# 5.0 Basis of Planning

## 5.1 Basis for Design

### 5.1.1 Population Growth Projections

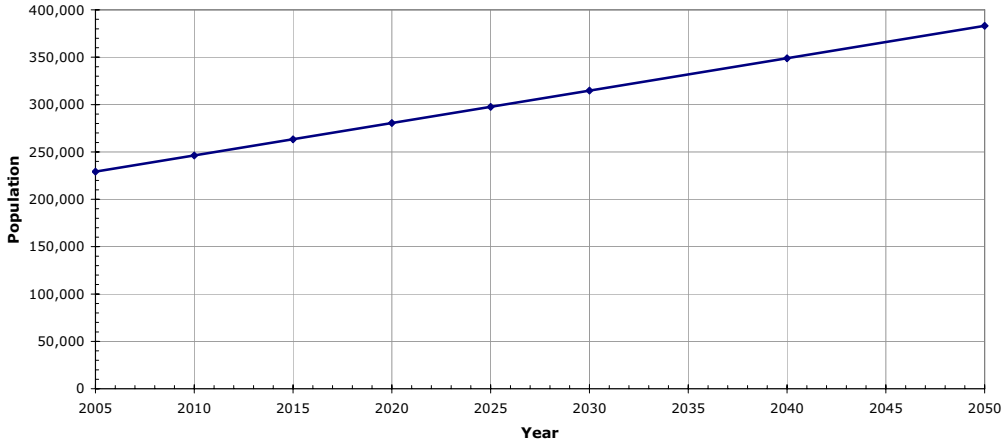
Historical population data were used to forecast the future MWMC service area population through the buildout year of 2050. Assuming that population growth will continue at a similar rate as it did between 1990 and 2002, the growth rate was projected forward to the year 2050 providing an estimate of future populations within Eugene-Springfield. Figure 5.1.1-1 illustrates the projected population for the service area. The build-out service area population is assumed to occur in year 2050, resulting in a population density of 18.1 persons per acre.

Table 5.1.1-1 summarizes the population projections for Eugene-Springfield, Santa Clara/River Road, and the combined MWMC service area at 5-year intervals over the study period.

**TABLE 5.1.1-1**
Population Projection Data for Eugene-Springfield Metropolitan Area
*MWMC Facility Plan, Eugene-Springfield*

| Year | Eugene-Springfield Population Projections | Santa Clara/River Road Population | Estimated MWMC Service Area Population Projections |
|---|---|---|---|
| 2005 | 207,745 | 21,400 | 229,145 |
| 2010 | 224,855 | 21,400 | 246,255 |
| 2015 | 241,965 | 21,400 | 263,365 |
| 2020 | 259,075 | 21,400 | 280,475 |
| 2025 | 276,185 | 21,400 | 297,585 |
| 2050 | 361,735 | 21,400 | 383,135 |

**FIGURE 5.1.1-1**
Population Projection Summary
*MWMC Facility Plan, Eugene-Springfield*




Typically, wastewater planning uses population projections developed by the local planning jurisdiction(s). In this case, the Eugene-Springfield Metropolitan Area General Plan (Metro Plan) and its adopted functional plans provide a basis for projecting population growth and land usage through the year 2015. Because the 2004 MWMC Facilities Plan is intended to serve the area through the year 2025, a population projection beyond the timeframe of the Metro Plan projection was necessary. The 20-year planning was selected for the 2004 MWMC Facilities Plan because the Oregon Department of Environmental Quality (DEQ) guidelines for the preparation of facilities plans specify a 20-year planning horizon.

Also, Lane Council of Governments (LCOG) is in the process of updating their population projections for the Eugene-Springfield area through their Region 2050 study because the most current adopted population projections in the Eugene-Springfield Metro Area General Plan (Metro Plan) are out of date. It may be several years before updated Metro Plan projections are adopted.

For these two reasons MWMC developed populations projections based on an evaluation of recent historical population data. Population projections used in the 2004 Facilities Plan were determined assuming approximately a 1.6 percent annual growth rate applied to the year 2002 population. This growth rate is based on historical growth rates for the community since 1990 (see Figure 5.1.1-2). The complete evaluation of historical population and the derivation of the projected population values for the 2004 MWMC Facilities Plan are presented in the *Flow and Load Projections Technical Memorandum* dated April 12, 2004.

The graph also shows population as far back as 1970 for historical perspective. This is a downward revision of the Metro Plan projection by about 0.2 percent annually. The current MWMC service area population (2002) is 217,737. The projected service area population in 2025 is 297,585, which represents a 36.7 percent increase.

**FIGURE 5.1.1-2**
Population Projection Comparison
*MWMC Facility Plan, Eugene-Springfield*

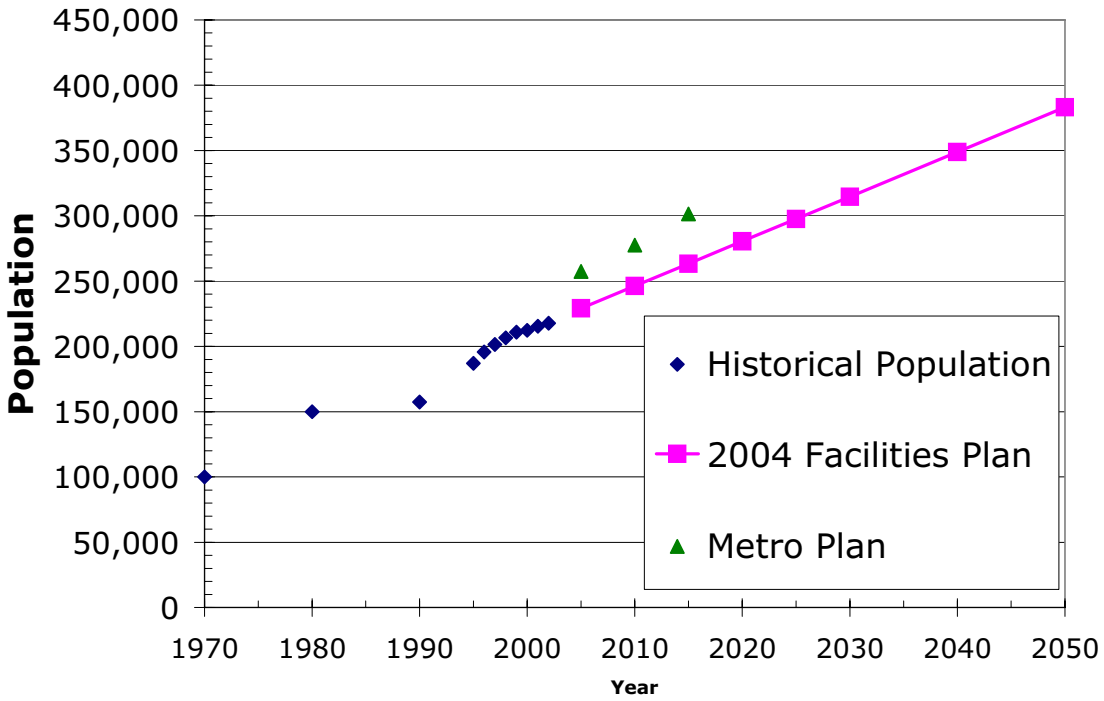



Figure 5.1.1-2 and Table 5.1.1-2 compares the population projections from the Metro Plan to the population projections used in the 2004 MWMC Facilities Plan. The Metro Plan values are from the Eugene-Springfield Metropolitan Area Residential Lands and Housing Study (February 1999) and incorporate the amendments as approved on January 15, 2002 per Order No. 001359. There are 2004 amendments to the Metro Plan/Public Facilities and Service Plan but these amendments do not include changes to the regions population projections. A letter from the state Department of Land Use and Development (DLCD) indicating that they concur with these 2004 facilities plan populations projections is presented in an appendix in Volume 2 of this Facilities Plan

**TABLE 5.1.1-2**
Population Projection Comparison
*MWMC Facility Plan, Eugene-Springfield*

| Year | Adopted Metro Plan[1] | 2004 Facilities Plan |
|---|---|---|
| **2005** | 257,400 | 229,145 |
| **2010** | 277,600 | 246,255 |
| **2015** | 301,400 | 263,365 |
| **2020** | | 280,475 |
| **2025** | | 297,585 |

**TABLE 5.1.1-2**
Population Projection Comparison
*MWMC Facility Plan, Eugene-Springfield*

| Year | Adopted Metro Plan[1] | 2004 Facilities Plan |
|---|---|---|
| **Build-out (2050)** | | 383,135 |

1) Eugene-Springfield Metropolitan Area Residential Lands and Housing Study, February 1999. Lane Council of Governments.

## 5.1.2 Projected Wastewater Flow and Load Characteristics

Wastewater flows and loads were projected to the year 2025, at 5-year intervals, and for the build-out condition (estimated year 2050) for domestic and industrial sources. Similar to the historical analysis, average, maximum month, maximum week, and maximum day flow ranges and loads were determined for both dry and wet seasons.

Domestic (residential and commercial, and I/I) projections were estimated based on the population projections and the selected per capita and peaking factors identified above. The methods for determining average, maximum month, maximum week, maximum day, and peak hour values are listed below and refer to both flows and loadings:

- *Average Dry Weather*—Determined by multiplying the selected per capita value by the projected population for 2005, 2010, 2015, 2020, 2025, and buildout.
- *Average Wet Weather*—Determined by multiplying the selected per capita value by the projected population for 2005, 2010, 2015, 2020, 2025, and buildout.
- *Maximum Month*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum month peaking factor.
- *Maximum Week*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum week peaking factor.
- *Maximum Day*—Determined by multiplying the future dry or wet weather averages for a given year by the selected maximum day peaking factor.
- *Dry Weather Peak Hour Flow*—Determined by multiplying the dry weather average for a given year by the selected peak hour peaking factor.
- *Wet Weather Peak Hour Flow*—Determined by modeling the collection system at a 5-year, 24-hour storm recurrence. The result of the modeling efforts is presented in the "Wet Weather Peak Flow" technical memorandum.

Tables 5.1.2-1 and 5.1.2-2 summarize the average and maximum month future projected flows and loads for both dry and wet seasons. These are the total flow and total load projections consisting of the residential, commercial, industrial, and I/I components. Peaking factors are not applied to the industrial portion of the overall flows and loads.

**TABLE 5.1.2-1**
Summary of Total Flow Projections (Residential, Commercial, and Industrial)
*MWMC Facility Plan, Eugene-Springfield*

| Year | 2005 | 2010 | 2015 | 2020 | 2025 | 2050 (build-out) |
|---|---|---|---|---|---|---|
| Estimated Population | 229,145 | 246,255 | 263,365 | 280,475 | 297,585 | 383,135 |
| ***Wastewater Flow Projections (mgd)*** | | | | | | |
| Average Dry Weather | 29.6 | 31.8 | 34.0 | 36.2 | 38.4 | 49.4 |
| Max. Month Dry Weather | 46.0 | 49.4 | 52.7 | 56.0 | 59.3 | 75.8 |
| Average Wet Weather | 52.5 | 56.4 | 60.3 | 64.3 | 68.2 | 87.8 |
| Max. Month Wet Weather | 85.7 | 92.0 | 98.2 | 104.5 | 110.8 | 142.1 |
| Peak Hour Wet Weather (Modeling)* | 266 | 268.5 | 271 | 274 | 277 | 294 |

*The "modeling" values for wet weather peak hour flows are based on actual modeling results for 2005 and 2025. For the purpose of planning at the WPCF, the intermediate peak flow values are interpolated. See “Wet Weather Peak Flow” technical memorandum for additional discussion.

**TABLE 5.1.2-2**
Summary of Total Load Projections (Residential, Commercial, and Industrial)
*MWMC Facility Plan, Eugene-Springfield*

| Year | 2005 | 2010 | 2015 | 2020 | 2025 | 2050 (build-out) |
|---|---|---|---|---|---|---|
| Estimated Population | 229,145 | 246,255 | 263,365 | 280,475 | 297,585 | 383,135 |
| ***BOD Loading Projections (lb/day)*** | | | | | | |
| Average Dry Weather | 42,400 | 45,600 | 48,700 | 51,900 | 55,000 | 70,900 |
| Max. Month Dry Weather | 57,500 | 61,600 | 65,700 | 69,900 | 74,000 | 94,500 |
| Average Wet Weather | 42,400 | 45,600 | 48,700 | 51,900 | 55,000 | 70,900 |
| Max. Month Wet Weather | 57,500 | 61,600 | 65,700 | 69,900 | 74,000 | 94,500 |
| ***TSS Loading Projections (lb/day)*** | | | | | | |
| Average Dry Weather | 47,000 | 50,500 | 54,000 | 57,500 | 61,000 | 78,500 |
| Max. Month Dry Weather | 68,000 | 73,000 | 77,800 | 82,800 | 87,600 | 112,200 |
| Average Wet Weather | 59,600 | 64,000 | 68,500 | 72,900 | 77,400 | 99,600 |
| Max. Month Wet Weather | 79,700 | 85,500 | 91,200 | 97,000 | 102,800 | 131,700 |

The flow projections in Table 5.1.2-1 are based on peaking factors that were derived from historical data (1990 through 2002). As was discussed in Chapter 4 – Wastewater Characteristics and in more detail in the *Flow and Load Projections* technical memorandum, the DEQ methodology for predicting peaking factors/future flows was also performed. The projections that resulted from the DEQ method were less than or comparable to the projections based on the historical data method except for the dry season maximum month value. The 2025 values were 59.3 mgd based on the historical data method (1.5 peaking factor) and 68.9 mgd based on the DEQ method (1.9 peaking factor) which represents a one

in ten year frequency. DEQ has agreed to allow MWMC to proceed with this planning effort using the 59.3 mgd value under the condition that MWMC take operational measures at the WPCF if flows corresponding to the 1.9 peaking factor occur at some point in the future. During such an event, the WPCF plant staff could feed 33 percent of the primary effluent to each of the last three aeration basin cells during the diurnal peak and then revert back to feeding 25 percent to each of the four cells for the remainder of the day. This operating approach of utilizing a contact stabilization type of operation, which would not allow for nitrification, during peak diurnal and step feed during the rest of the day would take a considerable effort by the plant staff. The staff could not rely on this approach on a continuous basis but it is an approach that could be implemented for one month approximately every 10 years so that the risk of permit non-compliance could be mitigated during such an event.

## 5.1.3 Existing Regulatory Requirements

The WPCF discharges to the Willamette River at river mile 178. The discharge is permitted under an NPDES permit issued by the DEQ. DEQ issued a renewed NPDES permit for the WPCF in May 2002. The previous permit expired in 1997, and the current NPDES permit (No. 102486) expires December 31, 2006. The discharge limitations and requirements for the WPCF's current NPDES permit are summarized in Table 5.1.3-1. These discharge limitations and requirements are defined for three categories of wastewater sources:

1. Treated effluent: outfall 001 [diffuser and Outfall 001A (bank outfall)]
2. Reclaimed water: outfall 101 (Level II) and outfall 102 (Level III)
3. Emergency SSOs: outfalls 002 to 014

**TABLE 5.1.3-1**
Existing NPDES Discharge Requirements and Limitations for the WPCF
*MWMC Facility Plan, Eugene-Springfield*

(1) Treated Effluent Outfall 001 and 001A (No discharge from Outfall 001A from May 22 through October 31 unless approved by the DEQ)

May 1 – October 31:

| Parameter | Average Effluent Concentrations Monthly | Weekly | Monthly[1] Average (lb/day) | Weekly[1] Average (lb/day) | Daily[1] Maximum (lbs) |
|---|---|---|---|---|---|
| $CBOD_5$ | 10 mg/L | 15 mg/L | 4,100 | 6,100 | 8,200 |
| TSS | 10 mg/L | 15 mg/L | 4,100 | 6,100 | 8,200 |

November 1 – April 30:

| Parameter | Average Effluent Concentrations Monthly | Weekly | Monthly[1] Average (lb/day) | Weekly[1] Average (lb/day) | Daily[1] Maximum (lbs) |
|---|---|---|---|---|---|
| $CBOD_5$ | 25 mg/L | 40 mg/L | 16,000 | 24,000 | 32,000 |
| TSS | 30 mg/L | 45 mg/L | 19,000 | 28,000 | 38,000 |

**TABLE 5.1.3-1**
Existing NPDES Discharge Requirements and Limitations for the WPCF
*MWMC Facility Plan, Eugene-Springfield*

Year Round:

| Parameter | Limitations |
|---|---|
| *E. coli* Bacteria | Shall not exceed 126 organisms per 100 mL monthly geometric mean. No single sample shall exceed 406 organisms per 100 mL. |
| pH | Shall be within the range of 6.0 - 9.0 |
| $CBOD_5$ and TSS Removal Efficiency | Shall not be less than 85% monthly average for $CBOD_5$ and 85% monthly for TSS. |
| Total Residual Chlorine | Shall not exceed a monthly average concentration of 0.05 mg/L or a daily average concentration of 0.12 mg/L |
| Excess Thermal Loading: May 1 – Oct 31 (Summer) | Shall not exceed a weekly average of 3.1 billion BTUs per day |
| Ammonia: May 1 – Oct 31 (Summer) | Shall not exceed 22 mg/L daily<br>Maximum and 12 mg/L monthly average.<br>*(Not specified in permit, but should be expressed as Ammonia–N)* |

(1) *The permit also defines the mixing zone as follows:*

The allowable mixing zone is that portion of the Willamette River from 20 feet upstream of the diffuser to 200 feet downstream of the diffuser. In addition, the zone of immediate dilution (ZID) shall include that portion of the Willamette River within 50 feet downstream of the diffuser.

(1) *The permit also contains the following language regarding effluent limitations:*

This permit contains either technology or water quality based effluent limits for those parameters discharged by the permittee that the Department has determined require effluent limitations to comply with the water quality standards found in OAR 340-41-445 outside the above mixing zones. The limits were established on the basis of the information provided by the permittee and following the Department's rules, including OAR 340-41-026. Other parameters also were identified in the permittee's application for which the Department did not establish effluent limitations. The Department has determined that those parameters do not present a reasonable potential to violate applicable water quality standards. The permittee is required to notify the Department if changes occur in its processes or influent stream which could significantly change the effluent stream for any of those parameters.

(2) Reclaimed wastewater outfall 101 and 102

No discharge to state waters is permitted. All reclaimed water reuse shall prevent:

a. Prolonged ponding of treated reclaimed water on the ground surface
b. Surface runoff or subsurface drainage through drainage tile
c. The creation of odors, fly and mosquito breeding, or other nuisance conditions
d. The overloading of land with nutrients, organics, or other pollutant parameters
e. Impairment of existing or reasonably probable beneficial uses of groundwater

Outfall 101:

Prior to reuse of the reclaimed water, it shall receive at least Level II treatment as defined in OAR 340-55 to: Reduce total coliform to 240 organisms per 100 mL in two consecutive samples, and a 7-day median of 23 organisms per 100 mL.

**TABLE 5.1.3-1**
Existing NPDES Discharge Requirements and Limitations for the WPCF
*MWMC Facility Plan, Eugene-Springfield*

| | |
|---|---|
| | Outfall 102:<br><br>Prior to reuse of the reclaimed water, it shall receive at least Level III treatment as defined in OAR 340-55 to: Reduce total coliform to 7-day median of 2.2 organisms per 100 mL and maximum of 23 organisms per 100 mL.<br><br>Irrigation shall conform to the irrigation management plan approved by the Department in accordance with OAR 340-55 for agricultural, commercial, or industrial use. |
| (3) Emergency Overflow Outfalls 002 through 014 | |
| (1) | No wastes shall be discharged from these outfalls and no activities shall be conducted which violate water quality standards as adopted in OAR 340-41-0445, unless the cause of the discharge is due to storm events as allowed under OAR 340-41-120 (13) or (14) as follows: |
| (2) | Raw sewage discharges are prohibited to waters of the state from November 1 through May 21, except during a storm event greater than the one-in-five-year, 24-hour duration storm, and from May 22 through October 31, except during a storm event greater than the one-in-ten-year, 24-hour duration storm.<br><br>If an overflow occurs between May 22 and June 1, and if the permittee demonstrates to the Department's satisfaction that no increase in risk to beneficial uses occurred because of the overflow, no violation shall be triggered if the storm associated with the overflow was greater than the one-in-five-year, 24-hour duration storm. |

[1] Average dry weather design flow to the facility equals 49 mgd. Summer mass load limits based on average dry weather design flow to the facility. Winter mass load limits based on average wet weather design flow to the facility equaling 75 mgd. The daily mass load limit is suspended on any day in which the flow to the treatment facility exceeds 98 mgd (twice the design average dry weather flow).

The treated effluent discharge has mass load and concentration limitations for $CBOD_5$ and TSS established for the dry season (May 1 – October 31) and the wet season (November 1 – April 30). These current mass load limitations are the same as for the previous NPDES permit, and these are based on the standards for the Willamette Basin. The permit requires 85 percent removal of $BOD_5$ and TSS, and the permit also allows for the daily mass load limitations to be suspended on any day that the influent flow exceeds 98 mgd (or twice the design average dry weather flow).

The permit does not address effluent blending or selective treatment operation methods that are used by the WPCF when plant flows exceed the maximum day hydraulic capacity. Under these conditions, a portion of the primary effluent flow is directed to the chlorine contact basins and blended with secondary effluent prior to disinfection.

Treated effluent also includes limitations for ammonia, bacteria (*E. coli*), pH, total residual chlorine, and excess thermal loading (during May 1 – Oct. 31). The ammonia and excess thermal load limitations are new to the 2002 permit.

The untreated emergency SSOs have specific limits on the seasonal timing and storm event conditions that create circumstances such that these discharges are unavoidable and allowable under state law [OAR 340-41-120 (13) or (14)].

The third category of discharge that is addressed in the NPDES permit is reclaimed wastewater. MWMC is constructing a reclaimed water pipeline from the WPCF to the BMF to provide water to the planned poplar plantation and the BMF's belt filter presses. No reuse is permitted without meeting specific permit conditions and providing a specific plan for its use. The permit specifies that prior to any use of reclaimed water it must receive at least Level II or Level III treatment as defined in OAR 340-55, and must meet specific bacteria limitations.

### 5.1.4 Regulatory Basis of Planning

To plan for future regional wastewater facilities for the Eugene-Springfield metropolitan area, the following assumptions were made regarding the future regulatory requirements for Eugene-Springfield with respect to the current NPDES permit:

- Dry season concentration limits will be set to the current Willamette River basin standards of 10 mg/L for carbonaceous biochemical oxygen demand (CBOD) and TSS on a monthly average basis.
- Dry season mass limits for CBOD and TSS will remain the same as in the existing discharge permit and will be based on the dry season flow.
- Wet season concentration limits will remain the same as in the existing discharge permit
- Wet season mass limits for CBOD and TSS will remain the same as in the existing discharge permit and will be based on wet season flow.
- Dry and wet season monthly average percent removal for CBOD and TSS will remain at 85 percent, the same as the existing discharge permit.
- Wet season maximum day mass limits will be suspended when the plant flow is equal to or greater than twice the dry season design rating of the plant, the same as the existing discharge permit.
- The dry season ammonia concentration limits will remain the same as in the existing discharge permit.
- The excess thermal load limit in the dry season will remain the same as in the existing discharge permit. The DEQ refined Oregon's water quality standards for temperature and obtained EPA's approval in March 2004. Also, as of the final printing of this Facilities Plan DEQ has developed a temperature total maximum daily load (TMDL) for the Willamette River. This TMDL is currently under review at the EPA. Once the new TMDL is finalized, this assumption may need to be revisited.
- The current limitation for effluent disinfection is based on *E. Coli*. It is assumed that the *E. Coli* limit will remain the same as in the existing discharge permit.
- The effluent pH limit will remain the same as in the existing discharge permit.

DEQ proposed revisions to approximately 100 toxic water pollutants in May 2004 and it was initially estimated that those standards would become effective in February 2005. However, implementation of the new standards is currently pending EPA review. Under a court decision, revised water quality standards are not effective until approved by EPA. At this

time it is unclear how long EPA's review will take and what the final outcome will be. During future permit renewal cycles MWMC will need to review the impact of those revised standards if they are adopted.

With respect to mass load limitations, the DEQ is directed by OAR 340-041-0061(10(b) to calculate mass load limits based on proposed treatment facility capacities and the highest and best practicable treatment to minimize the discharge of pollutants. If this calculation results in greater mass load than currently listed in the existing NPDES permit, MWMC may apply for a mass load increase by performing water quality studies and making the required environmental and financial findings. However, it is unknown at this time if these findings can be made and therefore it has been assumed that the mass load limit currently listed in the NPDES permit will remain the same through the planning period.

### 5.1.5 Effluent Quality

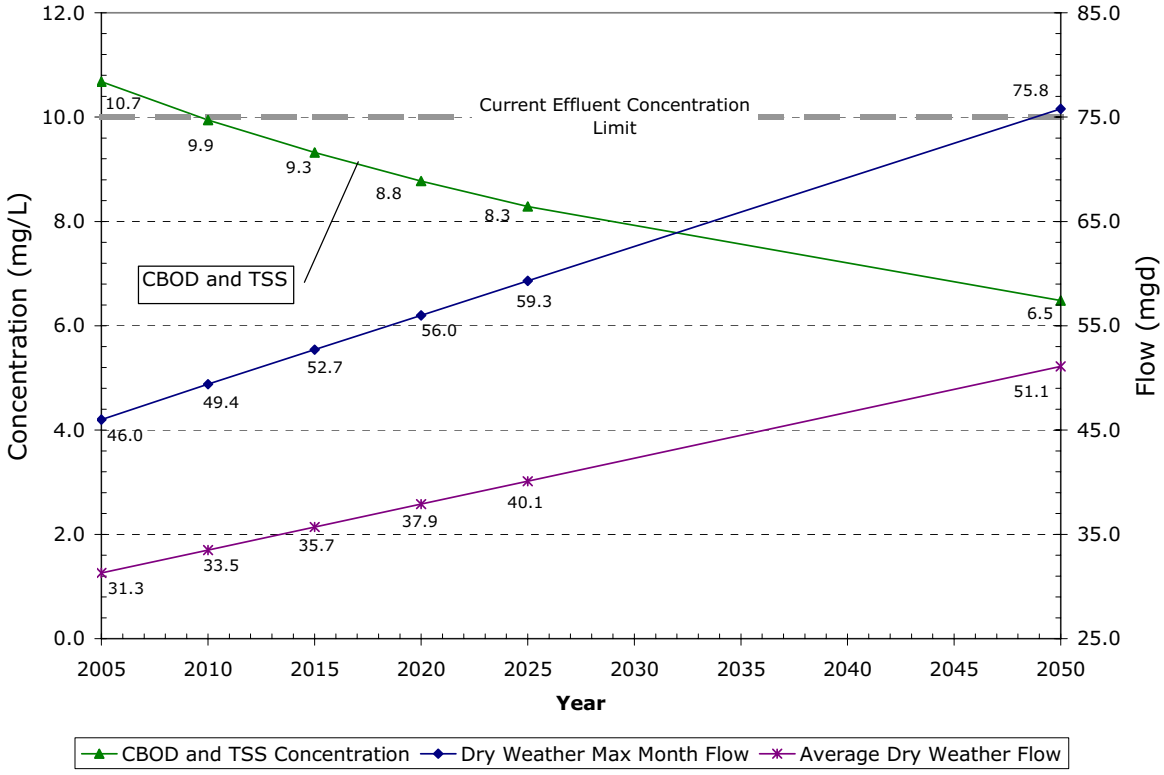
The following section discusses key constituents and/or elements associated with water quality on the lower Willamette River. The Willamette River is a 303(d) listed water body for specific parameters. The majority of these parameters are discussed below. Those that are not include fecal coliform bacteria, dieldrin, DDT, PCBs, aldrin, polynuclear aromatic hydrocarbons (PAH), iron, manganese and pentachlorophenol. With the exception of fecal coliform, iron, and manganese, none of these parameters have been detected in effluent from the WPCF at the detection limits used by plant staff. MWMC is not currently required to monitor for iron and manganese and as a result there is no current effluent data for these parameters. Fecal coliform is not required to be monitored per MWMC's 2002 permit renewal, which switched bacteria limits from fecal coliform to *E. coli*. In general, effluent from the WPCF has had no knowing affect on biological or dissolved oxygen criteria.

Based on options in their last NPDES permit, MWMC chose to conduct bioassays four times per year, performed in the year prior to the next renewal cycle. Four bioassays were conducted in 2002 and four more will need to be conducted in 2005, as the permit expires at the end of 2005. The 2002 bioassay tests evaluated acute and chronic toxicity on fathead minnows and *Ceriodaphnia dubia*. Results from the acute and chronic bioassay tests indicated no statistically significant reduction in survival or growth at any effluent concentrations tested.

#### CBOD and TSS

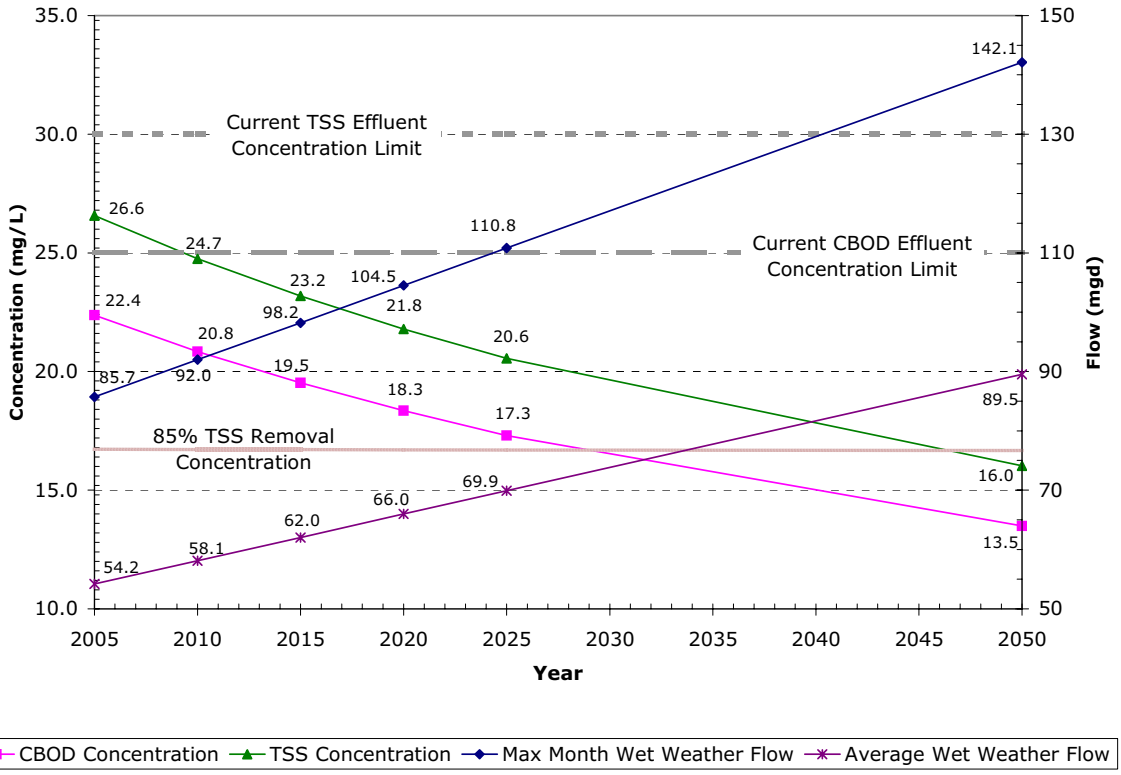
Dry season mass limitations for both CBOD and TSS as outlined in the NPDES permit are based on the current average dry season flow of 49 mgd. The mass limit requirements must also be met for the highest 30-day flow period in the dry season (maximum month basis). Even if the constant concentration limits for CBOD and TSS are met, the mass limits imply a lower concentration requirement if the wastewater flows exceed the current dry weather design capacity or if the future dry weather design capacity of the facility is increased. Concentration limits as well as percent removal requirements are also specified in the NPDES permit. Figure 5.1.5-1 illustrates the anticipated maximum month CBOD and TSS concentrations that result from projected flows and unchanged mass limitations as specified in the existing NPDES permit. These are shown relative to the anticipated concentration limits. Percent removal limits apply; however, they are not a factor during the dry season because the mass and concentration limits are significantly more stringent.

**FIGURE 5.1.5-1**
Dry Weather Maximum Month Effluent Concentration Requirements
Based on Existing Mass Load Limitations and Projected Flows
*MWMC Facility Plan, Eugene-Springfield*



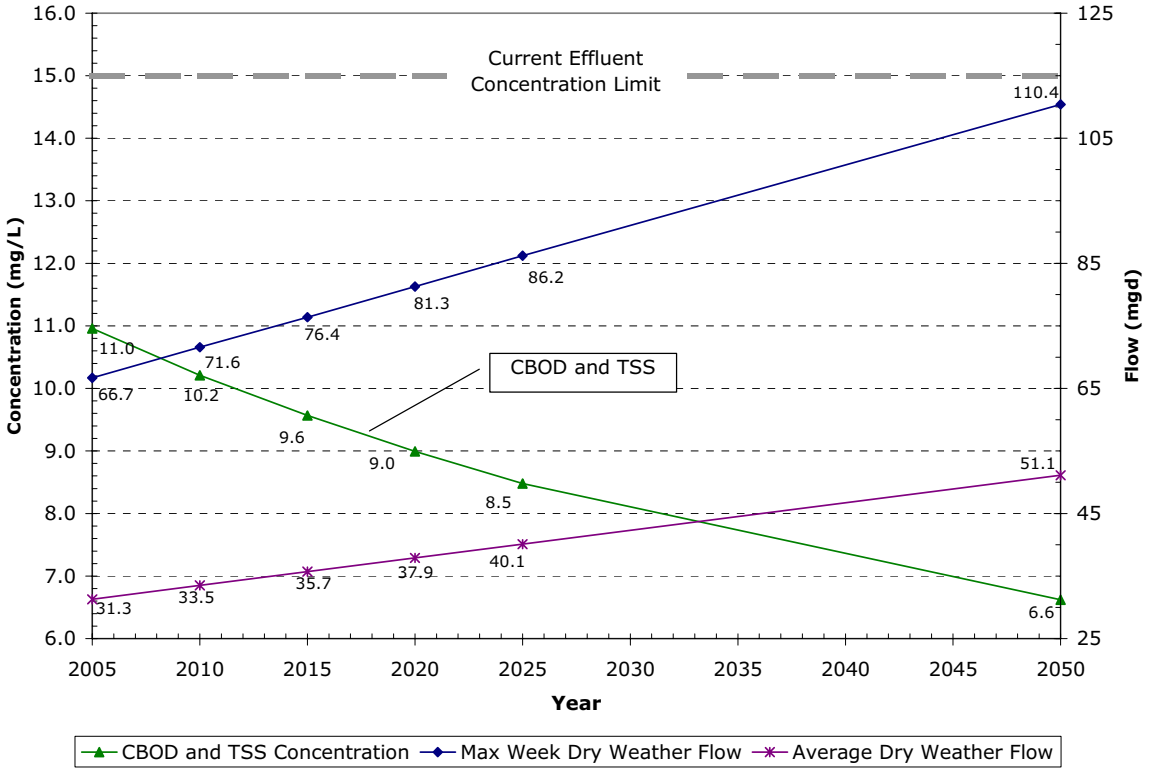

Similarly, wet season maximum month mass limitations for both CBOD and TSS as outlined in the NPDES permit are based on the average wet season flow of 75 mgd. Although significantly higher, concentration limits are also specified in the NPDES permit for wet weather. Percent removal requirements also apply. Figure 5.1.5-2 illustrates the anticipated maximum month CBOD and TSS concentrations that result from projected flows and unchanged mass limitations as specified in the existing NPDES permit. These are shown relative to the anticipated concentration and percent removal requirement. However, because peak wet weather flows are very dilute, it is the percent removal requirement that limits effluent CBOD and TSS during critical wet weather flow periods and this is the most difficult to achieve.

**FIGURE 5.1.5-2**
Wet Weather Maximum Month Effluent Concentration Requirements
Based on Existing Mass Load Limitations and Projected Flows
*MWMC Facility Plan, Eugene-Springfield*



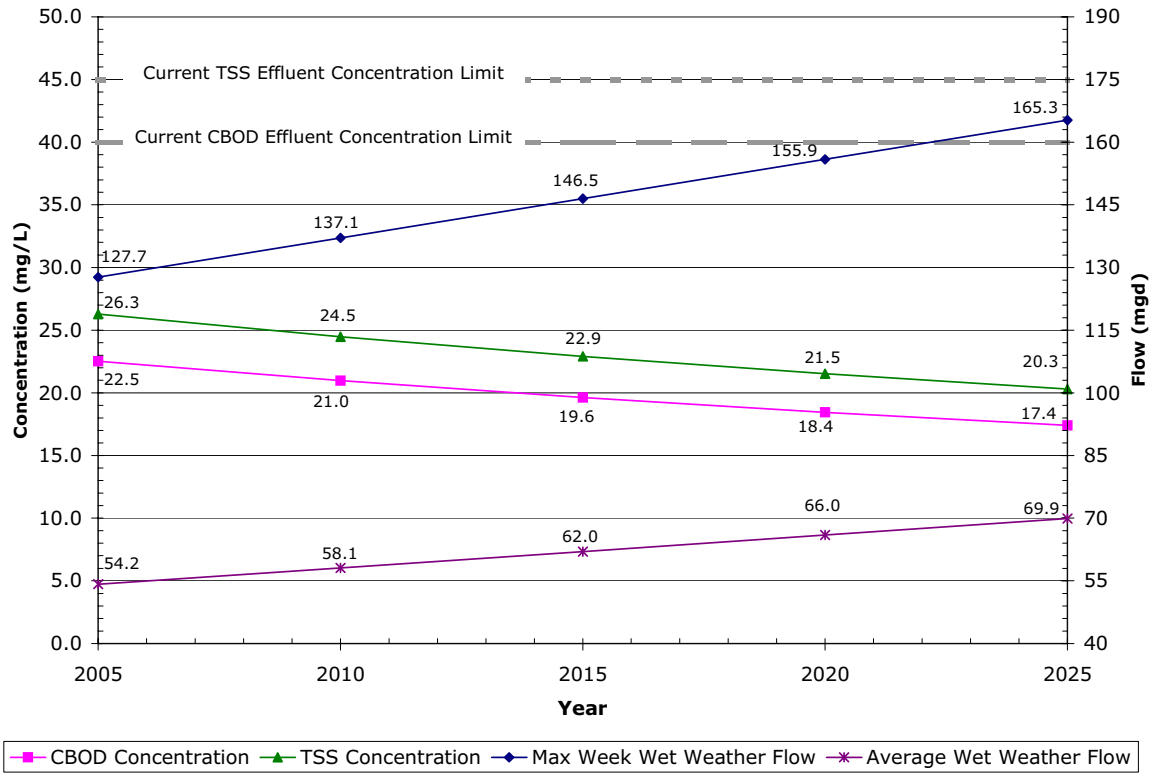

Dry weather maximum week mass limitations for both CBOD and TSS as outlined in the NPDES permit are based on the average dry season flow of 49 mgd. Concentration limits are also specified in the NPDES permit. Figure 5.1.5-3 illustrates the anticipated maximum week CBOD and TSS concentrations that result from projected flows and unchanged mass limitations as specified in the existing NPDES permit. These are shown relative to the anticipated concentration limits. Percent removal limits do not apply on a maximum week basis.

**FIGURE 5.1.5-3**
Dry Weather Maximum Week Effluent Concentration Requirements
Based on Existing Mass Load Limitations and Projected Flows
*MWMC Facility Plan, Eugene-Springfield*




Wet season maximum week mass limitations for both CBOD and TSS as outlined in the NPDES permit are based on the average wet season flow of 75 mgd. Concentration limits are also specified in the NPDES permit. Figure 5.1.5-4 illustrates the anticipated maximum week CBOD and TSS concentrations that result from projected flows and unchanged mass limitations as specified in the existing NPDES permit. These are shown relative to the anticipated concentration limits. Daily maximum mass limits also apply but are suspended when the average flow exceeds twice the dry weather capacity rating of the facility (currently 98 mgd).

**FIGURE 5.1.5-4**
Wet Weather Maximum Week Effluent Concentration Requirements
Based on Existing Mass Load Limitations and Projected Flows
*MWMC Facility Plan, Eugene-Springfield*




## Ammonia

The current NPDES permit (issued in 2002) includes ammonia limits in the dry season. Current Oregon water quality criteria drove previous reasonable potential findings and the justification for a dry weather average month and maximum day effluent ammonia concentration limit of 12 milligrams per liter (mg/L) and 22 mg/L, respectively. Effluent concentrations measured between 1997 and 2002 ranged from 1.4 to 27 mg/L. The Oregon DEQ has proposed a revision to the ammonia water quality criterion. That revision has not been approved by EPA. In the absence of adoption of that revised criterion, it is assumed that the current ammonia effluent limitations will be implemented in future permits. If the standards change in the future, those changes will be addressed at the next NPDES permit renewal. The result is that the biological process at Eugene-Springfield will need to be modified to accommodate more sustainable nitrification, and thus de-nitrification will be required to address the alkalinity deficit currently experienced.

### Excess Thermal Load

Under the 1996 Oregon Temperature Standard (Oregon Administrative Rule 340-41-0026), the WPCF was required to prepare and implement an approved Temperature Management Plan for the following reasons:

- Discharge from the facility is to a stream that is water quality-limited for temperature;
- Heat is contributed to the stream above a water quality-limited stream segment;
- Reasonable potential exists for the discharge to have a measurable impact outside of the assigned mixing zone; and
- Temperature-sensitive endangered fish may be present

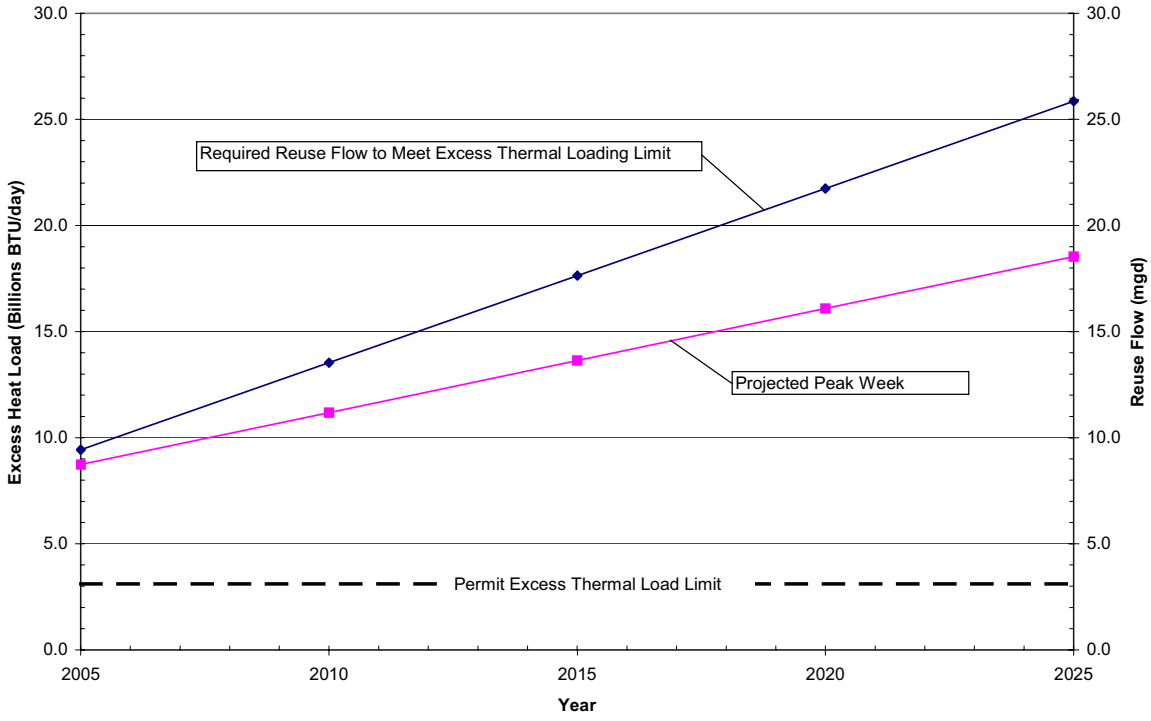
The Temperature Management Plan for the facility was developed and approved by the DEQ prior to permit renewal.

The current NPDES permit was issued in 2002 with a thermal load limitation that was based on the dry weather design average flow. The NPDES permit specifies that the facility must meet this thermal load limit for the maximum week during the dry season. Because of the way that the excess thermal load limit is calculated, the facility has the potential to surpass the permitted excess thermal load limit of 3.1 billion BTUs during peak week flows.

Since the Temperature Management Plan was approved by DEQ, Oregon's water quality standard for determining thermal load limitations has been evolving. In June 2003 DEQ published guidance that specifies that the maximum weekly design flow should be used to calculate the excess thermal load. In early March 2004, EPA approved Oregon's new water quality standards for temperature. The DEQ is developing a temperature TMDL for the Willamette River based on the new Oregon standard. The details of the TMDL are still being discussed between DEQ and EPA, but could result in a revised thermal load limitation for the facility once the permit is up for renewal (the current NPDES permit expires on December 31, 2006). In the absence of the new TMDL standards, the WPCF will continue planning for facilities using the current thermal load limitation and will continue to implement the approved Temperature Management Plan.

A thermal load analysis, based on the limit in the current NPDES permit, was performed for this facilities plan to estimate the projected dry season thermal load through 2025. Thermal loads discharged to the river are the product of wastewater flows and their corresponding temperatures. The analysis evaluated 12 years of historical flow and temperature data to develop average and peak week dry season thermal loads. From this data, a peak week thermal load peaking factor was calculated and applied to future average thermal loads developed from projected flows and historical average temperatures. The resulting projected peak week thermal load is shown in Figure 5.1.5-5. This figure also shows the flow rate that would be required to be removed from the river to meet the current peak week thermal load limit specified in the NPDES permit. As previously noted, the Oregon DEQ is currently developing a temperature total maximum daily load (TMDL) for the Willamette River. Once this TMDL is finalized and a new thermal allocation is assigned to the Eugene-Springfield WPCF, the thermal load analysis presented in this Facilities Plan will have to be revisited.

**FIGURE 5.1.5-5**
Dry Season Peak Week Excess Thermal Load
Based on Existing Thermal Load Limitations and Projected Flows
*MWMC Facility Plan, Eugene-Springfield*




## Sanitary Sewer Overflows (SSOs)

Perhaps the most significant impact to potential future treatment technologies lies in the changing regulations for SSO requirements. Currently, untreated emergency SSOs have specific limits on the seasonal timing and storm event conditions that create circumstances such that these discharges are unavoidable and allowable under Oregon state law. Oregon's current SSO rules are embedded in the bacteria water quality standard, which prohibits overflows from less than a 5-year 24-hour winter storm, and from a less than 10-year 24-hour summer storm. Proposed federal rule changes for SSO requirements are currently on hold for further review and it is possible that these rule changes may not be promulgated during the planning period. More restrictive future federal rules on SSOs will override the Oregon regulations. SSO requirements are a major driver for significant future wet weather improvements. Recommended future treatment technologies should include alternatives for various combinations of SSO possibilities and blending techniques.

Previous studies and collection system modeling efforts have concluded that peak wet weather flows (PWWFs) resulting from the projected 2025 5-year 24-hour storm (which equates to 3.9 inches of rain for the Eugene-Springfield area, derived from statistical evaluation of precipitation data recorded at the Mahlon Sweet Airport) could be conveyed by the collection system to the WPCF for treatment without SSOs. Collection system models

estimate the current PWWF in excess of 250 mgd, a situation that now results in SSOs. Current PWWFs entering the treatment facility exceed 200 mgd, and are limited by the influent pump station's ability to get flow into the plant. An increase in both peak flow conveyance and treatment capacity is necessary to comply with DEQ's future requirement that the wet season flow associated with the 5-year, 24-hour rainfall event be accommodated by MWMC's facilities without resulting in SSOs.

### Blending Policy

Blending or split flow refers to the practice of diverting flow around a treatment component (usually secondary treatment) during high flows; specifically, PWWFs. The WPCF was designed to operate using blending when flow exceeds the secondary system capacity, currently estimated at 103 mgd. The practice is not acknowledged in the current NPDES permit and is currently under review by EPA. In late 2003 EPA issued for public comment a proposed policy on blending that if adopted would clarify that blending is a legal practice, subject to the six principles outlined in the proposal. The proposal requires that all re-routed flows be combined before discharge. It is anticipated that the practice of blending will continue to be an acceptable approach for treating PWWFs. For the purposes of evaluating treatment technologies, it is recommended that the WPCF look at solutions that are flexible enough to implement either conventional primary effluent blending or equivalent secondary effluent blending.

With the elimination of SSOs, blending will provide the most cost-effective opportunity for the WPCF to provide a treated effluent that meets secondary treatment standards in the most cost- effective manner. Using blended treatment would eliminate large capital investments for facilities that would be used very infrequently. In addition, treatment alternatives should attempt to maximize the capacity of the existing facility's primary and secondary treatment facilities, minimizing the frequency of blended treatment, and taking full advantage of MWMC's existing investment. Even under the best circumstances, significant investments and modifications to the facility will be required to convey and treat the projected PWWF.

### Bacteria

It is anticipated that the current bacteria limitations specified in the NPDES permit, which require a monthly geometric mean of 126 *E. Coli* per 100 mL and a maximum sample containing 406 *E. Coli* per 100 mL, will continue to be implemented in future NPDES permits. Although not required to meet anticipated bacterial limitations, alternative disinfection technologies should be evaluated to address operator and community safety issues associated with the current disinfection practice that uses gaseous chlorine and sulfur dioxide.

### Turbidity

The current turbidity standard is based on the Oregon State Water Quality Standard, which stipulates that the wastewater cannot increase the river turbidity by more than 10 percent at the edge of the mixing zone. This standard is currently under review by the state and it is possible that a more stringent numerical limit could be imposed in future NPDES permits. Treatment alternatives that include improved secondary treated effluent water quality and effluent filtration should be considered.

### Dissolved Oxygen

The Willamette River in the Eugene area is not included in the 303(d) list for dissolved oxygen (DO). The current DO standard is based on the Oregon State Water Quality Standard; however, there is no current numerical limit in the NPDES permit. It is possible that a more stringent numerical limit could be imposed in future NPDES permits. The implementation of a future DO numerical limit may require future treatment facilities. However, for purposes of this facility plan, no facility accommodations for DO are being considered.

### Mercury

A TMDL for mercury is currently being developed for the Willamette River because it does not meet water quality standards. The requirements resulting from the TMDL are uncertain at this time. Average effluent concentrations measured in 2003 and 2004 were approximately 0.004 μg/L.

### Arsenic

The Willamette River was listed in the 2002 303(d) list for exceedances of the arsenic human health criterion for "water and fish ingestion." This listing could eventually lead to development of a TMDL for arsenic. Any numerical arsenic limit is unlikely to affect future recommended treatment technologies at the WPCF and will likely be implemented as source control reductions. Average effluent concentrations measured in 2003 and 2004 were approximately 0.80 μg/L.

### Cyanide

Cyanide discharges into the treatment facility are currently below the calculated maximum allowable headworks loading, which is 34 lbs/day. Analytical laboratory results for final effluent indicate detectable levels of total cyanide, while analysis of secondary effluent before chlorination has consistently resulted in non-detectable amounts. The current disinfection process generates compounds that analyze as cyanide. These analytical results for total cyanide concentrations are not high enough to cause an exceedance of a water quality standard in the Willamette River and will not affect future recommended treatment technologies. Average effluent concentrations measured in 2003 were 8.4 μg/L.

### Metals

Current effluent and biosolids metals concentrations are well below any regulatory thresholds. Some changes to the Oregon criteria for metals are expected as a result of triennial review. New criteria are expected to be adopted by the Environmental Quality Commission (EQC) in April 2004, including metals criteria expressed as dissolved. This will reduce the likelihood of water quality-based effluent limitations for metals becoming a permit issue. Any numerical limits for metals are unlikely to affect future recommended treatment technologies at the WPCF and will likely be implemented as source control reductions.

MWMC monitors effluent metals data on a monthly basis. The average concentration for 2003 through 2004 (up through September) is as follows:

Arsenic: 0.85 ug/L; Cadmium: 0.05 ug/L; Copper: 4.24 ug/L; Chromium: 1.09 ug/L; Lead: 0.43 ug/L; Silver: 0.19 ug/L; Nickel: 1.94 ug/L; Mercury: 0.0038 ug/L; Zinc: 24.1 ug/L;

Molybdenum: 2.96 ug/L; and Selenium: 0.58 ug/L. Three analyses for cadmium and thirteen for selenium during this period yielded non-detectable results; the detection limit was used for those data points in calculating the averages presented.

#### Toxicity

There are no current problems complying with the acute and chronic toxicity requirements in the permit. If a situation were to arise whereby effluent toxicity was identified as a potential problem, a Toxicity Identification Process would be implemented that would likely result in a source control reduction program.

#### Phosphorus

Phosphorus has not been identified as an effluent quality issue for the Willamette River and there is currently no TMDL for phosphorus planned in the immediate future. However, phosphorus is quickly becoming targeted for biological nutrient removal in the wastewater treatment industry. Flexibility for phosphorus removal should be considered when evaluating alternative treatment technologies. Average effluent concentrations measured between 1997 and 2002 were approximately 2.6 mg/L.

#### Total Dissolved Solids (TDS)

The TDS guide concentration in the Willamette River is 100 mg/L. There are currently no compliance issues with respect to effluent quality and TDS. Any numerical limit is unlikely to affect future recommended treatment technologies at the WPCF. However, alternative disinfection practices such as the addition of sodium hypochlorite can significantly increase TDS discharges.

#### Dioxins and Furans

A toxic equivalency factor approach for the human health criteria for dioxins and furans was considered by the DEQ for inclusion in the proposed changes for Oregon water quality standards, but at the time of writing it appears that this will not be included in the standards revision package to be considered by the EQC, currently planned for May 2004. Any limits for dioxins and furans are unlikely to affect future recommended treatment technologies at the WPCF and will likely be implemented as source control reductions.

### 5.1.6 Biosolids Quality

Both federal and state regulations apply to land application of biosolids from wastewater treatment plants (WWTPs). Federal regulations include 40 CFR 257 and approved 40 CFR, Part 503. State of Oregon regulations include OAR 340-50. Since the passing of the federal 503 regulations, the state has prepared and passed amendments to OAR 340-50 that adopt provisions outlined in the 503 regulation.

For disposal of biosolids as interim cover or as fill at a solid waste landfill, federal regulations 40 CFR, Part 258, apply. If the biosolids is incorporated in the final cover for the landfill, the 503 regulations would still apply.

State regulations take precedence over federal regulations, where applicable. In some instances, state regulations may impose more stringent requirements than federal regulations. However, federal regulations apply if no state regulations are declared.

## Regulations

Current federal regulations for land treatment of biosolids are listed in the Federal Register under 40 CFR, Part 257, "Criteria for Classification of Solid Waste Disposal Facilities and Practices," dated September 13, 1979. In the past, Part 257.3-5 has regulated solid waste application to food crops; however, these regulations have been considered too general. Therefore, new regulations under 40 CFR, Part 503, were required by Section 405 (d) of the Clean Water Act of 1977 (as amended by the Water Quality Act of 1987).

The new regulations under 40 CFR, Part 503, have gone through several scientific community and public reviews and were released as final in late 1992.

In December 1984, DEQ defined rules for the land application and disposal of sewage treatment plant biosolids and biosolids-derived products, including septage (OAR 340-50). These regulations are currently in the process of being updated to conform to the adopted federal regulations.

## Biosolids Quality

According to current state and new federal regulations (40 CFR, Part 503), biosolids samples should be analyzed for the parameters listed in Table 5.1.6-1.

**TABLE 5.1.6-1**
Sampling Requirements for EPA 40 CFR, Part 503, Sludge Regulations[a]
*MWMC Facility Plan, Eugene-Springfield*

| Parameter | Units |
|---|---|
| Arsenic | mg /kg dry weight |
| Beryllium | mg/kg dry weight |
| Cadmium | mg/kg dry weight |
| Copper | mg/kg dry weight |
| Lead | mg/kg dry weight |
| Mercury | mg/kg dry weight |
| Molybdenum | mg/kg dry weight |
| Nickel | mg/kg dry weight |
| Selenium | mg/kg dry weight |
| Zinc | mg/kg dry weight |
| Total Nitrogen | % dry weight |
| Nitrate nitrogen | % dry weight |
| Ammonia nitrogen | % dry weight |
| Phosphorus | % dry weight |
| Potassium | % dry weight |
| pH | standard units |
| Total solids | % dry weight |
| Volatile solids | % dry weight |
| PCBs[b] | µg/kg |

[a] From 40 CFR, Part 503 (December 1992).
[b] PCBs include PCB-1016,-1221,-1232,-1242,-1248,-1254, and -1260.

The nitrogen, phosphorus, and potassium content of the biosolids are important when applying biosolids at agronomic rates. Nitrogen content can vary significantly in the

biosolids depending on its source, age, and history. The concentration levels of these nutrients should be determined from samples taken immediately prior to biosolids application because stored biosolids can lose nitrogen rapidly. Therefore, it is important that the real nitrogen content of the biosolids is known to avoid under- or over-application. The available nitrogen in the biosolids was determined assuming the following:

- 15-20 percent of the organic nitrogen will be available
- 50 percent of the ammonia nitrogen will be available
- 100 percent of the nitrate-nitrite nitrogen will be available

Under the new federal regulations 40 CFR, Part 503, maximum concentrations, cumulative pollutant loading rates, average pollutant limits or "clean biosolids," and annual pollutant loading rates have been established for nine heavy metals. Table 5.1.6-2 shows the acceptable levels for land application. These rates are used to determine site life, which is the number of years that biosolids with a uniform metal content could be applied to a specific site. However, MWMC has adopted a policy that pollutant concentrations in biosolids be half of the federally required standards.

**TABLE 5.1.6-2**
New Federal Regulations (40 CFR, Part 503) for Heavy Metals[a]
*MWMC Facility Plan, Eugene-Springfield*

| Parameter | Maximum Concentration (mg/kg) | Cumulative Loading (kg/ha) | Average Concentration (mg/kg) | Average Concentration Loading Rate (kg/ha/yr) |
|---|---|---|---|---|
| Arsenic | 75 | 41 | 41 | 2.0 |
| Cadmium | 85 | 39 | 39 | 1.9 |
| Copper | 4,300 | 1,500 | 1,500 | 75 |
| Lead | 840 | 300 | 300 | 15 |
| Mercury | 57 | 17 | 17 | 0.85 |
| Molybdenum | 75 | 18 | - | 0.90 |
| Nickel | 420 | 420 | 420 | 21 |
| Selenium | 100 | 100 | 100 | 5.0 |
| Zinc | 7,500 | 2,800 | 2,800 | 140 |

[a] From 40 CFR, Part 503 (December 1992).

Table 5.1.6-3 summarizes testing results from biosolids produced in 2003. As noted in the table only the shaded columns represent land applied biosolids for 2003. A comparison of Table 5.1.6-3 to the federal limits shown in Table 5.1.6-2 shows that MWMC biosolids meet all metal pollutant concentration requirements.

**TABLE 5.1.6-3**
2003 Laboratory Testing Results for MWMC Land Applied Biosolids
*MWMC Facility Plan, Eugene-Springfield*

| Sample Dates | 04/16/03 | 05/21/03 | 06/18/03 | 07/14/03 | 08/18/03 | 09/08/03 |
|---|---|---|---|---|---|---|
| Cadmium, ppm dw | 4.6 | 4.2 | 5.8 | 4.3 | 3.5 | 4.2 |
| Copper, ppm dw | 690 | 900 | 760 | 630 | 560 | 550 |
| Chromium, ppm dw | 57 | 74 | 54 | 45 | 42 | 40 |
| Nickel, ppm dw | 32 | 97 | 33 | 27 | 24 | 26 |
| Lead, ppm dw | 120 | 150 | 110 | 84 | 83 | 84 |
| Zinc, ppm dw | 1000 | 1800 | 1300 | 1100 | 920 | 950 |
| Mercury, ppm dw | 2.7 | 2.6 | 3.4 | 3.5 | 3.5 | 2.8 |
| Silver, ppm dw | 69 | 57 | 64 | 53 | 55 | 51 |
| Arsenic, ppm dw | 4.5 | 5.3 | 5.5 | 3.7 | 4.7 | 3.0 |
| Selenium, ppm dw | 2.4 | 2.5 | 2.6 | 2.2 | 2.6 | 2.7 |
| Molybdenum, ppm dw | 20 | 19 | 18 | 21 | 18 | 7.7 |

Notes:
Shaded areas represent land applied biosolids in 2003

## Site Identification and Approval

Prior to approving any potentially sensitive application site (with respect to residential housing, runoff potential, or groundwater threat), DEQ may require an opportunity for public comment and public hearing. A statement of land use compatibility from the responsible planning jurisdiction should accompany requests for approval of biosolids land application sites. New sites or expansion of existing sites must be proposed to DEQ prior to use. Newly approved sites become part of the biosolids management plan.

Site criteria for land-applying biosolids include physical geographical features (geological formation, flood plain proximity, and groundwater and surface water proximity, topography, and soils), and method of application. DEQ's specific criteria are outlined in Table 5.1.6-4.

MWMC has a DEQ-approved Biosolids Management Plan that outlines their solids production processes, expected quantities and quality, and disposal options. MWMC's disposal options are primarily through land application on farmland, the adjacent Seasonal Industrial Waste Facility, and the Biocycle Farm. MWMC has site disposal approval letters for all of these sites.

## Special Management Considerations

Land receiving bulk Class B biosolids for agricultural use requires special management considerations. These relate to access to the site, types of crops grown, plant nutrient rates, timing and duration of biosolids land application (site life and seasonal constraints), and grazing restrictions.

## Access

Controlled access to bulk Class B domestic biosolids and domestic septage land application sites is required for a minimum of 12 months following surface application of solids. Controlled access means that public entry or traffic is unlikely. Rural private land is assumed to have controlled access while parks or other public lands may require fencing to ensure control.

**TABLE 5.1.6-4**
DEQ Site Criteria for Biosolids Application[a]
*MWMC Facility Plan, Eugene-Springfield*

| Parameter | Criteria |
|---|---|
| Geology | • Must have a stable formation. |
| Floodplain | • Restricted period of application and incorporate biosolids if in a floodplain. |
| Groundwater | • At time of application, the minimum depth to permanent groundwater is 4 feet; the minimum depth to temporary groundwater is 1 foot. |
| Topography<br>Slope less than or equal to 12%<br>Slopes up to 30% | • Liquid biosolids application with appropriate management to eliminate surface runoff.<br>• Surface application of dewatered or dried biosolids.<br>• Direct incorporation of liquid biosolids into the soil. |
| Soils | • Minimum rooting depth of 24 inches.<br>• No rapid leaching.<br>• Avoid saline or alkaline soil. |
| Method of application and proximity to water bodies | • Buffer strips may be required to protect water bodies. Size depends on method of application and proximity to sensitive area (variable with local conditions and left to discretion of DEQ), as described below.<br>• Direct injection: no limit required.<br>• Truck spreading: less than 200-foot buffer strip.<br>• Spray irrigation: 350- to 500-foot buffer strip.<br>• Near ditch, pond, channel, or waterway; greater than 50-foot buffer strip.<br>• Near domestic water source or well: greater than 200-foot buffer strip. |

[a] From OAR Chapter 340, Division 50, as amended.

## Crops

As a general rule, crops grown for human consumption should not be planted for at least 14 months after bulk Class B biosolids or domestic septage application. If the edible parts will not be in contact with the biosolids-amended soil, or if the crop is to be treated or processed prior to marketing such that pathogen contamination is not a concern, this requirement may be waived. No restrictions on planting time are required where Class A biosolids-derived products are land-applied to sites used for the cultivation of fresh market vegetables.

#### Nutrient Loading

Biosolids application to agricultural land should not exceed the annual nitrogen loading required for maximum crop yield and is, therefore, managed according to its fertilizer value. Biosolids may be applied to approved sites above agronomic rates on a one-time basis or less than once per year as long as runoff, nuisance conditions, or groundwater contamination do not occur. Nitrogen accumulation from higher than agronomic rates and annual nitrogen use will determine the acceptable loading rate and frequency.

#### Site Life

Site life is important in planning because sites generally have a limited application life based on the chemistry of the soil and the metals loading from the biosolids. Site life is calculated by dividing lifetime biosolids loading limits based on the most limiting constituent by the annual application rate.

#### Seasonal Constraints

In western Oregon, where soil damage may occur from application equipment traffic in the wet season, biosolids application should be restricted to the dry season. The main consideration in land-applying on sloping ground is avoiding surface runoff and soil erosion.

#### Grazing Restrictions

Grazing animals should not be allowed on pasture or forage nor should livestock feed be harvested for 30 days after application of bulk Class B biosolids or domestic septage.

The current biosolids management practices are discussed in section 6.5 in Chapter 6.0.

### 5.1.7 Reuse Effluent Quality

An alternative to direct river discharge of treated effluent during dry weather is to apply treated effluent to meet irrigation demands at agricultural lands, golf courses, and parks. Effluent can also be reused as reclaimed water for specific nonagricultural industrial uses, such as cooling water. The standards for effluent reuse in Oregon are established by the DEQ through OAR Chapter 340 Division 55 (340-55).

#### Treatment and Monitoring Requirements for Effluent Reuse

Through OAR 340-55, DEQ has established treatment and monitoring requirements for potential agricultural and nonagricultural uses of the treated effluent. DEQ has classified reclaimed water into four categories and assigned a minimum degree of treatment required:

- Level I: Less than biological treatment or biological treatment without disinfection
- Level II: Biological treatment plus disinfection
- Level III: Biological treatment plus disinfection (stricter coliform limit)
- Level IV: Biological treatment, clarification, coagulation, and filtration treatment plus disinfection

Limits for total coliform (organisms/100 mL) and turbidity [nephelometric turbidity units (NTUs) have been established for the four categories. These standards serve as a general guideline for defining the anticipated water quality required for the various uses. In

addition to the water quality limits, DEQ has provided standards for the minimum monitoring required for total coliform and turbidity based on the four categories. Table 5.1.7-1 summarizes the treatment and monitoring requirements for the four reuse categories. DEQ may include additional permit effluent limitations and/or other permit conditions other than those shown in Table 5.1.7-1 if they have reason to believe that the reclaimed water may contain physical or chemical contaminants that would impose potential hazards to the public or environment.

**TABLE 5.1.7-1**
Treatment and Monitoring Requirements for Use of Reclaimed Water
*MWMC Facility Plan, Eugene-Springfield*

| Category | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|
| Biological Treatment | X | X | X | X |
| Disinfection | | X | X | X |
| Clarification | | | | X |
| Coagulation | | | | X |
| Filtration | | | | X |
| Total Coliform (organisms/100 mL): | | | | |
| Two Consecutive Samples | N/L | 240 | N/L | N/L |
| 7-Day Median | N/L | 23 | 2.2 | 2.2 |
| Maximum | N/L | N/L | 23 | 23 |
| Sampling Frequency | N/R | 1 per week | 3 per week | 1 per day |
| Turbidity (NTU): | | | | |
| 24-Hour Mean | N/L | N/L | N/L | 2 |
| 5% of Time During a 24-Hour Period | N/L | N/L | N/L | 5 |
| Sampling Frequency | | | | Hourly |
| General | | | | |
| Public Access | Prevented (fences gates, locks) | Controlled (signs, rural or nonpublic lands) | Controlled (signs, rural or nonpublic lands) | No direct public contact during irrigation cycle |

## General Requirements

A number of general requirements have been outlined in DEQ's Chapter 340 Division 55 rule. These requirements address agricultural and nonagricultural uses that are acceptable based on the effluent water quality level, irrigation system, public access requirements, and buffer zones for irrigation. Table 5.1.7-2 summarizes these general requirements based on the different levels of reclaimed water quality.

**TABLE 5.1.7-2**
General Treatment and Monitoring Requirements for Use of Reclaimed Water*
(Numbers in the Table refer to Footnotes)
*MWMC Facility Plan, Eugene-Springfield*

| Category | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|
| IV | | | | |
| Buffers for Irrigation: | Surface: 10 ft. Spray: site-specific | Surface: 10 ft. Spray: 70 ft. | 10 ft. | None required |
| Agricultural: | | | | |
| Food Crops | N/A | N/A | N/A | |
| Unrestricted | | | | |
| Processed Foods Crops | N/A | 1 | 1 | |
| Unrestricted | | | | |
| Orchards and Vineyards | N/A | 2 | 2 | |
| Unrestricted | | | | |
| Fodder, Fiber, and Seed Crops not for human consumption | 3 | 1 | 1 | |
| Unrestricted | | | | |
| Human Ingestion | | | | |
| Pasture for Animals | N/A | 4 | 4 | |
| Unrestricted | | | | |
| Sod | N/A | 1 | 1 | |
| Unrestricted | | | | |
| Ornamental Nursery Stock | N/A | 1 | 1 | |
| Unrestricted | | | | |
| Christmas Trees | N/A | 1 | 1 | |
| Unrestricted | | | | |
| Firewood | N/A | 1 | 1 | |
| Unrestricted | | | | |
| Commercial Timber | 3 | 1 | 1 | |
| Unrestricted | | | | |
| Parks, Playgrounds, Schoolyards, Golf Courses with Contiguous Residences | N/A | N/A | N/A | 5, 6 |
| Golf Courses without Contiguous Residences | N/A | 5,7 | 5,7 | 5,6 |
| Cemeteries, Highway Medians, Landscapes without Frequent Public Access 5,6 | N/A | 5,7 | | 5,7 |
| Industrial or Commercial Use | N/A | 9,10,11,12 | 9,10,11,12 | 9,10,12 |
| Construction Use | N/A | 9,10,11 12,13 | 9,10,11 12,13 | 9,10, 12,13 |
| Impoundments: | | | | |
| Unrestricted | N/A | N/A | N/A | 8,10 |
| Restricted | N/A | N/A | 8,10,14 | 8,10 |
| Landscape Impoundments | N/A | 8,10,14 | 8,10,14 | 8,10 |

*DEFINITIONS:
Surface: Surface irrigation where application of reclaimed water is by means other than spraying such that contact between the edible portion of any food crop and reclaimed water is prevented.
Spray: Spray irrigation where application of reclaimed water to crops is by spraying it from orifices in piping.
Processed Food Crops: Those which undergo thermoprocessing sufficient to kill spores of Clostridium botulinum. Washing, pickling, fermenting, milling or chemical treatments are not sufficient.

**TABLE 5.1.7-2**
General Treatment and Monitoring Requirements for Use of Reclaimed Water*
(Numbers in the Table refer to Footnotes)
*MWMC Facility Plan, Eugene-Springfield*

| Category | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|

N/A: This level of reclaimed water not allowed for this use.
N/L: No limit.
X: Required treatment for this treatment level.
N/R: Not required.

FOOTNOTES:
1 Advisory Notice Only: The Oregon State Health Division recommends that there should be no irrigation of this level of effluent for 3 days prior to harvesting.
2 Surface irrigation where edible portion of crop does not contact the ground, and fruit or nuts shall not be harvested off the ground.
3 The Department may permit spraying if it can be demonstrated that public health and the environment will be adequately protected from aerosols. Advisory Notice Only: The Oregon State Health Division recommends that there should be no irrigation of this level of effluent for 30 days prior to harvesting.
4 Surface or spray irrigation: No animals shall be on the pasture during irrigation.
5 Signs shall be posted around the perimeter of the facility's perimeter and other locations indicating that reclaimed water is used for irrigation and is not safe for drinking, and in the case of effluent quality Levels II and III for body contact (e.g., for Level IV, ATTENTION: RECLAIMED WATER USED FOR IRRIGATION DO NOT DRINK. ATENCION: RECLAMADO DESPERDICIO DE AGUA USADO PARA LA IRRIGACION NO BEBA EL AGUA; for Levels II and III, ATTENTION: RECLAIMED WATER USED FOR IRRIGATION AVOID CONTACT DO NOT DRINK. ATENCION: RECLAMADO DESPERDICIO DE AGUA USADO PARA LA IRRIGACION EVITE EL CONTACTO NO BEBA EL AGUA).
6 Reclaimed water shall be applied in a manner so that it is not sprayed onto areas where food is prepared or served, or onto drinking fountains.
7 Reclaimed water shall be applied in a manner so that it is not sprayed within 100 feet from areas where food is prepared or served, or where drinking fountains are located.
8 Signs shall be posted around the perimeter and other locations indicating that reclaimed water is used and is not safe for drinking, and in the case of effluent quality Levels II and III for body contact (e.g., for Level IV, ATTENTION: RECLAIMED WATER DO NOT DRINK. ATENCION: RECLAMADO DESPERDICIO DE AGUA NO BEBA EL AGUA; for Levels II and III, ATTENTION: RECLAIMED WATER AVOID CONTACT DO NOT DRINK. ATENCION: RECLAMADO DESPERDICIO DE AGUA EVITE EL CONTACTO NO BEBA EL AGUA).
9 The Department may impose more stringent limits on the use of reclaimed water if it believes it is necessary to protect public health and the environment.
10 There shall be no disposal of reclaimed waters into surface or groundwaters without authorization by an NPDES or WPCF permit.
11 Use of reclaimed water in evaporative cooling systems shall be approved only if the user can demonstrate that aerosols will not present a hazard to public health.
12 Members of the public and employed personnel at the site of the use of reclaimed water shall be notified that the water is reclaimed water. Provisions for how this notification will be provided shall be specified in the reclaimed water use plan.
13 Unless decontaminated in a manner approved in writing by the Oregon Health Division, tanker trucks or trailers that transport and/or use reclaimed water shall not be used to transport potable water intended for use as domestic water. A tanker truck or trailer used to transport and/or use reclaimed water shall have the words “NONPOTABLE WATER” written in 6-inch high letters on each side and the rear of the truck. The words “NONPOTABLE WATER” shall not be removed until decontamination as approved by the Health Division has occurred.
14 Aerators or decorative fixtures which may generate aerosols shall not be used unless approved in writing by the Department. Approval will be considered if it can be demonstrated that aerosols will be confined to the area of the impoundment or a restricted area around the impoundment.

**ADVISORY NOTICE ONLY:**
The Oregon State Health Division recommends that persons who must handle irrigation or other equipment for reclaimed wastewater or who are exposed to reclaimed water should be fully advised of any hazards associated with such exposure and should be provided with necessary protective clothing.

## 5.1.8 Plant Reliability and Redundancy Criteria

This facilities plan assumes that the standards for mechanical, electrical, fluid systems, and component reliability in accordance with EPA's policy will be met. The DEQ guidelines for redundancy will also be met. The EPA policy was developed to ensure that the treatment facilities will operate effectively on a day-to-day basis and that capabilities are provided for satisfactory operation during power failures, flooding, peak loads, equipment failures, and maintenance shutdowns. These reliability and redundancy standards are important to ensure that unacceptable degradation of the receiving water will not occur as a result of the interrupted operation of specific treatment operations or processes. In that regard, standards have been established for three classes of wastewater treatment works. The Reliability Class I definition is applicable for the WPCF. This reliability designation is based on the possible beneficial uses that may be negatively affected by a WPCF failure. The Reliability Class I definition consists of the following: "Works which discharge into navigable waters that could be permanently or unacceptably damaged by effluent which was degraded in quality for only a few hours. Examples of Reliability Class I works might be those discharging near drinking water reservoirs, into shellfish waters, or in close proximity to areas used for water contact sports."

Table 5.1.8-1 lists the minimum backup requirements for plant components that may be provided at the WPCF facility in accordance with EPA's Works Design Criteria, Reliability Class I, for sewage treatment plants. Also, mechanical components in the facility will be designed to enable repair or replacement without violating the effluent limitations or causing control diversion.

**TABLE 5.1.8-1**
Reliability Class I Requirements
*MWMC Facility Plan, Eugene-Springfield*

| Plant Component | Requirement |
|---|---|
| Raw Sewage Pumps | Peak flow with largest unit out of service. Peak flow is defined as the maximum wastewater flow expected during the design period of the treatment works. |
| Mechanical Bar Screens | One backup with either manual or mechanical cleaning (manual cleaning if only two screens). |
| Grit Removal | Minimum of two units. |
| Primary Sedimentation | 50% of design flow capacity with largest unit out of service. Design flow is defined as the flow used as the design basis of the component. |
| Activated Sludge Process | A minimum of two equal volume basins; no backup basin required. |
| Aeration Blowers | Supply the design air capacity with the largest unit out of service; provide a minimum of two units. |
| Air Diffusers | Isolation of largest section of diffusers (within a basin) without measurably impairing oxygen transfer. |
| Secondary Sedimentation | 75% of design flow capacity with largest unit out of service. Design flow is defined as the flow used as the design basis of the component. |
| Disinfectant Contact Basin | 50% of the design flow with largest unit out of service. Design flow is defined as the flow used as the design basis of the component. |
| Filtration | 75% of design flow capacity with largest unit out of service. Design flow is defined as |

**TABLE 5.1.8-1**
Reliability Class I Requirements
*MWMC Facility Plan, Eugene-Springfield*

| Plant Component | Requirement |
|---|---|
| | the flow used as the design basis of the component. |
| Effluent Pumps | Peak flow with largest unit out of service. Peak flow is defined as the maximum wastewater flow expected during the design period of the treatment works. |
| Electrical Power | Two separate and independent sources of electrical power shall be provided, either from two separate utility substations or from a single substation and a works-based generator. Designated backup source shall have sufficient capacity to operate all vital components, critical lighting, and ventilation during peak flow conditions |

The reliability criteria for sludge processes presented in Table 5.1.8-2 are also based on the guidance offered in EPA's Works Design Criteria.

**TABLE 5.1.8-2**
Sludge Handling System Reliability
*MWMC Facility Plan, Eugene-Springfield*

| System Component | Requirement |
|---|---|
| Sludge Holding Tanks | The volume of the holding tank shall be based on the expected time necessary to perform maintenance and repair of the component in question. |
| Anaerobic Sludge Digestion | At least two digestion tanks shall be provided. At least two of the digestion tanks provided shall be designed to permit processing of all types of sludges normally digested. |
| Sludge Pumping | Pumps sized to pump peak sludge quantity and maintain velocities above 2 fps. Provide a minimum of 2 pumps. |

# 5.2 Basis for Cost Estimate

Unit process and system alternative cost comparisons are to be based on total project or relative project costs. Project costs are calculated to include legal costs, administrative costs, contingency costs, engineering costs, and construction costs. End-of-life salvage value will not be considered in the cost evaluations.

Relative cost estimates are typically used to compare alternatives in which many of the facilities in each alternative are identical. Only those costs that are unique to each alternative are estimated and used for comparison purposes. This approach is useful when considering systemwide alternatives in which many of the facilities are the same and the relative costs of each alternative can be narrowed down to selected facilities. Costs for the selected systemwide alternative, used to develop the 20-year project list, are to be comprehensive costs that include all costs associated with the facilities in that alternative.

### 5.2.1 Capital Costs

Order-of-magnitude capital costs for alternatives will be estimated based on a combination of published cost literature, past vendor quotes, and past experience with similar-sized structures, equipment, and systems. The accuracy of this type of cost estimate typically ranges from -30 percent to +50 percent. The capital costs will be indexed to the January 2004 *Engineering News-Record* (ENR) Construction Cost Index (CCI) for the City of Seattle (7864). All capital costs include contingency, engineering, legal, and administrative costs.

### 5.2.2 Operations and Maintenance Costs

O&M costs will be based on current cost information for chemicals, power, and labor. Chemical costs are obtained from local distributors. Power costs are based on the current WPCF rate of $0.05 per kilowatt-hour. Labor costs for O&M are based on $68,000/FTE (Full Time Equivalent employee including fringe benefits).

For many of the unit process and system alternative cost evaluations, the 20-year O&M costs will be insignificant relative to the capital cost. In other cases the O&M costs will be equal for the alternatives being considered. In these situations, the O&M costs are not required to be considered in the cost evaluation.

### 5.2.3 Present Worth Costs

Where a present worth cost was calculated for alternatives, a present worth factor is to be applied to the O&M costs to convert the annual expenditures to present dollars. The present worth and annualized costs are to be based on an interest rate of 3 percent over the 20-year design life of the facility, resulting in a series factor of 14.88. The total present worth cost of each alternative is then determined by adding the capital cost to the O&M present worth cost.

### 5.2.4 Contingency Costs

For all cost evaluations a 25 percent contingency is to be applied to the capital cost to account for unknowns and unidentified items.

### 5.2.5 Engineering, Legal, and Administrative Costs

For all cost evaluations a 25 percent allowance for legal, administrative, and engineering is to be applied to the capital and contingency costs to cover the project design and Owner legal and project administration.

## 5.3 Water Quality Impact

### 5.3.1 Background Data on Receiving Stream

The WPCF discharges treated wastewater to the Willamette River at river mile 178 through a multi-port diffuser. The beneficial uses for this area of the Willamette River are listed in the OARs and include public and private domestic water supply, industrial water supply, irrigation, livestock watering, anadromous fish passage, salmonid fish rearing and spawning, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation,

aesthetic quality, and hydro power. Applicable water quality standards for the Willamette River that protect these uses are found in OAR 340 Division 41.

In general, the water quality of the Willamette River in Eugene-Springfield meets applicable standards, with a few exceptions. DEQ's "2002 List of Water Quality Limited Waterbodies" (DEQ, 2002) indicates that the beneficial uses of the Willamette River are not entirely supported in the area of the discharge. The list indicates the Willamette River violates the in-stream standards for temperature in summer, mercury in fish tissue year-round, and also violates the human health criteria for arsenic.

### Temperature

New revised Oregon water quality standards for temperature were recently developed by DEQ and approved by EPA in early 2004. Included in the standards package are a series of maps that delineate the fish uses for water bodies in the state. According to these maps, the Willamette River in the area of the WPCF discharge is listed as salmon and trout rearing and migration, and also as salmon and steelhead spawning from October 15 through June 15. This assignment of a spawning use to the Willamette River in Eugene-Springfield does not match other findings, including the recent Habitat Assessment[1]. It may be a reflection of thinking that the area is a potential spawning area.

Temperature criteria in the new standards are expressed as 7-day-average maximum temperatures. The new criterion for salmon and trout rearing and migration areas is 18 degrees Celsius (64.4 degrees Fahrenheit). The October 15 to June 15 spawning use has an associated temperature criterion of 13 degrees Celsius (55.4 degrees Fahrenheit), and this may be a future issue for further noncompliance with standards, particularly in October during warm, dry fall periods.

The temperature standard is violated in the Willamette River during the summer. Typical summer wastewater temperatures are in the low 70s Fahrenheit. The new Oregon temperature standard provides for a human use allowance along a specified reach of 0.3 degrees Celsius, and utilizing 25 percent of the 7Q10 stream flow assuming the stream temperature is above the numerical standard. Previously, DEQ standards specified that the point source discharges could not impact receiving waters by more than 0.2 degrees Fahrenheit.

A TMDL has been developed by DEQ and submitted to EPA for review. The final TMDL and its impact on MWMC will depend larger in the outcome of this review as well as the ultimate implementation approach taken by DEQ. It is premature at this time to present an analysis of the possible revised thermal load allocated to MWMC in the draft TMDL because of the uncertainty associated with the development of this TMDL.

### Mercury

The Willamette River in Eugene is included in the 2002 303(d) list as not meeting water quality criteria for mercury in fish tissue. This listing is based on exceedances of the reference fish tissue value of 0.35 parts per million (ppm). The EQC is expected to act on

[1]MECT, 2002. Aquatic and Riparian Habitat Assessment for the Eugene-Springfield Area. September 2002.

DEQ's recommendations for changes to water quality criteria for toxic substances in the near future, and is expected to adopt EPA's recommended fish tissue criterion for methyl mercury of 0.30 ppm. Currently, DEQ is developing a mercury TMDL for the Willamette River. This TMDL is not expected to initially result in waste load allocations for point sources, but rather to impose requirements for monitoring and implementation of mercury reduction plans.

The mercury in the Willamette River system is believed to originate from natural volcanic and mineral sources and legacy mining wastes and atmospheric deposition in the river headwaters. The MWMC has monitored its influent and effluent for mercury for many years. The facility does not use, store, treat or discharge mercury in significant amounts and should not impact the water quality status for that pollutant.

### Arsenic

Based on data from the regional wastewater program's ambient water quality monitoring program, DEQ has included the Willamette River in Eugene-Springfield as water quality limited for arsenic, based on exceedances of the current human health criterion of 0.002 μg/L. As mentioned above, DEQ is expected to adopt new criteria for toxic substances in the near future, and this criterion is expected to be revised upwards to 0.014 μg/L. The ambient monitoring data[2] indicate that the river would continue to be listed if the criterion is revised upwards. This arsenic in the river is believed to be from natural sources. Arsenic is present in rock formations in Lane County, and in some areas arsenic is commonly found in groundwater. A TMDL for arsenic will be developed but is not on DEQ's current TMDL schedule.

### Other Parameters

Data from the Eugene-Springfield ambient monitoring program indicate no exceedances of other water quality criteria at any of the Willamette River monitoring sites, including *e. coli* and metals[2].

Nutrient concentrations do not approach levels of concern. Ammonia-nitrogen is typically less than 0.1 mg/L. Nitrate+nitrite nitrogen and total phosphorus concentrations do show a measurable increase downstream of the WPCF discharge. For example, average nitrate+nitrite – N concentrations increase from 0.02 mg/L to 0.11 mg/L, and total phosphorus from 0.04 mg/L to 0.09 mg/L[2].

Dissolved oxygen (DO) concentrations in the Eugene-Springfield area and downstream of the WPCF discharge meet applicable criteria for cold water uses. If the designation of the Willamette River in Eugene-Springfield as a salmon and steelhead spawning area from October 15 to June 15 remains in effect, the corresponding DO criterion would be 11.0 mg/L. Monitoring data indicate that the DO concentrations are frequently below this criterion.

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[2] City of Eugene Public Works Department, 2003. City of Eugene Stormwater Annual Report. May 2003.

### Summary

Willamette River water quality in the Eugene-Springfield area generally exceeds applicable water quality criteria, with the principle exception of temperature. The background water quality does not create any significant issues related to the treated wastewater discharge, both at current and future planned flows.

## 5.4 Design Capacity of Conveyance System and Wastewater Treatment Plant

### 5.4.1 Conveyance System

Conveyance system alternatives were developed and evaluated in the WWFMP (CH2M HILL, 2000). The current facilities planning effort focused on the analysis of wastewater treatment alternatives regarding influent pumping, preliminary and primary treatment, secondary treatment, disinfection, and biosolids management.

As part of the current facility planning effort, collection system modeling was performed by updating the MWMC MOUSE hydraulic model developed for the WWFMP to provide an estimate of WWPH flows to be used in the analysis of wastewater treatment alternatives and pumping capacity. A detailed report of the wastewater collection system hydraulic modeling analysis is given in the March 2004 "MWMC Wastewater Facility Plan—Wet Weather Peak Flow Analysis" technical memorandum (see Volume 2). The most significant tasks in the modeling update process were the following:

1. Conversion of the wet weather flow estimating method from a spreadsheet-based regression analysis to the new RDII modeling module that is a part of the MOUSE model
2. Calibration of the model based on more recent system flow monitoring data
3. Use of a new planning time frame (2025) not addressed in the WWFMP

The WWFMP did not explicitly evaluate peak flows for 2025, although it did evaluate buildout flows. Current modeling efforts were also undertaken, using the limited additional flow monitoring data (from six permanent monitoring locations), to assess the effectiveness of ongoing RDII reduction efforts. In addition, the current modeling effort has incorporated system network configuration modifications, such as physical upgrades to pump stations and/or pipelines.

In accordance with DEQ guidelines, the 10-year summer and the 5-year winter rainfall events were compared to determine which storm produced the defining (worst case) flow condition in the wastewater collection system. The 10-year, 24-hour storm event produced an unadjusted peak flow at the WPCF of 181 mgd for the 2025 condition, far less than the 277 mgd for the 5-year event. Therefore, the 5-year rainfall event was used as the design rainfall event.

The 2004 Facilities Plan modeling effort indicated that WWPH flows generated in the collection system were comparable to those projected in the WWFMP. The 2004 Facilities Plan estimates of WWPH flow at the WPCF are 277 mgd and 294 mgd for 2025 and

buildout, respectively. The WWPH flow rate predicted in the WWFMP was 290 mgd for buildout. The WWFMP did not estimate a 2025 value. Some of the initial peak flow management alternatives evaluations that were conducted as part of this 2004 Facilities Plan effort occurred before the updated modeling efforts were completed. For these initial evaluations a flow of 300 mgd was assumed for the WWPH flow in 2025.

During the calibration process it was found that calibrating the model flows to the six collection system monitors resulted in model flow predictions at the E-S WPCF that were higher than the monitor data at the treatment plant. It is advisable to collect additional flow monitoring data during the upcoming wet season, and to locate (or relocate) temporary monitors where they might provide a check on the treatment plant and permanent (MGD) monitors. It was decided to calibrate the model primarily to E-S WPCF data and use the collection system monitors to set RDII module parameters relative to one another. This resulted in lower model flows predicted at some of the six monitor locations than was actually measured, some by more than 20 percent. The apparent flow measurement discrepancy warrants further investigation, and additional flow monitoring, so that the overall model calibration can be improved. MWMC has an ongoing flow monitoring program, and will continue to update and improve the collection system model calibration as additional flow data become available. Improvement of the model calibration could potentially change the peak design flows within the collection system and at the E-S WPCF. However, it should be noted that a system-wide calibration of the hydraulic model was also performed as part of the WWFMP, and the current calibration maintains the same distribution of collection system flows. For the 2004 Facilities Plan MWMC will use a peak flow in 2025 (based on the 5-year, 24-hour storm) of 277 mgd.

## 5.4.2 Liquids Treatment Facilities Design

The 2025 design criteria for flow at the WPCF are summarized in Table 5.4.2-1. These flows provide the basis for future liquids unit process design.

**TABLE 5.4.2-1**
Summary of Total Flow Projections For 2025 (Residential, Commercial, and Industrial)
*MWMC Facility Plan, Eugene-Springfield*

| Year | 2025 |
|---|---|
| Estimated Population | 297,585 |
| ***Wastewater Flow Projections (mgd)*** | |
| Max. Month Dry Weather | 59.3 |
| Max. Month Wet Weather | 110.8 |
| Peak Day Wet Weather | 227 |
| Peak Hour Wet Weather | 277 |

Table 5.4.2-2 summarizes the anticipated 2025 facility needs, design basis, and condition requirements for each liquids unit process based on reliability and redundancy requirements.

**TABLE 5.4.2-2**
Liquids Unit Process, Existing and 2025 Design Capacity
*MWMC Facility Plan, Eugene-Springfield*

| Unit Process | Design Basis | Existing Total Capacity (mgd) | 2025 Capacity Need (mgd) | 2025 Condition of Need |
|---|---|---|---|---|
| Influent Pumping | PWWF | 215 | 277 | Firm capacity with largest unit out of service |
| Influent Screening | PWWF | 175 | 277 | Firm Capacity with one unit out of service |
| Grit Removal | PWWF | 175 | 277 | Firm Capacity with one unit out of service |
| Preaeration | AWWF | 58.4 | No Additional Capacity Need | None |
| Primary Clarification | PWWF | 86 | 277 or 160 with flow management | 50% of design flow capacity with largest out of service |
| Aeration Basins | ADWF | 49 | 59 | Total Capacity |
| | AWWF | 75 | 111 | Total Capacity |
| Secondary Clarification | ADWF | 49 | 59 | 75% of design flow capacity with largest out of service |
| | AWWF | 75 | 111 | |
| Disinfection | ADWF | 80 | 59 | |
| | PDWWF | 175 | 227 | |
| | PWWF | 175 | 277 | 50% of design flow capacity with largest out of service |
| Filtration | ADWF | 0 | 30 | 75% of design flow capacity with largest out of service |
| Plant Hydraulics | PWWF | 175 | 277 | |

## 5.4.3 Biosolids Treatment Facilities Design

The 2025 design criteria for CBOD and TSS loads at the WPCF are summarized in Table 5.4.3-1. These loads, in conjunction with the 2025 flows, provide the basis for future solids unit process design.

**TABLE 5.4.3-1**
Summary of Total Load Projections for 2025 (Residential, Commercial, and Industrial)
*MWMC Facility Plan, Eugene-Springfield*

| Year | 2025 |
|---|---|
| ***BOD Loading Projections (lb/day)*** | |
| Average Dry Weather | 55,000 |

**TABLE 5.4.3-1**
Summary of Total Load Projections for 2025 (Residential, Commercial, and Industrial)
*MWMC Facility Plan, Eugene-Springfield*

| Year | 2025 |
|---|---|
| Max. Month Dry Weather | 74,000 |
| Average Wet Weather | 55,000 |
| Max. Month Wet Weather | 74,000 |
| ***TSS Loading Projections (lb/day)*** | |
| Average Dry Weather | 61,000 |
| Max. Month Dry Weather | 87,600 |
| Average Wet Weather | 77,400 |
| Max. Month Wet Weather | 102,800 |

Table 5.4.3-2 summarizes the anticipated 2025 facility needs, design basis, and condition requirements for each solids unit process based on reliability and redundancy requirements.

**TABLE 5.4.3-2**
Biosolids Unit Process, Existing and 2025 Design Capacity
*MWMC Facility Plan, Eugene-Springfield*

| Unit Process | Process Description | Design Basis | Existing Total Capacity | 2025 Capacity Need | 2025 Condition of Need |
|---|---|---|---|---|---|
| Waste Activated Sludge Thickening | Gravity Belt Thickeners | WWMW | 96,500 lb/day | 144,720 lb/day | Total capacity |
| Solids Stabilization | Anaerobic Digestion | AA | 145,350 gpd | 200,000 gpd | Total capacity with minimum of two tanks |
| Solids Stabilization | Facultative Sludge Lagoons | SLR | 27,225 lbs VSS/day | 27,225 lbs VSS | Total capacity |
| Biosolids Dewatering | | WWMW | 307,440 gpd | 307,440 gpd | Total capacity |
| Biosolids Storage | Facultative Sludge Lagoons | NA | 41 MG | 41 MG | Total capacity |
| Biosolids Storage | Air Drying Beds | NA | 3130 dry tons | 3130 dry tons | Total capacity |

## 5.4.4 Biosolids Disposal

Table 5.4.4-1 summarizes the anticipated 2025 biosolids receiving capacity of the Biocycle Farm and the cooperative farms, which are the two main land application alternatives for disposal of MWMC biosolids.

**TABLE 5.4.4-1**
Existing and 2025 Site Characteristics and Receiving Capacity of the Biocycle Farm and Cooperative Farms
*MWMC Facility Plan, Eugene-Springfield*

| Unit Process | Existing Criteria/Conditions | Year 2025 |
|---|---|---|
| **BIOCYCLE FARM** | | |
| **SITE CHARACTERISTICS** | | |
| Site Delineation | | |
| Poplar Trees (non-buffers) | 165 acres | 425 acres |
| Grass (buffers) | 20 acres | 132 acres |
| Roads | 23 acres | 23 acres |
| Feed Store Lot | 16 acres | 16 acres |
| Site Capacity (based on non-irrigated loading) | | |
| Poplar Trees (liquid biosolids) | 1,444 dry tons | 2,128 dry tons |
| Grass (dewatered biosolids) | 549 dry tons | 612 dry tons |
| Poplar Harvest Rotation | 10 years | 10 years |
| Percent Dry Solids in Applied Liquid Biosolids | 1-4% | 1-4% |
| Site Loading Criteria | | |
| Nitrogen Loading | | |
| Poplar Trees (liquid biosolids) | 220 lbs N/acre | 220 lbs N/acre |
| Grass (dewatered biosolids) | 120 lbs N/acre | 120 lbs N/acre |
| Biosolids Loading | | |
| Poplar Trees (liquid biosolids) | 3.4 dry tons/acre | 5.4 dry tons/acre |
| Grass (dewatered biosolids) | 4.2 dry tons/acre | 4.2 dry tons/acre |
| **COOPERATIVE FARMS** | | |
| **SITE CHARACTERISTICS** | | |
| Available Land, total | 7500 acres | Unknown |
| Dewatered Biosolids Capacity, total | 31,200 dry tons/year | Unknown |