

## Walla Walla Basin in Oregon: Temperature TMDL

### Water Quality Concerns

The Walla Walla River and several tributaries do not currently meet water quality standards for temperature. Attaining these standards assures that beneficial uses of the rivers, such as swimming, fishing and drinking water sources are protected. Oregon DEQ is issuing temperature targets and an improvement plan to address stream and river heating in the Basin.

### Total Maximum Daily Load

Watershed temperature assessment and planning is carried out through the Total Maximum Daily Load (TMDL) process. TMDL goals for the Oregon part of the Basin have been developed in coordination with a similar effort in Washington. When water quality standards are not met, the federal Clean Water Act requires a TMDL to be established. A TMDL is the maximum amount of pollution that can be present in a water body without exceeding standards. It identifies where pollution comes from within the basin and “allocates” the pollution loads among different land use authorities. In other words, it specifies a maximum amount of pollutant, in this case heat, for each source.

### The Problem

The Walla Walla River and its tributaries are not cool enough in the summer to fully protect salmon and trout (salmonids) when they rear and spawn. The Walla Walla Basin salmonids that are most sensitive to this heating are: chinook salmon, steelhead trout and bull trout, present in much of the Basin.

During the summer and early fall, low stream flows and high solar input cause the water temperature to rise to levels that can be deadly to cold water species. At temperatures above 65-70 °F, these fish are inefficient at hunting, hiding and processing food. In addition, warmer water can also harm salmonids by increasing the incidence of disease, impairing their ability to spawn, reducing growth rates, and decreasing survival of eggs.

### Temperature Standard

The Oregon water quality standard for temperature (revised in 2004) includes biologically-based temperature targets and accounts for naturally high temperature. The TMDL assessment found that natural temperatures are relatively high (Figure 1). Given this situation, not uncommon in Eastern

Oregon, the following text in the standard describes the objective addressed by the TMDL:

*Natural Condition Criteria. Where the Department determines that the natural thermal potential of all or a portion of a water body exceeds the biologically-based criteria in Section (4) of this rule, the natural thermal potential temperatures supersede the biologically-based criteria, and are deemed to be the applicable temperature criteria for that water body.*

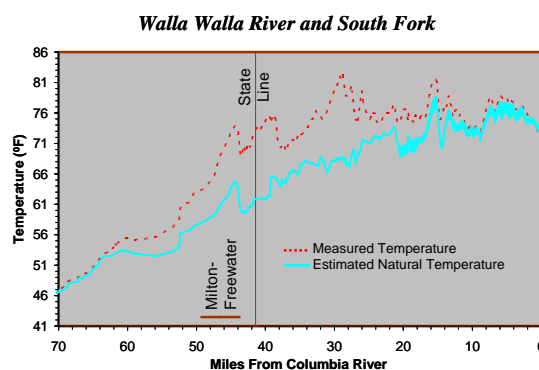


Figure 1. Typical August Afternoon Temperature

In the Walla Walla Basin, a substantial cause of stream heating results from the removal of trees and other shade-producing vegetation adjacent to the stream. This allows direct sunlight to heat the water. In addition, vegetation disturbance and stream straightening are common causes of bank erosion in the Basin, resulting in wider channels with more solar heating.

### Addressing the Problem

The TMDL addresses the problem in several ways:

1. Provides an estimate of near-natural temperatures along the length of the Walla Walla River. This allows managers to see where the greatest room for improvement is.
2. Establishes numeric goals for on-the-ground conditions that would lead to more natural temperatures. The TMDL identifies vegetation heights and stable channel widths that would provide for lessened, more natural, heating. Potential increased stream flow is also estimated, along with a resultant temperature profile. However, it is important to recognize that DEQ does not regulate flow, nor is the TMDL intended to diminish existing water rights.



State of Oregon  
Department of  
Environmental  
Quality

Water Quality Division  
Eastern Region  
700 SE Emigrant Suite 330  
Pendleton, OR 97801  
Phone: (541) 278-4603  
(800) 452-4011  
Contact: Don Butcher,  
Water Quality Division;  
[www.deq.state.or.us](http://www.deq.state.or.us)

3. *The TMDL is accompanied by a management plan designed to establish a cooling trend.* A TMDL Water Quality Management Plan (WQMP) provides a framework with placeholders for various authorities: Oregon Departments of Agriculture and Forestry, the US Forest Service and US Bureau of Land Management. These designated management agencies (DMAs) will provide TMDL water quality management planning and implementation for the area each administers.

#### **TMDL Analysis**

DEQ worked in partnership with the Walla Walla Basin Watershed Council and in collaboration with the various affected organizations and watershed managers. This effort advanced our understanding of the river.

Based on historical information, existing areas with little disturbance and literature, a TMDL team estimated natural thermal conditions for the Walla Walla River and the South Fork up to it's confluence with Skiphorton Creek, totaling roughly 70 miles of river. A resultant temperature profile is shown in *Figure 1*. Many other temperature profiles were generated to account for varying levels of shade, channel width and flow. The outcome of the study is summarized here:

- Increased vegetation, increased flow and decreased channel width would all lead to similar reductions in stream heating. Each of these factors will need to be addressed in order to attain a more natural heating pattern.
- The upper South Fork is managed with special protections by the Umatilla National Forest and is already at natural temperatures.
- Substantial heating occurs in the Milton-Freewater levee and further downstream, due to low flow, vegetation reduction and a widened channel. Much of the flow loss is due to irrigation diversion, some due to bed loss.
- Channel straightening has led to a fifty percent increase in channel width in parts of the Basin.
- From the South Fork at Harris County Park to the mouth of the Walla Walla River, vegetation has been compromised. Most of the river has the potential for large willow, cottonwood, alder and other trees.
- Roughly 50 percent of the existing solar heating of the River is caused by human activities such as vegetation and bank disturbance.

Meeting the TMDL allocations will require reductions in heating associated with agriculture, forestry, and transportation corridors. In general, this means restoring stream-side areas so that banks are stable and vegetated. Where feasible,

floodplains, sinuosity and channel complexity should be restored to more natural conditions. The TMDL management plans and land use authorities should provide guidance, planning, incentives and rules to implement these measures.

#### **TMDL Documentation & Implementation**

The TMDL and management plan is a single document, about 180 pages in length. Part 1 contains the TMDL numeric objectives and Part 2 is the WQMP. The lengthier technical appendix describes the evaluation and computer modeling of flow, heating and temperature; for those who seek an understanding of how the TMDL allocations were developed.

The management plans that will fill in the placeholders of the WQMP are expected with 18 months of TMDL issuance. The Agricultural Water Quality Management Area Plan already has been developed by local stakeholders and approved by the Oregon Department of Agriculture. The agricultural plan will be revised as needed for TMDL implementation. Stream heating related to non-federal forestry activities will be controlled through the Oregon Forest Practices Act. The other designated management agencies will develop and carry out TMDL Implementation Plans to address sources of heating which they have jurisdiction over.

#### **Adaptive Management**

An "adaptive management" approach is employed to implement TMDLs. This involves ongoing tracking and evaluation of actions taken to reduce pollution. If TMDL implementation efforts prove to be inadequate, DMAs will need to revise their TMDL Implementation Plans.

If DEQ, in consultation with DMAs, concludes that all feasible steps have been taken to meet the TMDL and attainment of a standard is not practicable, DEQ will reopen and revise the TMDL as appropriate. DEQ will also reopen the TMDL if new information indicates that updating is needed.

#### **For more information**

For more information, contact Don Butcher at (541) 278-4603, Mitch Wolgamott at (541) 278-4619, Bob Bower at (541) 938-7086 or use the toll-free number in Oregon at (800) 452-4011. The TMDL document can be viewed at: <http://www.deq.state.or.us/wq/TMDLs/TMDLs.htm>