

### **Temperature and Total Maximum Daily Loads**

Water temperature deeply affects the biological cycles of aquatic species; if temperatures are too high (and in many places they already are), threatened and endangered salmonid populations throughout western Oregon face dire consequences. Water temperatures are influenced in general by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. Surface water temperatures are warmed by anthropogenic activities such as discharging heated water, changing stream width or depth, reducing stream shading, and water withdrawals. OAR 340-041-0028(1).

It is the established policy of the Oregon Department of Environmental Quality (DEQ) to protect aquatic ecosystems from adverse warming and cooling caused by human activities public and private. The policy is intended to encourage the protection and restoration of critical aquatic habitat, by minimizing the risk to cold-water aquatic ecosystems from anthropogenic warming to, and controlling extremes in human-caused temperature fluctuations. The DEQ further recognizes that, even in their natural condition, some of Oregon's salmonid-bearing waters do not provide optimal thermal conditions at all places and at all times. This makes it especially important to minimize additional warming due to anthropogenic sources. OAR 340-041-0028(2).

To ensure that water temperatures are maintained and restored for salmonid viability, the DEQ has set total maximum daily loads (TMDLs) that define the maximum amount of heat loading that can enter into a waterbody without violating the water quality standard. Because TMDLs include estimates of pollutant loadings from all sources, including non-point sources and natural background levels, they allow for a comprehensive assessment of what reductions are necessary to achieve water quality standards.

Last year, the Environmental Protection Agency (EPA) approved Oregon's most comprehensive TMDL to date: the Willamette River TMDL, which establishes pollution limits for temperature, as well as bacteria and mercury. The EPA has also approved temperature TMDLs for many other large and small river basins in western Oregon, including the Tualatin, Umpqua, Applegate, Bear Creek, and Sucker Creek watersheds. These comments focus on the Willamette TMDL, though they are applicable to all western Oregon watersheds that are water quality limited for temperature.

### **Headwaters Protection**

Streams that occur on BLM lands mostly comprise the smaller, headwater flows that are so critical in determining the condition of lower watercourses. DEIS, 359. Headwaters protection has become a cardinal rule of watershed management, and experts now advise that the first priority in improving fish & wildlife habitat should be to recognize and preserve existing high-quality watershed areas. *Williams, Wood & Dombeck 1997, Willamette TMDL at 6.* Protecting headwaters is particularly important to meeting the existing standards, because they provide cold water refugia for overheated salmon as they migrate up river. *Id.*, OAR 340-041-0028(4)(d). Indeed, the TMDL focuses on protecting cold water (rather than cooling hot). It specifies that if water is colder than the biologically-based criteria and is habitat for threatened and endangered species, it may not be warmed by more than .3° c. above cold water ambient temperatures. OAR 340-041-0028(11).

### **Relationship of TMDL & Federal Land Management**

High stream temperature is the most common existing violation of water quality standards on the 569 miles of streams in 81 watersheds administered by the BLM and listed as water quality limited for temperature under section 303(d) of the Clean Water Act. DEIS, 359, 365. Forest management on federal lands must meet the requirements of the TMDLs and is subject to the DEQ's jurisdiction. Pursuant to a Memorandum of Agreement between the DEQ, US Forest Service and BLM, water quality standards are expected to be met through development and implementation of water quality restoration plans, best management practices and aquatic conservation strategies. Where a federal agency is a designated management agency, implementation of these plans, practices and strategies is deemed to be in compliance with the TMDL. OAR

340-041-0028(12)(g).

The current Water Quality Restoration Plan (WQRP) Template, developed for the USFS and BLM by DEQ to implement the Willamette TMDL for temperature, relies on the USFS and BLM adhering to the water quality guidelines established in the Northwest Forest Plan, specifically the Aquatic Conservation Strategy (ACS) Objectives and Riparian Reserve system. As the template specifically states: “[p]aramount to the recovery [of water quality] is adherence to the Standards & Guidelines of the NWFP to meet the ACS Objectives, including protection, restoration and active management of riparian areas.” *WQRP Template*.

The WQRP also relies on the assumption that implementation and monitoring of projects designed to meet ACS Objectives and use of the temperature strategy logic and tools provides reasonable assurance that watersheds under the direction of the NWFP will move towards attainment of water quality standards and will support beneficial uses. However, the WOPR does not adhere to the Aquatic Conservation Strategy or Riparian Reserve System set up by the NWFP.

Not only does the Oregon DEQ anticipate that the BLM must comply with the NWFP to meet water quality standards for the TMDL, the U.S. Environmental Protection Agency recently weighed in on the issue as well. In a recent letter to the BLM, the EPA noted “[u]nder the Clean Water Act, the EPA and the State are obligated to prepare [TMDLs] to address the impairments in [303(d) listed] waters. The measures under the NWFP . . . have successfully demonstrated improvements in water quality on federal lands. We consider this to be a very important achievement.” The EPA concluded that it is very concerned that the WOPR could delay or reverse the positive trend towards water quality improvements, which would be a “big step backwards for water quality in Oregon.”

#### **Aquatic Conservation Strategy v. BLM’s Plan Under WOPR**

A comparison of riparian management under the NWFP and the WOPR elucidates the threats that WOPR implementation would pose to existing TMDLs. The Aquatic Conservation Strategy (ACS) was designed to restore and maintain the ecological health of watersheds within the area inhabited by the Northern Spotted Owl. *USDA, NWFP Standards and Guidelines 1994*. A key component of the 1994 Northwest Forest Plan, the ACS is a regional strategy to protect salmon, steelhead, and other aquatic species on federal lands managed by the Forest Service and Bureau of Land Management (BLM). There are five main components of the Aquatic Conservation Strategy: (1) Riparian Reserves; (2) Key Watersheds; (3) Watershed Analysis; (4) Watershed Restoration; and (5) Standards and Guidelines for management activities. (*USDA 1994*). Although all five components are critical to the overall protection of watersheds, a comparison between the Riparian Reserve system and BLM’s preferred alternative in the WOPR is the most instructive of WOPR’s failures.

The Northwest Forest Plan (NWFP) identified 2,627,500 acres of Riparian Reserves within the matrix. Although acreage of Riparian Reserves in other land allocations under the NWFP was not calculated, *USDA* estimated that 40 percent of those other land allocations were comprised of Riparian Reserves. *USDA, NWFP Standards and Guidelines 1994*. Fourteen percent of land administered by the BLM, and included under WOPR, is designated Riparian Reserve. This includes approximately 364,000 acres. Riparian reserves serve many ecological functions: (1) protect areas directly adjacent to streams, (2) improve travel corridors for anadromous fish, (3) provide connectivity for the greater watershed, and (4) serve as connectivity corridors for all species between late-successional reserves.

Riparian reserve widths are specified for five categories of streams or waterbodies under the NWFP. For fish-bearing streams, timber harvest is prohibited within a buffer of at least 300 feet on each side of a waterbody. There are also specific road, mining and recreation management provisions that apply in those areas. Non-fish bearing streams are protected with buffers of at least 150 feet on each side of the waterbody. Intermittent streams require at least 100-foot buffers. Riparian reserves also protect the areas around the

perimeter of lakes, ponds, and wetlands.

On the contrary, BLM's preferred alternative in the WOPR proposes "Riparian Management Areas" for three categories. Alternative 2 significantly decreases streamside vegetation buffers for all classes of creeks, streams, rivers and other waterbodies. Specifically, harvesting will be allowed up to the water's edge of perennial and intermittent fish-bearing streams for "safety and operational reasons." Timber harvest, for any reason, is allowed beyond a 25-foot buffer of these fish-bearing streams so long as there is 80% shade retention. After 60 feet, the BLM must only maintain 50% canopy retention. For all other waterbodies, there appear to be no requirements for effective shade. For intermittent streams, alternative 2 essentially allows clearcutting beyond a 25 foot vegetation buffer, with the requirement to leave 12 trees per acre (1 tree every 175 feet) with no size specification for leave trees. In addition, yarding corridors and new roads would be permitted in riparian management areas if no practical alternative exists to access adjacent uplands. *DEIS, chpt 2, 120*. The BLM's Riparian Management Areas afford substantially less protection to Oregon's rivers than the NWFP and would render TMDLs, like the Willamette, insufficient and potentially illegal.

The BLM manages approximately 600,000 acres in the Willamette River watershed. Under the BLM's preferred alternative, this area would see a large increase in logging, with a corresponding decrease in Riparian Reserves. In the Salem District of the BLM, matrix land will increase from 13% to 44%, while Riparian Reserves decrease from 12% to 8%, and in the Eugene District, matrix increases from 26% to 51% and Riparian Reserves decrease from 19% to 9%.

### **Environmental Impact**

According to the DEIS, more harvesting would occur near stream channels in Alt. 2 than in all other alternatives. *DEIS, 741*. Also under Alt. 2, approximately 400 acres of clearcutting would occur on non-debris flow prone intermittent channels across the planning area over 10 years. *DEIS, 741*.

Inexplicably, given the evisceration of streamside buffers and increase in clearcutting and roadbuilding near streams, the DEIS makes a sweeping general conclusion, with little to no supporting data, that none of the alternatives would result in increases in stream temperature that would affect fish habitat or populations, except in the Coquille Management area. *DEIS, 743*. The DEIS later claims that under alternatives 2 & 3, thinning would maintain at least 50% canopy cover in the secondary shade zone, and this combination would leave 80% effective shade, which would result in a .2° F. change per mile, but that this change is in the natural range of variability. *DEIS, 754*. This conclusion is woefully mistaken, as the DEIS simply fails to account for the wide range of factors that impact water temperature and shading across the landscape.

### **Temperature Analysis**

Streams gain thermal energy through a variety of processes, including radiation from the sun, infrared radiation from the atmosphere, inputs of warm water and the conduction of heat from warmer air or water. Streamside vegetation prevents a stream from heating by blocking sunlight, and is often the most anthropogenically affected variable in forest ecosystems. Because near stream land cover is such a controlling factor in stream temperatures regimes, the condition and health of land cover is a controlling factor in meeting the water quality standards of the temperature TMDL. *Willamette TMDL, Appendix C at 20*. Reversing or removing human disturbance from near stream land cover is "a pathway for compliance with Oregon's water temperature standards". *Id.*

Understanding temperature change on a landscape level is difficult and often resource intensive. *Willamette TMDL, App. C at 79*. As the amount of shade is one of the only non-point anthropogenic temperature factors, "effective shade" has become a benchmark to use in assessing impacts on stream temperatures. Effective shade is defined as the fraction of daily solar thermal energy flux that is prevented by vegetation from reaching the stream surface. (Clean Water Services, 2004). Many factors go into determining effective shade, including the position of the sun relative to the stream and its riparian area, stream width, vegetation

type & height, topography, stream flow and hydrology, etc.

Unfortunately, in the WOPR the BLM takes a cookiecutter approach to shade modeling that only accounts for tree height and hill slope in determining its effective shade curve *WOPR App. I at 189*. The temperature TMDLs, on the other hand, recognize that determining the effective shade curve is much more complex and site specific. The TMDLs use multiple different geomorphic units, with varied vegetation covers, to determine effective shade for each eco-type in the watershed. *Willamette TMDL, App. C at 30*. The BLM's model falls far short of this standard and cannot be relied on for accurate measures of effective shade and temperature increases. In fact, it can be expected to systematically under-estimate such increases.

Similarly, the BLM's shade modeling assumptions in the WOPR also fall short of those anticipated in the WQRP template. The template assumes that the BLM will use the SHADOW model for stream shading and temperature, which factors in stream width, orientation and topography. The template assumes that use of this model in watershed level planning would establish the minimum no-cut buffers necessary to maintain and restore site-potential shade. A "one size fits all" approach to shade modeling, which only accounts for a few of the many variables needed to determine an effective shade curve, does not provide the information necessary to fully determine effective shade – and thus comply with the TMDL – across a large and varied landscape.

Not only are the BLM's blanket assumptions about effective shade across a diverse landscape not accurate, their conclusion that 50% effective shade would only increase temperature by .2° F. is unsupported. Their model does not account for local geology, geography, soils, climate, legacy impacts, natural disturbance rates and other factors that may prevent effective shade from having the temperature-reduction impacts presented in effective shade curves. *Umpqua TMDL, 3-32*. The BLM does not consider these other factors at all. And of course, there are all the other parameters that affect stream temperature besides effective shade, including channel morphology, solar radiation, ambient air temperatures, groundwater inflows, and stream velocity, volume, and flow. *Willamette TMDL at 79, OAR 340-041-0028(1)*. The DEIS failed to significantly account for any of these factors in its analysis of the WOPR's impacts on temperature, thus its conclusions are not supportable.

### **Other Temperature Issues**

As if this wasn't bad enough, the BLM justifies shrinking riparian buffers to 100 feet on fish-bearing streams by claiming that additional shade beyond 100 feet "has little effect on the increased shading of streams." DEIS, 371. However, in the very same sentence, it continued ". . . particularly when a thinned forest stand is left to provide additional tree shading." *Id.* This conclusion implicitly recognizes that additional shading beyond 100 feet *does* in fact have an effect on water temperature; this effect is not analyzed or accounted for. Not only that, under Alternative 2, only perennial fish-bearing streams are given the 100 foot buffers with effective shade requirements. All other types of creeks, streams, lakes, wetlands, etc. will not receive vegetation covers capable of providing effective shade. But all that water affects temperatures downstream in salmonid-bearing watercourses! Because the temperature analysis in the DEIS relates solely to effective shade cover, the temperature impacts on all other waterbodies and streams were left unanalyzed.

This omission is especially crucial as it relates to intermittent streams. As explained at a mid-October technical meeting about the WOPR in Medford, the BLM's computer model assumed the definition of an intermittent stream was a stream that dried up at least 3 months out of the year. However, the BLM presenter emphasized that individual district managers could choose their own definition of intermittent stream - the more common definition being a stream that dries up at least one month out of the year. If the one-month definition is used, this increases the number of streams that will be clearcut with only a negligible vegetation buffer far beyond that analyzed in the DEIS.

The DEIS fails to provide data comparing the effect of the different alternatives on stream temperature (aside

from its baseless assertion that there will be no change). Table 269 supposedly compares the alternatives for not meeting effective shade on perennial streams, but is blank. *DEIS I-1119*. There are no tables comparing the alternatives for temperature effects on other waterbodies. This lack of data may be unsurprising, given the utter dearth of serious scientific assessment the BLM performed regarding stream temperature, but it is illegal under NEPA.

### **Conclusion**

At a time when all other designated management agencies in Western Oregon are focused on minimizing anthropogenic impacts on effective shade, the BLM's proposal stands in stark contrast. As noted above, high stream temperature is the most common violation of water quality standards on BLM administered streams. There are 569 miles of streams on BLM administered land that are 303(d) listed as water quality limited for temperature. And yet, the WOPR proposes a drastic reduction of streamside vegetation buffers, to virtually none on intermittent streams. This, coupled with increased road building and yarding in riparian areas will inevitably result in decreased shade and increased water temperature. How much? The BLM's utterly inadequate assessment fails to reliably inform us or them. But the impacts are likely to violate the law.

In watersheds with TMDLs for temperature, such as the Willamette and the Umpqua, and all other water quality limited streams, the BLM's plan of action to increase riparian logging in the headwaters is untenable. The WOPR violates the TMDL (and thus the Clean Water Act) by failing to comply with the strategies and objectives of the Northwest Forest Plan and the Memorandum of Agreement that BLM entered into with DEQ. The WOPR substantially sets back the progress made toward decreasing water temperatures in western Oregon, is illegal and should be set aside.