharmaceuticals, ingredients of household chemicals and personal care products, chemicals used in small businesses or industries, and pesticides. Current regulations do not account for these types of pollutants or the little known impacts of these compounds. These contaminants have shown various

deleterious effects on fish health and behavior and prolonged low-level exposure poses negative effects, such as increased antibiotic resistance, hormone mimicry (endocrine disruption), and carcinogenicity, on human health as well. They enter sewage waste streams in several ways, including:

1. Flushing of drugs by consumers and health professionals;
2. Prescribed medications are released in urine by users;
3. Chemicals from personal care products enter drains;
4. Flame retardants and other performance chemicals from clothing are released when washed;
5. Medication sent to landfills can contribute to

Even materials containing micropollutants that are deposited into a landfill can enter the sewage waste streams as leachate from landfills is often sent to the wastewater utility for treatment.

These pollutants are not easily eliminated in the conventional treatment process and therefore can lead to water pollution. Although concentrations of those substances and their decomposition products are quite low, there is still a chance to harm aquatic organisms. Research has found high levels of contaminants from pharmaceuticals and personal care products, even large distances from sewage outlets, in Lake Michigan indicating that contaminants do not readily dissipate. Techniques for elimination of micropollutants at a WWTP include activated carbon filters adsorb micropollutants, ozone oxidizes micropollutants and, the use of enzymes and fungi degrade micropollutants. These technologies are still costly and therefore are not applied on a regular basis.

Future directions for eliminating water contamination include providing sustainable funding for source control reductions, expanding destruction options, raising consumer awareness, reducing and avoiding drug waste and banning certain ingredients available to manufacturers.

One Water

"One Water" is the name for the paradigm shift beginning to take place as water and sewer utilities and other local government institutions start to integrate the management of potable water, waste water and stormwater. This approach seeks to eliminate the dominant practice of centralized and siloed systems and manage the urban water cycle as a single system in which all water flows are recognized as a potential resource and where the interconnectedness of water supply, groundwater, stormwater, wastewater, flooding, water quality, wetlands, and water bodies is recognized. Research into successful case studies of regional collaboration will be need to overcome the complex regulatory structure and other barriers to realize the lower costs and increased water availability that are the benefits of an integrated system.

Regionalization

It is sometimes more cost-effective or environmentally beneficial to abandon an existing treatment plant and provide treatment by connecting to a nearby treatment plant, or to combine the operations of several existing plants in a new regional plant. In the past, many feasibility studies have been conducted to examine the advisability of this approach. The Morrisonville Sanitary District No. 1, the City of Verona, and the Village of Dane are examples of communities that had their own WWTP in the past, but determined in was a preferred option to connect to the regional MMSD WWTP.

The feasibility of regionalization is not determined by cost-effectiveness alone. The availability of excess capacity in nearby collection and treatment systems, the level of cooperation between management agencies, environmental constraints, and political will are all necessary for the success of a regional treatment alternative. These circumstances are reviewed and investigated for each WWTP requiring expansion as part of the facility planning process. There are no treatment plants, at this time, where a regionalization study is called for. As treatment plants reach their design capacity or require extensive upgrading, the need for such a study should be reevaluated based on the particular circumstances present at the time.

In some cases, a regional approach to individual treatment and disposal processes may prove more cost-effective where complete regionalization is not. Lab functions, sludge drying, sludge hauling, and sludge storage are a few processes which have proven amenable to such an approach. It may prove more cost-effective for two small plants to share sludge hauling equipment instead of spending capital to duplicate equipment which is not used continuously.

The MMSD has for some time been providing limited technical assistance in the areas of monitoring, laboratory analyses, treatment operations, residual waste disposal, and sewer system evaluation and rehabilitation to other point source management agencies. This assistance has been offered in circumstances which would result in regional environmental benefits and cost advantages to the District and its municipal customers, and where providing such services would not be detrimental to the District's operation or its existing customers, and where such services are not readily available from the private sector.

Recently, some municipalities facing the need to expand biosolids management have requested MMSD consider providing this service, thereby expanding MMSD's technical services and assistance to include management services as well. The idea of regional biosolids management is endorsed by the WDNR. The MMSD has made policy changes to allow it to provide a contract-based, regional biosolids management service so long as it will not interfere with its own operation.

The CARPC supports the expansion of the services the MMSD can provide to the surrounding communities. This, however, should be done only where a thorough cost-effectiveness analysis shows it to be favorable. Regional operation of wastewater treatment facilities has proven to be cost-effective in other regions of the country (see for example the Metropolitan Council in Minnesota), and may provide operational efficiencies and cost reductions for the Capital Region as well.

It should be recognized that regionalization can have detrimental environmental impacts. As the CUSA has encroached into adjacent river basins and watersheds, interbasin transfer of groundwater through regional wastewater collection systems has become a serious problem in Dane County. This is also true of the Yahara River watershed as treated effluent bypasses the Yahara Lakes. The Dane County Regional Hydrologic Model has shown that groundwater withdrawn by municipal wells reduces the same volume of water in the streams, lakes, and wetlands of the watershed. This has resulted in serious reductions in stream baseflows, drying of springs and wetlands, and impacted fisheries and natural habitats. These adverse impacts have necessitated a reevaluation of the drive to regionalization. New studies are

needed to evaluate the feasibility of satellite wastewater treatment facilities to ensure that groundwater withdrawn in critical watersheds and subwatersheds is returned to the same watershed after use and treatment. This approach may require changes in state law, especially as it relates to the discharge of highly treated effluent to the Yahara Lakes. Further studies are needed to develop cost-effective, environmentally sound, and feasible approaches for recycling highly treated wastewater through infiltration to resupply the groundwater and mitigate the adverse impacts of municipal well withdrawals.