

MWMC Recycled Water Program

briefing book



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Metropolitan Wastewater Management Commission



Partners in Wastewater Management

Original Production January 2012

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Introduction

Purpose

This briefing book has been produced in accordance with the Recycled Water Program Planning Phase I Communication Plan. The purpose of this book is to serve as a resource for the Commission and other decision makers, ensuring that individuals are provided with accurate, consistent information. This briefing book contains a series of informational backgrounder sheets and will be updated with new fact sheets as program planning progresses.

Organization of Briefing Book

A table of contents is located at the beginning of this guide.

Tab 1: Introduction

Tab 2: MWMC's Recycled Water Planning Progress. A review of the planning steps, decisions, strategies, and regulatory milestones related to the implementation of recycled water use.

Tab 3: Phase 1 Findings. A summary of information collected and developed for consideration of recycled water implementation and additional planning. Sub-tabs included are:

Regulatory Compliance (an overview of the Willamette TMDL for temperature and the MWMC's thermal load issues)

Thermal Load Mitigation Alternatives (a review of means to mitigate the MWMC's excess thermal load)

Community Acceptability (a summary of MWMC stakeholder input and lessons learned from other communities)

Recycled Water Alternatives (a description of the opportunities to use recycled water locally and alternatives recommended for further study)

Conceptual Project Costs (a detail of approximate costs to implement conceptual recycled water projects)

Tab 4: Phase 2 Recommendations. A summary of the key studies and tasks recommended to continue recycled water planning efforts.

Tab 5: About Using Recycled Water. General information about the use of recycled water in the nation and in Oregon.

Tab 6: Glossary & FAQs. A reference source for navigating through the technical terms and acronyms contained in the briefing book, as well as answers to common questions about recycled water and the MWMC's planning effort.

Tab 7: Program Background. A copy of the MWMC's recycled water program backgrounder as well as relevant DEQ fact sheets.

Additional Information tab. A placeholder for information briefing book users may want to use to add additional resources.

Retrospective and Look-Ahead

Initial recycled water planning considerations, 2004 – 2010

2004 Facilities Plan recommends four-phase plan for recycled water relying on Class A irrigation use, with potential applications of up to 10 million gallons per day (MGD).

2006 Willamette TMDL presents a waste load allocation (WLA) limitation to the MWMC's thermal discharge. Based on the DEQ's thermal load spreadsheet tool, the MWMC's potential risk appears in late October, equivalent to flows of up to 4 MGD under current conditions and 8 MGD at build-out projections.

Biocycle Farm Irrigation system emplaced to deliver Class D recycled water to the MWMC's poplar plantation.

2008 MWMC Temperature Mitigation Strategy for internal planning purposes, a portfolio approach including recycled water use, stream shading, and indirect discharge to gravel pits, is recommended.

2010 Recycled Water Implementation Scoping identifies priority assessments needed to develop recommendations for recycled water use alternatives.

Settlement Agreement establishes regulatory premise of TMDL compliance primarily through implementation of a recycled water program (complemented by other options).

MWMC Owosso Bridge Temperature Monitor provides new, better Willamette River temperature data.

Three-phase program planning process and implementation, 2010 – 2017

2010 Three-Phase Planning Approach defines a concerted, one-step-at-a-time study effort to determine efficacy of recycled water implementation.

2011 Phase 1 Planning Services provides a conceptual alternatives assessment for recycled water project development, including initial stakeholder involvement.

West Bank Trail Extension Recycled Water Piping installed in cooperation with City of Eugene's construction project.

2012 Phase 2 Planning Services to deliver an Alternatives Evaluation for thermal load mitigation through completion of feasibility studies, cost-benefit analyses, and public input.

NPDES Permit Renewal (tentative) requires the MWMC to implement thermal load mitigation measures.

2013 Phase 3 Planning Services to provide recycled water implementation and community involvement plans.

Effluent Reuse Phase I potentially funds construction of recycled water selected alternatives.

2016 Effluent Reuse Phase II potentially provides expanded uses of recycled water in the community.

2017 NPDES Permit Renewal (tentative) requires the MWMC to have thermal load mitigation measures in place.

Strategic Goals & Pillar Messages

Strategic Goals Guide Planning

In 2009, regional wastewater program staff developed seven goals presenting key guiding concepts in planning potential recycled water uses. The Phase 1 communications strategy identified five pillar messages to ensure focus and consistency in recycled water communications.

GOAL 1

REGULATORY COMPLIANCE – Help meet environmental regulatory discharge requirements of the Water Pollution Control Facility (WPCF) through reduction of thermal load to the Willamette River by diverting high-quality, treated effluent (recycled water) to beneficial reuse applications.

GOAL 2

COST EFFECTIVENESS – Meet recycled water usage goals through applications that are cost effective to the MWMC.

GOAL 3

COST BENEFITS – Develop recycled water applications that provide added value to the user and/or the MWMC.

GOAL 4

ENVIRONMENTAL BENEFITS - The recycled water program and applications will enhance surface water quality and protect water resources.

GOAL 5

REGIONAL WATER SUPPLY BENEFITS – Develop recycled water applications that fill existing water demands and that can reduce stresses on local water resources.

GOAL 6

SUSTAINABILITY – Develop a recycled water program that can help achieve future regulatory compliance demands, offset needs for future treatment system infrastructure, and is flexible to meet challenges of population growth and climatic variability.

GOAL 7

COMMUNITY RESPONSIVENESS – Develop a recycled water program that is responsive to and informed by community input.

PILLAR 1

SUSTAINABLE

- The Recycled Water Program will help achieve, sustain, and promote balance among community, environmental and economic needs.
- The program planning effort ensures that cost-effective, environmentally beneficial, and community-driven solutions will be studied and prioritized.
- The program will reflect community values, respond to community needs, and be informed by community input.

PILLAR 2

SAFE

- Protecting human health and the environment is the MWMC's first and foremost consideration.
- The program will identify recycled water uses that are a beneficial part of our regional water resources and provide the best outcome for people and for the Willamette River ecosystem.
- Recycled water use will provide many environmental benefits for the MWMC and the community, including improving water quality and enhancing habitat for threatened species, such as salmon.

PILLAR 3

RESPONSIBLE INVESTMENT

- Recycled water use is part of a cost-effective option to regulatory compliance.
- The Recycled Water Program will optimize and enhance the use of existing facilities and infrastructure already built/operated by the MWMC and local agencies.
- Opportunities to maximize potential cost offsets and cost-sharing benefits will be identified.

PILLAR 4

REGIONALLY ADVANTAGEOUS

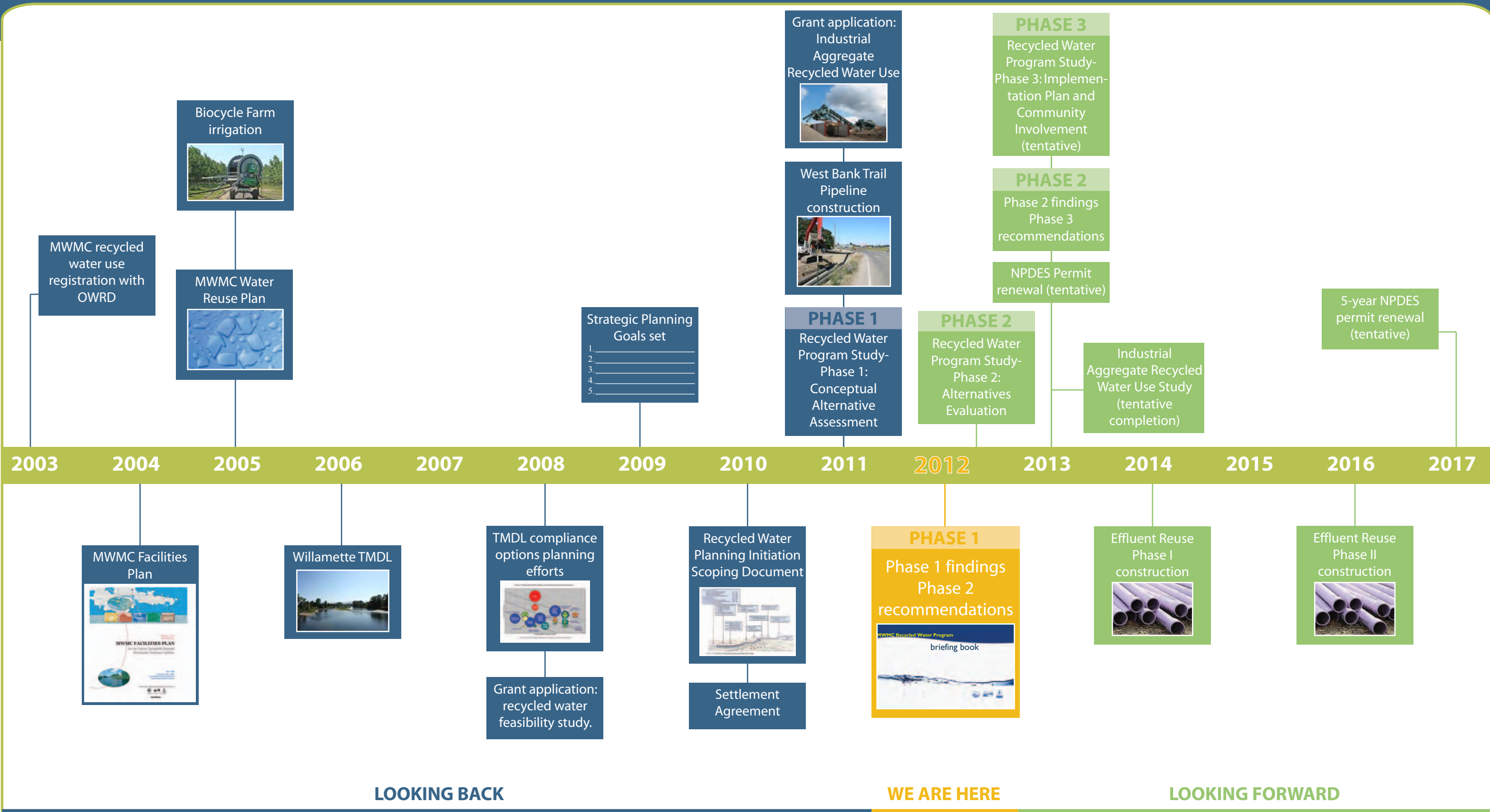
- Built on the strength of the MWMC's regional intergovernmental partnership, the program will utilize the knowledge and input of community members to develop a program that works!
- The resulting program will be reliable to operate and maintain, and will benefit our region and its communities.

PILLAR 5

FLEXIBLE

- The Recycled Water Program will provide flexibility in meeting community needs – providing the right water to the right use at the right time.

MWMC RECYCLED WATER PLANNING AND IMPLEMENTATION TIMELINE



Willamette Temperature TMDL

TMDL – Total Maximum Daily Load

TMDL stands for Total Maximum Daily Load. TMDLs are watershed-based pollutant limitations established under section 303(d) of the federal Clean Water Act. The Willamette River is listed under the Clean Water Act (known as “303(d) listed”) as “temperature limited” during summer (defined as April 1 through October 31).

In Oregon, TMDLs are established by the DEQ under the authority of the US EPA. DEQ issued the Willamette Basin TMDL on September 21, 2006. The temperature TMDL identifies maximum thermal loads that the Willamette River has the capacity to absorb without exceeding the temperatures protective of salmon.

Heat Sources on the Willamette River

Natural solar radiation is by far the largest heat source in the Willamette River system. DEQ estimates 86% of Willamette temperature increases are from the loss of natural riparian tree shade from human activities, such as urban development and agriculture. Other human activities that cause water temperature increases include point source discharges of municipal and industrial wastewater, water diversions, and dammed impoundments. DEQ estimates that point source discharges account for 14% of Willamette temperature increases and notes that the impacts of these discharges is relatively small.

Two other major contributors of Willamette temperature increases are the Army Corps of Engineers-operated dams and the overall loss of river channel complexity, including side channels and wetlands, that help slow and cool stream water. The Willamette TMDL considers both of these contributing factors as fixed conditions.

These existing conditions are not factored into calculated potential for lower river temperatures (referred to as “the natural thermal potential” – the benchmark by which added heat sources are measured).

DEQ estimates 86% of Willamette temperature increases are from the loss of natural riparian vegetation from human activities, such as urban development and agriculture.



Point sources (such as cities represented by yellow dots) contribute less than 14% of the Willamette River’s heat load. Federal dams (shown in red), in addition to channel modifications, have altered the natural temperature regime of the river system.

The Willamette River’s temperature benefits from cooler water flowing in from large tributaries. The confluence of the Santiam River, near Albany, marks the point where the Santiam’s waters greatly cool the Willamette. The point just upstream of the confluence, where thermal loads have culminated in the greatest degree of river temperature increase, is referred to as the upper Willamette point of maximum impact. The MWMC is part of the upper Willamette community contributing to the total thermal load measured at that point.

Willamette Temperature TMDL

The MWMC's TMDL Limit

The DEQ prepared a spreadsheet-based model of the MWMC's thermal loading based on treatment plant daily flow and temperature data from 1991 to 2003.

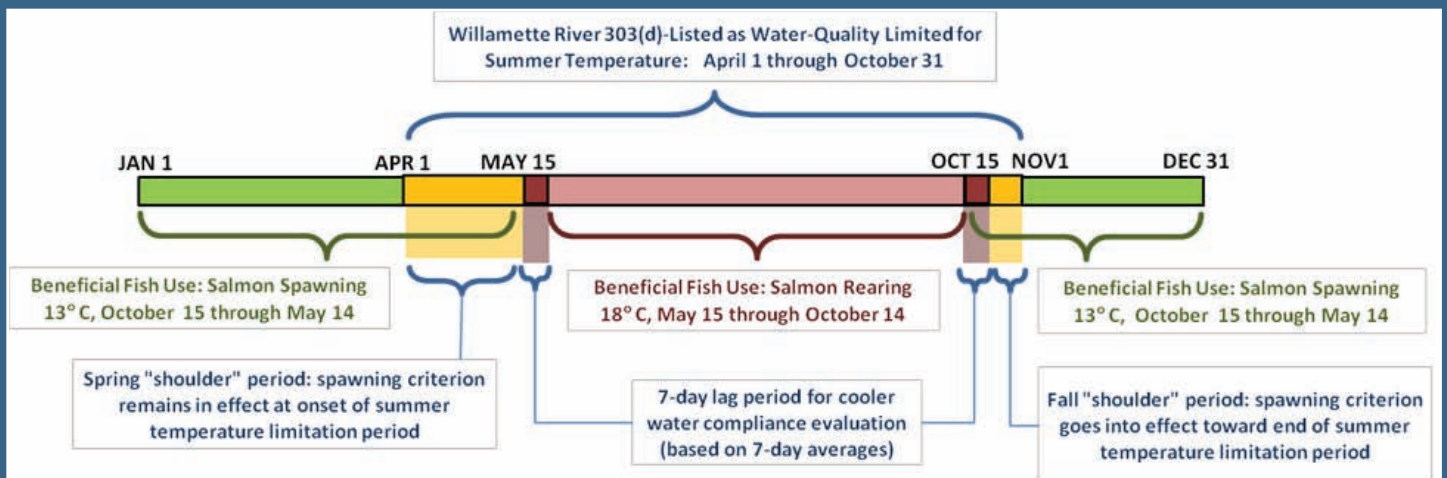
The data indicate the MWMC would have experienced one period of excess thermal load – in October 2003, a period of unusually warm weather accompanied by low river flows. **The October 2003 data indicate an excess thermal load need of approximately 93 million Kcal/day – the equivalent of just over 3 MGD under the October conditions on record.**

The Willamette TMDL requires that the MWMC be able to stay within its waste load allocation (WLA) by having a thermal reduction plan in place to accommodate the 93 million Kcal/day offset.

Reserve Capacity

The DEQ allotted the MWMC a portion of the “reserve capacity” (the amount of thermal load remaining available on the Willamette River for future human uses) as temporary loan to offset thermal load. Since the 2006 TMDL went into effect upon issuance of the Order, existing dischargers became protected against immediate non-compliance through the reserve capacity loans to absorb the excess thermal load historically observed in the discharger's effluent. For the MWMC, the October 2003 thermal load need was 15.1% above the MWMC's WLA – so the DEQ provided the MWMC with a temporary reserve capacity factor of 1.151 (i.e. 15.1%).

Having the reserve capacity allows the MWMC to remain in compliance with the TMDL while it implements thermal offset strategies, such as recycled water diversion or riparian shade planting.

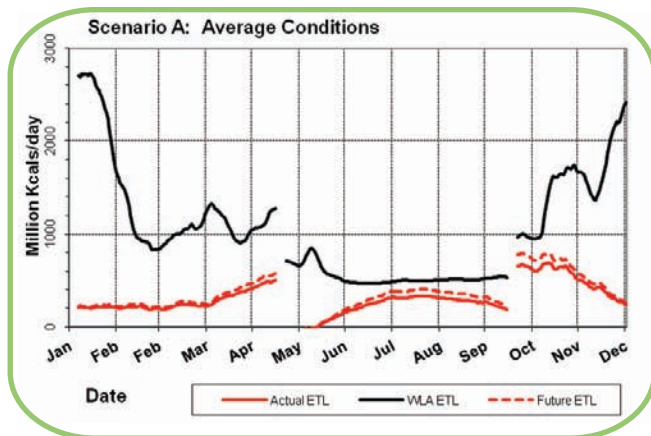


MWMC's Thermal Load Characteristics

The MWMC's TMDL Waste Load Allocation (WLA)

The MWMC's WLA is based on a complex calculation of values related to river and effluent flows and temperatures as well as several scaling factors. The MWMC can opt for a simpler, fixed-number WLA in lieu of a daily data-based calculation, but the fixed values are more stringent, and therefore present the MWMC with undue regulatory burden.

The graph labeled "Scenario A" shows both the WLA and effluent thermal load (ETL) using daily averages of flow of temperature conditions. The black line indicates how greatly the MWMC's WLA fluctuates, even under averaged daily conditions. The sharp line breaks shown at May and October represent the 5°C change in salmon habitat criteria (i.e. "spawning season" versus "rearing season"). The red line shows the MWMC's actual ETL.



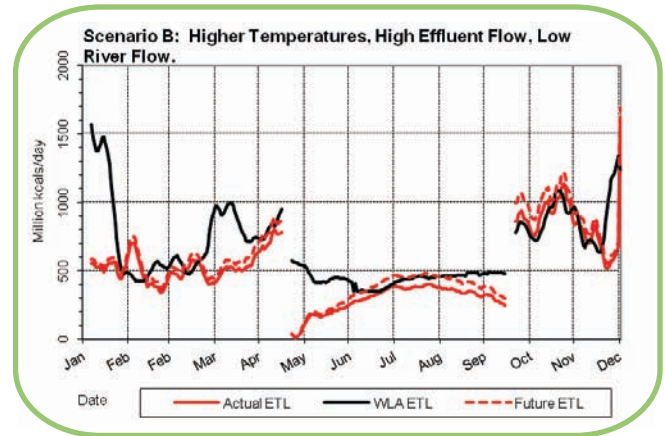
Scenario A: Under average daily conditions, the MWMC is unlikely to exceed its WLA.

Under average conditions, the MWMC is not at risk of exceeding its WLA. The dashed red line represents how the ETL is affected if average flow increased by 5 MGD.

Thermal Risk under Worst Case Condition

The graph labeled "Scenario B" represents a theoretical worst-case scenario using historical high effluent temperature and high river temperature concurrent with worst-case flow conditions (both the highest effluent flow at its highest effluent temperature and the lowest river flow at highest river temperature).

Under this extreme conditions scenario, the MWMC is at risk of thermal load exceedances in early May, mid-summer, and late October. Increased effluent flows in the future (e.g., from population growth or increased water use) would increase the MWMC's risk of exceeding its WLA.



Scenario B: Under combined extreme temperature and flow conditions, there is potential MWMC exceeds its WLA.

Excess Thermal Load Under Facilities Plan Build-Out Conditions

Based on historical data from 1991 - 2003, late October 2003 presented the most extreme thermal load condition, at an excess of 93 MKcal/day (orange values on table). Projecting this worst historical-case condition for a plant flow of 59 MGD at build-out, this excess thermal load becomes 234 MKcal/day, an equivalent of almost 8 MGD of plant flow (yellow values on table).

Current thermal offset need

Thermal Load Need Condition	Fish Criterion (spawning or rearing)	WLA (MKcal/day)	Excess Thermal Load (MKcal/day)	Percent Exceedance	Excess Effluent Flow
Current (2003) Plant Flow Extreme Condition	Spawning Period (spring and fall)	615	93.0	15.1%	3.11 MGD
	Rearing Period (summer)	NA	0	0%	0 MGD
Projected Build-Out (2050) Flow Extreme Condition	Spawning Period (spring and fall)	615	234	38.6%	7.94 MGD
	Rearing Period (summer)	444	9.35	2.11%	0.610 MGD

Thermal Trends and Resiliency

Community and climatic factors can impact thermal offset need

The Willamette TMDL bases allocation of thermal load on several variables. These variables are usage-based (wastewater flow and temperature) and climatic (river flow, river temperature, and, indirectly, air temperature). To generate a conservative estimate of the MWMC's potential thermal offset need, the DEQ's calculations apply an additional 5 MGD to historical flows. The Phase 1 thermal load assessment reviewed which factors have the greatest potential impact (or sensitivity) limiting thermal loads.

Population Trends

The 2004 Facilities Plan recommended planning for a **1.6% annual population growth** based on regional planning indicators, resulting in a 36.7% overall increase in population (and correlating wastewater flow) by the year 2025. Under this scenario, **the estimated future excess thermal load is equivalent to 8 MGD.**

(MWMC Facilities Plan, Section 5.1.1 and Technical Memorandum No. 3)

Industrial Growth

New industrial uses could increase the need for thermal load mitigation. For context, **the former Hynix facility typically contributed nearly 1 MGD of wastewater influent.** The successful establishment of just two similar facilities in the future would generate 2 MGD (and potentially more during peak operating periods).

Water Conservation and Use Trends

Nationally, water conservation and efficiency advances are responsible for approximately a 1.5% decrease in water consumption per capita per year – perhaps offsetting local population increases for the near term. These conservation and efficiency trends help

offset some, but not all, future needs. EWEB estimates base demand for water in Eugene will grow from 19 MGD in 2009 to 23 MGD by 2050. This represents an annual growth of around 0.5%. (Demand actually dropped by over 10% in recent years, in large part due to closure of the Hynix plant.)

(Data from EWEB Sustainability Report 2010, Global Resource Indicators summary reports WU2 and WU7).

Local data indicate the Eugene-Springfield area population continues to grow at nearly 1.5% annually

Data from Adopted Eugene-Springfield Consolidated Plan 2010

Recent data trends

A review of plant data through 2010 indicate that the MWMC has remained within the thermal limit

threshold imposed by the Willamette TMDL and wastewater flow rates have remained steady.

The MWMC's actual effluent thermal load (ETL) is slightly increasing over time, whereas the daily waste load allocation (WLA) trends around a steady norm. In other words, thermal output is going up, whereas allowed thermal load is not. Average effluent temperatures were rising through 2003, but have since shown a decreasing trend, possibly reflecting recent years' below-average atmospheric temperatures.

The data suggest the MWMC faces an increasing thermal load trend, but the risks of exceeding the WLA

are only likely under infrequent or unusual circumstances. These circumstances include significant rain events in the summer and early fall, and periods of high ambient air temperatures.

Rain Event Flow Issues

A significant source of effluent flow comes during heavy precipitation events that saturate the ground and infiltrate the wastewater collection system piping.

Heavy rains during periods of thermal exceedance risk – such as mid-summer or late October – could add unforeseen thermal load.

In 2007, a multi-day, 3-inch rainfall event in late October increased influent by 20 MGD, bringing discharge within 1.5 MGD of the MWMC's waste load allocation threshold.

Thermal Trends and Regulatory Resiliency: Local Climate Change Considerations

Climatic Predictions

According to professional agency researchers, and as supported by the MWMC's own data sets, predicting climate trends for our region is difficult. The area is impacted by the long-term cycles of the Pacific Decadal Oscillation (which brings us El Nino and La Nina conditions), as well as long-term climate change. **USGS staff reviewed MWMC temperature data and recommended taking a conservative approach to planning by expecting warmer, drier climatic conditions for the planning horizon.** (Stuart Rounds, USGS, June 2011, pers comm.)

What's in store for Oregon's climate?

Several models for climate change impacts on the Pacific Northwest predict warmer, drier summer seasons accompanied by warmer, wetter winter seasons. The predicted impact is heavier stream flows in the winter and early spring, followed by lower stream flows in the summer period.

Preparing for Climate Change in the Upper Willamette River Basin of Western Oregon: Co-Beneficial Planning for Communities and Ecosystems (University of Oregon Climate Leadership Initiative, March 2009).

Oregon's "warm" snow packs will most likely be among the first casualties of regional warming. Some areas of the state that have low summer stream flows are likely to see those flows occurring earlier in the year. Rivers sourced by spring flow from large volcanic aquifers will continue to have relatively high summer base flows. In general, the influence of the Pacific Ocean, the mid-latitude position of our state, and mountainous geography will probably result in less severe impacts from climate change relative to many other parts of the nation.

Institute for Natural Resources White Paper: Managing for climate change in an ecosystem dynamics framework, Recommendations from April 16, 2009 seminar

Oregon Climate Change Policy

The State of Oregon recognizes the dramatic consequences of climate change on all of our states resources.

The effects of climate change have serious implications for Oregon's economy and environment. Our winters are becoming milder, our summers hotter. Snow packs are shrinking and unseasonably warm temperatures are leading to rapid spring melts depleting Oregon's supply of summer water for agriculture and stream flows for wildlife.

- Oregon DEQ web page "Answering the Oregon Challenge: Climate Change": Home > Air Quality > Climate Change (2011)

State-level preparedness will be critical in coping with projected changes such as increased temperatures, rising sea levels and increased storm surges, declining snowpack, more frequent extreme precipitation events, and an increased risk of drought and heat waves.

- Preparing Oregon's Fish, Wildlife, and Habitats for Future Climate Change: A Guide for State Adaptation Efforts (Subcommittee on Fish, Wildlife, and Habitat Adaptation, Oregon Global Warming Commission, 2008)

Federal Climate Change Policy

The White House recently established a National Action Plan on Priorities for Managing Freshwater Resources in a Changing Climate, adopting a goal to prepare for impacts to water resources under climate change.

Government agencies and citizens collaboratively manage freshwater resources in response to a changing climate in order to assure adequate water supplies, to protect human life, health, and property, and to protect water quality and aquatic ecosystems.

- (National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate, Draft, June 2, 2011, Interagency Climate Change Adaptation Task Force).

TMDL and Permit Considerations

TMDL and Permit Dynamics

The MWMC faces regulatory uncertainty related to the future thermal load obligations under a renewed NPDES permit. The DEQ's internal timelines, the emergence of new water quality limitations, and potential revisions to the TMDL all present dynamics to which the MWMC will eventually adjust its preferred paths to regulatory compliance.

Settlement Agreement Conditions

The MWMC and DEQ negotiated a Settlement Agreement and Implementation Order in October 2009 in response to challenges brought against the adoption and implementation of the Willamette TMDL. The Settlement Agreement requires the DEQ to review and revise the Willamette TMDL to address specific deficiencies with the current TMDL and provides specific compliance options for the MWMC to satisfy the requirements of the existing TMDL when they are incorporated into the MWMC's NPDES permit.

The details of the specific compliance options available to the MWMC under the Settlement Agreement may be renegotiated if it is in the MWMC's interest to do so (*Mark Hamlin and Ranei Nomura, Oregon DEQ, October 2011, pers. comm.*). A renegotiation in advance of the MWMC's NPDES permit renewal may be advantageous to ensure regulatory compliance, in particular as it applies to recycled water use and/or riparian shade credits.

TMDL Revision

The Settlement Agreement obligates the DEQ to begin reviewing and revising the Willamette TMDL by December 31, 2012. However, it is unlikely that the DEQ will commence the review and revision process within that timeline. The revisions will address potential shortfalls in the methodologies, calculations, and apportionment of thermal load documented under the existing TMDL.

The MWMC may, at its option, work with the DEQ to identify data needs and collect and model data supporting the revised TMDL calculations. Providing thorough data is expected to evidence a lower thermal load impact for the MWMC and could result in a reduced regulatory burden under a revised TMDL. However, a reduced regulatory burden under a revised TMDL is not a certainty.

Reserve Capacity Allocation

The DEQ allocated reserve thermal capacity to the MWMC – in essence a “loan” of thermal load capacity.

Under the Implementation Order:

1. DEQ shall allocate the MWMC a reserve capacity multiplier of 1.151 during salmon spawning periods (early May and late October).
2. Reserve capacity initially allocated to the University of Oregon shall be allocated first to International Paper at Albany and any remaining capacity shall be allocated on a pro rata basis to the remaining sources (including MWMC).
3. NPDES permit renewals will continue the reserve capacity allocations above at least until a revised TMDL is established.

It may benefit the MWMC to negotiate for additional thermal capacity based on the curtailment of the University of Oregon's discharge and the 2011 closure of the International Paper plant at Albany.

Bubble Permit

The MWMC can enter an Excess Thermal Load Sharing Agreement (as approved by the DEQ) in which thermal load can be managed in cooperation with other upper Willamette basin dischargers using the USGS's Willamette Point Source Trading Tool.

Initial discussions between the MWMC and City of Albany indicate that load sharing may not be advantageous, as both entities are most likely to experience concurrent periods of thermal excess. Additionally, the City of Albany recently constructed its “Talking Water Gardens” project which is designed to accommodate all of Albany's cooling needs. Excess thermal load sharing opportunities with City of Corvallis may be mutually advantageous and could be further explored.

TMDL and Permit Considerations

Recycled Water Use / Offsets and Trading

Under the Settlement Agreement, the MWMC may reduce its thermal load through implementation of a recycled water use plan. If the MWMC implements a recycled water use plan, including construction on a schedule to be approved by the DEQ, no additional thermal load reduction will be required and MWMC will be deemed in compliance with the excess thermal load limits that will be incorporated in its next renewal NPDES permit.

Allowed projects under the recycled water use plan include, among others, storage of water at the MWMC's Beneficial Reuse Site. Projects are to be completed by 2017 unless the DEQ agrees to a different completion timeline. The MWMC will not be subject to other permit-driven thermal load reduction strategies during the construction period.

The DEQ may require subsequent offset or trading strategies if either

- (a) the proposed recycled water projects are not completed according to plan, or
- (b) implementation of the recycled water use plan does not produce the expected thermal reduction

but additional offset or trading would not be required until imposed through a DEQ-initiated NPDES permit modification.

In planning for recycled water uses, the MWMC can propose a balance of riparian shade credits and/or storage strategies along with, or in lieu of, an intended recycled water use plan.

Exceptional Conditions Exclusion

Under the Settlement Agreement, the MWMC's renewal NPDES permit will incorporate two abnormal conditions exceptions to temperature compliance: (1) abnormally low river flow and (2) abnormally high air temperatures. Both conditions are likely to exacerbate the potential for, and magnitude of, thermal load exceedance.

Low Flow Exclusion: The Settlement Agreement protects the MWMC during unusually low river flows. The minimum river flow observed on a 10-year recurrence interval based on 7-day average daily flow measurements is referred to as the "7Q10" flow. For the Willamette River at river mile 178 (location of the Eugene/Springfield wastewater treatment plant), the 7Q10 is 1310 cubic feet per second (cfs); 1340 cfs during the shoulder month salmon spawning periods. An exceedance of the excess thermal load limit will not be considered a permit violation during stream flows that are less than the 7Q10 flows.

Ambient Air Temperature Exclusion: Under the Settlement Agreement, the MWMC may document that extraordinarily high ambient air temperatures result in a delayed temperature increase at the treatment plant, and receive exception to thermal load limits under those documented conditions.

Regional wastewater program staff analyzed effluent data, revealing that most or all of the MWMC's past thermal loads near or exceeding the WLA coincided with periods when ambient air temperatures exceeded the upper 95th percentile recurrence interval (i.e. a 5-in-100 or 1-in-20 year event for the date of occurrence). This suggests that the MWMC should collect data to demonstrate to the DEQ the actual delayed impact of ambient air temperatures so that the delayed impact is accommodated for by the ambient air exclusion in the MWMC's NPDES permit.

Thermal Load Considerations Related to the NPDES Permit under the Settlement Agreement:

- | | |
|--------------------------------|-------------------------------------|
| 1. TMDL Revision | 4. Thermal Offset and Trading |
| 2. Reserve Capacity Allocation | 5. Bubble Permit Allocations |
| 3. Recycled Water Use | 6. Exceptional Conditions Exclusion |

Reference: Settlement Agreement, entered into by the MWMC, City of Albany, and Oregon DEQ on October 27, 2009, including Implementation Order In the Matter of the Willamette Basin Total Maximum Daily Load for Temperature, September 21, 2006; executed in tandem with the Settlement Agreement

Reduce Discharge Flows to River

Reducing volume of effluent discharged reduces thermal load

The total thermal load carried by the MWMC's treated water is proportional to the total daily volume of effluent discharged. By reducing the total daily flow, the MWMC can reduce its total thermal load.

Reduce-Reuse-Recycle

Three primary options are available to reduce the total plant effluent flows: (1) Reduce – by storing effluent temporarily for discharge at a later time, (2) Reuse – by indirectly discharging effluent through a water feature such as a wetland, water is temporarily diverted from the river while it seeps through the earth back to the river, and (3) Recycle – by producing recycled water for beneficial consumptive uses.

Storage (reduce)

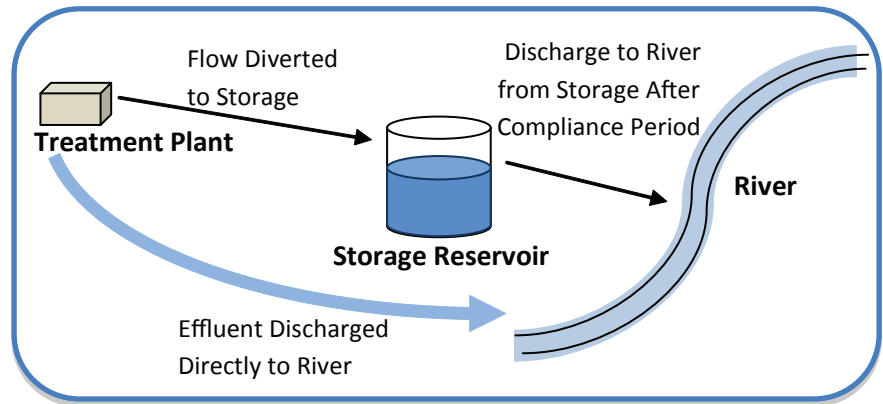
Storage options include the Beneficial Reuse Site lagoon, the Biosolids Management Facility lagoons, and potentially unused system capacity, such as idle secondary clarifiers during low-flow periods.

Indirect Discharge

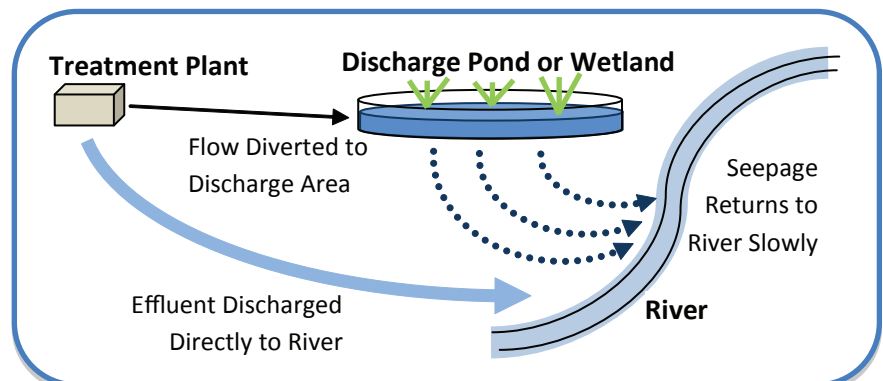
The Confluence Island site operated by Delta Sand & Gravel is an option for indirect discharge, such as discharging water to settling ponds or restored gravel pits. Wetland discharge at the Beneficial Reuse Site or Biocycle Farm may also be possible.

Recycled Water (recycled)

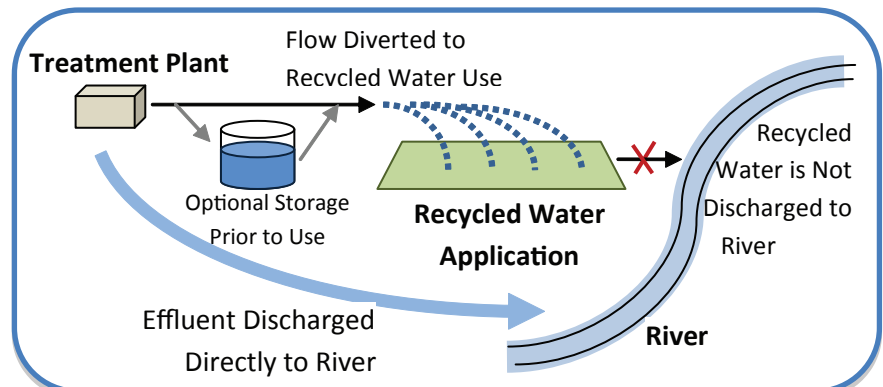
Recycled water use at sand and gravel operations near the wastewater treatment plant is a significant diversion opportunity. Additional recycled water use at MWMC facilities may also be practical.



Reduce: Temporarily divert water to storage to reduce flows during thermal risk period



Reuse: Divert water to a seepage pit or wetland where effluent indirectly returns to the river via the ground



Recycle: Divert water to a beneficial recycled water use; water is used and does not discharge to river.

Engage in Water Quality Trading

Water quality trading provides cost-effective water-quality improvement options

The DEQ and the EPA recognize and promote water quality trading (regulatory credits) as beneficial to the goals of the federal Clean Water Act and to cost-effective regulatory compliance. Trading allows point source permittees to either sponsor water-quality improvements elsewhere within the affected watershed or to purchase water quality trading credits outright from a credit registry.

Thermal Load Compliance Credit Options

Three primary mechanisms are available to the MWMC to secure regulatory credits toward its NPDES permit compliance for temperature: (1) riparian shading projects, (2) purchase of credits from qualified restoration projects, and (3) other watershed restoration projects that mitigate for temperature impacts on fish habitat.

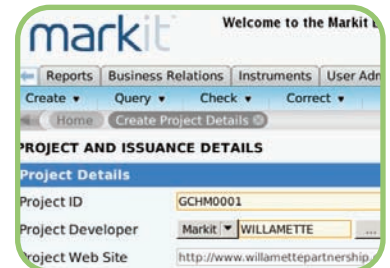


Riparian Shade Sponsorship

The MWMC, in partnership with conservation organizations, can finance the restoration of shade trees on salmon streams. Collaboration would be needed to identify projects, secure land, and maintain the site. The MWMC can quantify shade value, document project implementation, and secure regulatory credit for the work performed. Credit-ing requires ongoing demonstration of project success.

Credit Registry Services

A registry of water quality trading credit projects approved by the DEQ for regulatory acceptability simplifies the documentation and lowers the risk for the MWMC. The MWMC can invest in a credit registry to develop project credits or to purchase existing credits. The Freshwater Trust is currently developing StreamBank, an online restoration tool the organization likens to "TurboTax for the environment." However, no pre-approved credits are currently ready for purchase.



Cold Water Habitat Restoration



Thermal credits for creating and restoring cold water alcoves along the lower Willamette River are an option for permittees downstream of Albany. The DEQ may accept similar restoration that directly benefits cold water features for fish in the upper Willamette system. In addition to alcoves, such projects could include flood-plain, side channel, and wetland restoration. Each project would require demonstration by the MWMC that a measurable habitat benefit exists to secure project credit. There may be an opportunity to partner with sand and gravel companies near the wastewater treatment plant to do site restoration projects.

Water Quality Trading Credit Mechanisms

Trading Credit Option	Riparian Shading	Credit Banking	Cold Water Habitat Restoration
Assets	Opportunity to support local restoration needs	Low administrative and risk burden	Potentially significant local project needs
Drawbacks	Requires partnerships to identify projects, secure land, and maintain site.	Evolving process ; no pre-approved credits ready for purchase.	No formally approved metrics for restoration credits.

Reduce Effluent Temperature

Heat reduction at the treatment plant

Industrial chillers have long been ruled out as too expensive, energy-consumptive, and at odds with the goals of meeting the temperature TMDL.

If we ever build another chiller in Oregon at the expense of ecosystems, we've failed.

DEQ Director Dick Pedersen

No practical alternatives for reducing effluent temperatures through treatment plant modifications or heat recovery have been identified to date.

Reducing heat entering the wastewater system

Temperature reduction at points of water use can be achieved through heat recovery devices, conservation, or lowering thermostats. However, **reduction of industrial heat sources has no measureable impact on the temperature of influent reaching the wastewater plant.**

The MWMC's 2004 Temperature Management Plan eliminated source control from further consideration as industrial temperature reductions would not result in lower influent temperatures. One reason for this fact is that water temperature equalizes in waste streams and between pipe systems and the ground.

Water conservation to reduce thermal discharge to the waste stream

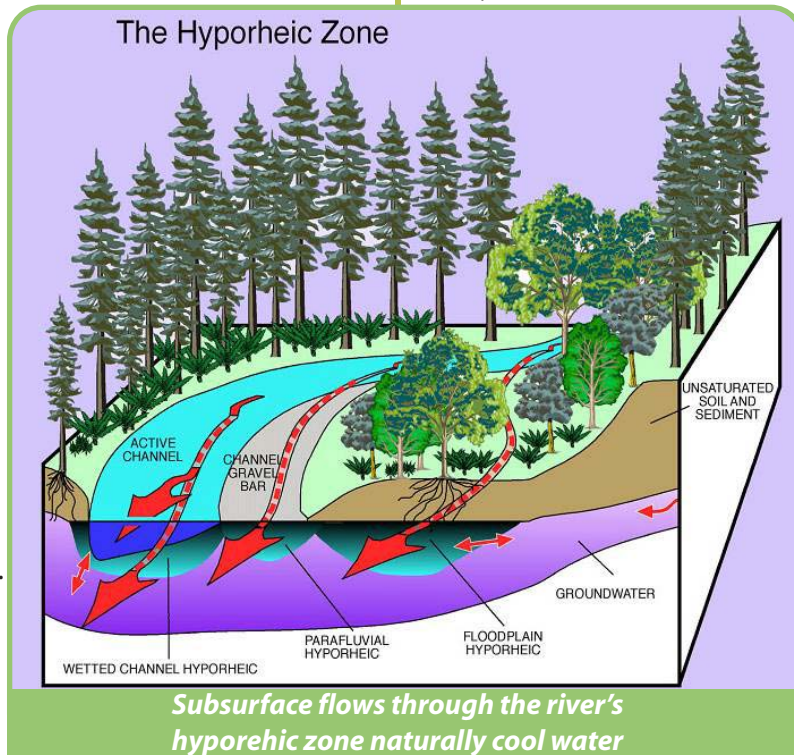
A community conservation effort could reduce water usage and, therefore, the total thermal load reaching the treatment plant. **An overall community reduction of indoor water use of 10% could have significant impacts on reducing the MWMC's thermal load.**

However, conservation may be difficult to achieve, take time, and not be as effective during times of peak need.

Furthermore, conservation would be unlikely to help address thermal load problems caused by flow increases during warm season storm events.

Post-treatment cooling with natural system processes

The hyporheic zone is the subsurface area that is directly interacting with stream flow. This zone extends from river bottoms and stream banks out into



the near channel groundwater zone. **Indirect discharge of treated wastewater effluent via the hyporheic zone may cool discharge to the river.** Hyporheic cooling benefits are maximized by longer travel times between flow introduction points to river discharge zones, a factor of both distance and geology.

Green Infrastructure: using natural systems to cool water

HYPORHEIC FLOW: Indirect discharge via ponds, trenches, or wells into gravel zones slows, cools, and returns flow to river.

POND COOLING: Discharge to habitat ponds with shade trees or "floating islands" results in cool, denser water sinking lower in the pond prior to seeping out to the river.

WETLAND COOLING: Wetland vegetation, slow flow, and deep connecting channels all contribute to the cooling of water prior to discharge to the river.

Thermal Mitigation Alternatives Comparison

Recycled water use is among other high ranking strategies, such as riparian shade and indirect discharge, for potential TMDL compliance.

Over the past several years, the MWMC and regional wastewater program staff reviewed and screened TMDL compliance strategies to develop a portfolio of thermal mitigation tools. Leading strategies for reducing effluent flow, securing regulatory trading credits, reducing effluent temperature, and ensuring permit flexibility have varying assets. The strategies most likely to be feasible and effective rank as "High" in the chart below, including water recycling. The Phase 1 conceptual project costing includes cost comparisons of these high-ranking strategies.

TEMPERATURE MITIGATION STRATEGY ALTERNATIVES	Regulatory Acceptability	Ease of permitting	High technical feasibility	Adaptable to compliance periods	Controllable/scalable by the MWMC	Near-term feasibility	Likely to achieve desired results	Provides additional community benefit	Low implementation cost	Likely to be cost- effective	Overall likelihood of feasibility and cost- effectiveness
Flow Reduction											
Water Recycling	•		•	•	•	•	•	•		•	High
Effluent Storage	•	•	•	•	•	•	•			•	High
Community Conservation		•	•	•				•	•	•	Moderate
Indirect Discharge	•			•							Low
Water Quality Trading											
Riparian Shading Credits	•		•	•	•	•	•	•		•	High
Third-Party Credit Bank	•	•	•	•	•	•	•		•	•	High
Habitat Restoration Credits				•	•		•	•			Low
Temperature Reduction											
Cooling Ponds/Wetlands	•		•	•	•		•	•			Moderate
Household Use Reduction		•						•	•		Low
Industrial Use Reduction				•		•		•	•		Low
WPCF Operational Reductions	•	•		•	•						Low
Hyporheic Flow Discharge	•			•	•		•				Low
Permit Flexibility											
Exceptional conditions (high ambient temperatures)	•	•	•			•	•		•	•	High
Bubble (load sharing with other point-source dischargers)	•	•	•			•			•		Moderate
TMDL recalculation (DEQ justification for reduced thermal load)	•	•		•			•		•	•	Moderate

Lessons Learned in Recycled Water Use

Applied Lessons from Case Studies

(Water Reuse – Issues, Technologies, and Applications; Metcalf & Eddy: p.1452-1453, Ch. 26, Public Participation and Implementation Issues)

Assume nothing. People come to understand a project in their own way and time. Lack of initial public concern or inquiry does not indicate support will be there later.

Share information early and often. Keeping the public educated and informed is critical, as is establishing the utility as the reliable and trusted information source. Debunking false information or responding to arguments taken out of context is very difficult.

Begin education at once. Prepare elected officials for the nature of the debate, and make sure they are kept informed of the continued development and challenges of the project, so they do not lose continuity with citizens or issues under discussion.

Use appropriate tools. Adopt core values that guide the organization in achieving its core purpose. Set your ground rules and follow them.

Let the citizens speak. Allow advisory committee members and stakeholders to deliver their own resolutions in their voice. These voices deliver a positive, powerful, and meaningful message to decision makers.

It all takes time. Allow time for the community to understand the dimensions of the water management issue and how to best approach its resolution.

Developing trust and open communication with stakeholders is an important contributor to success.



Community-Driven Planning

Public information efforts begin by targeting the most impacted stakeholders. Over time, as an early education base is built among stakeholders, the education effort then broadens to include the public at large. Regardless of the audience, all public involvement efforts are geared to help ensure that adoption of a selected water reuse program will fulfill real user needs and generally recognized community goals including public health, safety, and program cost.

(EPA Guidelines for Water Reuse: p.221, Ch. 7, Public Involvement Programs)

Community Assessment

Key stakeholder interviews provided understanding of community awareness and support for recycled water

A Community Assessment was conducted to identify stakeholders' awareness and attitudes about recycled water and to provide guidance about potential uses and issues that should be addressed during program development. The Community Assessment identified the following key opportunities and potential barriers to the MWMC's potential use of recycled water.

Key Opportunities

Community Goals: The recycled water program is viewed as complementary to the goals of local government and industry.

Regulatory Requirements: Emphasize the regulatory compliance benefits of recycled water use, as technically justified, to build on local government agency support and public understanding.

Confidence About Safety: Build on and support current stakeholder confidence in the safety of recycled water and its current regulatory oversight.

Water Utility Collaboration: Local utilities may be interested in potential recycled water partnerships to ensure water quality protection and support conservation.

Community Use Potential: Most interviewees agreed that strong potential exists for irrigation, agricultural applications, and industrial uses.

Customer Satisfaction: The MWMC biosolids program has built a base of satisfied agricultural customers who may accept recycled water as an additional service.

Broad Acceptance: Most potential users are willing to consider recycled water use for a wide range of allowable uses.

Sustainable Development: Recycled water may be a benefit to the growing trend of green building and LEED certified construction.

Economic Development: Recycled water availability could be an economic advantage to attract to large industrial development.

Product Pricing: Stakeholder interest indicates a successful price point can be set for recycled water.

35 Stakeholders Interviewed

Stakeholders represented the following groups:

Local Agency

Partners

- MWMC Commissioners
- Local Elected Officials
- City Officials
- Utilities

Potential Users

- Sand and Gravel Agriculture and
- Forest Products
- Public Works and Fire Departments

Interest Groups

- Conservation Organizations

Leverage Multiple Public

Benefits: Encouraging use by government agencies that recognize the multiple benefits of recycled water may support the economic feasibility of the program.

Address Community

Concerns: Thoroughly addressing concerns identified during the Community

Assessment may help the MWMC build support, attract users and operate a successful program.

Other Successes: Continue to emphasize other successful recycled water projects to build local knowledge and support.

Community Relationship: Implementation of the recycled water program would provide a good opportunity for the MWMC to build a strong and positive relationship with the community.

Community Assessment

Potential Barriers

Cost-related Issues: Cost-related issues will be critical to community acceptance.

Abundant Supply: Many potential users have access to water at low cost, making it more difficult to attract users.

Infrastructure Needs: The community is not in a growth mode and local construction is limited, making it more difficult to expand infrastructure.

Proximity Issues: Initial users will need to be located near MWMC facilities to provide cost-effective access to recycled water.

Public Support: To build public support, a public education program is needed for the recycled water program that addresses the program's value, purpose, safety, health impacts, environmental impacts, cost, impact on ratepayers, and sources of funding.

Technical Needs: Interviewees and regional staff have identified many technical issues will need to be resolved.

Conservation and Environmental Organizations: Building a positive relationship with these groups and providing easy-to-understand and accurate information to support decision-making will be important in gaining support.

Buy-in from Government Agencies: The MWMC's role in a multi-jurisdictional environment presents challenges in getting buy-in for the recycled water program.

MWMC Public Image: The public has a low level of awareness of the organization, and may have primarily heard about the MWMC in regards to negative experiences, such as rate increases. This will make building support for the recycled water program more challenging.

Potential Uses for Recycled Water

A range of potential uses for recycled water have been considered

The 2004 Facilities Plan identified public greenspace irrigation as a likely beneficial use for recycled water. The potential opportunity for industrial use at aggregate operations neighboring the WPCF has since shown the MWMC that other uses could present cost-effective alternatives for regulatory compliance. The Phase 1 Planning study considered a wide range of alternatives for recycled water use to help identify community potential and interest.

Irrigation

Agricultural. Irrigated agricultural lands are located along waterways downstream of the MWMC's Biocycle Farm and Beneficial Reuse Site. Grass and hay are dominant crops, but a secure supply of recycled water could allow farmers to consider other crops.

Parks. City of Eugene parks along the Willamette River Greenway include significant acreage for irrigation use. The parks system connects Maurie Jacobs, Skinner Butte, and Alton Baker parks.

Golf Courses. Several golf courses are within a close-in service area of the MWMC's infrastructure and present irrigation needs similar to Eugene's riverfront parks.

Facility Landscaping. Commercial campuses and school grounds could be opportunities for expanding future uses off of available recycled water infrastructure.

Industrial Use

Aggregate. Sand and gravel operations use large amounts of water; several operations are immediately downriver of the WPCF. Other construction demands include concrete and asphalt batching, dust control, and equipment washing.

Forest Products. Lumber yards, landscaping materials and composting facilities, and bioenergy producers present opportunities for recycled water use.

Manufacturing. Some large facilities such as the former Hynix facility have large water demands.

Municipal

Public Works. Uses include street cleaning, fleet washing, and street tree nurseries.

Airport. The largest single user of the municipal water supply is the Eugene Airport. Air fleet and car rental washing, landscape irrigation, and terminal needs drive demand. The Eugene Airport is located adjacent to the MWMC's Biocycle Farm.

Fire Safety. The Eugene fire training facility draws large volumes of municipal water. Recycled water can also service building sprinklers and fill pump trucks.

Environmental

Wetland Restoration. Recycled water is used to restore and enhance wetland function and provide habitat features. Mitigation wetland banking can provide economic benefits to local government.

Flow Augmentation. Maintaining stream flows for habitat and water quality is an acceptable recycled water use. Urban waterways could present a need for flow augmentation.



PHASE 1 FINDINGS: RECYCLED WATER ALTERNATIVES

Conceptual Projects Comparison

Screening conceptual alternatives for planning level cost estimation

A screening process evaluating positive attributes of potential near-term applications for the MWMC's recycled water identified conceptual projects with high marks for consideration. For Phase 1 project cost estimation, only the highest ranking conceptual uses were identified for costing.

CONCEPTUAL PROJECTS CONSIDERED		POSITIVE INDICATORS FOR CONCEPTUAL ALTERNATIVE EVALUATION															Overall Potential for Conceptual Cost Evaluation
		Summer Use	October Use	Use > 1 MGD	MWMC Facility Served by Existing Infrastructure	Near Existing Infrastructure	Class D use	Class A Not Required	Offsets Existing Water Use	Maintains River Flow	Site Ready to Proceed	Value Added Benefits	Few Regulatory Obstacles	Favorable Stakeholders	Key Stakeholders Currently Engaged		
Irrigation Uses																	
Agriculture	Beneficial Reuse Site storage and hay crop	•	•	•	•	•	•	•			•		•	•	•	High	
	Biocycle Farm dedicated irrigation system	•			•	•	•	•			•	•	•	•	•	High	
	A-1 Channel irrigation conveyance to grass/hay farms	•				•	•	•	•							Low	
Parks	Greenway Parks irrigation	•				•						•	•			Low	
Golf Courses	none investigated																
Campuses	none investigated																
Industrial Uses																	
Sand & Gravel	Delta Sand & Gravel gravel production	•	•	•		•	•	•	•	•	•		•	•	•	High	
	Knife River aggregate products	•	•	•		•	•	•	•	•	•	•	•	•	•	High	
Forest Products	none investigated																
Manu-facturing	none investigated																
Municipal Uses																	
Public Works	none investigated																
Airport	Airport fleet washing and irrigation	•	•	•		•			•				•			Moderate	
Fire Safety	Eugene fire training facility	•	•			•		•	•		•		•	•		Moderate	
Environmental Uses																	
Wetlands	Confluence Island gravel pit reclamation and wetland creation	•	•	•			•	•		•		•				Moderate	
	Biocycle Farm wetland swale enhancement	•	•		•	•	•	•			•	•				Moderate	
Stream Flow	none investigated																

Recommended Study Alternatives

"Inside the Fence" Uses



Beneficial Reuse Site

The receiving lagoon at the Beneficial Reuse Site on Beacon Road is 14 acres and can hold up to 57 million gallons. The lagoon is serviced by existing piping connecting to the WPCF's recycled water line. The

lagoon can store water during late October thermal mitigation need periods for following season irrigation. Irrigation water can be delivered to on-site hay fields (which can be converted to other crops) or to the Biocycle Farm to augment irrigation needs of the poplar plantation.



Biocycle Farm

The poplar plantation has an irrigation need of approximately 120 million gallons per year, but on average only 50 to 60 million gallons is applied. Additional irrigation would enhance the

health and quality of the poplar stands. Additional irrigation would result in larger diameter poplar which would have greater market value at harvest.

"Outside the Fence" Uses



Delta Sand & Gravel Facility

Delta Sand & Gravel management is very supportive of exploring recycled water use for aggregate

production. Delta pumps up to 2 MGD from the river, with instantaneous peak demand of up to 5 MGD. Delta's water use is year round (with some slow down in winter) for producing gravel, washing equipment, and controlling dust. Used process water is discharged to silt settling ponds and seeps back to groundwater and river flow.



Knife River Facility

Knife River is collocated with Delta Sand & Gravel and shares equipment wash facilities and dust control water demands. Knife River's total demand ranges from 0.5 to 1 MGD. Significant

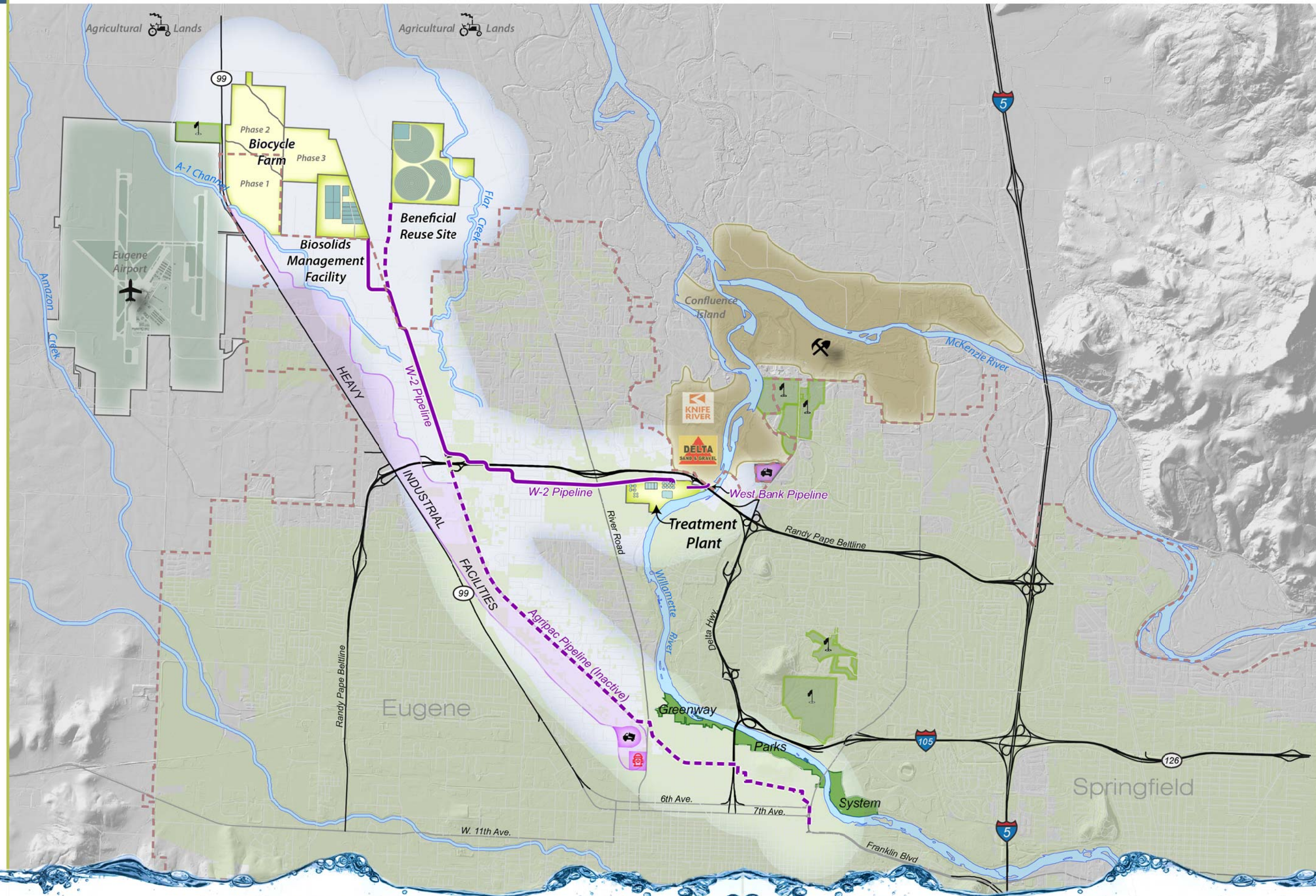
uses are concrete and asphalt batching, which consume water or discharge water as vapor.

Potential Benefits of Recommended Study Alternatives

Inside the Fence: The MWMC's Beneficial Reuse Site and Biocycle Farm facilities present the opportunity to store 5 MGD during the late October compliance period in the 57 million gallon lagoon. Tree growth and health at the Biocycle Farm poplar plantation would benefit from augmented irrigation of 50 million gallons per year.

Outside the Fence: The Delta Sand & Gravel and Knife River facilities combined can use 3 MGD nearly year round, including the October compliance period. This use would maintain stream flow in the Willamette River, increase the recycled content of construction materials for green development projects, and potentially result in energy conservation opportunities.

POTENTIAL RECYCLED WATER SERVICE AREA MAP



Legend

- Area within 1/2 Mile of MWMC Infrastructure
- MWMC Facilities
- Recycled Water Pipeline (Active)
- Recycled Water Pipeline (Inactive)
- City Limits Eugene/Springfield
- Metro UGB
- Waterways
- Golf Course
- Airport
- Sand & Gravel Operations
- Municipal Facilities
- Public Works Yard
- Fire Training Facility
- Agricultural Land



0.5 1 Mile

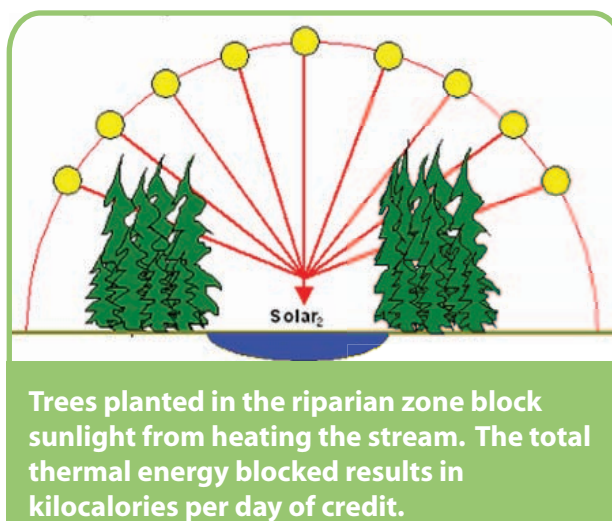
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PHASE 1 FINDINGS: CONCEPTUAL PROJECT COSTS

Riparian Shading Costs

DEQ's model for determining shade credit values

Shade-a-lator is a calculation tool used by the DEQ for measuring the value of riparian (stream bank) shade. Ultimately, restoration of riparian shade trees results in a reduction of stream temperature (or more accurately, thermal load) measured in kilocalories per day (kcal/day). Predicted shade is calculated by modeling the existing stream bank condition, then comparing the modeled future planted and grown-out condition to that baseline.



Restoration Costs

Restoration performed to water quality trading standards requires more effort and diligence than traditional habitat restoration. Traditional riparian restoration (which typically includes little, if any, long-term monitoring, maintenance, and land use payments) costs upwards of \$15,000 per acre. Restoration projects done for trading credits involve concerted steps to ensure planting success. The additional

monitoring, reporting and credit certification required, as well as landowner lease payments over a 20+ year period, results in extra cost. The Freshwater Trust estimates the costs of restoration for credit on private lands in the Cedar Creek watershed to be \$43,210 per acre.

The Freshwater Trust's delivery of restoration credits costs \$43,210 per acre, including 20 years of monitoring, maintenance, landowner payments, and

Factors affecting the value of shade

Not all shade provides an equal amount of thermal credit. Factors which increase shade tree values include wider streams (which provide greater surface area per foot of bank), lack of existing vegetation, lack of steep banks and hill shade, and dominant southern exposure.

reporting (based on private land prospects in the Cedar Creek watershed).

Project Period	Site Preparation and Planting	Certification, Monitoring, and Maintenance	Site Lease payments	Total
Years 1 - 4	\$ 22,528	\$ 2,843	\$ 600	\$ 25,971
Years 5 - 9	\$ -	\$ 3,953	\$ 2,200	\$ 6,153
Years 10 - 24	\$ -	\$ 3,286	\$ 7,800	\$ 11,086
Cost per Acre	\$ 22,528	\$ 10,081	\$ 10,600	\$ 43,210

Estimated credit cost of shading projects

Organization / Source	Shading Site (Watershed)	Kilocalories per Acre	Cost per kilocalorie*
Clean Water Services	Tualatin watershed	260,355	\$ 0.17
The Freshwater Trust	Mohawk River pilot project	176,463	\$ 0.24
Long Tom Watershed Council	Lower Long Tom River (preliminary study estimate)	3,085,500	\$ 0.01
The Freshwater Trust	Cedar Creek	139,512	\$ 0.32
The Freshwater Trust	Medford project area (equivalent to the Trust's current StreamBank system of credit banking)	1,450,000	\$ 0.03

* Based on The Freshwater Trust's proposed 20-year private land restoration cost of \$43,210 per acre.

Industrial Aggregate Use Costs

Water Demands of Industrial Aggregate Operations

The reported water demand at the industrial aggregate processing sites neighboring the treatment plant accounts for up to 6 or 7 MGD at peak times and averages approximately 2.5 MGD during peak months of operation. The hourly peak use drives the design for piping and pumping capacity, whereas the daily average use drives the calculation of daily thermal offset benefits.

Construction Cost Factors

With the recycled water piping in place beneath the West Bank Trail Path connecting the WPCF property to the industrial aggregate sites, the construction costs are primarily mounted in construction of a dedicated Class C recycled water disinfection and pumping station to produce and deliver the water to the user.

Given the preliminary conceptual stage of project design, construction cost estimates are considered "planning level," and appropriate for early alternatives evaluation. Multiple costing considerations factor into determining the overall conceptual project cost-benefit of an operational industrial aggregate water use strategy:

1. Base construction costs
2. Construction contingencies
3. Associated consultant and administrative costs
4. 20-year operating life cycle costs
5. Potential thermal load benefit.

Estimated Construction Costs: Industrial Aggregate Use

Construction Cost	\$1,897,000
Contingency	\$379,000
Construction Subtotal	\$2,277,000
Consulting Services	\$524,000
Administrative Services	\$273,000
Total Project Cost	\$3,074,000
Annual Operating Cost, Years 1-10	\$114,000
Annual Operating Cost, Years 11-20	\$103,000
Net Present Value 20-year O&M	\$1,627,000
Total Life Cycle Cost	\$4,701,000

The base construction cost, with an added 20% contingency, is estimated at \$2,277,000. Associated consulting and administrative services bring the project cost to \$3,074,000. The 20-year life cycle of the project adds costs for operation, maintenance, and replacement of pumps and other parts of the system. These future costs are presented as net present value (NPV) in today's dollars. **The total NPV for the project is \$4,701,000.**

A Broad Range of Cost-Benefit

In full operation, the industrial aggregate recycled water demand of 3 MGD in late October equates to approximately 90 MKcal/day, or a cost of \$0.05 per Kcal/day. This unit cost is variable depending on actual recycled water use and climatic conditions. If operations offered the flexibility to increase recycled water use during peak thermal offset need periods (for example, by running two shifts daily and using 5 MGD) the resulting thermal benefit is greater. However, if the MWMC's thermal offset driver is summertime mitigation, the resulting seasonal thermal benefit is less.

Estimated Thermal Cost - Benefit:

Operating Water Demand (MGD)	\$ per Kcal/Day
5 MGD	\$0.03 - \$0.09
3 MGD	\$0.05 - \$0.16
1 MGD	\$0.16 - \$0.47

Kcal/Day = unit of thermal load in kilocalories per day
MGD = million gallons per day

Beneficial Reuse Site/Biocycle Farm Use Costs

Beneficial Reuse Site Capacity and Biocycle Farm Water Demand

The MWMC's irrigation and water storage facilities at the Beneficial Reuse Site (BRS) and Biocycle Farm offer a range of potential recycled water uses and capacity. The 57 million gallon BRS lagoon has the potential to accommodate peak daily flow diversions to meet thermal offset needs (conceptually up to 5 to 7 MGD). Both facilities could seasonally use the stored water for irrigation. Preliminary costing reflects the construction alternatives to meet this range of potential uses.

Construction Cost Factors

The existing W2 recycled water piping connecting the WPCF to the BRS and Biocycle Farm facilities presents a significant construction asset. However, the pipeline is a potential bottleneck to higher capacity flows, as the original line (designed for seasonal industrial waste flows) is a smaller diameter than newer sections put in place for recycled water conveyance.

Phase 1 construction cost estimates are considered "planning level" appropriate for early alternatives evaluation. Costing includes:

1. Base construction costs
2. Construction contingencies
3. Associated consultant and administrative costs
4. Net present value (NPV) 20-year operating life cycle costs

Flexible Design and Project Cost

Four separate elements were costed out as discrete potential project alternatives for storing or using recycled water:

1. Upsizing the older sections of the W2 Line from the WPCF to Awbrey Lane, where the line tees off to the BRS and Biocycle Farm;
2. Upsizing the older W2 Line from Awbrey Lane to the BRS (to enhance daily flow rates to the lagoon);
3. Upgrading the BRS for lagoon storage and seasonal irrigation; and
4. Upgrading the Biocycle Farm irrigation piping and equipment for enhanced use of stored recycled water.

Depending on the need for summertime or late October thermal load mitigation and on the additional benefits increased irrigation capacity at MWMC facilities may provide for crop productivity or operating efficiency, different project concepts present flexibility in cost-effective solutions for the MWMC.

The combined estimated NPV for all four project elements is \$12,126,000. However, the ideal project strategy for best thermal offset and irrigation benefit is likely to be a lesser combination of potential construction elements.

Estimated Construction Costs: BRS and Biocycle Farm Recycled Water Use

MWMC Facility Upgrade	Construction Cost	Total Project Cost	Life Cycle Cost (NPV)
1. W2 Pipeline Upgrade to Awbrey Lane	\$1,369,425	\$1,849,000	\$1,849,000
2. W2 Pipeline Upgrade Awbrey Lane to BRS	\$637,826	\$1,076,000	\$1,076,000
3. BRS Upgrade and Reservicing	\$3,167,739	\$4,276,000	\$5,122,000
4. Biocycle Farm Irrigation Upgrades	\$2,277,048	\$3,074,000	\$4,079,000
TOTAL FOR ALL PROJECT ELEMENTS	\$7,452,038	\$10,275,000	\$12,126,000

Conceptual Alternatives Cost Comparison

Potential for Cost Effective Options

The four project concepts recommended for Phase 2 feasibility study and alternatives selection present potentially favorable cost-benefits. Given the planning-level construction cost estimates, projected water demands, and expected thermal benefits of recycled water diversion, the projects have the potential to be cost-competitive with riparian shading credits – within the same order of magnitude (power of 10) – for temperature compliance. Further, the chart below exhibits that at the varying millions of kilocalories per day (Mkcal/day) benefit achievable by the alternatives, recycled water cost per Mkcal/day during late October is on par with investment in riparian shading credits.

Phase 1 cost estimating achieved three steps toward equating costs for project alternatives: (1) project construction cost estimation, (2) life cycle costing to account for 20 years of project operations, and (3) cost per kilocalorie/day thermal benefit produced from each project.

Planning Level Cost Estimation

The planning level cost estimates prepared in Phase 1 study are based on best engineering understanding of construction requirements given the conceptual stage of the design. The industry standard for such cost estimates is a range of -30%/+50%, meaning actual project construction costs are expected to range from 30% below the estimate to 50% greater than the estimate.

Life-Cycle Cost Accounting (Net Present Value – NPV)

Phase 1 cost estimates also accounted for the 20-year life cycle of the project. Future costs for operation, maintenance, and equipment replacement are calculated to a net present value (NPV) in current dollars (accounting for price inflation and the time-value of money). NPV estimates provide better consideration of the long-term investment costs in comparing conceptual alternatives.

Thermal Benefit Equivalents

The final Phase 1 cost-benefit consideration is the value of the conceptual project in Mkcal/day of thermal load offset. During the late October compliance period, treatment plant effluent carries a load of approximately 30 Mkcal/day per million gallons per day (mgd). The equated thermal load benefit of conceptual recycled water projects is presented below, allowing cost comparison to riparian shading credits.

Cost Comparison: Industrial or Agricultural Use versus Shade Credits

Conceptual Alternative	MGD Capacity	20-Year Cost Estimate	Mkcal/day (October)	\$ per kcal (October)
Industrial aggregate facilities use	3	\$4,700,000	90	\$0.05
BRS storage and irrigation*	2.8	\$5,122,323	84	\$0.06
BRS storage and irrigation* with W2 line increased flow upgrade	5	\$10,972,323	150	\$0.07
Shade credits via The Freshwater Trust	--	\$5,000,000	100	\$0.05

*Irrigation could occur seasonally at the BRS, the Biocycle Farm, or both.

Water Balance Modeling

Recommendation

Developing a model of the MWMC's water recycling system is recommended to provide a basis for evaluating recycled water uses, discharge, storage, and routing alternatives. The model would represent the system under current and potential future configurations, operations, and hydrology. It would identify management strategies and options to accommodate current and future water quality regulatory constraints. Staff recommends an Excel-based Visual Basic programmed spreadsheet to most effectively meet project needs, including ability for staff to run the model without additional consultant assistance.

Purpose

A water balance model is a useful tool for calculating the total mass of water and water quality constituents, including the total thermal load, to ensure operational demands and regulatory needs would be met. Knowing the total mass of water discharged to the Willamette River, retained in storage, or applied to recycled water use provides useful information for calculating thermal load under varying seasonal conditions.

The model can be used to determine how various combinations of conveyance, reuse, storage, inflow/infiltration control, average dry weather flow, and regulatory constraints affect recycled water availability, discharge volume, discharge timing, and regulatory compliance.

The recommended model would have the following advantages over the currently used DEQ-developed Excel-based thermal loading tool:

- Ability to look at performance under range of flow/environmental conditions
- Widest adaptability/scalability to long-term model needs
- Potentially lowers net costs incurred if used over a long-term planning and implementation period
- Capable of modeling multiple water quality parameters/benefits
- Can be adapted to simulated model scenarios
- Consolidates calculations to improve error-checking capability
- Usable to demonstrate the MWMC's regulatory compliance to the DEQ

Proposed Phase 2 Tasks

BUILD THE MODEL	<ul style="list-style-type: none">• Step 1: Define spatial extent (and limits) of the system to be modeled, including existing facilities and infrastructure as well as potential future modifications and additions.• Step 2: Assemble historical data sets, using existing data in the MWMC's Temperature TMDL spreadsheet tool and any available updated data sets.• Step 3: Refine the conceptual model for recycled water use. The conceptual model describes the recycled water classes, volumes, rates, and timing of use.• Step 4: Develop the platform (Visual Basic programming) used to construct and operate the model.• Step 5: Program daily operations including system flows and capacities, recycled water storage, discharge, use, and regulatory constraints including temperature.
USE MODEL	<ul style="list-style-type: none">• Document model operation and train staff as appropriate to use the model.• Simulate proposed recycled water uses and operating conditions to support project recommendations for thermal load management and operating costs.

PHASE 2 RECOMMENDATIONS

Feasibility Studies

Recommendation

Phase 1 findings support pursuing two primary feasibility studies as Phase 2 tasks: (1) Industrial Aggregate Recycled Water Use Study, and (2) Beneficial Reuse Site/Biocyte Farm Recycled Water Use Study. These two studies would evaluate conceptual recycled water uses that could fully provide compliance-period thermal load benefits and would fulfill a water resource need. The recommended studies provide evaluations of both an “outside the fence” use with a commercial partner and an “inside the fence” use at an MWMC facility.

Purpose

Detailed feasibility studies would assess the technical, operational, regulatory, maintenance, and constructability issues and benefits associated with the conceptual

projects. These studies are essential to fully calculate the cost-benefits of the projects. These measures are needed to compare recycled water projects to other thermal load mitigation alternatives, such as riparian shade restoration credits.

Feasibility studies identify project assets, risks, benefits, or complexities that help stakeholders consider whether to proceed with the project or not. Examples of issues include energy costs/savings, equipment and asset replacement benefits, integration or interference with existing or planned activities, construction and right-of-way obstacles, and specific issues related to recycled water management.

Proposed Phase 2 Tasks

Capacity and Conditions Assessment – document the hydraulic capabilities and integrity of existing infrastructure proposed for use in the conceptual project. The infrastructure assessed would include:

BRS/Biocyte Farm Study

- Storage lagoon condition and operating limitations
- Irrigation systems capability and upgrade needs
- Northwest Expressway W2 (recycled water) line condition and upgrade needs
- Electrical systems capacity and expansion capability

Industrial Aggregate Study

- Pump system condition and demands
- Electrical systems capacity and expansion capability
- Industrial water distribution piping layout and condition

Environmental Review Process – document federal and state rules related to natural resource management and protection with agency consultation to identify project permitting requirements and issues. For the industrial aggregate use, water rights and instream flow management strategies will be identified.

Operational Strategies Evaluation – assess system controls, reliability, required capacities, equipment sizing, and operation and maintenance requirements for the conceptual project.

Recycled Water Handling Assessment – record the water quality and quantity demands, application and site control requirements, discharge permit and recycled water use plan obligations, and related issues. These findings inform design issues and water balance model feedback.

Recommended Alternative Design – prepare a preliminary project design consistent with DEQ recycled water use requirements. The design will be based on preferred alternatives in consideration of operational preferences and project goals and will include any recommended improvements. The recommended alternative design may be prepared in tandem with a triple-bottom-line cost-benefit assessment.

Triple Bottom Line Cost/Benefit Analysis

Recommendation

Conducting a standardized Triple Bottom Line (TBL) assessment of proposed recycled water alternatives and other thermal load mitigation strategies is recommended for Phase 2. Alternatives and strategies to be assessed will include industrial use of recycled water at the Delta Sand & Gravel/Knife River operations, irrigation use and storage of recycled water at the Beneficial Reuse Site/Biocyte Farm facilities, generation of riparian shade credits through sponsoring local watershed restoration projects, and outright purchase of water quality trading credits from The Freshwater Trust's StreamBank.

Purpose

The TBL assessment accounts for positive and negative impacts of potential projects on the environment, economic opportunities, and social assets. TBL accounting provides the MWMC with quantified, comparable indices of thermal load reduction strategies' full public costs and benefits. The TBL indices will complement the calculated capital costs of each of thermal load mitigation alternative.

What is Triple Bottom Line?

Triple Bottom Line (TBL) accounting is a commonly adopted framework for public sector full cost accounting. TBL accounts for the community, environmental, and economic costs and benefits of a project. It also captures life-cycle cost analysis in its calculations. Ultimately, TBL indices help decision-makers to better assess project results. The indicators can be tailored to community values.

Who Uses Triple Bottom Line?

Locally, EWEB has adopted the Global Reporting Initiative's widely accepted, international standard for disclosure of sustainability performance. The City of Eugene has adopted a standard triple bottom line analysis tool for measuring performance indicators. This TBL tool is used in program reviews as well as staff recommendations to city council.

Proposed Phase 2 Tasks

1. Develop and weight criteria for a TBL assessment based on a standard TBL method.
2. Assign TBL values to each criterion for each considered recycled water use alternative and thermal load compliance strategy.
3. Perform the TBL analysis and report results. The analysis will include the following specific elements:
 - **ECONOMIC:** Net Present Value Costing. Quantification of the monetary cost of each project alternative over its life cycle, including construction, operation, and maintenance costs. Project costs will be reported as net present values for alternatives comparison.
 - **SOCIAL:** Paired Values Analysis. Gather information from commissioners and potentially other project stakeholders on the relative values placed on pairs of social benefit indicators against economic and environmental performance measures .
 - **ENVIRONMENTAL:** Life Cycle Inventory. Quantification of the energy, raw materials, waste products, and other environmental consumptions and releases over the life cycle of each project alternative. Quantification includes the generation of environmental benefits (such as habitat) over the project life cycle.

Stakeholder Information & Input

Recommendation

An expanded stakeholder information sharing and input gathering process is recommended for Phase 2. Successful recycled water planning and project development relies on a continually informed and engaged community.

The MWMC **Recycled Water Program Planning Communication Plan** should be amended to outline the engagement of a community advisory committee, emphasis of messages through a recycled water branding strategy, raising stakeholder awareness through formal presentations, provision of fact sheets to interested news media, and development of interpretative tools on the MWMC web site.

Purpose

Recycled water program success is contingent on good community understanding and support for the MWMC's activities. Stakeholders interviewed in 2011 expressed desire for more information from the MWMC on a regular basis and noted the current absence of such communications.

A **branding strategy** helps ensure that not only is effective communication occurring, but that consistent messages important to building strong community support for the MWMC's programs are shared with the public.

A **community advisory committee** comprised of a diverse and interested stakeholder group will help inform the MWMC's decisions related to expanding the use of recycled water and developing community partnerships.

Presentations by the MWMC on recycled water have been requested by staff of local watershed councils and water utilities. Phase 2 communication tools could provide formally prepared presentations that meet community groups interest and reinforce the MWMC's key messages.

Prepared **fact sheets** assist staff and reporters with relaying timely and accurate information. Getting positive messages to the public in advance of any detracting statements from uninformed citizens is key to preventing program setbacks.

Interpretative tools are provided effectively through the MWMC's recently updated web site. These tools should be geared toward the general public to increase awareness and understanding of water recycling, water resources, water quality, and protection of the Willamette River.

Proposed Phase 2 Tasks

- **Recycled Water Program Planning Communication Plan Update.** Build upon the recently updated strategies of the MWMC's Communication Plan to meet the Phase 2 recycled water communication needs.
- **Integrated Branding Strategy.** Solidify the MWMC's recycled water image through a formal set of communication tools to deliver a consistent, positive message.
- **Community Advisory Committee.** Engage, invite, and convene a stakeholder group to provide input on the MWMC's recycled water project planning.
- **Partner Presentations.** Develop presentations to deliver to key stakeholder groups.
- **Media Fact Sheets.** Prepare fact sheets to share timely and accurate information with the news media as appropriate.
- **Interpretative Web Site Tools.** Enhance the MWMC's web page on recycled water through interpretative tools to increase public awareness of recycled water issues.

Recycled Water Use Plan

Recommendation

Preparing a draft **MWMC Recycled Water Use Plan** is recommended in Phase II to:

- Outline projected uses of recycled water, including water classes, volumes, seasonality, and locations.
- Ensure recommended projects are consistent with permitting requirements.
- Identify potential data gaps or regulatory hurdles to be addressed in Phase 2 or Phase 3 planning efforts.
- Describe foreseen pilot/experimental uses of recycled water and demonstration use for short- or long-term exhibition of recycled water use and safety.

The recycled water use plan describes all of the MWMC's recycled water uses to ensure compliance with recycled water use rules and compliance with the NPDES permit. Recycled water uses not described in the Plan are not permissible without Plan revision. The DEQ allows exception for one-time pilot uses of recycled water, such as the MWMC's "green" concrete pilot project with Knife River conducted in 2011.

Any new potential recycled water uses will need to be addressed and included in the MWMC's recycled water use plan. Preparing a draft plan for alternatives recommended during the Phase 2 planning process ensures the proposed projects are likely to be acceptable and

compliant with all rules and permit requirements.

Purpose

A recycled water use plan is a required component of the NPDES permit. The MWMC's current recycled water use plan must be updated during permit renewal. The MWMC's NPDES permit is scheduled for 2012 renewal; however, a postponed renewal is likely by request of either the DEQ or the MWMC.



Pilot testing industrial uses, initiating uses at new locations, and demonstrating safe and effective use to the public are all considerations for a draft Recycled Water Use Plan.

Demonstration elements of proposed alternatives, including pilot uses for demonstrating recycled water use feasibility or providing interpretative opportunities for community stakeholders, will be outlined in the draft Plan.

Proposed Phase 2 Tasks

- **Current Plan Review.** Identify update needs of the current Recycled Water Use Plan for consistency with MWMC uses and regulatory requirements.
- **Identify Updated Plan Elements.** Outline the potential expanded and new uses, including demonstration or pilot use features.
- **Draft Plan Content.** Develop all data, figures, descriptions and other plan elements.
- **Draft Demonstration Plan.** Define pilot uses, demonstration, and interpretative elements of project alternatives.
- **Gap Assessment.** Prepare a report identifying any regulatory issues and data gaps that need to be addressed should the projects be recommended for implementation.

Government Initiatives for Water Recycling

Federal and state policies promote water recycling expansion

The State of Oregon's recycled water use rules (OAR 240-055) and the federal EPA's Guidelines for Water Reuse establish frameworks to promote the safe and beneficial use of recycled water. Multiple other state and federal policies, directives, and initiatives foster recycled water use.

Oregon's integrated Water Resources Strategy (Draft, December 2011)

The State of Oregon encourages the reuse of water, so long as the use protects public health and the environment.

Encourage Additional Water Reuse (Action Item 11.C)

- Conduct a statewide assessment of the potential for additional water reuse. Determine the potential for water re-use to fulfill current and future water resource needs, while taking into consideration potential impacts on streamflow and water quality. Match the water quality of reclaimed water to appropriate end uses.
- Ensure that Oregon has the right policies and regulations in place to facilitate water reuse, while giving due consideration to the protection of instream flow, water quality, public health, and drinking water sources.
- Provide incentives for increased water reuse for municipal, industrial, and agricultural uses.

Senate Bill 212 Implementation Report (DEQ, 2001)

- Recycled water can (1) provide nutrient benefits and reduce the demand for irrigation water from ground or surface water sources and (2) reduce the demand for potable water supplies, which can be used instead for drinking water and instream flow protection.
- Water quality and water availability continue to be serious issues confronting growing communities in Oregon. Appropriate uses of recycled water are necessary options for many communities to comply with federal and state water quality laws.

EPA Web Site on Water Recycling and Reuse: The Environmental Benefits (2010)

- Water recycling can decrease diversion of freshwater from sensitive ecosystems
- Water recycling decreases discharge to sensitive water bodies
- Recycled water may be used to create or enhance wetlands and riparian (stream) habitats
- Water recycling can reduce and prevent pollution

Oregon Governor's Executive Order 05-04 (issued March 2005)

Whereas,

- Water reuse provides an environmentally-sound method for managing wastewater, while conserving water and replenishing valuable water supplies;
- Water reuse can be a source of water to communities during drought conditions;
- The Environmental Protection Agency, a federal agency, encourages water reuse as a means for managing wastewater under the provisions of the Clean Water Act;
- Oregon statutes and regulations protect public health and environmental quality, and require a specific level of water quality and treatment corresponding to each beneficial use of reclaimed water;

The State of Oregon shall promote policies and programs to encourage and support water reuse, to work together to overcome institutional and regulatory barriers and funding constraints, to ensure protection of public health and environmental quality, to encourage public acceptance of water reuse, and to help this state meet its overall water needs.

National Success Stories

Yelm, Washington (pop. 7,000)

A bedroom community to Olympia and Lacey, Yelm is the first city in Washington to recycle 100% of its wastewater for Class A use. Protecting the Nisqually River (a high-quality salmon stream) from Yelm's rapid growth, need to move away from reliance on inadequate septic tanks, and pressure from local environmental groups led Yelm to build a recycled water facility. Yelm's recycled water serves summer irrigation demands, industrial and concrete uses, and local park features, all without discharging to the Nisqually River. The community prizes Yelm's eight-acre community park including trails around recycled water wetlands and a trout fishing pond. Excess recycled water is either stored for later irrigation use or augments a hydro-electric power canal.

(EPA Guidelines for Water Reuse: p.55, Ch. 2, Types of Reuse Applications)

Project leaders emphasized community values and explained the city's water issues to residents, encouraging citizens to become involved in the recycle project. A public awareness campaign designed to engage the community in recycled water was developed. Local school children named a mascot, "Mike the Pipe," in honor of the purple pipe that signifies reclaimed water. The town's high school drama department produced a skit called "Down the Drain and Back Again" to show their support and excitement for the new system.

(DJC, 11/16/00; Article by Thomas Skillings: "Little Yelm sets big environmental goals – and meets them.")

Santa Rosa (pop. 170,000) & Petaluma (pop. 60,000), California

Santa Rosa started providing recycled water for irrigating pastures in the 1960's. Rapid growth, changing land use, and tightening water quality regulations caused the program to evolve. Conversion of pasture land to wine vineyards needing less water, coupled with regulatory restrictions barring seasonal discharge of treated wastewater, prompted expansion of the program. Today, Santa Rosa has more demand for recycled water than supply. With a 20-year contract to send recycled water to recharge the Geysers geothermal energy field, new users are on a

waiting list behind existing organic farmers, the 350-acre Gallo wine vineyards, and landscape irrigators.

Nearby Petaluma tapped its oxidation pond, used to store treated water during periods of discharge restrictions, to irrigate 800 acres of agricultural lands and a golf course. To upgrade their system, Petaluma constructed treatment wetlands. The citizens of Petaluma expressed strong interest in a recycled water facility that also serves as a community asset, and formed the Petaluma Wetlands Park Alliance to further this goal. Ultimately, a park and trail system was completed around 30 acres of wetlands.

(EPA Guidelines for Water Reuse: p.44, Ch. 2, Types of Reuse Applications)

Water Recycling in Oregon

- 90 municipalities permitted for recycled water use
- 4,000 acres of crops irrigated with recycled water
- 90% Exclusive Farm Use Zoning
- 10% Forest and Industrial Zoning
- 85% Publically-owned Lands

(SB212 Implementation report, DEQ, 2001)

St. Petersburg, Florida (pop. 250,000)

In 1972, the City of St. Petersburg faced new water quality restrictions on discharge to the highly polluted Tampa Bay. The City elected to adopt water recycling coupled with injection wells to result in a zero-discharge system, leading to the initiation of the largest urban recycled water system in the United States.

Local acceptance was bolstered through utility attitude changes, such as renaming "sewage treatment" facilities to "water reclamation" facilities. In turn, staff members have adopted a "manufacturing" mentality instead of a "treat and dispose" attitude.

The system constructed in the late 1970's initially served public space and commercial irrigation needs. By the 1980's, research demonstrated the water's safe use for residential applications. St. Petersburg's system is now among the largest in the world, with increasing demand for recycled water at the same time potable demand has stabilized. Significant cost savings are being realized by the indefinite delay of expensive potable water system projects.


(Water Reuse – Issues, Technologies, and Applications; Metcalf & Eddy: p.1453-1459, Ch. 26, Public Participation and Implementation Issues)

ABOUT USING RECYCLED WATER

Oregon's Recycled Water Classes

Four classes of recycled water provide flexibility and safe use

Oregon's recycled water use rules (OAR 340-055) specify how the four defined classes of recycled water (A, B, C, and D) can be applied. The MWMC's basic product, Class D recycled water, is suitable for non-food agriculture, such as poplar trees and hay. Enhanced disinfection produces Class C recycled water, which greatly expands the potential use and distribution of recycled water.

Approved Uses for Recycled Water in Oregon	RECYCLED WATER CLASS (Purification level)			
				
BENEFICIAL USES	D (Basic)	C (Enhanced)	B (High)	A (Highest)
AGRICULTURAL IRRIGATION				
Fodder, Fiber, and non-food Seed Crops; Commercial Timber	✓	✓	✓	✓
Pasture, Sod, Christmas Trees, Ornamental Nurseries, and Firewood	✓	✓	✓	✓
Processed Food Crops; Orchards/Vineyards		✓	✓	✓
Food Crops				✓
LANDSCAPE IRRIGATION				
Cemeteries, Highway Medians		✓	✓	✓
Golf Courses (without Contiguous Residences)		✓	✓	✓
Golf Courses (with Contiguous Residences)		✓	✓	✓
Industrial or Business Campuses		✓	✓	✓
Parks, Playgrounds, Schoolyards,				✓
Residential and Public Landscapes				✓
IMPOUNDMENTS				
Landscape Feature		✓	✓	✓
Recreational (restricted access)			✓	✓
Recreational (non-restricted access)				✓
COMMERCIAL/INDUSTRIAL				
Industrial, Commercial, and Construction Use (including dust control and street sweeping)		✓	✓	✓
Fire Suppression Systems; Non-Residential Toilet Flushing; Floor Drain Trap Priming			✓	✓
Commercial Car Washing; Ornamental Fountains				✓
Groundwater Recharge				✓
OTHER USES				
Beneficial purpose authorized by DEQ	✓	✓	✓	✓

ABOUT USING RECYCLED WATER

Oregon's Recycled Water Classes

Each class (or purification level) of recycled water provides added water quality

Oregon's recycled water use rules (OAR 340-055) specify the minimum treatment requirements of the four defined classes of recycled water (A, B, C, and D). The basic level of recycled water produced from the MWMC's treatment process is Class D.

Public signage and notification requirements decrease for higher classes of recycled water

The table below shows site setback distances, fencing, and signage decreases to nearly no restrictions on Class A use.

Treatment Required for Recycled Water in Oregon	RECYCLED WATER CLASS (Purification level)			
	D (Basic)	C (Enhanced)	B (High)	A (Highest)
TREATMENT LEVEL				
Biologic Treatment (oxidized and nonputrescible)	✓	✓	✓	✓
Disinfected	✓	✓	✓	✓
Filtered				✓
DISINFECTION LEVEL				
Total Coliform (E. coli organisms/100 mL)				
30-Day Mean Log <126	✓			
Maximum < 406	✓			
Two Consecutive Samples < 240		✓		
7-Day Median <23		✓		
7-Day Median <2.2			✓	✓
Maximum < 23			✓	✓
SAMPLING FREQUENCY				
1 per week	✓	✓		
3 per week			✓	
1 per day				✓
POST-FILTRATION TURBIDITY				
24-Hour Mean	n/a	n/a	n/a	2 NTU
5% of Time During a 24-Hour Period	n/a	n/a	n/a	5 NTU
Maximum	n/a	n/a	n/a	10 NTU
Sampling Frequency	n/a	n/a	n/a	Hourly

SITE BUFFERS AND CONTROLS REQUIRED FOR USE	CLASS D Basic	CLASS C Enhanced	CLASS B High	CLASS A Highest
Public Access Restrictions	Controlled (site is fenced off from public access)	No direct public contact with site allowed during use	No direct contact with water on golf courses allowed	No restrictions
Width of Irrigated Site Buffer (surface application)	10 feet	10 feet	None	None
Width of Irrigation Site Buffer (spray application)	100 feet	70 feet	10 feet	None
Distance of Spray Irrigation From Food Prep Areas or Drinking Fountains	70 feet	70 feet	10 feet	No direct spray contact allowed
Setback From Potable Water Supply Source	100 feet	100 feet	50 feet	none
Period of No Irrigation Required Before Harvest	not applicable	3 days	3 days	none
Signage/Warning Requirements	Site perimeter signage	Work area signage	Personnel and public notification of use	Agricultural use only: Notification of personnel and public Impoundment use only: Signage

Terminology: Recycled-Reclaimed-Reused

What is the difference between recycled, reclaimed, and reused water?

The State of Oregon has adopted **recycled water** as the specific term for treated, cleaned wastewater produced for beneficial purposes. Formerly, the State used **reclaimed water** as the official terminology, and according to Oregon's legal definitions, the two are synonymous. Agencies have adopted the **recycled water** term to better align with public understanding and values related to resource conservation.

Different states, agencies, organizations, and industries use the three terms either interchangeably or in different ways. Ultimately, they are all referring to the practice of making more efficient use of water by capturing it after first use for applications where potable water use is an unnecessary practice.

Oregon's Legal Definitions

"Recycled Water" means treated effluent from a wastewater treatment system which as a result of treatment is suitable for a direct beneficial purpose. Recycled water includes reclaimed water as defined in ORS 537.131.

"Beneficial Purpose" means a purpose where recycled water is utilized for a resource value, such as nutrient content or moisture, to increase productivity or to conserve other sources of water.

-OAR 340-055-0010: Definitions

Professional Industry Definitions

RECLAIMED WATER: Water that is used more than one time before it passes back into the natural water cycle. Wastewater that has been treated to a level that allows for its reuse for a beneficial purpose. Reclaimed water is sometimes another name for recycled water.

REUSE: To use again; recycle; to intercept, either directly or by exchange, water that would otherwise return to the natural hydrologic (water) system, for subsequent beneficial use.

-Water Reuse Association, Water Reuse Glossary

Does it matter which term we use?

Recycled water or **water recycling** is the preferred term for MWMC work products. The term provides consistency with state regulations and reinforces the identity of the MWMC's water products and its capability to recover and reuse resources.

The Terminology of Water Reuse – a general guide to word meaning

Recycled Water. Treated municipal wastewater cleaned to one of several classes of water processed and provided to users for specified uses in accordance with state rules.

Reclaimed Water. Used as a synonym for "recycled water," the term can also refer to water captured (and potentially filtered or cleaned) in any process for reuse, regardless of the source and application. Many industries reclaim water from their processes for further use, avoiding the need to use additional potable water.

Water Reuse. Any collection of water for using again. Typically the term has applied to wastewater plants, but it can be applied to domestic graywater use for irrigation, stormwater or rainwater harvesting, or other effective means of conserving water after first use for multiple uses.

W2. The Eugene/Springfield WPCF's term for final treatment effluent that is used in place of potable water within the fenced boundaries of the treatment plant for irrigation, wash water, and to support equipment operation. W2 is equivalent to Class D recycled water. The term originates from design drawings representing nonpotable water; W1 represents potable water.

Environmental Fate & Permitting

After Reuse: Recycled Water's Fate

Recycled water is considered a beneficial resource and therefore must be applied to a beneficial use. This gives recycled water an interesting disposition: it is both a perfectly usable water product, but it still needs to be managed to avoid offsite discharge without a permit.

What does this mean? A simple example is recycled water stored for use in ponds by a golf course operation. The recycled water can be used for ornamental purposes in the pond, can be pumped out and applied as irrigation, but cannot be allowed to flow into a natural water body without a discharge permit. If such discharge were needed, it would be the responsibility of either the golf course operator or the wastewater utility to hold and comply with the permit.

Responsibility for Use

Any person having control over treatment, distribution, or use of recycled water must comply with Division 55 Recycled Water Use Rules. It is up to the permittee and recycled water user to establish any agreement to maintain compliance with the rules.

- Implementing Oregon's Recycled Water Use Rules
DEQ, 2009

Differentiation: Use and Discharge

Most recycled water must be applied and used at the rate required for the beneficial use without site runoff. For example, irrigation must be balanced with the plant uptake rates; industrial use can be consumed in production (such as incorporated in concrete or released as steam) or recaptured for further use. Some activities, such as street sweeping or dust control, are managed to not produce runoff, and therefore do not constitute a discharge. However, any release of recycled water to streams or ground-water likely requires an NPDES or WPCF discharge permit. **Infiltration to groundwater is permissible where there is shown to be no reasonable impact to the groundwater resource.** Oregon does allow aquifer recharge systems with recycled water meeting drinking water standards.



Wetland and Stream Flow Augmentation

Recycled water can be used to augment stream flows, recharge aquifers, or provide downstream irrigation water. All of these uses must be approved by state agencies and follow a recycled water use plan under an NPDES or WPCF permit allowing for the specific discharge for leakage, infiltration, or offsite flow.

Recycled Water – an effluent reduction or a discharge relocation?

From aspects of both regulatory permitting and stakeholder acceptability, the fate of recycled water as a consumptive use and discharge reduction or instead a relocation of the point of discharge for other benefits is an important element for recycled water planning. These examples illustrate some of the differentiation.

Use typically allowed under a recycled water plan	Use potentially requiring a NPDES/WPCF permit
Water consumed by irrigation	Irrigation overflow runs off site
Ornamental ponds circulate recycled water	Ornamental ponds outflow to stream or ground
Gravel wash rinsate collected and reused	Gravel wash rinsate infiltrates from settling ponds
Water stored in lagoon with evaporation loss	Water stored in lagoon with infiltration loss

GLOSSARY OF TERMS

303(d) list	The list of water bodies and pollutants causing water quality limitations to those water bodies developed under Section 303(d) of the federal Clean Water Act. The Willamette River is 303(d)-listed for summer temperature.
7Q10	The 10-year maximum (or minimum) 7-day moving average (meaning the daily value is the average of the 7 preceding days). It is a useful statistic for estimating the normal and unusual conditions of river flow, water temperature, or atmospheric temperature, for example. The Willamette River's minimum 7Q10 river flow in mid-October is 1310 cfs.
Beneficial Reuse Site	The MWMC's lagoon storage and field irrigation site located adjacent to the Awbrey Lane facilities northwest of Eugene. The Beneficial Reuse Site was developed formerly as the Seasonal Industrial Waste Facility (SIWF) to land-apply the high-organic content wastewater of the former Agripac cannery.
Biocycle Farm	The MWMC's 600-acre hybrid poplar plantation located on Awbrey Lane northwest of Eugene and across Highway 99 from the Eugene Airport.
cfs	Cubic feet per second. The common measure of river flow, equivalent to approximately 0.66 MGD.
DEQ	Oregon Department of Environmental Quality.
Effluent	Water leaving the wastewater treatment plant. Effluent is treated water restored to appropriate water quality to discharge from the WPCF.
EPA	The United States Environmental Protection Agency. The EPA administers the federal Clean Water Act and delegates authorities under the Act to the Oregon DEQ.
ETL	Effluent Thermal Load. The daily contribution of heat (in kilocalories per day) to a water body by a discharger – such as the MWMC's daily discharge to the Willamette River. The ETL needs to remain below the WLA (waste load allocation) to avoid exceeding regulatory limits.
Hyporheic	Subsurface flow. Hyporheic zones are essentially the underground part of a river or stream, through which surface water is continually flowing in and out of. Hyporheic zones play significant roles in stream ecology and maintaining cooler stream temperatures. Some wastewater treatment plants are indirectly discharging effluent to hyporheic zones, which maintains the flow returning to the river but provides a cooling effect on the discharge.
Influent	Water entering the wastewater treatment plant. Influent is untreated sewage, but is approximately 99% water.
Kcal/day	Kilocalories per day. A measure of heat contributed to a waterway over the course of one day.

GLOSSARY OF TERMS

MGD	Million Gallons per Day. The measure of large rates of flow. The MWMC treats approximately 25 to 50 MGD on average. An MGD is equivalent to 1.5 cubic feet per second, 700 gallons per minute, or 3 acre-feet per day.
MKcal/day	Million Kilocalories per day. The measure commonly used to express the discharge temperature contributions and limits under the Willamette TMDL.
NPDES	National Pollutant Discharge Elimination System. A vehicle of the federal Clean Water Act to reduce or eliminate pollution of our nation's waterways. The MWMC discharges treated water to the Willamette River under an NPDES permit administered by the DEQ.
OWRD	Oregon Water Resources Department.
Riparian	Stream side. Riparian zones are the land interface between stream banks and higher ground occupied by vegetation adapted to flood conditions and ecologically integrated with aquatic and terrestrial wildlife. Loss of riparian shade vegetation is a leading cause of high stream temperatures.
RM	River Mile. Used to identify geographic locations along a river, counting upwards from RM 0 at the mouth of the river. The Willamette River's RM 0 is at the Columbia River, and the MWMC's WPCF is at RM 178.
Shade-a-Lator	The DEQ's model for calculating the thermal benefit of riparian vegetation. Shade-a-Lator is the primary tool to document the value of riparian restoration projects for thermal load credits.
Shoulder period	The transition of the calendar periods between salmon spawning (winter) and rearing (summer) temperature requirements. The Willamette's summer temperature-limited period overlaps the winter spawning season in late spring and mid-fall, creating "shoulders" on the temperature compliance period with stricter temperature requirements.
Thermal load	The amount of heat contributed as temperature measured under the Willamette TMDL. The temperature contributions of the MWMC's discharge to the Willamette River are measured as a daily thermal load in kilocalories per day.
TMDL	Total Maximum Daily Load. A pollutant threshold measured as the maximum concentration a waterway can carry without impairing the health or use of the water.
W-2	Treated water discharged from the WPCF. W-2 is used by the MWMC to irrigate facility landscaping and is equivalent to Class D recycled water. The W-2 pipeline conveys recycled water from the WPCF to the Biocycle Farm.
WLA	Waste Load Allocation. The maximum pollutant contribution a point-source discharger (such as a wastewater treatment plant) can reach without exceeding its limit. The Willamette TMDL prescribes the MWMC a WLA for thermal load that varies daily based on a computational formula.
WPCF	Water Pollution Control Facility. The formal designation of wastewater treatment operations permitted under the federal Clean Water Act.

About the MWMC's Recycled Water Planning

TOPICS

1. Recycled Water's Role as a Water Resource

- What is recycled water?
- Is recycled water safe?
- Why should we recycle water?
- Where can I find general information about recycled water?

2. Production and Safety

- How is recycled water produced?
- Who regulates recycled water?
- How is the public notified that recycled water is being used?
- What is the meaning of each class of recycled water?
- Is Recycled Water Drinkable?
- Why not completely purify wastewater?
- Does recycled water spread microconstituent chemicals, such as cleaning products, health and beauty products, and plastics, into the environment?

3. Environmental Protection

- How does recycling water benefit the environment?
- Will discharging less water into the Willamette River reduce the river flow?
- How does recycling water help protect salmon and other aquatic species?
- How does use of recycled water affect groundwater?

4. Use & Sustainability

- Where is recycled water being used?
- How is the MWMC currently using recycled water?
- How could the MWMC use recycled water in the future?
- How does recycled water support the green business model?

5. Investment Costs

- What are the costs associated with recycled water?
- How would recycled water projects be funded?
- Would recycled water projects require additional infrastructure?
- What are the long-term costs and benefits of recycled water production?

1. RECYCLED WATER'S ROLE AS A WATER RESOURCE

What is recycled water?

Recycled water is cleaned and disinfected wastewater restored to beneficial use quality. All water is continually recycled in nature through the water cycle. In fact, the water we use every day is as old as the Earth itself. Modern wastewater treatment replicates this natural recycling process to restore quality to large volumes of water used by our communities – quickly and effectively.

The resulting recycled water is clear, safe, and treated to strict standards. It is a valuable, sustainable resource that matches the right water quality to the right uses. Every gallon of recycled water used for irrigation, industrial processes, wetland restoration and other beneficial uses potentially can conserve a gallon of our community's water resources.

Is recycled water safe?

Yes. Recycled water is a safe way to preserve our natural water resources. Recycled water use is approved for specific purposes designed and operated to protect public health and the environment. Careful monitoring ensures that the MWMC produces a highly treated and disinfected product that meets all regulatory requirements. Recycled water is as clean as – or cleaner than – water restored to the quality necessary for returning to the Willamette River.

Why should we recycle water?

Across the country and around the globe, people recycle water for the same reasons they recycle other materials: to make more efficient use of a precious resource. The MWMC's use can help reduce the temperature impacts of discharging warmer cleaned water into the Willamette River. Together, the MWMC and the greater community may both benefit from expanding uses of recycled water.

Where can I find general information about recycled water?

Other excellent sources of information include:

- WaterReuse Association (www.watereuse.org)
- Thirsty Planet (www.athirstyplant.org)
- Department of Environmental Quality (www.deq.state.or.us, under Water Quality > Programs > Water Reuse)
- US Environmental Protection Agency (www.epa.gov, Region 9 > Water > Water Recycling and Reuse).
- LOTT Clean Water Alliance: <http://www.lottcleanwater.org/reclaimed.htm>
- Santa Rosa, California: <http://ci.santa-rosa.ca.us/departments/utilities/recycle>

2. PRODUCTION AND SAFETY

How is recycled water produced?

Wastewater arriving at the treatment plant is over 99% water! The treatment process removes most of the waste products that are carried by the water – the remaining less than 1% of wastewater – producing recycled water. First, wastewater passes through bar screens and grit chambers that remove large objects like gravel, rags, sticks, and even sand. Next, solids and organic materials are removed through processes called clarification (the settling out of solids from wastewater resulting in much clearer water) and oxidation/aeration (the injection of air bubbles to increase the amount of oxygen in the water to promote natural biological consumption of organic matter). At this point, the water is nearly clean enough (needing only the final step of disinfection) to return to the Willamette River. The water is now over 99.9% pure – containing just minor amounts of particles, and when disinfected, is the basic class of recycled water, suitable for non-food crop farming use.

To produce the highest quality of recycled water, the water is then ultra-cleaned through a filter to remove the finest particles from the water. Then, all of the MWMC's recycled water is disinfected by adding chlorine – similar to the way public drinking water and swimming pools are disinfected. Finally, recycled water is ready to be used for irrigation, industrial, or other approved uses.

Who regulates recycled water?

All recycled water use is regulated and registered by the State of Oregon through the Department of Environmental Quality and the Oregon Water Resources Department. The Department of Human Services also reviews plans for Class C and D recycled water uses to ensure the protection of public health. Oregon's recycled water use rules are covered by Oregon Administrative Rules Chapter 340 Division 55.

How is the public notified that recycled water is being used?

At a minimum, members of the public will notice signs indicating the use of recycled water at sites of use, and see purple-colored piping, spigots, or sprinkler heads. Nationally, all recycled water piping is marked or painted purple. Signs inform people that the water in use is not for drinking. In Oregon, all recycled water producers operate under permit and a Recycled Water Use Plan filed with the Oregon Department of Environmental Quality and the Oregon Water Resources Department.

What is the meaning of each class of recycled water?

The Oregon Department of Environmental Quality regulates recycled water under strict treatment standards and permitting requirements. Under Oregon rules, recycled water is classified as Class A, Class B, Class C, or Class D based on its intended use and level of treatment. Each class requires consistent testing and monitoring for water quality.

- Class D recycled water is suitable for non-food crop irrigation, and is approximately the same water quality as the cleaned wastewater that is returned to the Willamette River.
- Class C has a wide variety of industrial, commercial and agricultural applications, except those requiring Class A or B recycled water.
- Class B is safe for uses requiring spraying in the air, such as fire suppression and watering golf courses and cemeteries.
- Class A receives the highest level of disinfection, and is appropriate and safe for uses such as car washing, ornamental fountains, and watering parks, schoolyards, and food crops.

Is Recycled Water Drinkable?

No – recycled water does not go through the same level of treatment and testing done on drinking water supplies. In fact, one of the benefits of recycling water is to reduce use of drinking quality water when it's not needed. Oregon's regulations have no class of direct potable reuse – recycling water for drinking water – but "indirect" use is permissible. Indirect use allows for recycled water to replenish drinking water aquifers, much the same way rainwater and streams do naturally. However, in Eugene/Springfield, recycled water is only being considered for uses such as agricultural, commercial, and industrial applications.

Why not completely purify wastewater?

Removing all potential toxics from water typically is not technically feasible, cost effective, or necessary. Both the natural water cycle and modern water treatment processes removes a percentage of potential contaminants. When water is cleaned or recycled, the percentage of contaminants removed depends on how easily substances can be removed and on the quality of water needed for a specific use. Wastewater treatment and recycled water production do not produce drinking quality water. The aim is to produce water that is the appropriate quality to discharge to the river channel, or to use for irrigation, industry, or recreation uses.

Does recycled water spread microconstituent chemicals, such as cleaning products, health products, and pharmaceuticals into the environment?

Water treatment operators and regulators are becoming increasingly aware of numerous chemicals that are found in trace quantities in wastewater and in our environment. We are more aware of these substances today because modern technology allows us to identify them in extremely low concentrations. These trace chemicals result from our use of medications, antibacterial soaps, insect repellents, and other health and beauty products as well as commonly used flame retardants, plastics, and pesticides. Standard wastewater treatment processes are not specifically designed to remove these substances. The degree to which these substances are removed varies considerably from one chemical to another.

Recycling water, especially when used for land application, may actually improve the breakdown and removal of microconstituents. Experimental water treatment units use wetlands and planters to greatly reduce the majority of these chemicals. Recycling water also reduces the amount of these substances entering our waterways, where they can build up in sensitive aquatic species.

3. ENVIRONMENTAL PROTECTION

How does recycling water benefit the environment?

Water recycling can potentially provide multiple environmental benefits. Protecting human health and the environment and helping maintain the water quality of the Willamette River are foremost planning considerations for the MWMC. One way to enhance Willamette River water quality is to keep as much naturally cooler source water as possible in the river. Using recycled water instead of river water or groundwater for irrigation or other uses not only reduces stress on our water resources but also helps retain natural, cooler, water flows in the river. Recycling water also reduces the amount of potentially warmer water returned to the river by the wastewater treatment plant.

Will discharging less water into the Willamette River reduce the river flow?

During a typical dry season when the proportion of total wastewater flow to river flow is highest, the wastewater treatment plant discharge to the river currently is under 5% of the total river flow. When recycled water is used to replace water sources typically withdrawn from the river (such as municipal supplies or riverside wells), it helps maintain river flows.

How does recycling water help protect salmon and other aquatic species?

Many aquatic species are highly sensitive to any changes in their water environment, including changes in temperature and water quality. Salmon, in particular, are very sensitive to river temperatures. Wastewater discharge is warmer than the typical river temperature and also may vary in composition. Using recycled water rather than discharging wastewater can reduce the heat and water quality impacts to the river. These reductions benefit sensitive aquatic species including salmon.

How does use of recycled water affect groundwater?

The use of recycled water for irrigation is regulated to prevent over-watering and seepage through the soil that may impact groundwater. In some instances, recycled water is purposely used to replenish local groundwater. When recycled water is used as an alternative to withdrawing water from the river, water quality in local streams, wetlands, and groundwater supplies may also benefit.

4. Use & Sustainability

Where is recycled water being used?

Recycled water use has been steadily growing in the United States since the first planned urban uses were implemented in the 1960's in California, Colorado, and Florida. Earlier, recycled water was used at the Grand Canyon National Park for toilet flushing and lawn sprinkling (installed in 1926) and at San Francisco's Golden Gate Park for irrigation and ornamental ponds (started in 1932).

Recycled water has a variety of agricultural, industrial, commercial, institutional, environmental, and recreational uses. In Oregon alone, recycled water is in use in over 70 communities, including at over a dozen golf courses. The Oregon Gardens in Silverton thrive with recycled water further purified for irrigation use through a series of wetlands. Numerous U.S. cities have installed dedicated recycled water piping systems for landscape irrigation. Recycled water makes San Antonio's famed Riverwalk canal possible, providing almost all of the water flow in the dry months. Elsewhere in the northwest, Olympia, Washington, uses recycled water for many purposes, including restoring wetlands, landscape irrigation, and toilet flushing.

How is the MWMC currently using recycled water?

The MWMC produces recycled water as part of its high-quality wastewater treatment process. Currently, this recycled water is used to irrigate landscaping at the MWMC's facilities and at its Biocycle Farm poplar tree plantation. The recycled water is also used for cooling and operation of the MWMC's treatment process equipment. The MWMC recycles about 50 million gallons of water annually – or about two full days worth of our community's cleaned wastewater. We have a great capacity to supply more recycled water for community use!

How could the MWMC use recycled water in the future?

Any new recycled water uses will reflect community needs and values. It's important to the MWMC to engage stakeholders early to ensure that we use this resource in a way that is the best fit with our community. We want to find out what the community thinks about recycled water possibilities. Potential future uses could include increasing the amount of recycled water used at the MWMC's facilities, or extending recycled water use to the MWMC's neighbors in agriculture, sand and gravel, and other industrial operations.

How does recycled water support the green business model?

More and more businesses want to follow green, sustainable businesses practices. The use of recycled water supports the goals of green business. Local industry and other businesses interested in sustainability are already expressing interest in recycled water. Here are a few ways that using recycled water could support the green business model:

- The recycled water program is a step toward making more efficient use of our water resources and can help move the MWMC toward a more sustainable business model.
- Construction firms can increase their use of recycled products in building by using recycled water for making concrete and for other construction activities. Using recycled water to build a project could contribute to obtaining LEED certification. LEED (Leadership in Energy and Environmental Design) certification is internationally used to recognize environmentally sustainable building design and construction.
- Local sand and gravel producers can harness recycled water's availability and warmer temperatures to realize energy savings. By using recycled water, sand and gravel producers would save energy required to pump water from the river as well as the energy required to heat river water to make concrete during the winter.
- Local government facilities, such as car washes and maintenance yards, are being constructed to be energy and water efficient. If recycled water were available at those sites, it would help these facilities meet their sustainability goals.

5. Investment Costs

What are the costs associated with recycled water?

At the MWMC, project costs and benefits are always carefully considered before any new projects are implemented. Several years ago, the MWMC budgeted an initial \$15 million for recycled water projects to be potentially implemented over a 5-year period. However, the MWMC has not specified any new recycled water projects to date. Any new projects will be approached very conservatively before any money is spent to ensure the right project at the right cost at the right time.

How would recycled water projects be funded?

Much of the MWMC's revenues come from ratepayer support. When facility improvements are needed, the MWMC leverages ratepayer support by securing bonds and low-interest state loans for long-term projects. These bonds and loans are paid back over many years (typically 20) spreading the cost of the investments out among present and future users. Since meeting regulatory compliance with water recycling is part of the MWMC's current facilities budget, no additional funding is needed to complete potential projects.

Additionally, since recycled water projects offer sustainability benefits, they can attract outside funding sources, such as grants for water quality and environmental improvements. Ideally, future partnerships would be formed to fund projects that provide recycled water to users for a fee to offset costs. Fee-based programs are already common in California and other parts of the U.S.

Would recycled water projects require additional infrastructure?

The MWMC currently diverts only a small percentage of its total flow for recycled water uses, but virtually all of its cleaned wastewater could be recycled now! The treatment plant cleans 25 to 50 million gallons of the community's wastewater each day. The MWMC's basic water stream is rated Class D – appropriate for uses such as hayfield or woodlot irrigation. Higher classes of recycled water could be produced with some disinfection system modifications. Currently, the MWMC could produce up to 10 million gallons per day of Class A recycled water – the purest class of recycled water available in Oregon.

The MWMC's existing pipelines transport recycled water from the treatment plant on River Avenue approximately 6 miles away to the Biocycle Farm. Potential uses for recycled water along the pipeline route or adjacent to the treatment plant or Biocycle Farm could require only short "spur" pipelines to deliver water to the sites. Other potential uses would be more likely to require construction of distribution piping for recycled water delivery.

What are the long-term costs and benefits of recycled water production?

A recycled water program can provide significant financial benefits to the MWMC as well as help the MWMC meet regulatory requirements. The 2004 Facilities Plan identified the recycled water program as a proactive way to meet temperature compliance regulations. Using recycled water instead of discharging wastewater – which is frequently warmer than the river water temperature – into the Willamette River can help the MWMC meet temperature compliance regulations.

In addition to helping the MWMC meet regulatory needs, the recycled water program could provide a water source for community use – a valuable community commodity. As use and interest in recycled water grows, industrial or government users could be charged user fees that could recover some costs of providing or operating the program. However, recycled water programs take time to perfect and time to identify potential opportunities and users. Often small demonstration projects are needed to gain community acceptance and interest potential users in recycled water.

Where Recycled Water is Used

Nationwide, recycled water is used in thousands of locations. Here are some examples of how recycled water is used in Oregon and the US:

- In Silverton, Oregon, recycled water flows through the Oregon Garden's 17-acre wetlands and irrigates the gardens
- Over 80 Oregon communities use recycled water, including irrigation use at over a dozen Oregon golf courses
- In Texas, San Antonio's famed Riverwalk experience is made possible by the flow of up to 100 million gallons per day of recycled water
- In Santa Rosa, California, over 350 acres of Gallo's wine vineyards are irrigated with recycled water
- About 250,000 residences in Florida use recycled water for irrigation and/or toilet flushing
- Recycled water irrigates more than 12,000 acres of food crops in Monterey County, California
- Nearly 2,000 U.S. parks, playgrounds, and schoolyard sites are irrigated with recycled water

Source: MWMC and <http://www.athirstyplanet.com/>

more
info

Metropolitan Wastewater Management Commission

To tell us what you think about recycled water use or for more information, contact MWMC administration at 541.726.3694 or email mwmcpartners@springfield-or.gov. To learn more about the MWMC, visit us on the web at www.mwmcpartners.org.

The following organizations also provide information about recycled water:

Water Reuse Association

www.watereuse.org
www.athirstyplanet.org

Oregon Department of Environmental Quality

<http://www.deq.state.or.us/wq/reuse/recycled.htm>



A Strong Partnership

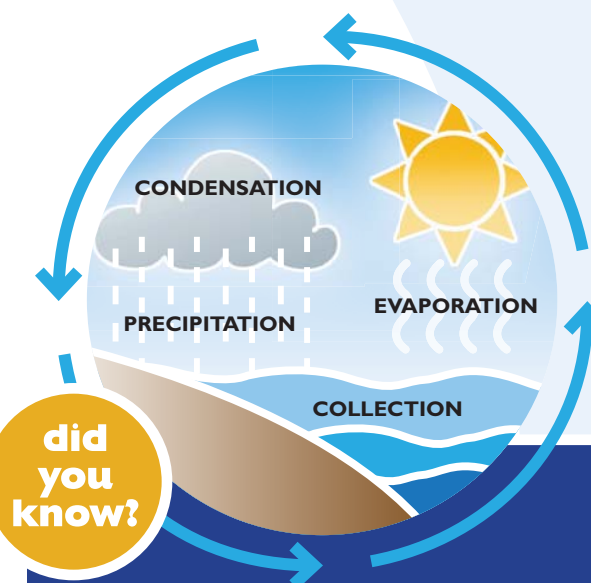
The MWMC is built on a partnership between the Cities of Eugene and Springfield and Lane County. The MWMC's purpose is to protect public health and safety and the environment by providing high quality wastewater management services to the Eugene-Springfield metropolitan area. The MWMC and the regional partners are committed to providing these services in a manner that will achieve, sustain and promote balance between community, environmental, and economic needs while meeting customer service expectations.

recycled water

A Sustainable Resource

Communities across the nation have been changing the way they think about water resources—surface water, groundwater, rainwater, and conserved and reused water. Even in the rain-blessed Pacific Northwest, water is a precious resource—especially with our renowned fisheries, farms, forests, and recreational opportunities. Water recycling is gaining recognition as an important conservation tool. Across the country and around the globe, people recycle water for the same reasons that they recycle other materials: to make more efficient use of a finite resource.

Recycled water is cleaned and disinfected wastewater restored for beneficial use. Recycled water is clear, safe, and has been treated to strict standards. It is a valuable, sustainable resource that matches water quality to specific reuse applications. Every gallon of recycled water that's used for irrigation, industrial processes, wetland enhancement and other beneficial uses potentially can save a gallon of our community's drinking water, river flow, or groundwater supplies for other competing demands.



Water is continually recycled in nature through the water cycle. The water we use every day is as old as the Earth itself. Modern wastewater treatment replicates the natural water recycling process to restore large quantities of water used by communities—quickly and effectively. See inside to learn how we produce recycled water.

Metropolitan Wastewater Management Commission



partners in wastewater management

Planning for Recycled Water's Regional Advantages

The MWMC currently uses recycled water to irrigate landscaping at our facilities and on our poplar plantation, Biocycle Farm. Soon the MWMC will have the ability to produce the highest class of recycled water recognized in Oregon—making it suitable for a wide variety of community uses. The MWMC is interested in exploring potential and interest in using more recycled water.

Any new recycled water uses will reflect community needs and values. It's important to the MWMC to engage stakeholders early to ensure that we use this resource in a way that is the best fit with our community. We want to find out what the community thinks about recycled water possibilities. Potential future uses could include increasing the amount of recycled water used at the MWMC's facilities, or extending recycled water use to the MWMC's neighbors in agriculture, sand and gravel, and other industrial operations.



In 2010, over 55 million gallons of the Eugene/Springfield community's recycled water irrigated nearly 88,000 poplar trees at the 600-acre Biocycle Farm.



OREGON'S RECYCLED WATER CLASSIFICATIONS

CLASS	USES	QUALITY
Class D	Non-food agriculture	River quality—meets all standards for returning to the Willamette River
Class C	Orchards and vineyards Industry and construction Golf courses and landscaping	Increased disinfection and testing criteria over Class D
Class B	Recreational ponds Toilet flushing Fire suppression	Highly disinfected—10 times more stringent testing than Class C
Class A	Food crops Parks and sports fields Car washes and fountains	Very high—water is additionally filtered and disinfected with daily testing required

Responsible and Sensible Investment

Recycling water in a way that is protective of human health, the environment, and of our ratepayers' investment is very important to the MWMC. That's why the MWMC is planning flexibility and adaptability in any of its recycled water considerations. Current and future regulatory compliance requirements will be balanced with the appropriate opportunities for recycled water uses.

Meeting our regulatory obligations. Water quality standards for the Willamette River and our nation's waters continue to become more stringent as the sensitivity of our waters to pollution—including temperature—becomes better understood. Meanwhile, the treatment technology needed to meet these strict requirements becomes more costly. What if there was a cost-effective community solution that protected water quality?

The MWMC believes recycled water could be an additional tool to meet regulatory requirements in a fiscally responsible way. By diverting recycled water, which can be warmer than river temperature standards, away from the river to a beneficial use, the total daily temperature impact on the river is lowered. And if recycled water substitutes for a

water supply extracted from the river, more cool river water stays in the stream.

Benefitting our community and the environment. Recycling water is a sustainable way to supply water for uses that do not require treatment to drinking water quality. As an alternative source to water extracted from streams and aquifers, recycled water use can help preserve our local river flow and groundwater.

Other communities are realizing some of these additional benefits of recycled water:

- Going "green" by mixing concrete, sweeping streets, and washing vehicles with recycled water
- Reducing stress on well fields and creeks by irrigating farms, vineyards, and orchards with recycled water
- Saving costs on golf course and park irrigation needs
- Enhancing stream and wetland habitat with recycled water



Safety: Our Highest Concern

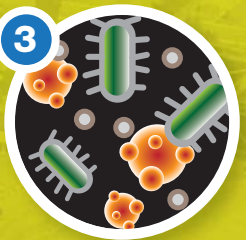
Protecting human health and the environment is the MWMC's first and foremost concern. All recycled water use is regulated and registered by the State of Oregon through the Department of Environmental Quality and the Oregon Water Resources Department. Recycled water is monitored and tested to ensure that it meets strict quality standards. Only water that meets those strict standards can be put to use.

Producing Recycled Water at Eugene/Springfield's Regional Facilities

Restoring water through natural treatment processes produces recycled water from wastewater



Wastewater from homes and businesses in Eugene and Springfield enters the wastewater treatment plant.



"Good" bacteria further clean the wastewater by digesting any leftover solid material that was too light to settle out.



The water is disinfected through a concentrated chlorination process (similar to drinking water and swimming pool processes).



Recycled water is transported through a separate system of purple pipes. Purple pipes are used exclusively for recycled water in order to clearly distinguish them from drinking water lines.



Solid matter is settled out of the wastewater and removed.



Some of the water may be processed through filters to remove very fine particles—producing extremely clear water.



Depending on the level of disinfection and filtration applied, recycled water is classed as A, B, C, or D.



Water Reuse: Using Our Water Wisely

Background

Protecting Oregon's water is one of DEQ's highest priorities. Developing strategies to encourage water reuse is a key action to help achieve this priority. Water reuse means using water again that has been previously used for another purpose. Reusing water reduces the demand to use drinkable water for uses, such as irrigation, that don't require highly treated water. The quality of reused water determines how it can be used to ensure protection of public health and the environment.

The value of reusing water

In recent decades water has been treated to very high standards, used for a primary purpose, and then discharged to a river or stream as "wastewater."

Although this water is typically of lower quality following a primary use, used water has resource value and can often

be safely reused for additional purposes without adverse effects to public health or the environment. Reusing appropriately treated "wastewater" for irrigation, industrial, commercial and construction applications helps conserve drinking water supplies and improve water quality of surface waters.



Types of water reuse

DEQ encourages reuse of three general categories of water:

Graywater refers to water from showers, baths, bathroom sinks, kitchen sinks and laundries. Graywater can be reused for limited activities, such as subsurface irrigation, with minimal treatment.

Recycled water refers to treated effluent from a municipal wastewater treatment facility. Oregon recognizes four classes of recycled water, based on various levels of treatment, that can be reused for specific beneficial purposes.

Industrial wastewater refers to treated effluent from an industrial process, manufacturing or business, or from the development or recovery of any natural resource. An example of industrial

wastewater is water derived from the processing of fruit, vegetables or other food products.

Who can reuse water

Homeowners and small businesses can reuse graywater for toilet and urinal flushing with the appropriate plumbing permit from a local building department. Outdoor reuse of up to 1,200 gallons per day of graywater can occur by carefully planning reuse activities and obtaining a general Water Pollution Control Facility graywater reuse and disposal system permit from DEQ.

Municipal or industrial wastewater treatment facilities are required to manage and operate water reuse projects under a reuse management plan. These plans are specific to each facility and part of a facility's National Pollutant Discharge Elimination System or WPCF water quality permit. Site-specific conditions, such as application rates, setbacks to sensitive features, signage and other limitations may be required to ensure protection of public health and the environment.

Many beneficial uses

Although water reuse activities are limited to non-drinking water purposes, a wide-range of activities can occur, including irrigation of crops and pastureland, irrigation of urban landscapes (e.g., golf courses, playing fields, business parks), industrial cooling, dust control, street sweeping, and artificial groundwater recharge. Specific water reuse activities depend on the water treatment and resulting quality. More reuse activities can occur with higher-quality water. As treatment technologies improve and public awareness of water reuse benefits increase, more innovative and urban uses of water will become more common.

For more information

Contact Ron Doughten, DEQ water reuse program coordinator, Portland, at 503-229-5472, or call toll-free in Oregon at 1-800-452-4011, ext. 5472.

Alternative formats

Alternative formats of this document can be made available. Contact DEQ's Office of Communications and Outreach, Portland, for more information at 503-229-5696, or call toll-free in Oregon at 1-800-452-4011, ext. 5696. Hearing-impaired persons may call 711.



State of Oregon
Department of
Environmental
Quality

Water Quality Community & Program Assistance

811 SW 6th Avenue
Portland, OR 97204
Phone: 503-229-5472
800-452-4011
Fax: 503-229-6037
Contact: Ron Doughten
www.oregon.gov/DEQ

Reducing Temperature in the Willamette Basin

Temperature Concerns

At times, the Willamette River and its tributaries are too warm to support healthy salmon and trout. Some of these cold water fish, including lower Columbia coho, spring Chinook, winter steelhead, and bull trout are threatened with extinction and elevated stream temperatures have contributed to their decline.

Warm water interferes with adult salmon and trout migration and spawning. Warm water also decreases chances of juvenile survival; it affects egg and embryo development, alters juvenile fish growth rates, and decreases their ability to compete with temperature-tolerant fish species for habitat and food. Salmon and trout are also more susceptible to disease when water temperatures are warmest.

Temperature Standards

Oregon water quality standards for temperature are established to protect each freshwater phase of the salmon and trout lifecycle. These include migration, spawning, and juvenile rearing. Standards identify where and when each phase of the lifecycle occurs and include numeric criteria necessary to protect it. For example, the salmon and steelhead trout rearing and migration use occurs in summer and early fall and the numeric criterion designated to protect that use is 18°C. Other uses require different criteria as seen in the side panel or at the DEQ website: [Oregon DEQ: Water Quality - Water Quality Standards - Water Temperature Standard](http://www.deq.state.or.us/waterquality/standards/waterqualitystandards.html)

Causes of Stream Warming

Stream temperatures are influenced by climate, elevation, geology, hydrology, stream side vegetation and many other factors. Natural warming is greatest during late spring, summer and early autumn when solar radiation levels are high and stream flows are usually at their lowest levels of the year.

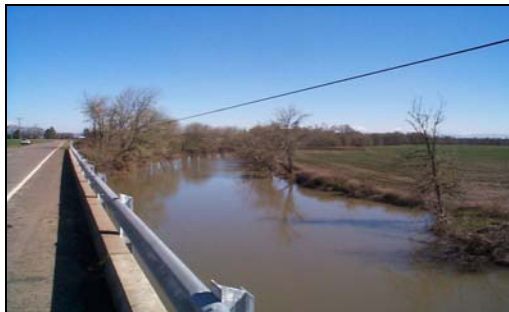
A legacy of past land use practices and current watershed management activities cause many Willamette Basin streams to warm beyond natural temperatures. Throughout the basin a principal cause of stream heating has been the removal of trees and other shade-producing vegetation from stream banks. This loss of riparian vegetation allows more solar energy to reach the water's surface. This warming is most

noticeable in small tributaries which typically can be well shaded.

Water diversions also contribute to stream heating by reducing stream flow during critical periods. This increases stream sensitivity to natural warming processes by diminishing volume and slowing the movement of water downstream. The water that remains in the stream channel has greater exposure to solar radiation and other sources of heat. Reservoirs that store water for uses such as hydropower, recreation and flood control can also affect stream temperature by releasing water that is colder than natural in the spring and summer, but warmer than natural in the fall.

Wastewater from industrial and municipal treatment facilities may also be a source of heat when discharged to streams. This is most apparent in smaller tributaries and the upper Willamette River which have less flow than the lower river.

Activities that regulate or restrict river connectivity with its floodplain can affect water temperatures and stream habitats. Channel dredging, bank armoring and other activities in the stream channel and floodplain may degrade areas of cool tributary and groundwater inflow. These areas of cool inflow provide small but important refuges that sustain salmon and trout through periods of seasonally warm water temperatures.



TMDL Analysis

The federal Clean Water Act requires the establishment of a total maximum daily load for pollutants when water quality standards are not met. A TMDL determines how much pollutant a waterbody may receive without exceeding water quality standards. The TMDL identifies where



State of Oregon
Department of
Environmental
Quality

Northwest Region Water Quality Section

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Portland, OR 97201
Phone: (503) 229-5294
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Fax: (503) 229-6945
Lower Willamette
Contact: Manette
Simpson
www.deq.state.or.us

Western Region Water Quality Section

750 Front St NE, Suite
120
Salem, OR 97301
Phone: (503) 378-5073
(800) 349-7677
Fax: (503) 373-7944
Middle Willamette
Contact: Nancy
Gramlich
www.deq.state.or.us

Western Region Water Quality Section

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210
Eugene, OR 97401
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Upper Willamette
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www.deq.state.or.us

07-WQ-000

Last Updated: 04-06-07
By: Dennis Ades

the pollution comes from and divides or allocates the pollutant load among different sources.

DEQ, in collaboration with Portland State University, United States Geological Survey and basin stakeholders, developed dynamic stream flow and temperature models of the Willamette River. These models included water temperature and stream flow data, information on channel characteristics, stream side vegetation and meteorological conditions. DEQ and its partners used these models to simulate a condition free of point source and nonpoint source pollution. With this understanding DEQ determined how much heat the river could accept from human sources and still meet water quality standards. Heat loads were then allocated to all point and nonpoint sources of pollution with a small amount set aside in reserve for future use.

TMDL Results

The TMDL requires reductions in point source heat loads during periods of low river flow. The TMDL also requires reductions from nonpoint sources of heat. This means protection and restoration of streambanks and shade-producing vegetation throughout the basin. Heat load limitations were also assigned to non-federal hydroelectric projects located on the McKenzie, Clackamas and Willamette Rivers. Allocations for the federal flood control dams target natural stream temperatures that require substantial reductions in late summer and fall heat loads.

TMDL Implementation

Stream restoration activities that will cool stream temperatures and restore fish populations are underway throughout the basin. Local landowners and stakeholders in collaboration with federal, state and local agencies are actively protecting and restoring streamside vegetation. Many of these agencies will submit implementation plans for DEQ approval that detail actions planned within their jurisdiction to cool stream temperatures.

DEQ is also including thermal limits in many of the discharge permits the agency issues to point source discharges. These limits will be added to permits as they are renewed over the next five years. Permitted sources may reduce their heat load through investments in pollution control technology, wastewater reclamation or pollution trading.

DEQ will insure that non-federal hydroelectric facilities meet water quality standards before issuance of water quality certifications. DEQ will work with the US Army Corps of Engineers to implement the TMDL at the federal flood

control dams located throughout the Willamette basin.



Adaptive Management

Because of the uncertainties involved in the development of a TMDL and in the effectiveness of management strategies to reduce pollution, it is necessary to use an "adaptive management" approach to implement TMDLs. The adaptive management approach involves continual tracking and evaluation of actions taken to reduce pollution. TMDL implementation will be adjusted based on actual pollution reductions and water quality improvements.

For more information

For more information, contact Manette Simpson in Portland at (503) 229-5294 or Dennis Ades at (503) 229-6351, Nancy Gramlich in Salem at (503) 378-5073, Jared Rubin in Eugene at (541) 686-7838, ext. 261, or use the toll-free number in Oregon at (800) 452-4011. The Willamette website is:

http://www.deq.state.or.us/wq/willamette/WRB_home.htm

Alternative Formats

Alternative formats (Braille, large type) of this document can be made available. Contact DEQ's Office of Communication & Outreach, Portland, at (503): 229-5696, or toll-free in Oregon at 1-800-452-4011, ext. 5696.

Oregon Temperature Criteria

- **Waters identified as migration corridors including the mainstem Willamette below the Yamhill River - 20.0°C Celsius** (68.0°Fahrenheit (F)), applies year round.
- **Salmon/trout rearing and migration waters - 18.0°C** (64.4°F), generally applies late spring to early fall in most waters other than the lower mainstem Willamette;
- **Core cold water habitat - 16.0°C** (60.8°F), generally applies late spring to early fall to important reaches of several rivers flowing from the Cascades including portions of the McKenzie, North Santiam and Clackamas River;
- **Salmon and steelhead spawning waters - 13.0°C** (55.4°F), generally applies late fall through early spring to all but the lower 50 miles of the Willamette River; and
- **Bull trout spawning and rearing waters- 12.0°C** (53.6°F) *generally applies year round to cold tributaries flowing from the Cascades.*

Water Quality Trading

What is water quality trading?

Water quality trading is a program that allows DEQ permittees discharging wastewater to Oregon's waterways to obtain pollutant reduction credits from other pollutant dischargers or pollution-reduction activities within the same geographic area. These permittees typically include sewage treatment plants and industrial wastewater plants. Operators of other types of activities that impact the state's waterways, such as hydroelectric dams, may also participate in trading.

When is trading allowed?

DEQ only allows trading when it addresses the source or sources of the pollution problem and does not negatively affect the environment. Trading cannot be used to avoid existing federal and state treatment requirements.

Examples of water quality trading

The following are examples of trading:

- Wastewater treatment plants trade between themselves – one plant is allowed to discharge more of a pollutant provided another plant discharges less.
- A wastewater treatment plant offsets its pollution impact with activities that reduce the pollutant of concern but are not located at the plant. For example, a treatment plant discharging warm treated wastewater to a river is allowed to plant trees and other vegetation on the river bank instead of installing wastewater chillers.

This approach makes sense in areas where instream temperatures are warm enough to be unhealthy for fish and the main cause of warming is the removal of bank vegetation (no shade to block the sun from warming the water) rather than the wastewater discharge. Allowing this type of trade also has additional benefits: wildlife habitat is created; the treatment plant saves money because it does not have to purchase and operate wastewater chillers; and greenhouse gas emissions from operation of the chillers are prevented.

Why does DEQ encourage trading?

Trading provides the opportunity for DEQ and stakeholders to improve water quality in ways that offer the best overall protection of the environment. It is an important tool because the

best opportunities for improving water quality are not always at the end of a permittee's discharge pipe. Trading can also result in additional benefits, such as restoration of fish and wildlife habitat and reduced compliance costs for permittees.

Trading examples in Oregon

DEQ allows Clean Water Services, the public agency that operates sewage treatment plants in Washington County, to trade between its plants that discharge to the Tualatin River (one plant can discharge more of a pollutant provided another plant discharges less). DEQ also allows the agency to plant trees and other vegetation to shade streams that flow to the Tualatin River rather than install wastewater chillers. (For more information, see <http://www.deq.state.or.us/wq/wqpermit/cwsp permit.htm>). Water quality trading is also being considered in the Clackamas, Rogue and Klamath basins.

DEQ guidance on trading

DEQ recently updated its guidance to DEQ staff on how to evaluate proposed trading activities and develop conditions to regulate these trades. The guidance, titled *Water Quality Trading in NPDES Permits Internal Management Directive (December 2009)*, focuses on trades conducted to comply with National Pollutant Discharge Elimination System permit requirements because DEQ expects the majority of trading activity to be driven by permittees discharging warm wastewater to Oregon's waterways. The guidance may also be useful to parties involved with re-certification of hydroelectric projects that are trying to develop comprehensive approaches to comply with water quality standards.

More information

For DEQ guidance and more information on trading, please visit DEQ's website at: <http://www.deq.state.or.us/wq/trading/trading.htm>. You may also contact Ranei Nomura, Western Region Eugene Office, at (541) 686-7799, toll-free in Oregon at 1-800-844-8467, or by email at nomura.ranei@deq.state.or.us.

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*DEQ is a leader in
restoring, maintaining and
enhancing the quality of
Oregon's air, land and
water.*

Phase 2 Recycled Water Study

Grant Funding for MWMC Study of Industrial Recycled Water Use



In September 2012, the Oregon Water Resources Department awarded grant funds to the MWMC to study the feasibility of using recycled water for local industrial sand and gravel processing, including concrete and asphalt production. If practical, recycled water could supplant the current practice of withdrawing water from the Willamette River for those purposes.

Benefits of a positive study outcome could include regulatory compliance for reducing temperature burdens on the Willamette River, maintaining cooler instream flow for fish habitat, advancing more efficient use of water resources, and increasing the recycled content of local construction materials. The grant funding complements a low-interest planning loan from the Oregon Department of Environmental Quality's clean water state revolving fund to finance the entire planning efforts.

Water Recycling and Wastewater Treatment in an Age of Resource Recovery

Water recycling is just one of the MWMC's practices to recover resources from the community's waste stream. For years, the MWMC has irrigated its landscaping with recycled water, processed biosolid fertilizers for local farm fields, and generated heat and electricity from methane produced during the wastewater treatment process. The MWMC is currently updating its Facilities Plan, which includes reviewing the efficiency of its operations.

Nationally, communities are increasingly viewing wastewater as a resource for energy, nutrients, and water conservation – thereby turning a liability into an asset. The MWMC is currently investigating advancements in the use of biogas (methane) as an energy source as well as studying practical applications for expanding recycled water use for water resource benefits, regulatory goals, and cost-effectiveness.



Could wildlife benefit by use of recycled water instead of river water to wash gravel?

MWMC Recycled Water Program Implementation Planning Study Tasks

Phase 2: Alternatives Evaluation, August 2012 – December 2013

Water Balance Modeling – computational analysis of water flows to understand distribution capacity, water quality compliance, and net river flow benefits.

Feasibility Studies – technical analysis of recycled water use alternatives at industrial and agricultural facilities.

Community Input – solicitation of stakeholder input regarding water resource management, public and environmental health, watershed conservation, and infrastructure investment.

Conceptual Design and Cost Estimation – development of conceptual designs for practical alternatives to use recycled water at industrial and agricultural facilities.

Triple Bottom Line Assessment – evaluation of the economic/operational, environmental/health, and community/social assets and drawbacks of the proposed alternatives.

Draft Implementation Plan – proposed plan outline for project implementation, including near- or long-term opportunities, funding considerations, and additional information needs.

Phase 2 Recycled Water Study

Phased Approach to Planning Studies

MWMC completed a first phase of planning studies in March 2012. These studies included stakeholder interviews, regulatory compliance analysis, and screening of conceptual project opportunities. The MWMC is now in a second phase of study to assess the technical feasibility and triple-bottom-line benefits of two leading opportunities for expanded recycled water use: (1) industrial sand and gravel use (2) irrigation and water storage at MWMC agricultural lands. The Phase 2 study effort will continue from 2012 through 2013.

High-Value, Low-Risk Sites Identified

The MWMC is presented with a unique set of recycled water use opportunities within fenced, non-publically accessible locations having potentially high demands for water. Besides the local sand and gravel companies neighboring the wastewater treatment plant at River Avenue, the MWMC's own agricultural management sites near the Eugene Airport off Prairie Road present high potential for effective recycled water use.

These facilities include the Biocycle Farm poplar plantation and the Beneficial Reuse Site (the former produce cannery waste storage lagoon and irrigation system). Both the industrial and agricultural facilities offer existing infrastructure efficiencies and potential economic benefits from recycled water use. The MWMC facilities include potential off-season water storage as a possible solution for flow management.

What to Expect

Local officials may hear more about the recycled water studies during 2013 through OWRD grant reporting, stakeholder engagement, MWMC agenda topics, or media interest. No formal decision making on project recommendations will occur until after the 2013 studies are completed. Any considerations of expanding water recycling by the MWMC will need to be weighed with applicability to river temperature regulations currently under judicial and agency review, long-term operational and economic benefits associated with use, and ultimate community acceptability of alternatives.

Community Input

The involvement of community stakeholders is key to the MWMC's project success. During the first phase of recycled water study in 2011, stakeholders from local businesses, conservation organizations, and government agencies provided valuable input to help the MWMC identify the most promising recycled water use applications. The regional wastewater program staff is continuing to engage stakeholders during the second phase of study occurring 2012-2013. Any potentially feasible project alternatives will be identified with the input of stakeholder voices related to water resources, public and environmental health, watershed conservation, and infrastructure investment.

For Further Information

For details about recycled water planning, to request informational presentations, or for tours of the MWMC's facilities, contact Todd Miller or Rachael Chilton at the City of Springfield.

Recycled Water Program Implementation Planning

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