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TMDL Allocations and Water Allocations - Reconciling Quality and Quantity

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TMDL Allocations and Water Allocations – Reconciling Quality and Quantity

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A Total Maximum Daily Load (TMDL) allocates pollutants among sources, with the goal of meeting State or Tribal Water Quality Standards. Water resources are allocated among users by a variety of mechanisms including water rights and adjudication. Although the TMDLs and water resources are managed by two separate processes, in the real world water quality and quantity are often closely linked. Addressing those linkages can be challenging, given the institutional barriers. But where linkages can be identified, there may be opportunities to manage water quality and quantity concurrently.

A TMDL technical analysis often relies on an accurate understanding of the flow regime of the waterbody under consideration. For many of the most commonly impaired parameters – dissolved oxygen and temperature for example – the critical flow is during the summer low flow. Statistical measures of historic low flow, such as the seven-day ten-year (7Q10) discharge, are usually required, but may not accurately assess future flows where water withdrawals are increasing over time or where flow is regulated by an impoundment.

Modeling for a TMDL requires an accurate flow balance, including surface water withdrawals and ground water inputs which may be affected by ground water withdrawals. Obtaining accurate information on historic flows, current rates of withdrawal, or future trends can be very challenging.

Once TMDL is developed and adopted, compliance with the TMDL may depend on how instream flows are managed. Pollutant allocations may depend on the flow levels used in the TMDL development, and further reductions in flow may allow standards to be exceeded. This may occur due to loss of dilution, shallower flow, slower stream velocities, or loss of cool ground water inflows. A perfected water right cannot be regulated under water quality law. However under water resource law, some water permit decisions, such as application for a water right transfer or for a new permit, can be conditioned to support compliance with a TMDL.

Several case studies will be summarized to illustrate these issues.

In the Upper Chehalis dissolved oxygen TMDL, a flow balance was developed for 7Q10 conditions that included estimates of direct water withdrawals and ground water inflows. The TMDL set zero allocations for wastewater discharges from the Cities of Centralia and Chehalis, which required a compliance plan for the removal of their permitted discharges during the critical low flow period. Studies of the Upper Chehalis Basin have shown that water resources in the basin are over-allocated, so concerns had to be resolved about reduced flows from the removal of the wastewater discharges under the TMDL. Also, several applications for water withdrawals were denied based on the TMDL.

The Lower Snohomish Estuary dissolved oxygen TMDL set limits on wastewater discharges for local municipalities in the Everett, Washington area. Modeling for this TMDL also identified impacts from the exercise of water rights, by showing that lower flows resulted in lower dissolved oxygen. During the TMDL a local water agency applied for the transfer of an existing water right held previously by a pulp mill. Processing of the transfer required quantification of the perfected portion of the right. Since a TMDL cannot set allocations for a perfected water right, the water right became part of the TMDL's "background" conditions. Ultimately however, the transferred water right included a condition limiting use of the water right during conditions when the TMDL had identified the potential for water quality impacts.

The Teanaway River Temperature TMDL identified a variety of practices to improve temperature in a rural watershed on the east slope of the Cascades. The TMDL analysis had shown that improved riparian buffers could increase shading, but flow quantities and the timing of flows could also impact temperatures. Water withdrawals and changes in watershed conditions have resulted in increased high flows and decreased low flows. The high flows caused erosion and increased bed sediment load, which resulted in shallower, wider channels susceptible to increased heating. Low summer flow decreases channel depth and thermal mass, also allowing increased heating. The TMDL relies on existing programs and voluntary controls to address flow problems, such as salmon recovery habitat restoration projects, instream flow studies under the state Watershed Planning Act, and a water right buy-back program using grant funding.