



TEMPERATURE MANAGEMENT PLAN CREDIT TRADING ACTIVITIES ANNUAL REPORTS

1.0 PERMIT REQUIREMENTS

Schedule B, Section 3, of Clean Water Services Watershed-Based NPDES Permit requires several annual reports throughout the year. This particular document meets the annual report requirements for the following programs/activities.

- Temperature Management Plan
- Credit Trading Activities

2.0 ANNUAL REPORT FOR TEMPERATURE MANAGEMENT PLAN (TMP) ACTIVITIES

The Watershed-Based NPDES Permit requires Clean Water Services to submit an annual report of its temperature related activities. The temperature related activities presented in this report apply to the period beginning on March 1, 2005 and ending on February 28, 2006 - Permit Year Two.

The allowable thermal load for the Rock Creek and Durham wastewater treatment facilities are those loads that will not cause a measurable increase in river temperature above the *system potential* temperatures defined in the 2001 Tualatin TMDL. The *excess thermal load* for the Rock Creek and Durham wastewater treatment facilities is the thermal load that exceeds the allowable thermal load. The Watershed-Based NPDES Permit allows Clean Water Services to offset the excess thermal load from its two wastewater treatment plants with other temperature related activities. The Thermal Load Credit Trading Plan, presented in Clean Water Services approved TMP, provides a mechanism for offsetting the excess thermal load from the two wastewater treatment plants with flow augmentation and riparian planting.

The excess thermal load (i.e. thermal load to offset) is based on average daily temperature and flow conditions from July 1 through August 31. This time period was selected as the thermal measuring period because it is the temperature credit trading period identified in the Watershed-Based NPDES Permit, and is the time of year when river temperatures are most likely to exceed the temperature criterion. The results of the reconciliation process apply to the entire temperature TMDL season - May 1 through October 31.

This report also includes a discussion of activities at the two wastewater treatment plants that would reduce the thermal load discharged to the river. These include the following.

- The volume of effluent that was reused rather than discharged directly to the receiving stream. (*Refer to Annual Reclaimed Water Use Report for 2005*)
- A discussion of other temperature management measures, including wastewater treatment facility changes and source control management measures.

2.1 STORED WATER RELEASES AND RIPARIAN PLANTING FOR PERMIT YEAR TWO

As noted above, Clean Water Services offsets the excess thermal load from the two wastewater treatment plants with the release of stored water from Hagg Lake, Barney Reservoir, and riparian plantings in the urban and rural areas of the Tualatin basin. The following is a brief discussion and summary of flow augmentation releases and riparian plantings in Permit Year Two.

2.1.1 STORED WATER RELEASES

Clean Water Services has 12,618 acre-feet of stored water in Hagg Lake (Scoggins Reservoir) and 1,667 acre-feet in Barney Reservoir. Stored water releases in July and August are primarily for flow augmentation credit in the temperature trading program. Stored water released later in the year (September to mid-November) is for water quality enhancement – primarily dissolved oxygen. Clean Water Services initiated stored water releases from Scoggins Reservoir on July 7, 2005. The average release rate for July and August was 36.3 cfs. Water releases ended on November 1, 2005 when the seven-day median of the daily average flow in the Tualatin River at Farmington exceeded 350 cfs, which marks the end of the Low Flow Period identified in the Watershed-Based NPDES Permit. Clean Water Services released about 82% of its stored water in Scoggins Reservoir. Clean Water Services released its entire allocation from Barney Reservoir. Tables 2 and 3 present the daily stored water releases from Scoggins and Barney Reservoirs during July and August.

2.1.2 RIPARIAN PLANTING PROGRAM

During the reporting period, 6.91 stream miles were planted. These include projects within and outside the Urban Growth Boundary (UGB.) Several projects were undertaken within the UGB to preserve stream health or enhance stream conditions by generating on-going benefits to water quality, water quantity, and aquatic habitat. Preservation activities include securing easements or management agreements with willing property owners to ensure that the stream corridor remains in a healthy state. Enhancement activities include channel reconfiguration, large wood placement, gravel-boulder placement, off-channel habitat, in-stream pond removal, invasive species management, and re-vegetation. Several projects were planted during the reporting period totaling 6.34 miles of riparian improvements within the urban area.

Outside the UGB, Clean Water Services has a contract with the Tualatin Soil and Water Conservation District (TSWCD) to provide incentives for enrolling landowners in Enhanced CREP and VEGBACC programs. While there was only one Enhanced CREP project of 0.57 stream miles included in this report, there has been a lot of activity in the Enhanced CREP and VEGBACC programs during 2005. There are currently seven Enhanced CREP projects scheduled to be planted during 2006. These consist of approximately 93 acres and 16,278 feet of re-vegetated stream buffer. These projects will be included in the next reporting period. Looking ahead, there are four Enhanced CREP projects scheduled to be planted during 2007. These consist of approximately 440 feet of re-vegetated stream buffer -- both sides equivalent. Additionally, there are several potential projects scheduled for 2007 that are awaiting eligibility determinations and buffer measurements. There are also three VEGBACC projects scheduled to be planted during 2007. These consist of approximately 2860 feet of re-vegetated stream buffer -



- both sides equivalent. The “+Upland Forest Program” was implemented during late November of 2005. Several landowners expressed an interest in the program, and eligibility determinations are pending. Beginning with next year’s annual report, Clean Water Services expects these programs to provide a much larger portion of the overall thermal shade credit.

A description of each shade project including the site location and project activities is presented in Appendix A. A map of the projects included in this reporting period is presented in Appendix B. The following table summarizes the urban and rural riparian planting programs during the reporting period. It includes the project name, length of the re-vegetated area, and the thermal credit. It should be noted that the planting season for stream restoration projects is typically from late January through early March of each year. The highlighted projects were scheduled to be planted by the end of February 2006, and are included in this report. As a result of the heavy rainfall this winter, the plantings for some of the projects may not be completed by the end of the reporting period. For the projects that are on-going at the end of the reporting period, we expect those to be completed by early March 2006.

Table 1: Riparian Planting Projects and Associated Thermal Credit

THERMAL CREDIT FOR SHADE				YEAR:	2005
Summary					
Total miles stream:	6.91	mi			
Thermal load blocked :	1.1E+08	kcal/d			
Thermal credit this year:	5.3E+07	kcal/d			
Average load blocked per ft:	1.2E+03	kcal/d/ft			
Restoration/Protection Record					
Project	Stream Length (ft)	Thermal Load Blocked in 20 yrs (kcal/d)	Thermal Credit (kcal/d)	Credit per Length (kcal/d/ft)	
Fanno 0 99W to Bonita	1600	8.46E+06	4.23E+06	2644	
Council Creek - Beal Pond	1400	2.58E+06	1.29E+06	920	
Banks - Banks Highschool	600	1.26E+04	6.28E+03	10	
Hillsboro Melvin Mark	1700	5.49E+06	2.74E+06	1614	
Beaverton Transit Center	1800	6.46E+06	3.23E+06	1796	
Beaverton Hall Creek	200	5.17E+04	2.58E+04	129	
Beaverton - Willow Creek at Walker	800	1.87E+06	9.35E+05	1169	
Beaverton - Burgerville	200	2.33E+05	1.17E+05	583	
Tigard - Copper Creek	200	1.71E+05	8.55E+04	427	
Tigard - Knez Wetlands	600	4.08E+06	2.04E+06	3400	
CREP - Eggers	3000	1.73E+06	8.67E+05	289	
Cedar Mill N Johnson	1100	2.50E+06	1.25E+06	1138	
TWS - Hedges Cr & Barnes Wetland	2700	1.44E+07	7.22E+06	2674	
Bronson Creek - W Union to Laidlaw	1600	9.25E+03	4.62E+03	3	
Hillsboro - Frances Street Park	800	1.62E+06	8.10E+05	1012	
Rock Creek Evergreen to Cornell	5200	1.60E+07	8.00E+06	1538	
Raleighwood Marsh Enhance phase ii	2200	6.26E+06	3.13E+06	1423	
Upper Sylvan Detention	1200	3.21E+05	1.61E+05	134	
Rock Creek - Highway 26 to W Union	3000	1.25E+07	6.25E+06	2082	
Willow Creek @ Bronson	900	6.45E+05	3.22E+05	358	
Hillsboro - Amberwood Natural Area	900	3.73E+05	1.87E+05	207	
CWS Property Enhancement - Rock Cl	3100	9.44E+06	4.72E+06	1523	
Gales Creek - B Street to Hwy 47	1700	1.02E+07	5.12E+06	3012	
Plantings for highlighted projects expected to be completed by late February/early March 2006					

2.2 ACTIVITIES AT WASTEWATER TREATMENT PLANTS

There were no specific changes to the wastewater treatment facilities which would have reduced the thermal load. Clean Water Services is continuing its work on a Reclaimed Water Master Plan project, which will outline the scope of the program along with potential uses and sites for reclaimed water usage. There were no industrial source control management changes, which would have reduced the thermal load.

3.0 ANNUAL REPORT OF CREDIT TRADING ACTIVITIES

Schedule B, Section 3 of the Watershed-Based NPDES Permit also requires Clean Water Services to submit “an annual report summarizing the results of its credit trading activities, as required by Schedule D, Section 7.” Schedule D, Section 7 requires that, at a minimum, the report shall include:

- a) Identification of Trading Baselines;
- b) Summary of Actual Loads Discharged;
- c) Summary of Credit Trades, including credits used to meet baselines, as well as credits generated, purchased, or held but not applied to baseline compliance;
- d) Environmental Benefits Summary, describing how the credit trades supported watershed management objectives; and
- e) Efficiency Summary, describing how the credit trades supported cost-effective and timely watershed management.

Clean Water Services has undertaken numerous stream enhancement projects to generate temperature trading credit for shade. These projects resulted in a total of 6.91 miles of riparian improvements within the Tualatin watershed. The projects are discussed in Appendix A.

3.1 IDENTIFICATION OF TRADING BASELINES

Tables 2 and 3 present the following daily average data, which forms the basis of the calculations regarding allowable thermal loads, thermal loads discharged, and flow augmentation credit.

- The daily average effluent flow from the Rock Creek and Durham wastewater treatment facilities for the period July 1 – August 31;
- The daily average temperature of the effluent from the Rock Creek and Durham wastewater treatment facilities for the period July 1 – August 31;
- The daily average Tualatin River flow at the Farmington Bridge (River Mile 33) for the period July 1 – August 31;
- The daily average flow augmentation rate from Scoggins and Barney Reservoirs for the period July 1 - August 31.

Table 2: Effluent Flow and Temperature, River Flow and Stored Water Releases (July 2005)

Date	Durham Flow (MGD)	Durham Temperature (C)	Rock Ck Flow (MGD)	Rock Ck Temperature (C)	Famington Flow (cfs)	Famington - RC WWTP (cfs)	CWS Hagg Release (cfs)	CWS Barney Release (cfs)	Total Flow Augmentation (cfs)
7/1/2005	16.8	20.2	29.3	19.4	261	215.6	0	0	0.0
7/2/2005	15.9	20.6	28.4	19	229	185.1	0	0	0.0
7/3/2005	15.3	19.1	27.3	20.1	217	174.8	0	0	0.0
7/4/2005	16.8	20.5	27.6	20.4	213	170.2	0	0	0.0
7/5/2005	16.0	20.1	29.0	21	201	156.1	0	0	0.0
7/6/2005	16.4	20.6	28.2	21.6	188	144.4	0	0	0.0
7/7/2005	16.3	20	28.1	20.7	184	140.5	30	0	30.0
7/8/2005	17.5	20.6	30.0	21	191	144.6	30	0	30.0
7/9/2005	17.2	20.1	29.5	19.9	263	217.3	30	0	30.0
7/10/2005	17.7	20.3	34.3	20.9	299	245.9	30	0	30.0
7/11/2005	16.3	20.3	33.7	21.1	303	250.9	30	0	30.0
7/12/2005	16.3	20.5	32.0	21	283	233.5	10	0	10.0
7/13/2005	16.0	20.4	31.7	20.8	258	208.9	10	0	10.0
7/14/2005	16.1	19.9	32.0	20.6	238	188.5	10	0	10.0
7/15/2005	15.7	20.1	30.6	20.9	224	176.6	30	0	30.0
7/16/2005	15.3	21.2	30.0	20.4	217	170.6	30	0	30.0
7/17/2005	15.6	21.2	30.7	21	227	179.5	30	0	30.0
7/18/2005	15.7	21.3	30.5	21.6	222	174.8	30	0	30.0
7/19/2005	15.6	21.1	29.2	21.1	204	158.8	30	0	30.0
7/20/2005	15.9	20.4	29.3	21.0	198	152.7	40	0	40.0
7/21/2005	16.0	20.7	30.1	21.4	204	157.4	40	0	40.0
7/22/2005	15.6	21.3	30.1	22.2	219	172.5	40	0	40.0
7/23/2005	15.4	21.0	29.4	21.6	229	183.5	40	0	40.0
7/24/2005	15.7	21.0	30.2	20.6	228	181.3	40	0	40.0
7/25/2005	16.0	21.9	30.2	20.9	227	180.2	40	0	40.0
7/26/2005	15.1	21.7	29.8	21.3	216	169.9	40	0	40.0
7/27/2005	15.2	20.9	29.8	21.6	203	157.0	40	0	40.0
7/28/2005	15.8	21.6	29.3	21.8	195	149.7	40	0	40.0
7/29/2005	15.3	21.1	29.3	21.5	198	152.6	40	0	40.0
7/30/2005	14.8	21.3	29.2	22.0	198	152.9	40	0	40.0
7/31/2005	15.7	22.2	29.6	22.0	196	150.2	40	0	40.0

Table 3: Effluent Flow and Temperature, River Flow and Stored Water Releases (August 2005)

Date	Durham Flow (MGD)	Durham Temperature (C)	Rock Ck Flow (MGD)	Rock Ck Temperature (C)	Farmington Flow (cfs)	Farmington - RC WWTP (cfs)	CWS Hagg Release (cfs)	CWS Barney Release (cfs)	Total Flow Augmentation (cfs)
8/1/2005	15.0	22.1	29.7	22.2	198	152.1	40	0	40.0
8/2/2005	15.3	22.0	29.6	21.3	191	145.3	40	0	40.0
8/3/2005	15.6	22.0	29.3	21.1	174	128.8	40	0	40.0
8/4/2005	14.9	21.0	29.1	21.8	170	125.0	40	0	40.0
8/5/2005	15.1	21.5	29.1	22.2	174	128.9	50.0	0	50.0
8/6/2005	15.1	22.0	28.4	22.1	182	138.1	50.0	0	50.0
8/7/2005	15.1	22.2	29.5	21.6	186	140.4	50.0	0	50.0
8/8/2005	15.3	21.9	29.7	21.5	207	161.1	50.0	0	50.0
8/9/2005	15.2	21.7	28.7	21.7	201	156.7	50.0	0	50.0
8/10/2005	15.0	21.7	29.4	21.8	181	135.6	50.0	0	50.0
8/11/2005	15.2	21.5	29.2	21.6	179	133.8	50.0	0	50.0
8/12/2005	15.0	21.8	29.6	21.5	190	144.2	50.0	0	50.0
8/13/2005	15.1	21.9	29.0	22.2	191	146.1	40.0	0	40.0
8/14/2005	14.9	22.1	28.8	22.2	184	139.4	40.0	0	40.0
8/15/2005	15.2	22.2	30.0	22.2	187	140.7	40.0	0	40.0
8/16/2005	14.9	22.1	29.3	21.8	188	142.7	40.0	0	40.0
8/17/2005	15.1	21.7	29.6	22.2	176	130.1	40.0	0	40.0
8/18/2005	15.1	21.8	30.0	21.9	171	124.6	40.0	0	40.0
8/19/2005	14.8	22.2	29.0	22.1	179	134.1	40.0	0	40.0
8/20/2005	15.0	22.2	29.0	22.5	183	138.2	60.0	0	60.0
8/21/2005	15.1	22.4	29.5	20.4	192	146.3	60.0	0	60.0
8/22/2005	15.0	22.4	30.0	22.4	202	155.7	60.0	0	60.0
8/23/2005	14.7	22.2	29.8	22.0	204	157.9	60.0	0	60.0
8/24/2005	15.4	21.1	29.6	21.9	190	144.3	50.0	0	50.0
8/25/2005	15.2	21.6	28.9	22.0	174	129.3	50.0	0	50.0
8/26/2005	15.1	21.8	28.2	21.8	167	123.3	50.0	0	50.0
8/27/2005	14.7	22.7	28.5	21.0	169	125.0	50.0	0	50.0
8/28/2005	15.1	22.2	30.0	21.6	180	133.6	50.0	0	50.0
8/29/2005	15.6	22.0	31.0	21.7	202	154.1	50.0	0	50.0
8/30/2005	15.3	21.2	30.4	21.7	234	187.0	50.0	0	50.0
8/31/2005	15.0	21.4	30.5	20.7	208	160.9	10.0	0	10.0

3.2 SUMMARY OF ACTUAL LOADS DISCHARGED

A summary of the average effluent flow, effluent temperature, and the excess thermal load discharged from the Rock Creek and Durham wastewater treatment plants are presented in the table below. This table also presents river flow, augmentation rate, and the thermal credit from flow augmentation at the two wastewater treatment plants.

Table 4: Summary of Wastewater Treatment Plant and Flow Augmentation Data (July 1 – August 31, 2005)

Wastewater Treatment Plant Data				YEAR:	2005
Rock Creek WWTP				Durham WWTP	
Mean RC WWTP flow:	45.9 cfs		Mean DU WWTP flow:	24.0 cfs	
Mean RC effluent temperature:	21.4 C		Mean DU effluent temperature:	21.3 C	
Median river flow u/s RC WWTP:	152.0 cfs		Median river flow u/s DU WWTP:	198.0 cfs	
Excess Thermal Load Discharged from RC:	719 million kcal/d		Excess Thermal Load Discharged from Durham:	164 million kcal/d	
Flow Augmentation					
Median Farmington flow:	198.0 cfs		Average thermal Credit for flow aug at RC:	-519 million kcal/d	
Mean flow augmentation:	36.3 cfs		Average thermal Credit for flow aug at Durham:	-407 million kcal/d	

3.3 SUMMARY OF CREDIT TRADES / THERMAL LOAD CREDITS

Table 5 is a reconciliation of all Clean Water Services activities and projects for generating thermal load credits, from both release of stored water and riparian planting projects. The table includes the following information.

- The thermal loads discharged by the Rock Creek and Durham wastewater treatment facilities;
- The allowable thermal loads for the Rock Creek and Durham wastewater treatment facilities;
- The thermal credits for flow augmentation;
- The thermal load at each plant after flow augmentation credit; and
- The thermal credits for shade.

Table 5: Annual Clean Water Services Thermal Budget

ANNUAL CWS THERMAL BUDGET						YEAR:	2005		
						Year number of permit:	2		
MEDIAN FARMINGTON FLOW:		198.0 cfs							
Rock Creek WWTP									
Loading from WWTP Effluent						Annual Thermal Load after Flow Augmentation Credit			
Mean effluent flow:		45.9 cfs		Thermal load from WWTP:				748 million kcal/d	
Mean effluent temperature:		21.4 °C							
Median river flow at outfall:		152.1 cfs							
Mixing zone flow:		38.0 cfs							
System potential temperature:		14.7 °C							
Mixing zone temperature change:		+3.6 °C							
Allowed Loading from WWTP Effluent									
Median river flow at outfall:		152.1 cfs		Allowed thermal load:		-29 million kcal/d			
Mixing zone flow:		38.0 cfs							
Allowed temperature increase		0.25 °F							
System potential temperature:		14.7 °C							
Credit for Flow Augmentation									
Refer to WWTP data for calculation of thermal credit				Thermal credit for flow augmentation:		-519 million kcal/d			
DURHAM WWTP									
Loading from WWTP Effluent						Annual Thermal Load after Flow Augmentation Credit			
Mean effluent flow:		24.0 cfs		Thermal load from WWTP:				189 million kcal/d	
Mean effluent temperature:		21.3 °C							
Median river flow at outfall:		198.0 cfs							
Mixing zone flow:		49.5 cfs							
System potential temperature:		18.1 °C							
Mixing zone temperature change:		+1.1 °C							
Allowed Loading from WWTP Effluent									
Median river flow at outfall:		198.0 cfs		Allowed thermal load:		-25 million kcal/d			
Mixing zone flow:		49.5 cfs							
Allowed temperature increase		0.25 °F							
System potential temperature:		18.1 °C							
Credit for Flow Augmentation									
Refer to WWTP data for calculation of thermal credit				Thermal credit for flow augmentation:		-407 million kcal/d			
CREDIT FOR RIPARIAN SHADE RESTORATION/PRESERVATION									
Total stream miles this year		6.9 miles		Thermal credit for shade:		-53 million kcal/d			
CUMULATIVE THERMAL BUDGET FOR CWS ACTIVITIES IN THE TUALATIN BASIN									
	Thermal Load after FA Credit		Thermal Credit for Shade		Net Thermal Input to Tualatin Basin				
	<i>Annual</i>	<i>Cumulative Average</i>	<i>Annual</i>	<i>Cumulative</i>					
Year 1	312 million kcal/d	312 million kcal/d	-30 million kcal/d	-30 million kcal/d	282 million kcal/d				
Year 2	200 million kcal/d	256 million kcal/d	-53 million kcal/d	-83 million kcal/d	174 million kcal/d				
Year 3	million kcal/d		million kcal/d						
Year 4	million kcal/d		million kcal/d						
Year 5	million kcal/d		million kcal/d						

The table shows that stored water releases from Scoggins Reservoir offset about 72% of the excess thermal load from the Rock Creek wastewater treatment plant. The thermal load after flow augmentation credit at the Rock Creek wastewater treatment plant is 200 million kcal/day. At the Durham wastewater treatment plant, stored water releases offset the entire excess thermal load. Thus, the thermal load after flow augmentation credit at the Durham wastewater treatment plant is zero. Compared to 2004, stored water releases in 2005 accounted for a larger portion of the thermal offset at the Rock Creek wastewater treatment plant because of a combination of higher release rates -- 36.3 cfs vs. 30.1 cfs -- and higher median flow in the Tualatin River -- 198 cfs vs. 157.5 cfs at Farmington.

For Permit Year Two - i.e. 2005 - the TMP specifies that the annual shade credit benchmark as 20%. To ensure that the entire thermal load from the wastewater treatment plants is offset within the permit cycle, Clean Water Services uses the *cumulative* average of the thermal load after flow augmentation credit. For Permit Year Two, the cumulative average is 256 million kcal/day, and the shade credit benchmark is 51.2 million kcal/day -- 20% of the cumulative average.

As noted in the discussion of the riparian planting program presented above, 6.91 stream miles were planted which resulted in a thermal credit of 53 million kcal/day. This exceeds the 20% shade credit benchmark for Permit Year Two. The thermal load after flow augmentation credit, shade credit benchmark in the TMP, the number of stream miles planted, and the thermal credits generated for the first two years of the permit is presented in Table 6.

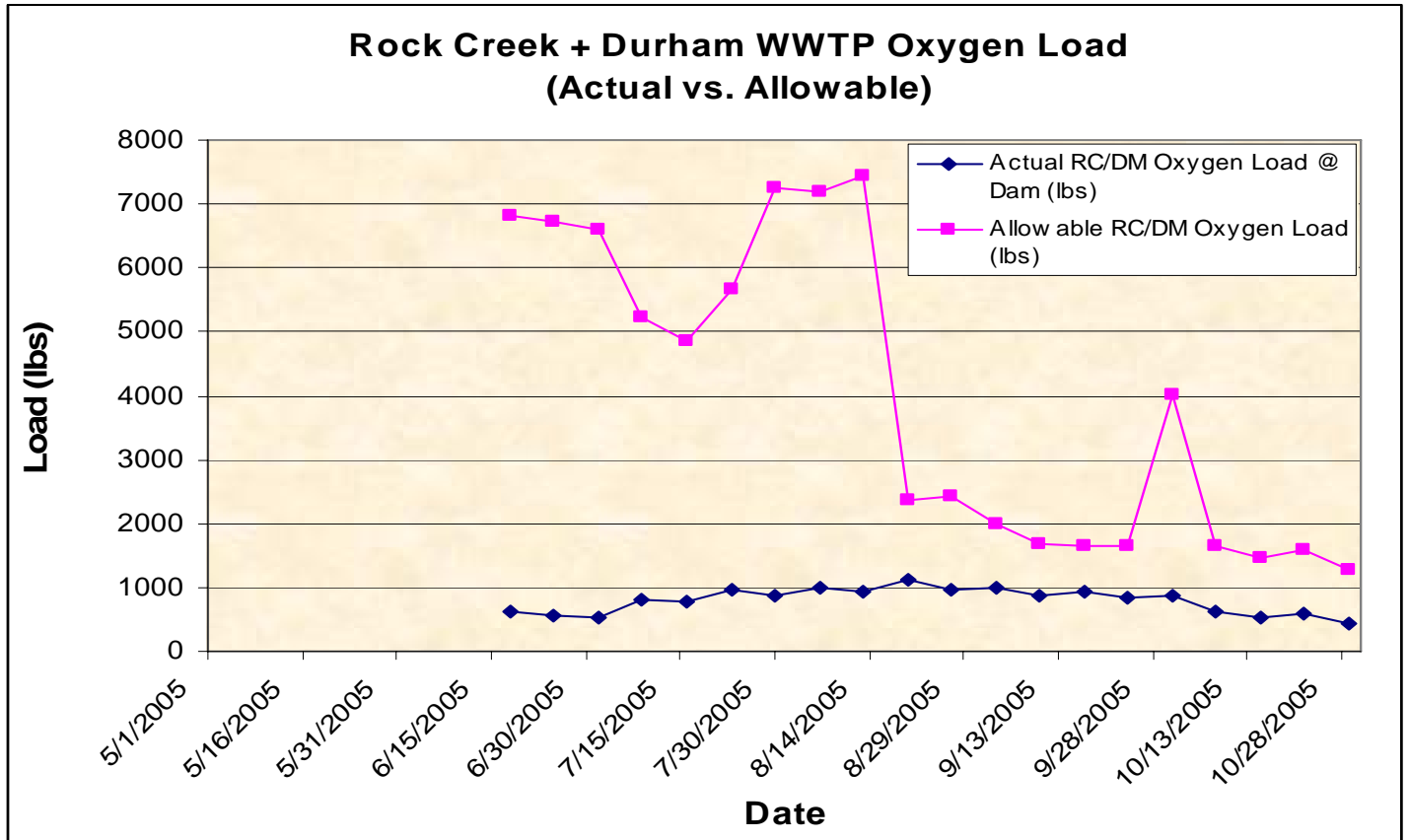
Table 6: Shade Credit Benchmarks and Thermal Credits Generated

Permit Year	Thermal Load after Flow Augmentation Credit		Shade Credit Benchmark	Stream Miles Planted		Thermal Credits Generated	
	Annual	Cumulative Average		Annual	Cumulative	Annual	
Year 1	312 million kcal/d	312 million kcal/d	10%	5.49	5.49	30 million kcal/d	
Year 2	200 million kcal/d	256 million kcal/d	20%	6.91	12.4	53 million kcal/d	
Year 3			30%				
Year 4			20%				
Year 5			20%				

OXYGEN DEMANDING SUBSTANCES CREDITS

Clean Water Services did not accomplish any inter- or intra- facility trading for oxygen demanding substances as allowed for by the permit in this reporting period. Figure 1 below shows the actual discharge loads for oxygen demanding parameters. Clean Water Services anticipates that in the future, water quality trading for these parameters will occur. Note that dry season permit limits took effect in late June, when the seven-day median of the daily average flow at Farmington fell below 250 cfs. Therefore, a comparison of actual versus allowable oxygen load is presented from mid-June onward.

Figure 1: Comparison of Actual vs. Allowable Loads for Oxygen Demanding Substances



3.4 ENVIRONMENTAL BENEFITS SUMMARY

The environmental benefits of the credit trades in supporting watershed management objectives are numerous. The ability to enhance riparian areas both within and outside the service area of Clean Water Services promotes a watershed-based approach to improving and enhancing the overall health of the Tualatin Watershed. The activities, which are covered by Clean Water Services numerous programs and initiatives, work to form the basis of a collaborative and cost-effective watershed-based management strategy.

The riparian shading activities, which generate a portion of Clean Water Services thermal load credits, produce many ancillary environmental benefits. These include bank stabilization, habitat creation for aquatic and terrestrial species, buffers for stormwater runoff to mention a few.



Clean Water Services release of stored water provides multiple environmental benefits, including socio-economic benefits to the residents of the watershed. This release of flow augmentation water, along with the discharge of the highly treated effluents from Clean Water Services advanced wastewater treatment facilities, provides a sustainable base flow to the main stem of the Tualatin River in the otherwise low flow periods of the summer months. The augmentation water provides cooling effects for the river as well as assimilative capacity for oxygen demanding substances during the critical period for the river. The cooling effects also increase the assimilative capacity of the river for oxygen demanding substances.

3.5 EFFICIENCY SUMMARY

The activities that comprise Clean Water Services thermal load credit trading program support a cost-effective and timely approach to improving and restoring the overall health of the Tualatin watershed. It focuses limited resources on addressing a systematic approach to integrated watershed management. By evaluating and considering the multiple objective nature of Clean Water Services water quality trading program, the benefits to the entire watershed are substantial and widespread.

Additionally, the shade generation activities support and generate numerous opportunities for collaboration of various organizations, as well as serving as a great mechanism to reconnect the citizens of Washington County to their watershed.

All these benefits indicate that Clean Water Services thermal load credit trading program results in a cost-effective and timely approach to watershed management.

APPENDIX A

Project Descriptions For Temperature Management Annual Report

Fanno Creek: 99W To Bonita

Location: Current segment is along mainstem Fanno Creek between Main Street and Hall Blvd.

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 300 plants, Spring 2005; 8000 plants, February 2006

Council Creek – Beal Pond

Location: At Beal Pond on the corner of Beal Road and Hartford in Cornelius

Activities: Planting native trees and shrubs adjacent to the pond

Construction: 300 native trees and shrubs planted adjacent to creek in December of 2005

Banks – Banks High School

Location: On Dairy Creek near Trellis Road in Banks

Activities: Native trees and shrubs planted adjacent to Dairy Creek

Construction: 100 native trees and shrubs installed December 2005

Hillsboro Melvin Mark

Location: Rock Creek at Evergreen Blvd in Hillsboro

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 973 plants, Fall 2005

Beaverton Transit Center

Location: Beaverton Creek between Hall and Beaverton Transit Center

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 5000 plants, November 2005/February 2006

Beaverton - Hall Creek

Location: Hall Creek off Medea Court

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 400 plants, Fall 2005

Beaverton – Willow Creek at Walker

Location: Willow Creek at Walker Blvd in Beaverton

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 1900 plants, Fall 2005

Beaverton - Burgerville

Location: Unnamed Tributary to Beaverton Creek between Broadway and Canyon Road

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 600 plants, Spring 2005

Tigard – Copper Creek

Location: Copper Creek north of SW Riverwood Lane in Tigard

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 440 plants, Fall 2005

Tigard – Knez Wetlands

Location: Red Rock Creek at SW Hunziker Street in Tigard

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 280-plants, Fall 2005

CREP – Eggers

Location: On McFee Creek near Egger Road and McCormick Hill Road in Washington County

Activities: Planting native trees and shrubs along un-vegetated tributaries of McFee Creek and along McFee creek itself

Construction: 3375 plants, March 2005

Cedar Mill – North Johnson

Location: North Johnson Creek at Barnes Road in Cedar Mill

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek and wetlands

Construction: 560 plants, Fall 2005

TWS – Hedges Creek & Barnes Wetland

Location: Near Teton and Herman Roads in Tualatin

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 2850 plants, Spring and Fall of 2005

Bronson Creek – West Union To Laidlaw

Location: Bronson Creek Upstream and Downstream of NW Kaiser Road

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek --
Part of the larger 2 mile 24 acre enhancement project

Construction: 11,180 plants, Fall 2005

Hillsboro – Frances Street Park

Location: Reedville Creek at SW Frances Street in Hillsboro

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 2400 plants, Fall 2005

Rock Creek – Evergreen to Cornell

Location: Rock Creek from NW Evergreen Parkway to NW Cornell Road

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek.

Part of a larger 1 mile, 17-acre enhancement

Construction: 13,940 plants, February 2006



Raleighwood Marsh Enhancement Phase II

Location: Raleighwood Marsh Park on Sylvan Creek between Old Scholls Ferry Road and SW Bancroft Way

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 25,000 plants, February 2006

Upper Sylvan Detention

Location: Approximately seven acres along Sylvan Creek adjacent to Sunset Hills Memorial Park

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 9500 plants, February 2006

Rock Creek – Highway 26 to West Union

Location: Rock Creek from NW West Union Road to Highway 26 overpass

Activities: Invasive species removal, planting native tree and shrubs species and placement of large woody debris to the creek

Construction: 13,812 plants, Fall 2005

Willow Creek At Bronson

Location: Willow Creek at NW Bronson Road in Beaverton

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 1900 plants, Spring 2005

Hillsboro – Amberwood Natural Area

Location: On Rock Creek between Amberwood Drive and Cornell, West of 206th in Hillsboro

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: Spring 2005

CWS Property Enhancement – Rock Creek

Location: Rock Creek from SE River Road to the mouth of the confluence of the Tualatin River

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 10,300 plants, February 2006

Gales Creek Enhancement

Location: Gales Creek at Highway 47 downstream to the confluence with the Tualatin River

Activities: Invasive species removal, and planting native tree and shrubs species adjacent to the creek

Construction: 17,427 plants, Fall 2005-February 2006

APPENDIX B

Project Locations For Temperature Management Annual Report

