



## TUALATIN RIVERKEEPERS®

11675 SW Hazelbrook Road • Tualatin, Oregon 97062

phone 503-218-2580 • fax 503-218-2583

[www.tualatinriverkeepers.org](http://www.tualatinriverkeepers.org)

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December 8, 2011

Avis Newell,  
Tualatin Basin Coordinator  
DEQ Northwest Region  
2020 SW 4th Avenue, Suite 400  
Portland, OR 97201

Subject: Tualatin TMDL Revisions

Dear Avis,

Attached you will find the comments of Tualatin Riverkeepers on revisions to the Tualatin TMDL. We are proposing some significant changes that will better protect urban streams and provide reasonable assurance that Designated Management Agencies will meet Load Allocations through their Water Quality Management Plans. Here are some of the highlights of our comments:

- The Temperature TMDL should include a load allocation for small top-flow dams.
- Oregon Board of Forestry should revise Forest Practices Act rules to meet the load allocation for temperature.
- Biological criteria on urban streams should be addressed through a TMDL that uses impervious cover as a surrogate for a variety of pollutants.
- DEQ should use its residual designation authority to require NPDES permits for discharges from real property with one acre or more of impervious cover.
- Water Quality Management Plans should follow DEQ's 1997 Guidance for Water Quality Management Plans Serving as TMDLs in order to provide reasonable assurance that load allocations are met.
- Discharging effluent from CWS facilities in Hillsboro and Forest Grove would increase temperature above the standard in a stretch of identified for salmonid rearing. Alternative discharge strategies, including effluent reuse should be used to avoid this impact.

Thank you for the opportunity to help shape the revisions of the Tualatin TMDL. Wishing you a speedy recovery.

Sincerely,

Brian Wegener  
Advocacy & Communications Manager



# Comments on the Draft Tualatin Subbasin TMDL

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December 2011

Brian Wegener, Riverkeeper  
Advocacy & Communications Manager  
[brian@tualatinriverkeepers.org](mailto:brian@tualatinriverkeepers.org)

Tualatin Riverkeepers  
11675 SW Hazelbrook Road  
Tualatin, Oregon 97062

[www.tualatinriverkeepers.org](http://www.tualatinriverkeepers.org)

## Biological Criteria Should be Addressed with a TMDL that Specifies 9% Effective Impervious Area as Surrogate Waste Load Allocation

Twelve urban streams in the Tualatin Basin with a total length of 82 miles are on the 303(d) list for biological criteria, but are not specifically addressed with TMDLs for biological criteria. Instead, it is assumed that the TMDLs for temperature and nutrient would address the biological impairment.

Tualatin Basin 303d Listed Streams for Biological Criteria			
Status	Water Body	Miles	Notes:
TMDL Approved	Ash Creek	3.7	Addressed through temperature & nutrient TMDLs
TMDL Approved	Fanno Creek	13.9	Addressed through temperature & nutrient TMDLs
TMDL Approved	Johnson Creek	4	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Beaverton Creek	9.8	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Bronson Creek	6.5	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Butternut Creek	5.3	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Cedar Creek	6.8	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Dawson Creek	4.1	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Hedges Creek	0	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Rock Creek (S)	5.7	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Rock Creek (N)	18.2	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Summer Creek	4	Addressed through temperature & nutrient TMDLs
Water Quality Limited Not Needing a TMDL	Williams Canyon(rural)	2.4	Addressed through temperature & nutrient TMDLs
<b>Total Miles Addressed Through Temperature &amp; Nutrient TMDLs</b>		<b>84.4</b>	

A significant body of research indicates that urban streams are affected by more factors than just temperature and nutrients that impact resident fish and aquatic life, including altered hydrology, toxics, channel morphology, and suspended sediments.<sup>1</sup> Further, the synergistic impact of combinations of these factors is not addressed by individual listing of specific pollutants.

The 2005–2006 Assessment of Fish and Macroinvertebrate Communities commissioned by Clean Water Services compared their survey results with the 2001 survey and found,

*“...these consistent results provide compelling evidence that rural and urban development of the Tualatin River basin has had a measurable effect on physical habitat and water quality in basin streams, which in turn, have measurably impaired biological integrity.”<sup>2</sup>*

EPA Region 10 emphasize the importance of addressing urbanization in their comments on the draft of the 2001 TMDL.

*“EPA recognizes that much of the remaining water quality impairments in the Tualatin Subbasin are related to impacts due to urban stormwater runoff. As such, implementation of stormwater control programs will be a critical element in determining the future success of these TMDLs.”<sup>3</sup>*

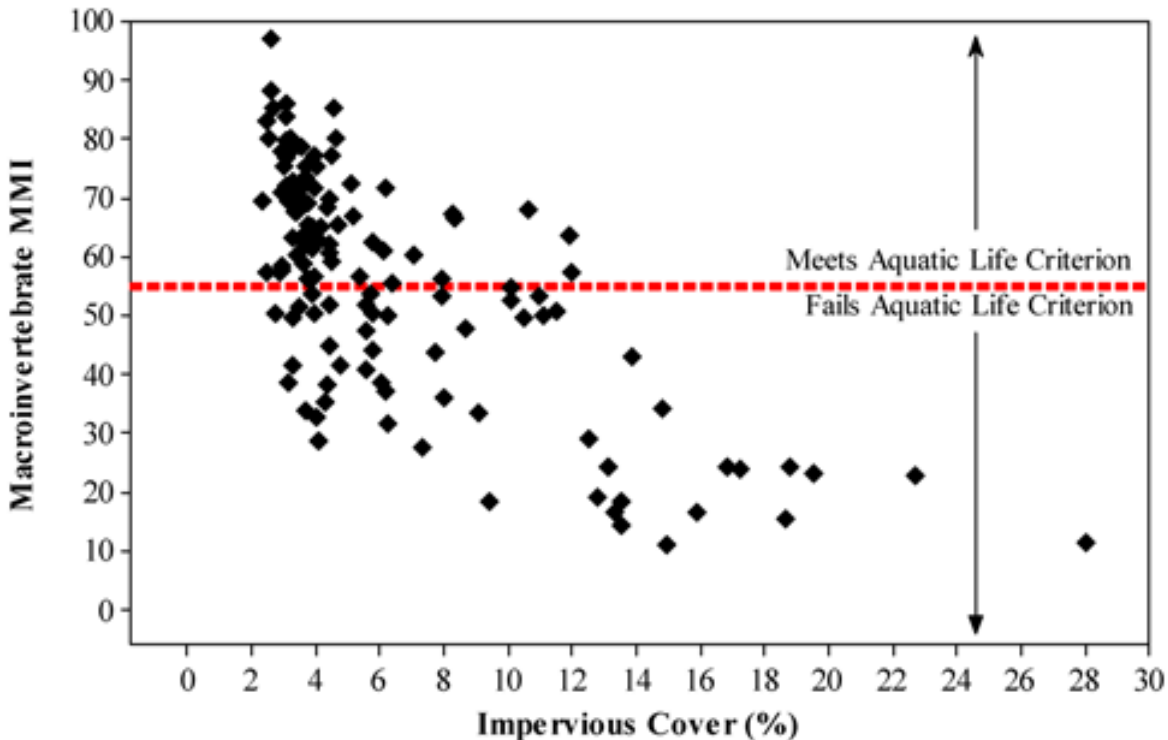
<sup>1</sup> Walsh, C. J., A. H. Roy, J. W. Feminella, P. D. Cottingham, P. M. Groffman, and R. P. Morgan II. 2005. **The urban stream syndrome: current knowledge and the search for a cure.** Journal of the North American Benthological Society 24(3): 706–723.

<sup>2</sup> FINAL REPORT 2005–2006 ASSESSMENT OF FISH AND MACROINVERTEBRATE COMMUNITIES OF THE TUALATIN RIVER BASIN, OREGON, MICHAEL B. COLE, JENA L. LEMKE, CHRISTOPHER R. CURRENS. PREPARED FOR CLEAN WATER SERVICES, HILLSBORO, OREGON. PREPARED BY ABR, INC.—ENVIRONMENTAL RESEARCH & SERVICES

<sup>3</sup> Letter from Jannine Jennings of EPA Region 10 to Rob Burkhart of DEQ (November 3, 2000)

A TMDL that recognizes impervious cover is an important step in addressing these “remaining water quality impairments”.

In 2005–2006, the Connecticut Department of Environmental Protection conducted statewide research comparing stream health, as indicated by metrics for benthic macroinvertebrate populations, to watershed impervious cover estimates. A total of 125 stream segments were studied; no stream segment with over 12% impervious cover in its immediate upstream catchment area met the state’s aquatic life criteria for a healthy stream.<sup>4</sup>



Scatter plot of the percentage of total impervious cover and macroinvertebrate multimetric index (MMI) for 125 stream monitoring locations in Connecticut. The MMI score is the average score of seven metrics and ranges from 0 to 100, with higher values representing the least stressed sites. Sites that plot above the horizontal line meet Connecticut’s water quality criterion to support aquatic life.

This study resulted in the state of Connecticut issuing in 2007 the first TMDL in the nation based on impervious cover for Eagleville Brook. A 2010 review of the status and findings of this TMDL made this assessment: “The team’s preliminary conclusion is that combining the simple framework of impervious cover with the force and accounting rigor of a TMDL can be an effective way to catalyze communities to plan and implement actions to remediate stormwater problems.”<sup>5</sup>

<sup>4</sup> Bellucci, Christopher. 2007. *Stormwater and aquatic life: making the connection between impervious cover and aquatic life impairments for TMDL development in Connecticut streams*. In Proceedings of the Water Environment Federation TMDL Conference, Bellevue, WA. Alexandria, VA: Water Environment Federation, 1003–1018.

<sup>5</sup> Arnold, C.L., C.J. Bellucci, K. Collins and R. Claytor. 2010. Responding to the first impervious cover-based TMDL in the nation. *Watershed Science Bulletin, Journal of the Association of Watershed & Stormwater Professionals* 1(1): 11-18.

Using impervious cover in a watershed as a surrogate TMDL target is appropriate for aquatic impairments caused by stormwater runoff.<sup>6</sup> The Barberry Creek TMDL (Maine), among others, has both load allocations and waste load allocations for impervious cover, thus using impervious cover as a surrogate for biological criteria is not unprecedented.

Clean Water Services found “correlations between macro-invertebrate community condition and the percentage of effective impervious area”<sup>7</sup> consistent with the findings of the University of Washington’s Center for Water and Watershed Studies. According to NOAA-Fisheries, “...*the most consistent and pervasive effect of urbanization is an increase in impervious surface cover, which alters the hydrology and geomorphology of streams, and causes predictable changes in stream habitat and water quality*”.<sup>8</sup> Clean Water Services’ scientists who conducted field observations found in urban and urbanizing areas of the Tualatin Basin found stream conditions consistent with those described by researchers from NOAA, The Center for Watershed Protection and University of Washington: “*scoured stream beds, limited channel diversity, conversion of forested wetlands to reed canarygrass, and low to nonexistent stream flows in the summer months...*”<sup>9</sup>

Due to the multiple impacts of urbanization that affect urban streams and aquatic life in those streams, we request that Effective Impervious Cover as a surrogate target for biological criteria for 303d listed urban streams in the Tualatin Basin. Tualatin Riverkeepers believes that temperature and nutrient TMDLs are insufficient for addressing these impacts. Based on studies correlating impervious cover to various indices of biological integrity, and due to the EPA’s general recommendation of 9% impervious cover as a target,<sup>10</sup> we recommend that 9% Effective Impervious Area be used for load allocations for urban designated management agencies (including Metro) and waste load allocations for the MS4 permit.

**Recommendation #1: A TMDL target of 9% Effective Impervious Area should be included as load allocations and waste load allocations for urban streams in the Tualatin Basin on the 303(d) list for biological criteria.**

In 2001, DEQ responded to requests for a Biological Criteria TMDL with the following explanation:

*The 303(d) List is intended to identify all waters not meeting water quality standards. EPA has interpreted that Total Maximum Daily Loads (TMDLs) are to be established only where a waterbody is water quality limited by a “pollutant.” In the case of the listings such as for Habitat Modification and Flow Modification which are not pollutants, TMDLs would not need to be established and other approaches to address these concerns, such as through Management Plans, should be used to address these impairments. In the case of a Biological Criteria listing which could be due to either a pollutant (e.g. excessive temperature, low dissolved oxygen or sedimentation) or some form of pollution (flow or habitat modification), the likely cause for the Biological Criteria exceedence needs to be determined. If pollutants were the likely cause, a TMDL would need to be established. If some other form of pollution was involved, other appropriate measures could be used.*<sup>11</sup>

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<sup>6</sup> ENSR Corporation, Pilot TMDL Applications Using the Impervious Cover Method, October 2005. Submitted to USEPA Region 1

<sup>7</sup> Clean Water Services, June 2005. Healthy Streams Plan. p. 59.

<sup>8</sup> National Oceanic and Atmospheric Administration – Fisheries, Northwest Region. March 2003. ESA Guidance for Analyzing Stormwater Effects.

<sup>9</sup> Clean Water Services, June 2005. Healthy Streams Plan. p.87.

<sup>10</sup> ENSR Corporation, Pilot TMDL Applications Using the Impervious Cover Method, October 2005. Submitted to USEPA Region 1 (Page 1-1)

<sup>11</sup> Tualatin Subbasin TOTAL MAXIMUM DAILY LOAD (TMDL) & WATER QUALITY MANAGEMENT PLAN (WQMP), Response to Public Comment . Oregon Department of Environmental Quality. January 31, 2001

We suggest that a synergistic influence of numerous pollutants from stormwater are responsible for the biological criteria listing including zinc, copper, and other metals, PAH and other toxics and fine sediment. We also believe that “erosive kinetic energy” is a pollutant impacting the aquatic biological communities in urban streams. Since one form of energy, heat, is recognized as a pollutant in this TMDL, it is not unreasonable to recognize and regulate another anthropogenic form of energy, “erosive kinetic energy” as a pollutant. Using impervious cover as a surrogate could address “erosive kinetic energy” while addressing the synergistic impact of a list of pollutants which singly would not warrant a listing.

The DEQ response to public comments on the 2001 Tualatin TMDL also included the following statement:

*The Department also recognizes that some parameters such as sedimentation and toxics were not fully addressed at this time, as they were not listed for the Tualatin. The Department will be seeking and reviewing data for these parameters in the Tualatin under its watershed approach and will revise TMDLs accordingly on a five-year cycle.*

Ten years later, we see an impervious cover TMDL as an appropriate revision to more fully address these parameters.

Much work has been done to guide the implementation of the impervious cover TMDL in the Tualatin Basin. The Tualatin Basin Effective Impervious Area Reduction Task Force Report (2002) lists 37 recommendations for reducing impervious cover. Many of these recommendations were echoed in the Healthy Streams Plan (2005). Adopting an impervious cover TMDL would strengthen these recommendations through NPDES permits and water quality management plans produced and implemented by designated management agencies.

## **Enforcement Mechanisms for Biological Criteria, Impervious Cover and Urban Runoff from Private Facilities**

Assigning allocations for impervious cover alone will not cause transformation of urban infrastructure impacting streams and aquatic biological communities without effective enforcement mechanisms. Clean Water Services has identified 1339 private water quality facilities treating 7496.3 acres of runoff.<sup>12</sup> Of these private facilities only 95 have 1200-Z permits requiring annual inspections. Overall, 32% of private facilities were inspected in the last reporting year.

Inspection of the 95 1200-Z facilities resulted in 62 administrative permit violations and 67 benchmark exceedances. For the 1244 private facilities not covered by the 1200-Z program, CWS scores the functioning of the inspected facility on a scale of 1-5. Ratings statistics were not reported in the Stormwater Annual Report, however these statistics could provide insight to support adaptive management decisions for the private stormwater facility program.

Clean Water Services only inspects and rates catch basins which are part of a treatment train for a water quality facility. Catch basins in standard parking lots (i.e. those without any supplemental water quality

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<sup>12</sup> Clean Water Services, November 2011. Stormwater Annual Report.

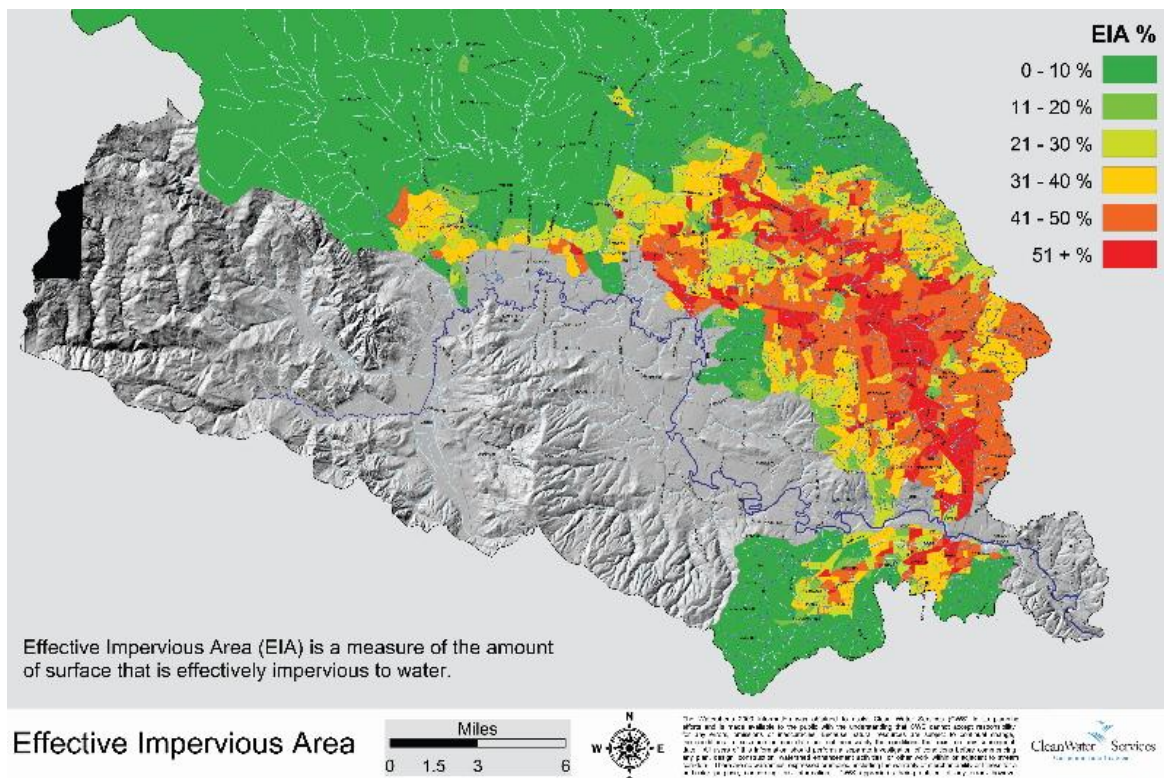
elements such as swales or biofilters) are not inspected as it has been determined by CWS that these catch basins provide little benefit for water quality improvement.<sup>13</sup>

The impact of private impervious cover on the watershed is significant. The Tualatin Basin Effective Impervious Area Reduction Task Force Report (2002) estimated that there was over 17,500 acres of impervious cover, including over 5,000 acres of parking lots and 7,840 acres of building footprint within the urban growth boundary of the Tualatin basin, compared with 2,319 acres of roads. Effective Impervious Area Private impervious cover produces the majority of runoff in the basin. Based upon the definition of “Effective Impervious Area” in the 2002 task force report, we assume that this acreage is in addition to the 7496.3 acres of treated impervious cover.

### *What is effective impervious area?*

*Impervious area such as rooftops, streets, sidewalks, and parking areas do not allow water to drain into the soil. Impervious area that collects and drains the water directly to a stream or wetland system via pipes or sheet flow is considered “effective impervious area”, because it effectively drains the landscape. Impervious area that drains to landscaping, swales, parks and other impervious areas is considered “ineffective” because the water is allowed to infiltrate through the soil and into ground water, without a direct connection to the stream or wetland.<sup>14</sup>*

A map of the basin shows that the highest density of impervious cover is in commercial areas along major transportation corridors (I-5, 99W, US26, Hwy 217).



Source: Clean Water Services Healthy Streams Plan (2005)

<sup>13</sup> E-mail from Peter Ruffier, Regulatory Affairs Department Director, Clean Water Services December 5, 2011.

<sup>14</sup> Tualatin Basin Effective Impervious Area Reduction Task Force Report, Clean Water Services. July 2002 DRAFT

We suggest such a significant volume of runoff coming from commercial and multi-family residential areas warrants regulations with NPDES permits. While industrial and commercial with specific Standard Industrial Classification (SIC) codes are regulated by permits, the vast majority of commercial acreage is not regulated by permits that hold individual property owners and managers accountable.

DEQ could require NPDES permits for impervious cover. Under “residual designation authority” (RDA) a state may on a case-by-case basis after balancing certain factors designate a stormwater discharge as requiring a NPDES permit because it contributes to a violation of a water quality standard or is a significant contributor of pollutants. (See 40 CFR 122.26)

This residual designation authority has been used three times in EPA Region 1 to address runoff and pollutants coming from impervious cover. An NPDES permit is required for stormwater discharges from real property containing impervious surfaces equal to or greater than two acres in Milford, Bellingham or Franklin, Massachusetts. Maine Department of Environmental Protection issued an RDA general permit for Long Creek in November 2009. The state of Vermont has issued combination of MS4 permit and RDA permit to implement stormwater TMDLs.

**Recommendation #2:** Whereas the Tualatin Basin has 12 urban streams on the 303(d) list for biological criteria; and impervious cover has been positively shown to cause the decline of aquatic biological communities; and the Tualatin Basin has 7500 acres treated by private stormwater facilities; and there is approximately 18,000 acres of impervious cover within the urban growth boundary of the Tualatin Basin; and catch basins from thousands of acres of parking lots are uninspected and presumably unmaintained; **Tualatin Riverkeepers requests that DEQ use its residual designation authority under 40 CFR 122.26 to require National Pollutant Discharge Elimination System permits for all stormwater discharges from real property containing impervious surfaces equal to or greater than one acre.**

## Comments on Chapter 2: Revised Temperature TMDL

### Discharging From Hillsboro and Forest Grove WWTPs Impacts Mainstem

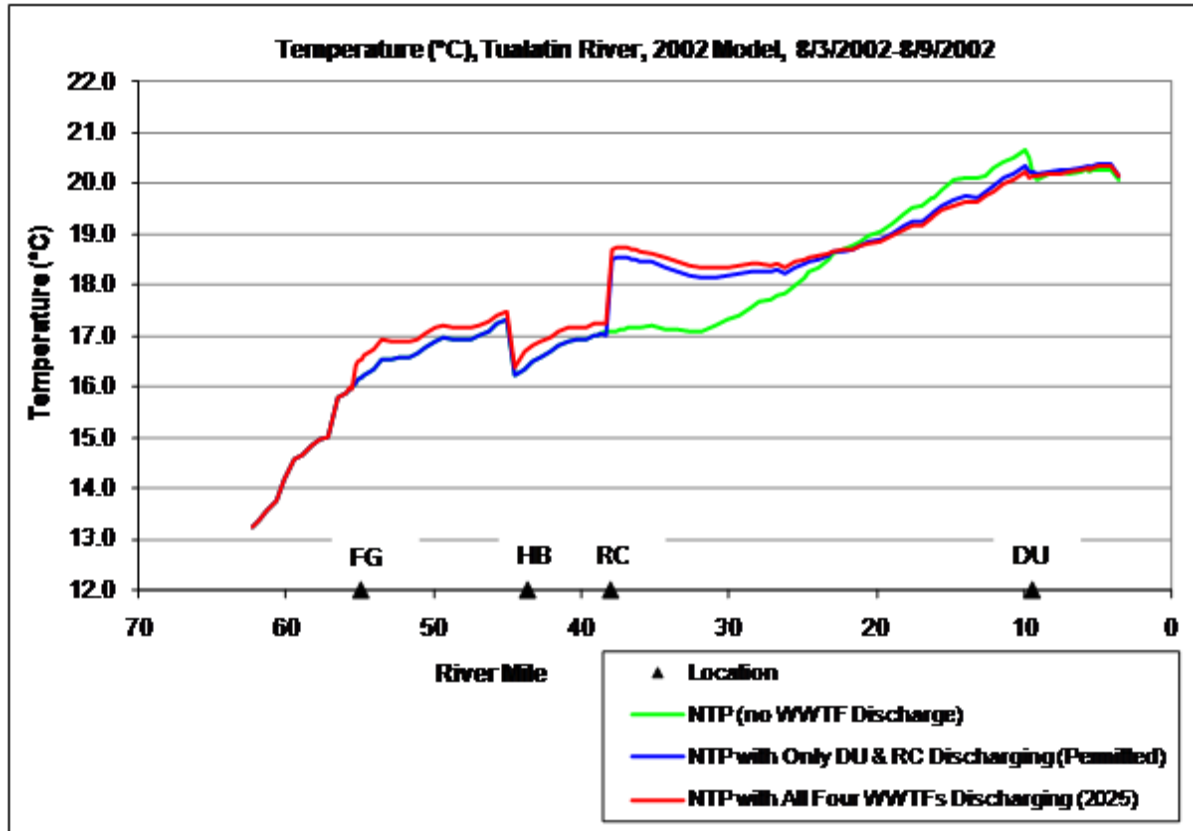


Figure 2-12 from Draft TMDL

TRK is concerned that the proposed bubble allocation for temperature that allow future discharges from the Forest Grove and Hillsboro treatment plants. As the above graph (Figure 2-12) shows, an increase in temperature is expected with the new discharges between River Mile 55 (FG) and River Mile 22. In effect, there is a 33-mile long thermal mixing zone.

These new point sources during the TMDL season will raise the river temperature creating a temperature impact in upper reaches of the river where salmonid rearing occurs (see Appendix F of 2001 Tualatin TMDL). Figure 2-12 depicts an increase in temperature with all four treatment plants discharging that would bring the river temperature to within 1 to .5 degree C. of violating the temperature standard of 18 degrees between RM 55 to RM 44.

Between Rock Creek (RM 38) and RM 25 the additional temperature load prevents the attainment of the 18°C standard. This appears to be a violation of DEQ's antidegradation rules OAR 340-041-0004.

**Recommendation #3:** This revised TMDL should require alternatives methods of effluent disposal that do not raise the river's temperatures.

## **Refocusing the Temperature Trade Program**

CWS temperature trade needs to be focused on the tributaries and targeted so that a measurable improvement in temperature can be achieved with adequate monitoring to inform adaptive management over time. It should be targeted as well to protect the beneficial use of cool water species on those tributaries where the most sensitive uses of spawning and rearing. The data exists to achieve this and should as well be coordinated with ODA and ODF land management DMAs.

In part, the rationale for the temperature trade is predicated on failure of nonpoint sources, agriculture and forest land uses to achieve shading to meet their load allocations. This should be corrected in the implementation of the TMDL so that CWS efforts to shade streams can focus on additional areas that are not already assigned a load allocation.

## **Reuse is a Viable Alternative to Mitigate Temperature for WWTP Discharges**

The Executive Summary for Temperature on page ii states that, “Instead of installing large-scale chillers to cool effluent, Clean Water Services established a temperature trading program that included supplementing summer river flows with stored water, and establishing shade along tributaries.” This statement erroneously implies that the only alternative to flow augmentation and shade is “large-scale chillers”. Additional alternatives are available including reuse programs that re-uses effluent as a water resource. Promotion of wastewater reuse which is proven temperature management strategy and will help address anticipated growth and municipal water demand.

Unified Sewerage Agency (now CWS) developed a Recycled Wastewater Master Plan in 1991. This plan came up with a whole array of recommended policies, system alternatives, program elements, and financing. As part of the work on this plan, a survey of more than 90 potential users found that “Sufficient demand for recycled wastewater exists to warrant implementation of a large scale system.”

**Recommendation #4: Reuse should be an increasing part of the temperature mitigation for the CWS wastewater treatment plants.**

## **Temperature Impacts of Urban Stormwater Management**

While no WLA has been assigned to urban stormwater, stormwater can influence stream temperature via changes to the historic geomorphology and hydrologic function of the streams. This impact is ignored in the TMDL. Groundwater recharge should be encouraged to moderate flows and cool tributaries.

**Recommendation #5: A Waste Load Allocation should be assigned to urban storm water to address its temperature impact related to channel structure, geomorphology and hydrologic function.**

## Load Allocation Needed for Small Dams

Thank you for recognizing the potential thermal impact of Scoggins Dam and Barney Reservoirs and including load allocations for these sources.

Tualatin Riverkeepers requests a TMDL thermal load allocation for small surface release dams on tributaries of the Tualatin River. The TMDL already recognizes that reservoir and dam operations are considered nonpoint sources that affect the quantity and timing of heat delivery to downstream river reaches.

Small surface release dams on streams increase water temperature downstream of the dams. Spreading the water surface over a larger area and slowing the flow increases solar gain. A reservoir's top layer of water will warm and decrease in density, while cooler, denser water will sink to the bottom layer of the reservoir.<sup>15</sup> The warmer upper layer of water (epilimnion) is selectively spilled over surface release dams, increasing downstream temperatures.

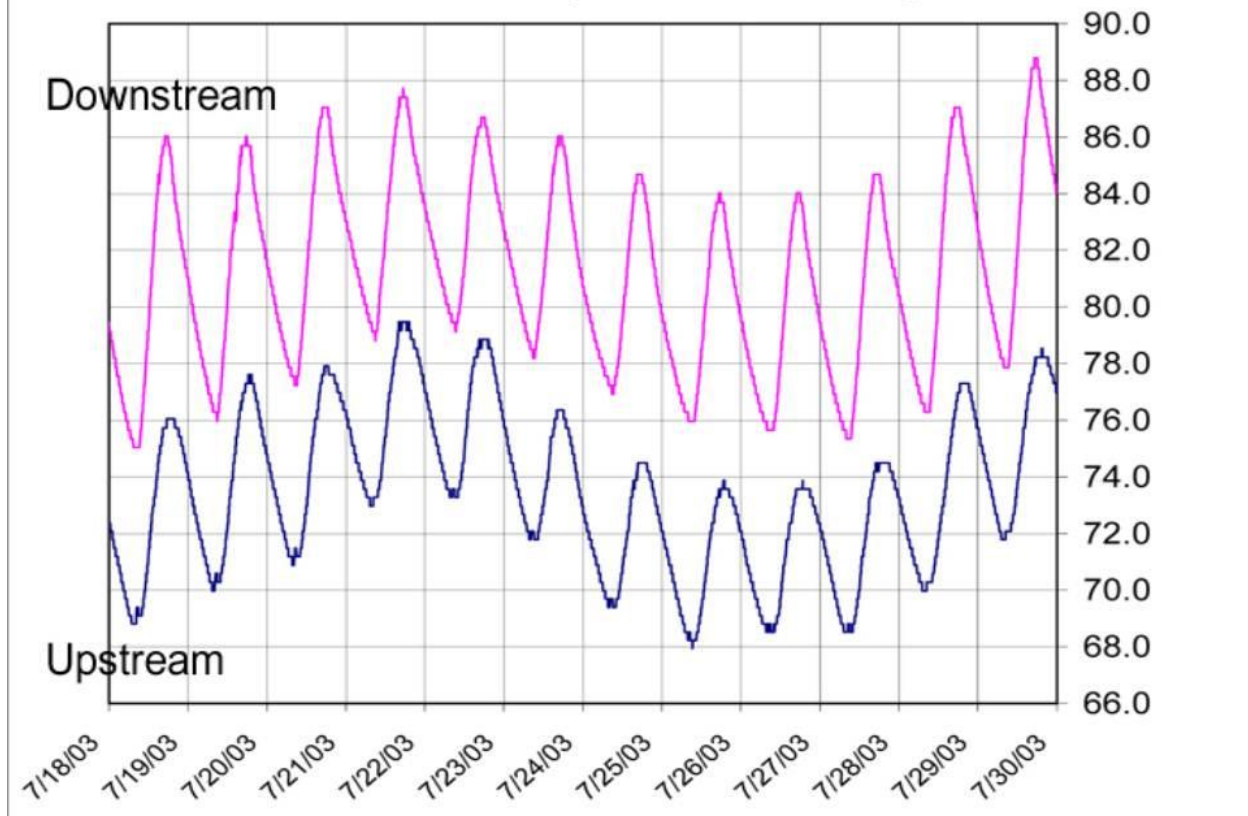
Tualatin Riverkeepers demonstrated this effect at Summerlake Park in Tigard. In the Summer of 2003, we placed two StowAway®Tidbit® temperature loggers in Summer Creek, one just upstream from the lake at Summerlake Park and one just below the dam that forms the lake.



The dam is approximately 5 feet high and all flow comes over the top edge of the dam.

<sup>15</sup> American Rivers 2002, The Ecology of Dam Removal: A Summary of Benefits and Impacts

## Summer Creek Temperatures July 2003 °F



Data collected by Tualatin Riverkeepers at Summerlake Park

The data collected showed that the downstream temperature was elevated 7°F to 11°F (3.9°C to 6.1°C) (over the temperature at the upstream monitoring point throughout the month of July. This is far above the 0.05°C of the 0.3°C human use allowance allocated to non-point sources. Note that the temperature at both monitoring sites exceeded the 18.0°C (64.4°F) standard for trout and salmon rearing and migration for the entire month.

Our results were not surprising. Lessard and Hayes found in a study of 9 small dams in Michigan that the mean summer temperature increased 2.7°C on average and that the increases in temperatures were maintained at least 2-3km below the dams.<sup>16</sup> Clean Water Services (CWS), has identified “instream ponds as a major **point-source** water quality problem because of their tendency to increase stream temperature, decreased dissolved oxygen, and alter sediment transport processes.”<sup>17</sup> TRK agrees with this assessment of instream ponds as point sources. As major point sources of temperature load, a waste load allocation is called for as well as regulation through NPDES permits.

<sup>16</sup> EFFECTS OF ELEVATED WATER TEMPERATURE ON FISH AND MACROINVERTEBRATE COMMUNITIES BELOW SMALL DAMS, JOANNA L. LESSARD\* and DANIEL B. HAYES, *Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI 48824, USA*

<sup>17</sup> Clean Water Services, Healthy Streams Plan (2005). pp. 76-79.

The extent of temperature loading from small dams in the Tualatin Basin is significant. The Oregon Water Resources Department lists 96 dams in Washington County, ranging in height from 6 feet to 122 feet and storage capacity ranging from 3 acre-feet to 60,000 acre-feet. This includes Barney Reservoir and Scoggins Dam, for which a TMDL allocation is already proposed. This does not include all dams in the Tualatin Basin, as those less than 10 feet in height or less than 9.2 acre-feet in capacity are generally exempt from state reservoir permits. In fact, the Summerlake Park dam that we did our temperature monitoring on is not in the inventory of the Water Resources Department.

Assigning a zero thermal load allocation to dams in the Tualatin Basin would not be precedent setting. There is a TMDL temperature allocation for Albeni Falls Dam in Idaho. DEQ has issued TMDL allocations for Emigrant Dam southeast of Ashland and for PGE's hydroelectric project on the Clackamas River. The California Water Resources Control Board has already addressed this issue in their TMDL for the Klamath River, and this TMDL was approved by USEPA on December 28, 2010:

*Iron Gate and Copco Reservoirs discharge elevated temperature waste, as defined by the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan). The discharge of elevated temperature waste to the Klamath River is prohibited by the Thermal Plan. Furthermore, temperature alterations caused by the reservoirs adversely affect beneficial uses. Thus, there is no allowable temperature increase that can be allocated to waters from Iron Gate and Copco 1 and 2 Reservoirs. Accordingly, the temperature load allocation for these reservoirs equals zero temperature increase above natural temperatures.<sup>18</sup>*

Mitigation for these temperature loads could take a number of forms that should be outlined in Water Quality Management Plans and/or NPDES permits. Dam removal could also address sediment, fish passage issues and accommodate streamside planting for shade. Pond by-pass, as demonstrated by Clean Water Services Tanasbrook Ponds Stream Enhancement Project is another example of a potential mitigation strategy with multiple benefits (photos below). Structural modification of surface release dams so that cooler water from lower levels is passed also has potential as a mitigation strategy.

The CWS healthy streams plan identified 9 ponds on Dairy Creek and two dams on Rock Creek for potential flow restoration projects.<sup>19</sup> Again, mitigation to meet temperature load allocations or waste load allocations should be specified in Water Quality Management Plans and NPDES permits.

Tualatin Riverkeepers requests that this TMDL include a temperature load allocation or waste load allocation for small impoundments or surface flow dams. This allocation is supported by scientific literature, the assessment of local agencies and our own monitoring. This temperature load impacts tributary streams that should be rearing habitat for native salmonids.

**Recommendation #6: This TMDL should include thermal load allocation of 0.05°C for small surface release dams on tributaries of the Tualatin River.**

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<sup>18</sup> California Environmental Protection Agency, Northcoast, Northcoast Regional Water Quality Control Board. KLAMATH RIVER TMDLs – CHAPTER 5. ALLOCATIONS and NUMERIC TARGETS.

<sup>19</sup> Clean Water Services, HEALTHY STREAMS PLAN, June 2005. p.29.



Figure 1 - Tanasbrook Ponds before CWS Bypass Project

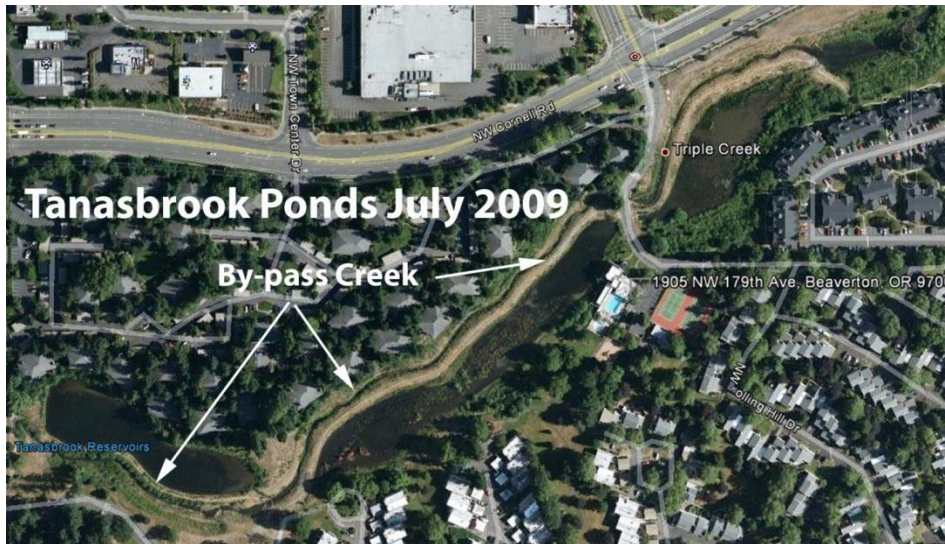


Figure 2 - Tanasbrook Ponds after CWS Bypass Project

## Comments on Chapter 3: Amendment for the Total Phosphorus TMDL

Thank you for assigning an allocation for Wapato Lake. This was a significant source that led to a serious blue-green algae outbreak in 2008.

What accounts for the spike in chlorophyll a at Rood Bridge [upstream of RCTP] during the period from late May through early July – is this Wapato or other agricultural operations? This is depicted in Figure 3-8.

Reasonable assurance that ODA can meet the assigned load allocations has not been demonstrated. See comments on Chapter 5.

## Comments on Chapter 5: Water Quality Management Plan

Management plans need to include specific timelines when allocations will be met. DMAs need to provide for adequate budget and monitoring, essential to inform adaptive management in order to meet the allocations. These concerns are nothing new.

*Excerpt of Letter from Jannine Jennings of EPA Region 10 to Rob Burkhart of DEQ (November 3, 2000)*

### **Water Quality Management Plan**

Inclusion of the Water Quality Management Plan (WQMP) as part of a TMDL is valuable and progressive. The implementation plan is the key to getting measures on the ground where needed in order to meet specific targets and goals laid out in the TMDL. We are pleased that development of WQMPs is an integral part of Oregon's TMDL process.

We recognize that while the Water Quality Management Plan is being submitted by DEQ as part of the TMDL, the Plan was developed by groups and agencies who have responsibility for the various components of the Plan (designated management agencies or DMAs). Therefore EPA's comments on this Plan are directed toward the applicable DMAs.

The Tualatin Basin TMDL is a scientifically sound analysis of excellent data, establishing a connection between landscape condition and water quality, and translating loads into understandable and achievable surrogate targets such as site potential effective shade. As such, the TMDL is the primary mechanism to use in order to ultimately meet water quality standards. It is an excellent tool for improving overall watershed health. It is the tool that should provide the basis for this Water Quality Management Plan. On page 9 of the TMDL it states that "It is the expectation, however, that WQMPs will address how human activities will be managed to achieve the surrogates." A similar statement is made on page 18 of the WQMP. Indeed if the surrogates are kept firmly in mind while projects and plans are drawn up, there is a high probability that they will be reached.

Therefore it is surprising and disappointing that this WQMP for the Tualatin is general and vague. The TMDL provides a sound, geographically specific analysis. Why have the designated management agencies not used this information and existing implementation information to provide more substance to this plan? It is understood that this WQMP is a "first iteration" of implementation planning; more detailed plans will be prepared according to a timeline with DEQ's participation (WQMP page 1). However, we find it surprising that in this basin where TMDL implementation has been underway for a number of years that there is so little detail on planned actions aimed at reaching the load allocations. Many of the practices being implemented for phosphorus control will also control bacteria and sediment. Where is the detail on these? A schedule? A budget? What are the benchmarks for attainment which will be used to measure progress?

On page 3, under "Adaptive Management" it is stated that the management agencies will develop benchmarks for attainment of TMDL surrogates which will then be used to measure progress. This is so crucial in order to do effective adaptive management. Yet in the plan, I see no discussion of, or commitment to developing benchmarks that specifically show progress towards meeting load allocations such as site potential effective shade.

Even reporting of program activities is often vague (ODA - talking, encouraging, promoting, monitoring). How is the water quality monitoring data being used? Tracking compliance with no prohibited conditions is useful but how does that relate to achievement of the load allocations? Some of the reporting information has potential to be linked to load allocations. Practices implemented in voluntary farm plans could include estimates of bacteria, nutrient, and sediment load reductions related to a water body, at least at the 6th field watershed scale; riparian plantings could be linked to estimates for attaining site potential shade, width to depth channel morphology changes, and reduced bank erosion. However, so much of the plan and reporting language is so vague and general, that we simply cannot see how DMA's will be able to decide where and how actions are achieving the desired results or not and what specific modifications are needed. In the more general approaches like the Forest Practices Act, is anyone looking to see if the provisions will meet the load allocations of this basin? What actions will be taken to correct legacy conditions on forest lands contributing to sediment and temperature problems?

The implementation plans from the local governments are almost carbon copy letters of intent that refer to other documents and talk about further planning.

There is good information in Appendix H on biological criteria which could help focus high priority protection and restoration efforts. There is no reference to it in the WQMP. Will the information be used?

As a whole, this WQMP is disappointing. It seems as if the DMAs work independently, with little if any cooperative, watershed-based coordination. Actions and information seem disjointed such that it will be difficult to understand how this sub-basin functions and responds as a whole.

These comments made by EPA 11 years ago are just as appropriate today. These issues would be explicitly addressed if DMAs were required to adhere to DEQ's 1997 *Guidance for Developing Water Quality Management Plans That Will Function as TMDLs for Nonpoint Source*.

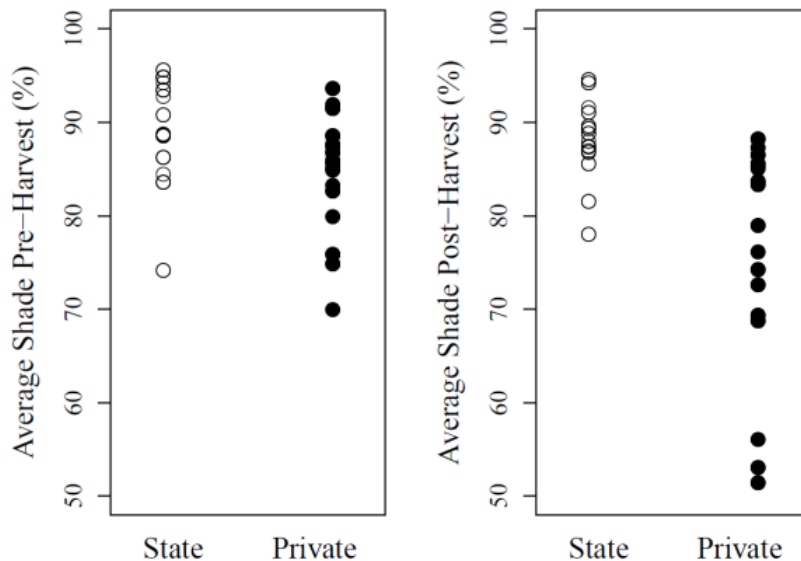
**Recommendation #7: All DMAs should be required to follow DEQ's 1997 *Guidance for Developing Water Quality Management Plans That Will Function as TMDLs for Nonpoint Source* when producing Water Quality Management Plans.**

**Land Use: Forestry on Private Lands**  
**DMA: Oregon Department of Forestry**

ORS 527.765 requires the Oregon Board of Forestry (the Board), in consultation with the EQC, to establish Best Management Practices (BMPs) and other rules applying to forest practices to ensure that to the maximum extent practicable non-point source discharges of pollutants resulting from forest operations do not impair the achievement and maintenance of water quality standards established by the EQC. The Oregon Department of Forestry (ODF) is the Designated Management Agency (DMA) by DEQ for regulation of water quality on nonfederal forestlands.

A 1998 memorandum of understanding between DEQ and the Oregon Department of Forestry (DOF) requires that TMDLs must be incorporated into the continuing planning process required by Section 303(e) of the Act and the continuing planning process must be included in the state's water quality management plan.

The recent RIPSTREAM study by ODF and Oregon State University comes to the conclusion "that FPA riparian protection measures for small and medium fish streams do not maintain stream temperatures similar to control conditions, and are inadequate to insure forest operations meet the state water quality standard for protecting cold water."



Source: Oregon Department of Forestry RIPSTREAM Study

While the 2001 TMDL temperature standard specifies that "*no measurable surface water temperature increase resulting from anthropogenic activities is allowed*". Nonpoint sources are allocated zero pollutant loading thus meeting the "*no measurable surface water temperature increase resulting from anthropogenic activities...*" Under the proposed standard, all nonpoint is allocated .05 c. This is shared by all nonpoint sources including agriculture and forest land uses.

This research indicates that on average, private lands compliant with the FPA rules experienced an average .7°C increase in temperature post-harvest, while state forest lands showed no increase in temperature. Harvest on private lands compliant with FPA rules, are not compliant with the temperature standard and allocation. The surrogate measurement, Effective Shade (system potential shade) targets translate the nonpoint source solar radiation loading capacity. This research also indicates that private forest lands compliant with FPA rules are not meeting the surrogate target post-harvest, while state managed lands are.

Changes to the FPA rules are required to bring about compliance and reasonable assurance that the TMDL is being implemented.

**Recommendation #8: Tualatin Riverkeepers request that section 5.6.6.2 of this revised Tualatin Subbasin TMDL include the following statement:**

**Oregon Board of Forestry must adopt rule changes for riparian management areas under the Forest Practices Act to provide reasonable assurance assure that temperature standard and allocation (*no measurable surface water temperature increase resulting from anthropogenic activities is allowed*), and the surrogate measure (*system potential shade*) is achieved on private forest lands.**

## **Land Use: Wapato Lake**

### **Responsible Party: U.S. Fish & Wildlife Service**

**Recommendation #9: Include U.S. Fish & Wildlife Service as a responsible party for Wapato Lake Dike and Pumphouse.**

U.S. Fish & Wildlife Service is the majority landowner in the Wapato Improvement District and owns enough land within the district that it has the authority do dissolve the district. The district's financial status is precarious and it is risky to assume that it has the capability to perform the necessary functions to protect water quality. U.S. Fish and Wildlife Service has the resources and technical expertise to better protect water quality.

USF&WS manages several impoundments on the refuge besides Wapato Lake. These impoundments can be sources of thermal load and nutrient and bacteria load due to heavy use by waterfowl and rodents. Management practices should prohibit discharge of impounded water during the TMDL season.

**Recommendation #10: Water quality management plans and NPDES permits should prohibit the discharge of impounded water between May 1 and October 1.**

## **Land Use: Agriculture**

### **DMA: Oregon Department of Agriculture (ODA)**

In 2003, Tualatin Riverkeepers raised the following concerns to the Local Advisory Committee (LAC) of the Tualatin Basin Agricultural Water Quality Management Plan (TBAWQMP):

- Objectives are not quantified, measured, directly linked to Load Allocations.
- Lack timeframes and milestones for implementation of measures and achievement of load allocation.
- Costs are not estimated.
- Adequate funding is not secured for measures.
- No adaptive management actions for lack of participation of voluntary programs.
- Prohibited conditions for shading are passive, inadequate to achieve system-wide site potential shading specified in the TMDL.
- Monitoring plan is insufficient, lacking in details, does not link measures to load allocations.
- In general, reasonable assurance that this plan will achieve water quality standards at the soonest possible date is lacking.

We continue to have these concerns with the biennial TBAWQMPs. If ODA and the local advisory committee had followed DEQ's 1997 *Guidance for Developing Water Quality Management Plans That Will Function as TMDLs for Nonpoint Sources* as specified in Recommendation #6, all of these concerns would have been addressed in the TBAWQM.

The Tualatin Basin Agricultural Water Quality Management Plan fails to provide reasonable assurance that the Tualatin TMDL and associated load allocations will be met. There is a lack of sufficient monitoring to correlate actions of the local operators with changes in water quality. At the November 11, 2010 meeting of the Local Advisory Committee, "Members of the LAC agreed that without water quality monitoring, it is difficult to assess Area Plan effectiveness."

**Recommendation #11: DEQ should specify a statistically valid sampling plan to assess the effectiveness of the TBAWQMP in achieving TMDL load allocations assigned to agriculture. This sampling should take full advantage of sampling performed by other agencies (USGS, Joint Water Commission, CWS and DEQ) but must also specify monitoring actions to be taken by ODA to fill data gaps.**

While Oregon Department of Agriculture is the DMA, most of the work on carrying out pollutant and temperature reduction strategies by other partners, largely the Tualatin Soil & Water Conservation District (TSWCD) and the federal Natural Resources Conservation Service (NRCS) relying on voluntary participation from individual property owners. The TSWCD is at a disadvantage compared to Soil & Water Conservation Districts in other counties in that it is not supported by a permanent tax base. The financial difficulty that ODA and local partners have experienced in implementing a plan to achieve the

agricultural load allocations is incongruous with the economic status of the agricultural industry in the Tualatin Basin. According to the 2010 TBAWQMP:

*Agriculture is a significant land use within the watershed. Approximately one-fourth of the watershed's land base is used for production agriculture. Agriculture is very important to the economy of the area, and agricultural lands in the watershed provide a high dollar return per acre. Washington County ranked third for agricultural gross income in the state in 2007. Gross agricultural sales in Washington County alone exceeded \$321,600,000 in 2007. Ag-related jobs in Oregon, including input suppliers, on-farm workers, food processing, transportation, warehousing, etc. account for approximately 150,000 jobs or eight percent of the state's workforce. This equates to 43 jobs per \$1 million in agricultural sales.*

With agriculture being such a significant economic force in the Tualatin Basin, it is unclear why much of the agricultural temperature reduction activity in the Tualatin basin needs to be subsidized by the urban ratepayers of Clean Water Services through the "temperature trade".

**Recommendation #12: This TMDL should specify that the agricultural water quality management plan should specify a financial plan that will support the achievement of the agricultural load allocations within 10 years of the adoption of this TMDL.**

The lack of measureable progress towards achieving agricultural load allocations is not unique to the Tualatin Basin. The existing Memorandum Of Agreement (MOA) between DEQ and ODA must be revised in order for the Agricultural Water Quality Management Program to move toward effective and accountable program implementation. Given the Governor's commitment to protecting human health, water quality, and Oregon's threatened and endangered fish populations, a clear MOA that moves the program into maturity is essential.

It is important to acknowledge and appreciate that ODA staff are currently working on designing a more strategic, accountable Agricultural Water Quality Management Program, and that ODA and DEQ staff are working to increase and formalize their coordination for the program. Additional funding for the program this biennium will assist with these improvements. These are important steps in the right direction. However, we must also acknowledge that currently, neither ODA nor DEQ are able to demonstrate that the Agricultural Water Quality Management Program has been effective in meeting water quality standards or load allocations, or is making progress toward doing so. While the Plans may in some instances be extensive, the Rules lack sufficient detail to serve as a measuring stick for landowners' performance, to provide clarity to landowners, and to support ODA landowner assistance and enforcement actions. Only the Agricultural Water Quality Management Program Rules are enforceable by ODA. The Area Plans are not. Currently program outreach and enforcement is solely complaint-driven, rather than based on pollution reduction priorities, or achieving agricultural load allocations. Moreover, the positive work being done to protect water quality and watershed health on agricultural land through landowner partnership with a number of public and nonprofit organizations is not necessarily targeted toward achieving TMDL load allocations, and is not measured and correlated to progress toward these benchmarks. As a result, DEQ is unable to provide reasonable assurance that Oregon's nonpoint source pollution control program for agriculture is effective in achieving load allocations or will be effective in doing so in the future.

It is clear that several new measures are required to bring the Agricultural Water Quality Management Program to a state of effectiveness and accountability in meeting water quality standards and load allocations. An essential first step is to include these measures in a revised MOA between ODA and DEQ for the program.

## **Land Use: Urban Stream Impoundments**

### **DMA: Cities, THPRD, Clean Water Services, and private owners**

Small urban dams have various owners. Several are owned by cities (e.g. Summerlake Park, City of Tigard) or by Tualatin Hills Park and Recreation District (e.g. Bethany Lake, Commonwealth Lake). Others are owned by neighborhood associations (e.g. Tanasbrook Ponds), commercial developments (e.g. Murrayhill Pond) and golf courses (e.g. Portland Golf Club). Lake Oswego Corporation owns a low head dam on the Tualatin River that backs the river up 30 miles. All those with legal authority to manage such impoundments should be identified as designated management agencies.

**Recommendation #13: All entities with ownership or legal authority to manage small urban dams on tributaries and the mainstem of the Tualatin River should be identified as designated management agencies with a 0.05°C thermal load allocation.**

## **Land Use: Urban Areas**

### **DMA: Metro**

A Designated Management Agency (DMA) is a “federal, state, or local government agency that has legal authority of a sector or source contributing pollutants, and is identified as such by the DEQ in a TMDL.”

**Recommendation #14: This TMDL should identify Metro to be a DMA Urban Areas. Metro should be required to address conditions of this TMDL in its land use decisions. Further we ask that this TMDL require that Metro prepare a water quality management plan within 18 months of the adoption of this TMDL that specifies how and when the Biological Criteria -10% Effective Impervious Area Load Allocation will be met through its land use planning and decisions.**

Metro is listed Designated Management Agency (DMA) in Chapter 5 of the Draft Tualatin Subbasin TMDL as a land owner “throughout the basin with potential water quality impact”. Metro has far greater water quality impact in its role as a land use authority. The preamble of Metro’s charter states that Metro “... undertakes, as its most important service, planning and policy making to preserve and enhance the quality of life and the environment for ourselves and future generations;”

The state of California has found that urban development increases pollutant load, volume and velocity of runoff.

**URBAN DEVELOPMENT INCREASES POLLUTANT LOAD, VOLUME, AND VELOCITY OF RUNOFF:** During urban development two important changes occur. First, natural vegetated pervious ground cover is converted to impervious surfaces such as paved

highways, streets, rooftops, and parking lots. Natural vegetated soil can both absorb rainwater and remove pollutants providing a very effective natural purification process. Because pavement and concrete can neither absorb water nor remove pollutants, the natural purification characteristics of the land are lost.

Secondly, urban development creates new pollution sources as human population density increases and brings with it proportionately higher levels of car emissions, car maintenance wastes, municipal sewage, pesticides, household hazardous wastes, pet wastes, trash, etc. which can either be washed or directly dumped into the MS4.

As a result of these two changes, the runoff leaving the developed urban area is significantly greater in volume, velocity and pollutant load than the pre-development runoff from the same area.<sup>20</sup>

This finding is supported by a large body of research and the Clean Water Services Healthy Streams plan. This fall Metro approved the addition of 2000 acres of land into the Urban Growth Boundary. Tualatin Riverkeepers requested that Metro avoid urbanizing areas not suitable for stormwater infiltration to avoid impacts to the Tualatin River and its tributary streams.

One such area that TRK identified was South Cooper Mountain. Cooper Mountain has shallow, slow draining soils on slopes. The Natural Resources Conservation Service (NRCS) soil survey reveals that 100% of the acreage in the South Cooper Mountain area brought into the UGB by Metro is "Very Limited" for "disposal of wastewater by rapid infiltration".

The National Marine Fisheries Service (NMFS) 4(d) Rule for Threatened Salmon and Steelhead on the West Coast limits (Limit No. 12) Municipal, Residential, Commercial and Industrial Development and Redevelopment (MRCI) to protect salmon and steelhead. In particular NMFS states that "An MRCI development ordinance or plan ensures that development will avoid inappropriate areas such as unstable slopes, wetlands, areas of high habitat value, and similar constrained sites. Metro's 2007 Natural Features Inventory identifies 74% of South Cooper Mountain with these constraints. NMFS also states in the 4(d) rule, "An MRCI development ordinance or plan adequately prevents stormwater discharge impacts on water quality and quantity and stream flow patterns in the watershed - including peak and base flows in perennial streams.

Metro could have avoided impacts to water quality, quantity and stream flow patterns by avoiding urbanizing South Cooper Mountain, or by limiting imperviousness as a condition of urbanization. Metro previously developed a stormwater management plan, but rescinded that plan in 2002. As the regional land use authority Metro must address state planning goals including Goal 6.

**GOAL 6: AIR, WATER AND LAND RESOURCES QUALITY - OAR 660-015-0000(6) To maintain and improve the quality of the air, water and land resources of the state. All waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards. With respect to the air, water and land**

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<sup>20</sup> CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, SAN DIEGO REGION, ORDER NO. 2001-01 NPDES NO. CAS0108758

resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs; (2) degrade such resources; or (3) threaten the availability of such resources.

Guidance for Goal 6 states that...

4. Plans which provide for the maintenance and improvement of air, land and water resources of the planning area should consider as a major determinant the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.

5. All plans and programs affecting waste and process discharges should be coordinated within the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plan.

Clearly Metro's role as a regional land use planning authority qualifies it as a "local government agency that has legal authority of a sector or source contributing pollutants, and is identified as such by the DEQ in a TMDL".

Thus Metro should be identified as a Designated Management Agency for its planning role and not just for the property it holds and manages. Further, Metro should provide a stormwater management plan that provides reasonable assurance that all waste and process discharges from future development, when combined with such discharges from existing developments shall not threaten to violate, or violate applicable state or federal environmental quality statutes, rules and standards including the Tualatin Basin TMDLs.

## **5.4 – Trading as a Management Strategy**

CWS temperature trade needs to be focused on the tributaries and targeted so that a measurable improvement in temperature can be achieved with adequate monitoring to inform adaptive management over time. It should be targeted as well to protect the beneficial use of cool water species on those tributaries where the most sensitive uses of spawning and rearing. The data exists to achieve this and should as well be coordinated with ODA and ODF land management DMAs.

Successful trials of flow augmentation on tributaries have been conducted by CWS in cooperation with Tualatin Valley Irrigation District. Such effective practices should be expanded.

CWS also constructed an in-stream pond bypass project at Tanasbrook Ponds. The CWS Healthy Streams Plan identified 9 potential in-stream pond reconfiguration projects on Dairy Creek alone. There are opportunities for similar projects at numerous in-stream ponds on other tributaries which could be encouraged through the temperature trade program and a load allocation for small top-flow dams.

In part, the rationale for the temperature trade is predicated on failure of nonpoint sources, agriculture and forest land uses to achieve shading to meet their load allocations. This should be corrected in the

implementation of the TMDL so that CWS efforts to shade streams can focus on additional areas that are not already assigned a load allocation.

**Recommendation #15: DMAs with temperature load allocations should be required to meet these allocations so that Clean Water Services temperature trade mitigation efforts can be focused on areas that are not already assigned a load allocation.**