

**Clean Water Services Revised Temperature Management Plan  
(2/28/2005)**

**Comments Received and DEQ's Responses**

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## **Comments from Janelle St. Pierre, Program Coordinator, Ash Creek Forest Management**

After reviewing the TMP, I am supportive of the program and applaud both DEQ and CWS for developing a creative approach to addressing temperature issues in the Tualatin Basin. I think the five year time span for full implementation is ambitious, but hope that the programs will be successful in both the rural and the urban areas.

As a restoration professional, I have a few concerns about the implementation of the shade program. Of particular concern is the eligible plant species list in Appendix G. This list is not a comprehensive list of all the appropriate plant species in the Tualatin Basin. It can function as a guideline, but should not represent all the plant species options for the projects. For example: many of the herbaceous species in the riparian forest mix are not appropriate for sites that have had limited site preparation. The riparian forest list also leaves out some important tree species like grand fir and valley ponderosa pine. There is a lot of overlap of species between different habitat types. It is very important to allow for flexibility in plant community design. This is reflected in the text of the permit, but not in the attachment.

There are also a couple of species on the list that do not grow in the Tualatin Basin. These species include *Rosa woodsii*, *Carex rossi*, *Juncus bufonius*, *Agrostis oregonensis*, and *Agrostis idahoensis*. I would also recommend extreme caution in utilizing any type of NW Native Wildflower mix. The mixes often include plants that are not appropriate for natural areas (and can also be contaminated with weed seed).

The plant list in the appendix also lists gallons as the primary plant type. The text of the permit specifies that bare root is preferable. The material in the appendix should be consistent with the material in the main text of the permit.

My last concern is with the planting process. It is not correct to assume that rural planting areas will have less mortality than urban planting areas. A rural planting area with a significant weed problem and altered hydrology will also need high planting density. Each site will require evaluation. Rural and urban sites should be held to similar standards. The other aspect of this is site preparation. The Table in appendix I is overly optimistic. Some sites will require more than one year of site preparation before planting can occur. Site with infestations of persistent noxious weeds, like Japanese knotweed, will require additional site preparation. Allowances should be made for significant site variability.

It would be helpful to include references/sources for information from NRCS and ODF. Clean Water Services has included the vegetation management plan they have developed for urban areas, but the equivalent information for rural areas does not seem to be included.

Thank you for your consideration.

### **Response to Ash Creek comments:**

**In response to your comment on the planting process, the TMP has been revised to contain more specifics on planting densities, followup monitoring, a trigger for replanting and revisitation of the planting process. These revisions are contained in chapter 4.**

**The other comments are more difficult to incorporate because they contain a level of detail that goes beyond what is required by the permit. Therefore, DEQ is giving these comments to CWS for their serious consideration.**

However, the comments are useful in that they touch on a larger issue that DEQ is concerned about, and hopes to address. DEQ perceives that riparian restoration is a relatively new endeavor, and as a result, there is not much in the way of agreed-on performance standards, let alone a methodology for developing such standards.

DEQ anticipates that the language in the CWS permit will be adequate for insuring that an adequate amount of riparian restoration work in the Tualatin occurs, however DEQ does not believe the language would be sufficient for a source that does not have the same level of experience and expertise that CWS possesses. In short, trades involving riparian restoration are currently a work-in-progress. DEQ is currently exploring ways to continue this work-in-progress, and hopes that professionals engaged in riparian restoration will be interested in working with DEQ to advance the state of the science.

## Comments from Tualatin Riverkeepers

### DEQ's responses in Red

Tualatin Riverkeepers remains remain concerned about the validity of the temperature trade proposed as it is in variance with the temperature TMDL set for the Tualatin basin. The temperature TMDL includes both point and nonpoint sources of thermal loading. The TMDL allocates a system potential for shade for nonpoint sources that include forest, agriculture and urban land uses. The TMDL also allocates several point source reductions including Clean Water Services discharge from the Durham and Rock Creek wastewater treatment plants. For the Tualatin TMDL to assure that the state water quality standard for temperature will be achieved relies on meeting both the TMDL point and nonpoint allocations.

The proposed trade waives a point source wasteload allocation in order to more quickly meet a nonpoint source allocation. We do not believe this is consistent with the Clean Water Act and casts uncertainty on the validity of the Tualatin basin temperature TMDL and achievement of state water quality standards.

Further, we believe that it is DEQ's responsibility to address the adequacy of the Tualatin Basin Agricultural Water Quality Management Plan and to the Oregon Forest Practices Act in meeting the temperature TMDL for the Tualatin basin. In previous comments we have asked DEQ to request of the Oregon Board of Forestry to determine the need for a Tualatin Basin Rule to address the temperature TMDL. We have serious doubts whether the temperature TMDL can be achieved in the Tualatin without addressing Oregon Forest Practices. And so we ask again for DEQ to request a Forest Practices Basin Rule.

DEQ's response: DEQ is allowing CWS to offset a portion of its temperature impact through riparian restoration because DEQ feels that this approach gets most directly at one of the biggest problems the watershed faces, and it does so in a way that will result in greater, more timely benefit to the watershed than the other options would have allowed. The response CWS has received from landowners to date confirms this.

With regards to the Forest Practices Act, ODF and DEQ completed *Forest Practices Act Sufficiency Analysis* (Sufficiency Analysis) in October 2002 pursuant to our 1998 Memorandum of Agreement. The Sufficiency Analysis identified a series of recommendations to highlight general areas where current forest practices could be improved in order to better meet the goals and objectives of the Forest Practices Act and in turn provide added assurance of meeting water quality standards statewide.

Since July 2003, the Board of Forestry has been considering possible riparian rule revisions and voluntary measures that take into account recommendations from the Sufficiency Analysis, the advisory committees and the IMST, as well as additional recommendations from Oregon Department of Fish and Wildlife (ODFW), DEQ, and other stakeholders. DEQ has been working closely with ODF during the rulemaking process, and have encouraged the Board of Forestry to continue to consider the riparian rulemaking as a priority.

In general, DEQ believes that the rule package that ODF has presented, with an additional rule to provide protection to small non fish-bearing streams, will lead to improved water quality throughout Oregon's state and private forestlands. DEQ plans to continue working with ODF and the Board of Forestry for formal rule adoption of their proposed riparian protection rules. At this time, DEQ is not considering to recommend to our Environmental Quality Commission to petition the Board of Forestry to consider developing a Forest Practices Basin Rule.

Please refer to the following staff report for the details of our collaboration with ODF and BOF.

<http://www.deq.state.or.us/about/eqc/agendas/attachments/oct2004/10.21.04.EQC-BOFjointReport.pdf>

With regard to the proposed CWS temperature plan:

## **METHODS**

The proposed temperature management plan does not provide adequate detail on selected temperature reduction methods that do not include trading. The proposed plan is more of a temperature trading plan for two specific point sources than a watershed-based temperature management plan. We would like to see a more complete TMP that addresses urban non-point sources, forestry and agriculture, and specifies a timetable for achieving the temperature TMDL in the Tualatin Basin.

We would like additional detail regarding reuse and source control. When will feasibility analysis be conducted? Is there a measurable temperature reduction in covering the primary clarifiers? What are the steps to determine the cost-effectiveness and interest in water right trades?

The TMP is in fact only meant to be a temperature trading plan for CWS. Therefore DEQ does not require the TMP to cover all of the information listed above, and DEQ views the current version as sufficient in its coverage. It is not the responsibility of CWS to produce a TMP for the entire basin because CWS is not the source of temperature problems throughout the basin.

Along the same lines, CWS is not required in this TMP to describe their internal process for deciding, for example, they do not wish seek credit for covering the primary clarifiers. Instead DEQ simply requires CWS say in the TMP what they have decided to do to offset their WLA and provide reasonable reasonable assurance that they will be able achieve this.

**In-stream pond removal** - We believe removal of in-stream ponds needs to be included in the temperature management plan. These impoundments increase in-stream temperatures and should be elevated as a priority. Clean Water Services is doing a pilot project in the Tanasbrook area of Bronson Creek to take manmade in-stream ponds off

line. Water Environment Services on Clackamas County has demonstrated the temperature mitigation benefits with the Spring Mountain Project on Mt. Scott Creek. The dams that form these ponds cause thermal loading and block fish passage. Our own research at Summerlake Park in Tigard on Summer Creek shows that the Summerlake dam causes a temperature increase up to 11 degrees F on a hot summer day. Clean Water Services should get temperature trading credits for removing manmade in-stream dams that elevate temperature and block fish passage. We urge DEQ to require removal of manmade in-stream dams that elevate temperature and block passage as part of this TMP, and to grant CWS temperature trading credits for such accomplishments.

CWS has been pursuing in-stream pond removal for some time and DEQ has expressed strong verbal approval for these actions. CWS has not elected not to seek temperature credit for these actions. DEQ cannot require CWS to justify this internal decision, only to provide justification for the actions they do wish to receive credit for.

**Stormwater infiltration** management practices and development of design codes should also be included in the temperature management plan. Maximizing infiltration of stormwater across the urban landscape is a means of restoring hydraulic function to control flashy winter flows, recharge groundwater and moderate low summer flows and reducing temperature impacts.

This option was discussed, and it appears that it would be very difficult to state what the summertime temperature impact of these actions might be. Such uncertainty made this option unattractive, and CWS has decided not to pursue it. Once again, DEQ cannot require CWS to provide justification for not seeking to get credit for particular actions. DEQ can only require CWS to provide justification for the actions CWS does wish to receive credit for.

**Flow augmentation** - We are concerned that the proposed minimum flow regime of 30 cfs may make less water available to address low dissolved oxygen levels at the end of the season. What is the optimal flow? How was the 30 cfs quantity determined? What are specific flow augmentation plans for the tributaries?

Appendix B of the TMP explains how the 30 cfs was determined. It is true that CWS has to manage not only for river temperature during the summer, but for low dissolved oxygen levels at the end of the season. In the past, CWS has generally managed to meet management objectives with water from Hagg Lake. If flows from Hagg Lake are insufficient, CWS will have to purchase water from other sources.

The TMP does not address flow augmentation plans for the tributaries because CWS has not elected to seek credit for flow augmentation in the tributaries.

**Reclaimed wastewater/reuse** – There is no plan for reuse in the Temperature Management Plan. This component needs to be further developed with objectives, outcome measures and a timeline.

DEQ only requires that the TMP state what CWS has decided to do to offset their WLA and provide reasonable assurance that they will be achieve this. By the same token, the

TMP does not have to spell out CWS' plans for reuse unless they wish to receive credit for it. They may elect to do so in the future.

## SHADE

**Prioritization criteria** – It is not clear how the prioritized stream reaches for trading were determined. We suggest the following as important criteria for determining stream reaches: stream reaches on the 303d list for temperature impairment, presence of anadromous fish, reaches accessible to fish passage unless there are immediate plans to remove fish passage barriers for example Scoggins Creek above the dam is included as a priority reach but there is no fish ladder to allow for migration to this reach and Chicken Creek has a fish passage barrier very low in the sub-basin, a water control structure located on the Tualatin River Wildlife Refuge). We believe these criteria will better integrate Endangered Species Act considerations to improve habitat for Threatened steelhead populations.

Since allowing a source to offset its temperature impact via riparian restoration on private land has not been done before, and because it is not yet clear how difficult it will be to get cooperation from a sufficient number of private landowner to achieve the goal, DEQ is not yet requiring that CWS prioritize stream reaches for trading. If landowners respond in sufficient numbers, CWS will prioritize based on the methodology described in Chapter 3, Section F of the TMP.

**Buffer widths** – We are concerned about the adequacy of a minimum 25 foot buffer in providing assurance that the specific site shade potential will be achieved. Another approach would be to identify a reference site and develop measurable performance criteria that can be applied to revegetation projects. These performance measures could then be used as a basis for monitoring survival objectives and informing adaptive management for example replanting to achieve the survival rate objectives.

The minimum buffer width for Enhanced CREP is 35 ft. and the “no touch” zone or buffer width for VEGBACC is 20 ft. The TMP has been modified to state this.

Apart from these minimums, CWS may plant whatever buffer width a particular landowner and site conditions will support. The maximum buffer width allowed for under CREP is 185 ft., and this will be the maximum buffer width that CWS will pay for as well. The amount of credit they get for a particular project will depend on the amount of shade that the Shade-a-Lator spreadsheet tool says can be achieved. The Shade-a-Lator is the same tool that was used to develop the TMDL.

The TMP has been revised to include more language relating to adaptive management. Specifically, Chapter 4, Section A states that “In the event that planting densities are determined to be a contributing cause of poor plant health or the need for extra maintenance, densities will be adjusted for future projects. If there is more than 20% plant mortality at a site, the site will be replanted.”

**Measurable results** - By scattering tree-planting projects across several sub-watersheds and numerous streams, the plan virtually assures that temperature mitigation effects will be unmeasurable. In order to determine if modeled temperature benefits are achieved, tree-planting projects should be concentrated in areas to facilitate measurement of temperature benefits. The Gales Creek subwatershed, which is on the 303d list and is proposed as critical habitat for threatened steelhead trout would be a good target for concentrated implementation of shade-producing tree-planting efforts.

DEQ appreciates the value of concentrating efforts in a subwatershed so that the cumulative effect of the projects will be maximized. However, as has been noted, it is not yet clear how difficult it will be to get cooperation from a sufficient number of private landowner to achieve the goal, DEQ is not yet requiring that CWS prioritize stream reaches for trading. If landowners respond in sufficient numbers, CWS will prioritize based on the methodology described in Chapter 3, Section F of the TMP. One of the criteria for prioritizing a watershed is the presence of salmonid spawning and fish rearing habitat, which Gales Creek has.

**Monitoring** - Provide more detail and measurable objectives for DMR. Also, how will monitoring inform and lead to active adaptive management.

Justification for initial planting densities has been added to Chapter 4, Section A. CWS will conduct follow-up monitoring with triggers for replanting. The replanting trigger for a particular site will be 20% plant mortality. In the event that follow-up monitoring indicates that planting densities need to be adjusted for future projects, they will be.

There remains the risk that not all planted areas will be in a mature vegetated state at the end of 20 years. With each permit renewal, the efficacy of the various incentive programs will have to be re-evaluated. The results may indicate a need for modifications.

Chapter 3 of the TMP lists possible measures that will have to be undertaken if benchmarks are not met. They include:

- Changes to landowner incentive programs
- Increased program marketing efforts
- Additional program staff/contractor resources
- Purchase/release of additional flow augmentation water
- Increased effluent reuse.

**Enhanced CREP gap** – Enhanced CREP and VEGBAC agreements need to extend 20 years to comply with the temperature trade rather than 15 years under CREP.

DEQ and CWS have discussed this issue at length, and have modified Chapter 3, Section D on the Shade Programs to reflect this discussion and our joint understanding. To summarize: Enhanced CREP and VEGBACC were designed with input from the farming community, and it was clear from this input that requiring 20 years' of "no touch" would reduce participation rates in both programs significantly. CWS explored the various disincentives that already exist for landowners to clearing riparian areas prior to 20 years. These are now listed in the TMP in Chapter 3, Section D. Based on the existence of these

disincentives, CWS decided that their best chance for success overall would be to design programs so as to maximize landowner participation. The risk remains that not all planted areas will be in a mature vegetated state at the end of 20 years. This risk and the options for dealing with it will need to be re-evaluated with each permit renewal.

If some landowners do in fact clear planted areas prior to 20 years, CWS will have to re-plant to compensate. In an effort to avoid this expense, CWS has included in both programs the option of a conservation easement, which is less expensive than mitigation, and provides the farmer with significant financial incentives to keep vegetated buffer areas intact. Clean Water Services intends to explore other approaches to keeping planted areas planted as well.

### **Consideration of Credit for Protection of Existing Shade Resources -**

Protection of existing shade resources is an important part of meeting the temperature TMDL, however, we do not see how this protection can be achieved through granting credits to Clean Water Services. Appropriate mechanisms for achieving protection of existing shade resources include:

- Monitoring and enforcement of prohibited conditions in the SB1010 Tualatin Basin Agricultural Water Quality Plan and the related Oregon Department of Agricultural regulations.
- Adopting a Tualatin Basin rule under the forest practices act to achieve the forestry load allocation for temperature.
- Adopting existing urban Title 3 Vegetated Corridor Standards for development in the rural areas or Goal 5 Safe Harbor.
- Adoption by Washington County of State tax credits for habitat preservation.

The section of the TMP pertaining to getting credit for preservation of existing high quality habitat has been deleted.

**Budget** - The TMP should include a budget in order to evaluate and determine assurance that performance objectives will be met. We are concerned that staffing levels need to be adequate so that no bottlenecks are created to landowner participation. Early implementation of Enhanced CREP and VEGBAC have attracted 20 interested landowners. This creates a volume of work for staff to develop management plans. It is our understanding that, at present, the program is closed to new participants for this year and with limited staff, outreach will be seriously curtailed. The bottle neck appears to be in development of farm management plans. We suggest ramping up the initial staffing to include two FTE capable of developing the six month reporting period that includes: dollars expended, # of property owners signed up, site specific management plans and one FTE to conduct landowner outreach. Another benefit of generating a large pool of potential participants is that it will allow for more targeted restoration in priority reaches. More closely targeting the highest priority reach will produce better results in terms of measurable reduction of temperature in a salmonid spawning reach.

We have assumed but would like to verify that the funding for the temperature trade will not come from surface water management fees.

Clean Water Services is paying for a portion of the enhanced CREP, yet proposing to receive temperature trading credit for the entire program. CREP is listed in the Tualatin Basin Agricultural Water Quality Plan as a significant tool for meeting the agricultural temperature load allocation. It is appropriate that CWS receive credit for the proportion of the program that they pay for and not receive credit for the proportion of the program that agriculture has committed to and is paying for.

DEQ does not require TMPs to include budgets. Chapter 4, Section E. entitled Program Implementation Time Frame/Benchmarks discusses the possibility that incentive programs and associated staffing and funding levels may have to be modified in the event that benchmarks are not met.

The funding source CWS chooses to rely on to pay for the temperature trade is not DEQ's concern. Likewise, DEQ does not see a need to limit the credit that CWS gets for projects completed with the help of CREP funds. It is worth noting that prior to efforts by CWS, no farmer had applied for CREP funds in Washington county.

#### **MONITORING AND REPORTING**

The proposed annual report functions as the equivalent of the monthly discharge management report (DMR). As such, we it is reasonable to require this compliance report every six months and include the following information: dollars expended, # of property owners signed up, progress on achievement of outreach objectives e.g. # of presentations to landowners, site plan objectives including site potential shade and performance objectives based on reference site, acres planted, vegetative monitoring of plant species and survival rates, comparison of survival rates to performance objectives, adaptive management plans that include replanting necessary to meet performance objectives, and stream temperature.

Information on planting and a trigger for replanting has been added to Chapter 4, starting on page 25. The section of the TMP that pertains to reporting, Chapter 5, has also been revised to include results of vegetative monitoring with reference to performance standards.

**NOAA Fisheries Section 7 Consultation** – We believe there may be federal nexus that compels a section 7 ESA consultation with NOAA Fisheries. Federal funding has been received to implement the Watershed Based NPDES permit that includes the temperature trade. Please clarify whether the Section 7 consultation has occurred and whether there has been a determination of jeopardy.

DEQ is not required to consult with NOAA Fisheries on individual NPDES permits, therefore no such consultation has occurred.

## **EPA Comments on Clean Water Services Temperature Management Plan**

See comments in red from DEQ.

Overall, the documents provided for public comment are very comprehensive and have considered many different issues and factors in developing a precedent-setting trading system for the Tualatin River Watershed. We are impressed by its thoroughness and detailed documentation. However, since it is the first temperature trading document which has been developed, special attention must be paid to the explanations for how the shade credits are to be calculated, verified through monitoring, and then used to offset the thermal load. The following comments are intended to point out areas where greater explanation is needed so that the calculations can be followed, or to raise points where there are potential inconsistencies with other parts of the document. Lastly, some comments are intended to show where more provisions are needed to ensure the program's ultimate environmental success.

### **I. Comments on "Clean Water Services Revised Temperature Management Plan" August 20, 2004**

#### **1. Need for a Glossary to Define Terms Used in Document**

There are many "new" terms introduced in this document which have not previously been used in the TMDL or permit, most of which have to do with calculations necessary to track the trade. Many of these are presented without much of a definition or explanation of the term. In addition to providing more thorough definitions when terms are first used, it would be very helpful if the Temperature Management Plan (TMP) included a glossary which more clearly defined these terms.

The TMP is the product of a long conversation between DEQ and CWS, and one result of this has been the development of specialized terms that require more explanation than the TMP initially contained. However EPA's subsequent comments only identified three terms requiring additional explanation so instead of developing a glossary, DEQ has elected to modify the body of the document to include more explanation of the new terms, and to reference where these terms are defined.

#### **2. Ch1, Section A: Temperature Standard**

Since the TMDL and NPDES permit were issued, the Oregon temperature criteria has changed. As this TMP has been written consistent with the conditions outlined in the permit, it reflects the old standard. This is reflected in both sections noted in the subheading for this comment. It would be beneficial for both the TMP and/or the DEQ evaluation to explain why this criteria is being utilized instead of the new criteria. The following provides some suggested language:

Since the time the Tualatin TMDL and the CWS NPDES permit were issued by DEQ the Oregon temperature standard has been revised. This TMP has been written to meet the requirements as specified in the NPDES permit and thus is tailored to the former temperature standard. When the permit is revised,

appropriate changes will be made to the permit and revised TMP to address the standard applicable at that time.

The above paragraph has been added to the TMP.

### 3. Ch.1, Section B: Allowed and Excess Thermal Loads

This is the first mention of the term “Thermal Load to Offset” and it is described as being set each year due to variable conditions. It says that as a result there will be no fixed “trading baseline” but that credits will be used to offset the actual conditions recorded July 1 - August 31. The end of August will serve as the temperature trading credit reconciliation period, but that the results apply to the entire temperature season of May 1 through October 31.

The terms Excess Thermal Load and Thermal Load to Offset are now both defined in the second paragraph of this section.

This brief description raises two important issues without offering any additional explanation, nor are they referred to in other parts of the document. The two main issues are the lack of clarity regarding calculating the credits to be traded and the discrepancy between the reconciliation period for calculating the generated credits (July - August) and the compliance period (May - October). The mention of these issues without much context so early on in the document leads to much confusion for the reader. Either more information needs to be added to this section to explain these concepts in greater detail or information should be provided which explains where that detail will be provided. One way of doing this may be to provide the basic equations which will be utilized for the calculations and then note where more explanation will be provided. In addition to providing clarity for this section, this approach would also serve to provide context for the upcoming sections.

Questions which arise from reading this section as currently written are:

What should serve as the baseline for trading, given that river conditions are so variable (we are not persuaded that no baseline is needed, as our later comments will indicate)?

It is true that river conditions are variable, however the thermal load to offset will be set relative to the system potential temperature established in the TMDL, so it is not really accurate to say there is no trading baseline.

Chapter 1, Section B has therefore been revised to say:

To better reflect actual conditions, the Thermal Load to Offset under the Revised TMP will be based on average daily temperature and flow conditions from July 1 through August 31 of each year and it will be calculated with respect to the system potential temperature defined by the TMDL for temperature. ~~The use of a Thermal Load to Offset that varies from year to year based on actual conditions means that there will be no fixed “trading baseline.”~~

If the trading reconciliation period only covers July and August, how does this guarantee that enough heat load is offset to account for exceedences for the entire year?

The Tualatin does not exceed the temperature standard throughout the entire year. The temperature problem is confined to the summer months.

Why can it be assumed that if heat loads are offset between May 1 and October 31, that this will account for the thermal load reduction needed for the entire year? See above.

Defining the reconciliation period as July-August may appear to encourage CWS to augment flow during these months to the exclusion of the fall months. If this were true, water quality in the fall months would be threatened. However, CWS' permit limits for BOD and nutrients that are based on instream DO levels. Lower flows increase the chances of reduced DO levels, which in turn triggers stricter permit limits for CWS for BOD and nutrients. It is therefore in CWS' best interest to see that flow levels are maintained at reasonable levels throughout the summer and fall.

As this section provides the context for the overall trading program discussed in this TMP, it should also include a discussion of the program requirements and the frequency of reporting. It should also be noted whether the "thermal load to offset" is to be met annually or over the 5- year term of the permit. Furthermore, as this program is based on a 20-year program, the steps to be taken over the next 3 permit cycles to maintain this effort should be included. It should also be explained that the shade credit calculation represents the amount needed to be planted within the first five years to result in the projected amount of shade coverage by the 20<sup>th</sup> year. In addition, since this section is the first discussion of the role of shade credits in offsetting the annual excess thermal load, it should refer to where in the TMP additional information is provided about how this shade credit is calculated and how adequate monitoring of the plantings will be conducted to assure DEQ that the credits are still valid.

Finally, this section should describe (or refer to where it is described) the consequences to CWS if it fails to offset the thermal load at the end of the annual compliance period, and what it will do if this becomes the case more than two years in a row. DEQ's evaluation report also did not state what the consequences should be if CWS fails to offset its excess thermal load offset, but EPA suggests that if it occurs more than two years in a row, then a plan should be written to create more shade credits to offset a larger amount of the thermal load, and that the plan should be implemented before the end of the permit's fifth year. This is because if the plan is not written or implemented until after the fifth year, then the new shade credits will not even be close to actually achieving the temperature goal for the watershed within 20 years from when the permit was first issued. That would give them a different time element than the other shade credits already being used, and this distinction would complicate the accounting for the shade credits, as well as delay achievement of the environmental goal upon which the TMP is based.

All of the information that is requested to be included into this section is covered later on (page numbers will be provided if requested), and it seems redundant to duplicate everything here.

#### **4. Ch.2., Section C: Calculation Credit for Flow Augmentation**

This is the first time the term “thermal energy budget” is mentioned, yet its explanation is deferred to Appendix B. It would be helpful to explain it in the main body of the TMP document and discuss how it is related to the “thermal load to offset” and the “thermal energy credit” from flow augmentation. Providing the basic equations for determining the thermal energy budget would be helpful in providing such context.

The term “thermal energy budget” is explained in the second paragraph of this section.

Since CWS has been augmenting flows for some time and these augmented flow values were utilized in calculating the WLAs in the TMDL, this section should address whether the average annual flow supplemented prior to 2004 will be counted towards the total flow augmentation credit. It should also provide an explanation of why/how this is consistent with the calculations in the TMDL and the permit.

The TMDL looked at how flow augmentation impacted temperatures in the Tualatin, with the intent of quantifying how CWS could offset their thermal load via flow augmentation, however CWS’ WLA was developed independent of the flow augmentation they were already doing. Therefore, flow augmentation that occurred prior to 2004 will not be counted towards the total flow augmentation credit.

#### **5. Ch.2., Section D: Long Range Plans to Increase In-Stream Water Supply**

While we appreciate the long-term vision of CWS in looking for potential future sources for flow augmentation, it is important that both CWS and DEQ keep in mind that this TMP and the programs initiated under it pertain to attainment of the WLA established in the TMDL and translated through the NPDES permit for the next five years. For the trading program outlined in this TMP to work, CWS must plan a planting program which will result in sufficient shade to offset the total load minus flow augmentation credits by the end of the fifth year. This will require that CWS make projections based on water currently available for purposes of flow augmentation and not count on potential future flows which cannot be guaranteed at this time. We request that DEQ ensure that planning numbers submitted by CWS provide for this accounting.

CWS has indeed made projections based on water currently available for purposes of flow augmentation. The information on long range plans to increase in-stream water supply was provided for informational purposes only.

It should be noted that though CWS generally relies on flow available from Hagg Lake Reservoir for flow augmentation, alternatives exist. For example, CWS can negotiate the purchase of water from the Tualatin Valley Irrigation District or the Bull Run system.

It appears that 2005 will be an unusually dry year. Hagg Lake levels are currently considered reasonable for this time of year; however CWS will continue to monitor the situation and plan accordingly for any anticipated shortfalls.

## 6. Ch. 3, Section B: Calculating Credit for Shade

The 50% contingency factor for energy credits, to compensate for the 20 year time frame necessary to establish mature shade, is a good feature. More explanation is needed, however, about how adequacy of shade density will be guaranteed in addition to the contingency factor's effect of doubling stream miles planted.

CWS will insure adequacy of shade density through followup monitoring with triggers for replanting. The replanting trigger for a particular site will be 20% plant mortality. Justification for initial planting densities has been added to Chapter 4, Section A. In the event that followup monitoring indicates these planting densities need to be adjusted for future projects, they will be.

In later sections of this document, it is noted that this 2:1 trading ratio will only be utilized for streams greater than 7 feet and that a 1:1 ratio will be utilized for streams of 7 feet or less. This provision should be presented in this section and an explanation provided explaining why no contingency factor is required for delay on narrower streams.

The thermal energy budget is said to be calculated and reported each year, and that: "The goal, after accounting for other temperature management measures, is to achieve enough thermal load credits from shade that, by the end of the five-year permit period, Clean Water Services contributes, on average, no net thermal energy to the Tualatin Basin." We have three comments on this statement:

1) Please note that full offset of the thermal load is not only a goal but a requirement of the NPDES permit. **This fact is noted.**

2) It is not clear, even after following the hypothetical example in Appendix B, how the five-year goal ties in with the previous acknowledgment of the twenty years needed for shade coverage to develop fully. As we mentioned in our comments on Chapter 1, Section B, if the credit amount given within the first five years is based on the amount of shade anticipated to be provided by a project in 20 years, then that should be stated more directly. It would also be helpful to note how this will be carried forward and handled in years 6-20 of the trading project. The specific compliance and maintenance monitoring which will be used to ensure that the shade credits will, in fact, be at the projected level in 20 years' time, should be specified.

**The sentence about CWS contributing on average no net thermal energy to the Tualatin basin has been deleted. Explanation of what will actually be achieved at 5 years has been added. As to what happens in years 6-20, Table 5 in Chapter 4, Section D contains a 20 year monitoring schedule that lists monitoring for growth as well as for shade.**

3) It is unclear whether the permit requires the thermal energy budget to be balanced a annually utilizing a projected shade credit or only balanced after the completion of a five-year period. As we stated in our comments on Chapter 1, Section B, we believe it is important that annual balancing be required (acknowledging some uncertainty in that the shade projection is a projection over a 5-year period) and that CWS be required to adjust its plan for shade credits if the annual thermal energy budget reveals a net increase in thermal load to the river for any two consecutive years. Doing so would provide some

guarantee that the adaptive management measures discussed later in the document will be employed prior to the end of the five-year period.

Annual “balancing” is required. Table 4 of Chapter 3, Section F lists annual benchmarks, and Appendix B describes how annual progress will be reported.

### **7. Ch. 3, Section C: Credit for Shade Creation**

Prior to determining how much credit will be granted for shade creation, site-specific information on the level of shade provided by existing vegetation (prior to CWS’ active planting programs) must first be established. This should serve as the shade baseline and should be measured prior to any planting. This section should discuss the need for such a determination as well as how and when this site-specific shade baseline will be determined. It should also address how this will be integrated into the modeling and calculations utilized to determine the shade credit.

As currently written, it appears that the assumption is that 0 kcal/day of heat energy are blocked by existing shade, a condition which very rarely exists. What will be the process utilized when planting activities occur in areas with partially intact riparian habitat? The TMP suggests that this is an issue when stating later in the document that many high priority streams will have some shade coverage in place already and that there is an interest in adding the ability to create credits for shade protection in a later stage of the program. However, this issue needs to be addressed for calculating credits for shade creation, not just shade protection.

The need to take into account existing shade has been passed onto CWS. Chapter 4, Section D has been modified to state the following:

Clean Water Services will monitor shade levels at the start of each riparian restoration project, and then monitor changes in stream shade at regular intervals...

### **8. Ch. 3, Section D: Credit for Shade Protection**

This section discussed a potential additional source of credits, but it is not clear how these credits will be based on something surplus to those forested areas’ existing contribution to the baseline. As currently presented by CWS, EPA does not support this concept because this shade is already in place, factored into the TMDL’s baseline assumptions, and current land management programs typically require some maintenance of vegetation in riparian areas.

This section has been deleted.

### **9. Ch. 3, Section F: Program Implementation Time Frame/Benchmarks**

This section raises a new term, the “Shade Credit Goal.” It is unclear how this goal is being established, especially given the annual variability in conditions and flow augmentation presented in previous sections. It appears that this term is describing a 5-year goal for how many miles of riparian vegetation will be planted, with annual benchmarks for breaking the miles out into annual targets. A clearer explanation of how benchmarks will fit in with the annual thermal load to offset, the thermal energy budget, and the annual reconciliation process should be provided, to avoid the confusion created by these seemingly unrelated elements that tie into the shade credit concept.

The term “Shade Credit Goal” is defined in Chapter 3, Section C. A reference has been added to Section F to clarify this. Language has also been added to Chapter 3, Section C to clarify the meaning of the “Shade Credit Goal” and how it is related to the annual benchmarks.

Terminology in this section is confusing as it appears to be referring to a shade credit in terms of “Stream Miles Planted” when the rest of the document utilizes this term to refer to a heat load. Some discussion of the relationship between stream miles and heat load credits should be included here. The section should also note that a fuller discussion of how credits will be counted is provided in Appendix B.

As mentioned above, language has been added to Section C to clarify.

Table 4 implies that CWS will be establishing both a 5-year goal and annual shade credit goal, and will utilize these in planning and reporting. However, earlier sections of the TMP stated that flow augmentation will be variable from year to year and that CWS would like to maintain the flexibility to adjust flow augmentation needs based on yearly water supply and river conditions. Footnote 14 (at the bottom of page 18) also states that “actual miles will depend on the conditions that exist during the measuring period and the temperature management measures used. For example, the amount of water released for flow augmentation will have a substantial effect on the amount of shade needed.” EPA does not support the deferment of the important decision on how much to plant to an annual process with such variability in outcome. As CWS must offset the full amount of excess heat loading during the permit period, some decisions must be made now on how much of the heat load will be offset by shade credits and how much through annually adjusted flow augmentation credits. These projections should be provided in this TMP, in the form of commitments to an actual number of stream miles to be planted at the end of five years, with the appropriate benchmark numbers set for each year. Since the amount of stream miles is based on shade credit calculations, an explanation of how the final number was derived, and the distribution of the number of miles between high priority streams and the other categories would be helpful.

The TMP overstates the variability issue in that it does not mention that CWS has multiple options for achieving flow augmentation targets. In addition to Hagg Lake, CWS is able to purchase water from Tualatin Valley Irrigation District and the Bull Run system, and has done so in the past when flows from Hagg Lake proved inadequate.

Table 4 establishes a benchmark of 10% of shade credit “planted” in 2004. Given that it is December 2004 and public comments are not yet incorporated into the TMP, is this a realistic goal? If not, the benchmarks should be adjusted accordingly.

Though ideally the TMP should have been finalized in 2004, CWS and DEQ have been in regular communication on CWS’ progress in meeting their first year goals. CWS has been working with the Soil and Water Conservation District to enroll farmers in the incentive programs, and has more than enough enrolled to meet their first-year goals.

Please define the period covered by a permit year. Is it January 1 - December 31 or some other period?

The period covered by a permit year is March 1<sup>st</sup> to April 30<sup>th</sup>.

As currently written, CWS will report on its annual progress towards meeting the benchmarks but is not required to provide any cumulative accounting for the permit period. Since the shade credit is cumulative over the five-year period, it is important that both annual and cumulative numbers be reported every year. Reporting should be revised to reflect this change.

The sample report in Appendix B shows both annual and cumulative reporting. For clarification, the requirement to provide a cumulative summary has been added to Chapter 5, Section C.

This section outlines additional reporting which will be required by CWS if the shade credit created is less than 50% of the applicable benchmark. We recommend two changes be made to this: 1) Reports are triggered when either the annual or cumulative created shade credits fall short of an established percentage of the benchmark. 2) The level required to trigger a report outlining additional measures be much higher than 50%. A trigger value of 75 or 80% compliance would serve as a more reasonable reporting level, especially as what is not done one year will need to be supplemented in a following year in order to meet the requirements of the permit, for CWS and DEQ to address significant problems at an earlier date and allow for CWS to make appropriate adjustments to out-year planting plans. Please also refer to our comments on Chapter 1, Section B for how this section should be revised to reflect the preparation and implementation of plans if the benchmarks to create shade credits are not met within the 75 - 80% range three years in a row.

The phrase “50% of the applicable benchmark” is intended to refer to the benchmark for a particular year. Language has been added to clarify this. It would be redundant to require CWS to submit a report when the cumulative total is less than 50% of the cumulative benchmark, because CWS would already be submitting a report based on achieving less than 50% of an annual benchmark. In other words, if the cumulative benchmark is not met, there is no way all of the annual benchmarks could have been met and so the problem would already be receiving attention.

### **10 Ch. 3, Section G: Prioritizing Shade**

EPA agrees that it is important to prioritize the protection of the best salmon habitat and is happy to see that CWS has utilized a scientific tool which enables them to do use such prioritization in this project. In general, we concur with your prioritization criterion and encourage CWS to actively follow these as they implement the program.

We note that the high priority streams are those which have existing tree canopies of at least 42% while medium priority streams have an existing tree canopy of at least 11%. As noted previously, the presence of some canopy prior to implementation of a vegetation project will require that a baseline shade measurement be made prior to any work being conducted. This value should be incorporated into the baseline modeling or otherwise be considered such that the existing shade will not be erroneously included in the shade credit calculations. Calculations discussed in Appendix B should be revised accordingly.

The first sentence of Chapter 4, Section D has been revised to state:

Clean Water Services will monitor shade levels at the start of each riparian restoration project, and then monitor changes in stream shade at regular intervals to determine progress toward meeting the Shade Credit Goal established in Section B of Chapter 3.

The earlier section on “Calculating Credit for Shade” provides the first explanation of the contingency factors and trading ratios to be utilized in this project. To avoid confusion, we encourage you to be more consistent in terminology and unit of expression since that section speaks to a 50% contingency factor while this one refers to a 0.5 contingency factor, and Appendix B calls it a “safety factor” (which may not be the same thing). When discussed previously, it was noted that the contingency factor was to “account for the delay associated with the twenty-year time frame to establish shade.” While we concur that the time frame would likely be less for narrower streams, the planting will not immediately supply full shade as suggested by the elimination of this contingency factor and the establishment of a 1:1 trading ratio. Furthermore, the figure being utilized to support this decision does not provide any information regarding time to attain full shade and thus provides little actual support for this approach.. Neither could we find any information in Appendix B which would numerically support the elimination of this contingency factor. We request that this decision be reconsidered and, if retained, that further justification be provided which scientifically supports the reduction in the contingency factor. We further recommend that the revised contingency factor continue to account for the delay associated with growing shade, which does occur on both wide and narrow streams.

The elimination of the 2:1 trading ratio for streams less than 7 feet across is not based on hard data about the time to achieve shade on smaller streams, though anecdotal evidence indicates that vegetation height can grow to double the stream width on smaller streams in as little as five years. DEQ’s decision to go with a 1:1 trading ratio on smaller streams is based on the fact that DEQ wished to remove the strong disincentive that existed for restoring smaller streams, on the grounds that these smaller streams can provide valuable salmon habitat. With regards to the strength of the disincentive, the cost to restore a mile of stream is the same regardless of the stream width, yet the number of stream miles that CWS would have to plant to offset their excess thermal load doubles if they plant streams that are 5’ across as opposed to streams that are 10’ across.

In calculating the thermal energy blocked by riparian shade, or the shade credit, Appendix B never incorporates a contingency factor into the calculations. Instead it appears that a safety factor of 0.5 is utilized. As stated above, if these refer to the same thing, consistency in the use of terminology is needed.

Appendix B and the Revised TMP will be modified so that consistent terminology is used. Instead of the terms “safety factor” or “contingency factor”, the term “trading ratio” will be used. In the Revised TMP, this change affects the first paragraph of Chapter 3, Section B. In Appendix B, this will affect the sections entitled “Safety and Incentive Factors” and “Annual Thermal Credit Calculation”.

Finally, Appendix B introduces a new term “incentive factor” which is never addressed in the main document (in sections entitled “Thermal Energy Credit for Shade” and “Safety and Incentive Factors”). An incentive factor of 4 would be applied to all high priority streams. No explanation is provided for why shade generated on high priority streams should be given 4 times the credit as other streams. We believe this is an extremely high incentive, especially given that most high priority streams are likely also small streams and thus the 0.5 contingency factor would not be applied. Greater explanation and justification of the appropriateness of this high incentive is needed, starting in this section of the main document.

The incentive factor of 4 appears to be an artifact from early drafts of this document. It will be omitted. The paragraph entitled Safety and Incentive Factors will be re-titled to Trading Ratios and the body will be replaced with the following:

Because it can take a significant amount of time for riparian restoration projects to generate a significant amount of shade, a trading ratio of 0.5 will be applied to the solar loads blocked for streams over 7 feet across. For streams 7 ft across and smaller, a trading ratio of 1 will be used. The justification for this is that it does not take many years to establish substantial shade on a stream that is only 7 feet across. Furthermore, to apply a trading ratio of 0.5 to such streams amounts to a disincentive to do projects as is demonstrated later in this Appendix (see the discussion entitled “Effect of aspect and NSDZ width”).

#### **11. Ch. 4 Shade Program Implementation**

The basic assumption of this program is that CWS will ensure the trees planted will be maintained over a 20-year period, thus gaining credit during years 1-5 of the program (this permit cycle) for shade which will not be present until some time in the future. Therefore, it is extremely important that CWS provide a guarantee that the vegetation which provides the shade credits used to balance the thermal energy budget will be preserved for 20 years. This guarantee should be in the form of a more detailed monitoring and maintenance plan in which CWS performs its own on-the-ground inspections on a consistent basis, rather than relying on contracts with the partner agencies.

Agreed. The section has been modified to state:

...each site will be monitored on a detailed basis at least once annually by CWS. DEQ staff may participate in the annual monitoring, at DEQ’s discretion.

CWS should also provide a plan for how the length of contracts will better support the requirements of 20-year credit than are currently provided in the standard agreements between the enrolled farmers and the partner agencies. Several of the VEGBACC and Enhanced CREP programs which will be utilized to implement this program on private lands are 10-15 year lease programs. In addition, the Conservation Easement option under VEGBACC has no minimum length of time which the landowner would be required to maintain the land as a restored buffer area. While this might make the program more enticing to landowners, these options provide no assurance that the vegetative buffer and its associated shade values will be maintained for the life of the 20-year credit associated with the planting. Prior to receiving full credit for the future shade generated from plantings, CWS should be required to provide DEQ with a written assurance that the vegetation will remain in place for the full term of their 20-year

agreement. While we acknowledge that doing so may require CWS to secure agreements longer than the minimums outlined in the programs slated to be utilized, we believe that such an assurance must be a part of any legitimate trading program. (Credit can not be gained for a trade which is not guaranteed.)

DEQ and CWS have discussed this issue at length, and have modified Chapter 3, Section D on the Shade Programs to reflect this discussion and our joint understanding. To summarize: Enhanced CREP and VEGBACC were designed with input from the farming community, and it was clear from this input that requiring 20 years' of "no touch" would reduce participation rates in both programs significantly. CWS explored the various disincentives that already exist for landowners to clearing riparian areas prior to 20 years. These are now listed in the TMP. Based on the existence of these disincentives, CWS decided that their best chance for success overall would be to design programs so as to maximize landowner participation. The risk remains that not all planted areas will be in a mature vegetated state at the end of 20 years. This risk and the options for dealing with it will need to be re-evaluated with each permit renewal.

If some landowners do in fact clear planted areas prior to 20 years, CWS will have to re-plant to compensate. In an effort to avoid this expense, CWS has included in both programs the option of a conservation easement, which is less expensive than mitigation, and provides the farmer with significant financial incentives to keep vegetated buffer areas intact. Clean Water Services intends to explore other approaches to keeping planted areas planted as well.

## **12. Ch. 4, Section A: Planting Plan**

This section should address the minimum specifications which will be accepted relative to width of the planted strip and plant density. As the TMDL allocation is established at site-potential vegetation, at a minimum, the width and density should be such that this condition would be met. Selecting an appropriate planting width should also take into consideration the other elements of a healthy riparian area to be provided by this vegetated zone. These are specified in the TMDL and referred to at several places in this document.

The minimum buffer width for Enhanced CREP is 35 ft. and the "no touch" zone or buffer width for VEGBACC is 20 ft. The TMP has been modified to state this.

Re: buffer widths used to calculate system potential temperature in the TMDL, the modelers typically set these at 300 ft, which is well in excess of what is likely to be planted. It is also in excess of what is needed to achieve site potential for shade at the stream. By using a greater buffer width than necessary to achieve site potential for shade at the stream, the model in effect contains a safety factor with respect to the impact of the buffer on stream temperature. CWS is not required to plant buffers identical to these. They may plant whatever buffer width a particular landowner and site conditions will support. The maximum buffer width allowed for under CREP is 185 ft., and this will be the maximum buffer width that CWS will pay for as well. The amount of credit they get for a particular project will depend on the amount of shade that the Shade-a-Lator spreadsheet tool says can be achieved. The Shade-a-Lator just mentioned is the same tool that was used to develop the TMDL.

As for planting densities, justification for initial planting densities has been added to Chapter 4, Section A. In the event that followup monitoring indicates these planting densities need to be adjusted for future projects, they will be. CWS will insure adequacy of shade density through followup monitoring with triggers for replanting. The replanting trigger for a particular site will be 20% plant mortality.

### **13. Ch. 4, Section B: Plant Supply**

VEGBACC participants will be able to sell cuttings to CWS to help supply native nursery stock for more restoration work. There should be some discussion of the amount of cuttings that can be removed from a parcel of land and how that reduction in shade will be accounted for in the shade credit calculations. Instead, according to Appendix D, the amount of cuttings is left as an item to be negotiated in the contract with TWSCD.

CWS has negotiated a 20 ft. “no touch” zone with TWSCD.

### **14. Ch. 4, Section C: Maintenance and Monitoring Plan**

The relationship between the partner agencies and their contractors with CWS is not clear, especially as it relates to incorporating the need for CWS to be able to conduct its own monitoring and maintenance inspections on the participant’s property. This document should specify who is conducting the monitoring and whether or not the frequency and type of monitoring that CWS needs to have done will be incorporated into the site plans. To the extent that CWS is relying on the partner agencies to monitor, CWS must provide some review and oversight of that monitoring, such as periodically accompanying the partner agencies on site inspections. In addition, DEQ must be allowed access to inspect sites and review monitoring as may be appropriate for purposes of assessing compliance.

This section has been modified to state the following:

...each site will be monitored on a detailed basis at least once annually by CWS. DEQ staff may participate in this annual monitoring, at DEQ’s discretion.

The section should also describe the measures which will be taken to maintain the density of plantings, since the only discussion about this is in Appendix D, in which agreements with the farmers limit the number of replacement plants provided to them at no cost. Presumably a farmer that does not maintain and replace plantings to sustain a specified density will be dropped from the program, but that is not discussed nor is the implication that has for the amount of shade credit that can be claimed over the course of the 20 year term. DEQ’s role in assessing the amount of credits substantiated by sites with valid shade coverage should also be discussed, and what CWS’ contingency measures will be in years 6 - 20 for credits that are later determined to be invalid due to less shade created than originally anticipated.

Justification for initial planting densities has been added to Chapter 4, Section A. CWS will conduct follow-up monitoring with triggers for replanting. The replanting trigger for a particular site will be 20% plant mortality. In the event that follow-up monitoring indicates that planting densities need to be adjusted for future projects, they will be.

As for DEQ's role in assessing the amount of credits substantiated by sites with valid shade coverage, the TMP has also been modified to allow inspection of riparian restoration projects by DEQ staff.

As mentioned in response to comment 12, there is a risk that not all planted areas will be in a mature vegetated state at the end of 20 years. With each permit renewal, the efficacy of the various incentive programs will have to be re-evaluated. The results may indicate a need for modifications.

Chapter 3 of the TMP lists possible measures that will have to be undertaken if benchmarks are not met. They include:

- Changes to landowner incentive programs
- Increased program marketing efforts
- Additional program staff/contractor resources
- Purchase/release of additional flow augmentation water
- Increased effluent reuse.

A footnote in this section states that “under the VEGBACC program, agreements concerning the minimum amount of time land will remain in vegetated buffer status are not required. However, incentives such as conservation easements and cuttings contracts are available to keep land in vegetated buffer status.” The fact that the 20-year credit is not guaranteed to align with the length of the VEGBACC agreement is an important issue, so it should be addressed more directly in the main body of the document and a plan cited for how CWS will actively use conservation easements with VEGBACC participants to address that concern.

The possibility of drought conditions, pests, and invasive species affecting new plantings' survivability is another issue that is not addressed sufficiently. While remedies may be referenced in site plans prepared by CWS or partner agencies, the need for CWS to monitor in a timely manner should be discussed here.

DEQ addressed these issues in response to comment 11 and to earlier portions of comment 14.

As mentioned in the comments for the previous sections, CWS should provide a detailed description of how it plans to monitor and enforce the terms of the contracts it holds with the partner agencies, including its own site inspections of the enrolled farmers' planted areas.

DEQ addressed these issues in response to earlier portions of comment 14.

#### **15. Ch. 4, Section D: Shade Monitoring**

The reference to the Shade Credit Goal should be to Section B of Chapter 3, not Chapter 2.

This correction has been made.

#### **16. Ch. 5, Section C: Reporting Requirements**

In addition to reporting the annual thermal loadings, the cumulative thermal budget for the permit cycle should also be provided. This would provide a means to access the overall progress towards meeting the 5-year permit requirements.

If the “Annual CWS Thermal Budget” table presented in Appendix B will be utilized to submit the required reporting data, this should be stated here.

The cumulative thermal budget will be included in the annual reporting. It is already listed in the sample report in Appendix B. Chapter 5, Section C now contains a reference to it as well.

## **II. Comments on Appendix B. Technical Documentation, Clean Water Services’ Temperature Management Plan**

### **17. Temperature Changes Associated with Flow Augmentation, Empirical functions (p. 9)**

It would be helpful if this section included a statement of how these equations and the  $\Delta T$  will be utilized in determining the energy credit for augmentation. This may consist of referring the reader to the later section “Thermal Budget for Clean Water Services Tualatin Activities, Thermal Credit for Flow Augmentation.”

The following sentence will be added to page 9 of Appendix B:

These equations will be used in CWS’s annual reporting to quantify the temperature differences resulting from flow augmentation.

### **18. Thermal Energy Blocked by Riparian Shade (p. 11)**

It appears that a projected canopy density will be utilized in these calculations which represent a “fully planted” condition. What guarantee is there that all reaches will be planted and maintained at such density? This should be addressed here and/or in the main document.

As stated in response to comment 11, justification for initial planting densities has been added to Chapter 4, Section A. CWS will conduct follow-up monitoring with triggers for replanting. The replanting trigger for a particular site will be 20% plant mortality. In the event that follow-up monitoring indicates that planting densities need to be adjusted for future projects, they will be.

The Shade-A-Lator utilizes a 15 foot interval for recording riparian widths. However, no protocol is provided for situations where the planted width is not a multiple of 15 (i.e. 15, 30, 45 feet). We recommend that such a protocol be added and that the planted width be rounded down to the nearest 15 foot interval (i.e. 15-29 feet is entered at 15 feet; 30-49 feet is entered at 30 feet). This method will ensure that credit is not received for shade in riparian widths not planted.

Shade-A-Lator is a spreadsheet that can be modified to use intervals other than 15 ft. and it will be modified as needed to evaluate specific projects.

This section should discuss how pre-existing baseline vegetation/shade will be accounted for in the calculations.

The first sentence of Chapter 4, Section D has been modified to say:

Clean Water Services will monitor shade levels at the start of each riparian restoration project, and then monitor changes in stream shade at regular intervals to determine progress toward meeting the Shade Credit Goal established in Section B of Chapter 3.

**19. Thermal Budget for Clean Water Services Tualatin Activities (p. 16)**

The introductory portion of this section needs to clearly define what is required on an annual basis and what is required over the five-year period. It is unclear whether the annual thermal budget must be balanced (based on the projected shade credit over a five year period) on an annual basis. This is critical in understanding how the basic elements of the trading project will operate.

Chapter 3, Section F lists annual benchmarks. The first paragraph on page 16 of the Appendix B needs to be modified to reference these benchmarks.

In the TMP it was noted that certain measurements would be based on average annual conditions during July and August. Specific information regarding the time frame and duration of data needed to calculate input values for all equations in this section should be provided in the section to ensure that the user has the information available to accurately apply the equations and derive the thermal budget.

Annual reports will be reviewed to insure they include information sufficient to allow the user to apply the equations and derive the thermal budget.