Frequently Asked Questions

Water Quality Trading

1. What is water quality trading?

Guidance from the EPA on water quality trading defines water quality trading as a tool to achieve water quality goals more efficiently. It allows one source to meet its regulatory obligation by using pollutant reductions created by another source that has lower pollution control costs. Trading may only take place when a source reduces pollution beyond levels required by federal or state regulations. Trading capitalizes on economies of scale and control cost differences among sources. It is a watershed approach based on voluntary partnerships at the local level.

2. Is water quality trading the same as pollution trading?

Yes. The terms water quality trading, pollution trading and effluent trading are used interchangeably.

3. Why is trading being incorporated into the permit for CWS?

Trading will help Clean Water Services improve water quality in the Tualatin River more efficiently. Water quality trading also allows for more innovative pollution reduction strategies that can meet multiple objectives. For instance, mitigating the temperature impact of Clean Water Services' wastewater treatment facilities by restoring riparian areas and releasing cool water from upstream reservoirs provides multiple benefits for fish, wildlife and the community that a technological approach focusing exclusively on temperature reduction could not.

4. Describe the trade that is being proposed in the permit.

Two trading programs are being proposed:

Oxygen demanding parameters: The proposed permit will include a water quality trading plan for the oxygen demanding parameters CBOD and ammonia. In this plan reductions in these parameters may be traded between Clean Water Services' Rock Creek and Durham Advanced Wastewater Treatment Facilities, according to a formula to be included in the permit that will ensure water quality in the Tualatin is protected. In addition to water quality benefits, this will provide greater flexibility in plant operations and potential cost savings for rate payers.

Thermal Load: The proposed permit will include an excess thermal heat load for the Rock Creek and Durham Advanced Wastewater Treatment Facilities which Clean Water Services will be required to offset. How Clean Water Services proposes to offset this thermal load will be included in a trading plan that will be developed after the permit is issued. It is anticipated that Clean Water Services will propose to offset this thermal load by increasing river flow through the release of cool water from Scoggins or Barney reservoirs, and by implementing a stream surface shading program through tree planting in riparian areas in the basin.

Questions Regarding Dissolved Oxygen (DO) Trading

1. What pollutants will be traded?

The two pollutants impacting dissolved oxygen that will be traded are ammonia and CBOD (carbonaceous biochemical oxygen demand). Both of these pollutants can consume dissolved oxygen in the water, though they do it in different ways and at different rates.

2. Where will the trading occur?

Trading will be allowed between the Durham wastewater treatment plant and the Rock Creek treatment plant, and within the plants themselves. The trading within the plants will be between ammonia and CBOD, while the interplant trading could involve just one or both of the pollutants.

3. How will the trading be regulated?

The trading will be regulated by the NPDES permit issued to the wastewater plants. The mechanism describing allowable trades will be in the permit along with requirements for reporting on the trades.

4. Will DO trading result in lower DO values for the Tualatin River?

No, the permit is designed to ensure that the dissolved oxygen levels in the river remain equal to, or greater than, the levels targeted in the Tualatin TMDL (Total Maximum Daily Load).

5. Will there be any impacts on the tributary streams in the basin?

Under the proposed permit, the pollutant trading related to dissolved oxygen will be not have any impact on the tributary streams.

Questions Regarding Temperature Trading

1. Explain how the temperature trade can benefit the environment.

The 2001 TMDL for temperature requires Clean Water Services to reduce the temperature impact of its treatment plants on the Tualatin River. The most plausible technological control option would be to install refrigeration equipment to cool the effluent. This would not only be extremely expensive, but it would have negative consequences for the environment.

Clean Water Services has estimated that it would cost between $60 to $150 million to install the necessary refrigeration equipment at both treatment plants. Yearly operational costs would be between $2.5 and $6 million. Significant amounts of electricity would be required to power the refrigeration equipment. If the electricity came from hydroelectric dams, salmon migration would be impacted. Electricity from conventional power plants would increase air pollution and contribute to global warming. In addition, the water quality benefits of refrigeration would be limited to a very small part of the watershed, the part of the Tualatin River that lies directly downstream of the treatment plants.

Because of the expense associated with refrigeration, the environmental side effects and the limited environmental benefit, DEQ and CWS have decided to consider water quality trading for dealing with the excess thermal load from the CWS treatment plants.

Clean Water Services is proposing three methods to meet its permit requirements for temperature and is continuing to explore other opportunities. The proposed methods all involve trading in one form or another.

Effluent reuse in lieu of irrigation withdrawals is proposed for the irrigation of non-food crops. Under this approach, willing farmers would trade their water rights in local streams or their right to stored water in Scoggins Reservoir for effluent. This would maintain current flow levels in the Tualatin and its tributaries while reducing temperature. Effluent reuse is widely-practiced throughout the state.

Another proposed approach is **flow augmentation**. Clean Water Services owns flow augmentation water in Scoggins and Barney reservoirs that it currently releases during the low-flow summer months. The release of this water can be managed to partially offset its temperature impacts. This water is cooler than the Tualatin during the warmest part of the summer. In addition, increasing the amount of water flowing in the river also helps reduce warming from the sun because the water is deeper and moves faster.

Riparian shading, which basically means planting trees along streams, is also being proposed. When the surface of the river is shaded, the sun is not able to warm the water. There are many miles of stream in the Tualatin Basin that lack adequate shade. Shading areas highest in the basin makes the most sense because shade along a stream does not actually cool it, instead it reduces the rate of warming from the sun. Increasing shade also provides ancillary benefits, such as reduced erosion and increased wildlife habitat.

2. Where will CWS plant trees in order to offset their temperature impact?
Clean Water Services will be prioritizing areas to plant based so as to maximize benefits to sensitive areas. It should be noted that the extent to which CWS will be able to plant in these areas will be dependent on the extent to which landowners choose to participate.

3. Doesn't the temperature TMDL for the Tualatin require farmers to plant trees on their own? How can DEQ give credit to CWS for something the farmers are already supposed to be doing?

The TMDL says that "nonpoint sources", which includes agriculture, are not supposed to impact stream temperature. To achieve this goal, farmers are supposed to comply with plans developed by the Oregon Department of Agriculture. It should be noted that the administrative rules being developed by Oregon Department of Agriculture for the Tualatin basin do not state that farmers must plant trees. Instead, they state that "By January 1, 2005, agriculture activities must allow for the natural or managed regeneration and growth of vegetation, consistent with the site capability, that is adequate after sufficient growth, to provide erosion control, streambank stability, and minimization of direct solar heating."

In the Tualatin basin, streams with less-than-adequate shade are commonly dominated by Himalayan blackberry and reed canary grass. The reason that ODA does not require active planting of trees in areas dominated by these invasives is that ODA views their presence as a legacy condition. ODA does not believe that farmers should be required to actively plant areas impacted by so-called legacy conditions. A legacy condition is a condition resulting from management actions taken a long time ago. The reason that Himalayan blackberry and reed canary grass have taken over is that decades ago, the conventional wisdom developed that removing (then-native) vegetation from streambanks would allow agricultural fields to drain more quickly. This was true as far as it went, but there turned out to be a number of unintended consequences to removing native vegetation. In particular, nonnative invasive species proved able to colonize the disturbed areas much faster than native plants were able to. Removal of native vegetation has also led to increased erosion with subsequent changes in channel shape, water table level, stream flow, temperature and ecology. We are still struggling to understand these changes and what we can do about them.

4. How did DEQ decide that CWS could get credit for cooling achieved by planting trees for a 20 year period?
The 20 year period was arrived at after consideration of local conditions and the other options available to CWS. As mentioned above, in the Tualatin basin, areas with less-than-adequate shade are commonly dominated by Himalayan blackberry and reed canary grass. Local experts on riparian vegetation agree that these form an extremely stable monoculture, and shade-producing vegetation consisting of overstory trees will not develop in such areas unless there is active planting. One could argue that if this is the case, then CWS should get credit for the trees they plant for as long as they make sure the trees stay planted. However, to do so would be considered double-counting, that is,

giving CWS credit for creating shade that should ultimately be the responsibility of nonpoint sources in the basin.

In light of this, DEQ has decided limit the duration of the credit to 20 years, which is approximately equal to the useful life of mechanical refrigeration equipment.

It should be noted that while mechanical refrigeration would be extremely expensive for CWS to install, restoring native riparian vegetation will also present significant challenges. Restoring native vegetation will not only require initial removal of invasives followed by planting of native species, but followup work to control invasives will also be required.

The bottom line is, restoring riparian areas to native vegetation is possible, but it is labor intensive and it cannot be done for free.

5. How big an area will CWS have to plant to offset their temperature impact?
Clean Water Services has several options for reducing their temperature impact, and riparian planting is only one of these options. Under the terms of the draft permit, Clean Water Services is required to develop a plan (within 90 days) stating how much cooling they expect to achieve via the various options mechanisms at their disposal.

6. If we don't know how big an area CWS will have to plant, how do we know that planting is cheaper than refrigeration?
The revised temperature management plan, due 90 days after issuance of the final permit, will address this question. This revised temperature management plan will be subject to public review and comment.

7. What does CWS know about planting trees?
Clean Water Services will rely on its partners in the riparian restoration work – the USDA, ODF, and SWCD. These organizations are routinely involved in riparian planting projects. Clean Water Services will set up the planting programs, help with the funding, and make sure that its partners perform in accordance with contract requirements. In the last seven years, Clean Water Services has been responsible for restoring about seven miles of stream. In addition, the District has proactively pursued riparian restoration in the Tualatin Basin by establishing a native plant nursery, funding community-based riparian restoration projects with SOLV, Friends of Trees, The Wetlands Conservancy, Tualatin Riverkeepers and other community groups, and forming the Tualatin Watershed Enhancement Coalition.

8. How will DEQ insure that the temperature trade works out as intended?
The draft permit directs CWS to submit, within 90 days of final permit issuance, a detailed temperature management plan for how it intends to offset its temperature impact. The plan, which will be subject to DEQ approval, will include a description of landowner

incentive programs, as well as how planting, maintenance, monitoring and shade measurement will be performed. Compliance with the permit will be established by how well CWS follows their approved plans.

9. Does DEQ anticipate that EPA will approve this permit?

US EPA policies support watershed-based permitting and water quality trading. DEQ and Clean Water Services have made a number of presentations to both regional and national staff to keep them apprised of the progress on the permit and trading framework.

10. Where else is trading happening?

This trade involving CWS is the only trade actively being pursued in Oregon at this time. Trading is being practiced on a limited basis in other states in the country. Oregon is the only state in the country where a temperature trade involving riparian restoration is being pursued.

The following questions were raised regarding trading at the Open House held on 10/23/03 at the Tualatin Valley Nature Park on Clean Water Services' permit application.

1. What is being "traded" by CWS and others regarding temperature?
The draft permit allows CWS to trade cooling that could be achieved at the plant via mechanical means, for cooling to be achieved higher up in the watershed via other means, such as flow augmentation or riparian shading. The units for the excess thermal load that CWS needs to offset are given in the TMDL as kcal/day.

2. Is there a TMDL allocation "trade-off" when establishing a trade?
The meaning of the question is unclear. Please contact Sonja Biorn-Hansen at (503)229-5257 to clarify.

3. What about low flow (drought) conditions – what are the comparative benefits between shading and refrigeration?
The wasteload allocation in the TMDL is a fixed number intended to provide protection during the low flow condition known as the 7Q10 flow. The 7Q10 flow is the lowest weekly average flow likely to occur in a 10 year period. It can also be thought of as the driest week in 10 years.

It is hard to say whether the difference between shading and refrigeration would be diminished or expanded during a drought event. That is because not all streams in the basin would be impacted in the same way by a drought, and the impacts of shading and refrigeration would occur in different parts of the basin.

4. Will any sections of the river be written off in a watershed-based permit and/or with trading?
The draft permit directs CWS to develop a methodology for prioritizing areas in the Tualatin Basin where riparian restoration projects could take place in order to maximize the benefits of the proposed projects for the projection of the most sensitive beneficial uses.

The amount of restoration that could potentially be accomplished as a result of this permit will be a very small percentage of the total stream miles in the basin. The Department does not view identifying particular areas as good candidates for restoration to be equivalent to "writing off" other areas.

5. Is shading a cost effective way to deal with temperature?
The Department has collected figures for restoration costs from the City of Portland and other groups in the basin, and the results seem to indicate that riparian restoration is a less expensive option than refrigeration.

The temperature management plan that has been submitted by CWS lists a variety of other options available at the plant for reducing effluent temperature. The revised

temperature management plan that will be due 90 days from the date of final permit issuance will contain additional information.

6. How long will it take to get shade benefits from planting trees? How will the calculated shading benefits reflect changes in the wastewater treatment facilities' discharge volume (e.g. how will growth be taken into account in the trading program)?

The thermal wasteload allocation given in the permit already takes into account growth by assuming a larger-than-current discharge volume. Since the excess thermal load that must be offset is based on this wasteload allocation, changes (increases) in the discharge volume are already accounted for.

As for how long it will take to get shade benefits from planting trees, that will depend on a variety of factors such as how wide the stream is, what gets planted and how favorable conditions are to plant growth.

The Department believes that considerable benefit can be achieved in the 20 year timeframe that has been defined for temperature credits. Overstory trees such as Douglas fir will not attain maturity in this timeframe, however there are a number of native species such as ninebark which can attain reasonable height and achieve a closed canopy over a small stream (one that is 10 to 20 ft across) within 10 to 20 years.

7. How will the uncertainty and variables associated with planting/shading be addressed in the trading conditions of permit?

The draft permit directs CWS to submit a revised temperature management plan within 90 days of issuance of the final permit, and Schedule C of the draft permit directs CWS to include in this plan information pertaining to planting/shading. Information required in the revised temperature management plan are a planting plan that includes expected plant survival rates, justification for planting densities, a monitoring plan to assess plant survival and a maintenance plan that will promote plant survival. The intent of these requirements is to ensure the success of riparian restoration projects, despite uncertainty and variability associated with planting/shading work.

8. Where can I get a copy of the cost analysis for refrigeration and maintenance projections?

The temperature management plan submitted by CWS contains some cost information pertaining to refrigeration. Comments and questions pertaining to the cost of refrigeration may be submitted during the public comment period. The revised temperature management plan that will be due within 90 days of issuance of the final permit will contain additional information.

9. How can effluent reuse be part of a trade?

Effluent reuse, which refers to the use of sewage effluent for irrigation, is an option by which CWS can reduce, rather than offset, their excess thermal load. Strictly speaking, effluent reuse is not "trading", though it is often mentioned in conjunction with actions

such as riparian restoration and flow augmentation, both of which the Department considers to be trading.

10. What alternatives has CWS considered in addition to refrigeration vs. trading?

The temperature management plan lists various alternatives for reducing the temperature of CWS' effluent. CWS may choose to consider other alternatives in the revised temperature plan that is due within 90 days of the issuance of the final permit. The draft permit states that "If the permittee wishes to propose other thermal credit trading options for consideration by the Department along with a technical justification for how much thermal credit it should be granted for such actions, it may do so."