SELL Tara L * ODF

From: Christine Golightly <golc@critfc.org>
Sent: Tuesday, July 21, 2015 2:25 PM
To: ODF_DL_Board of Forestry
Cc: tom.imeson@nwnatural.com; DAUGHERTY Peter * ODF; WHITMAN Richard M * GOV
Subject: July 23, 2015 Board Meeting: Developing Riparian Rule Prescriptions
Attachments: 2015 07 21 Board of Forestry Letter final draft.pdf; 2015 07 21 Board of Forestry Comments.pdf

(resent with comments attached)

Chairman Imeson,

Please see for consideration by your Board the attached letter and comments regarding Agenda Item #2 at your upcoming July 23, 2015 Board of Forestry Meeting, "Developing Riparian Rule Prescriptions."

Best Regards,

Christine Golightly
Policy Analyst
Columbia River Inter-Tribal Fish Commission
golc@critfc.org
503-731-1288

Critique and Observations on Evaluation of ODF Proposal for Changes in the Riparian Rules under the Forest Practices Act

Dale A. McCullough, Ph.D., CRITFC
July 21, 2015

In the process of developing these comments, I have reviewed the following documents (1) Riparian rule analysis: additional analyses of riparian prescriptions and considerations for Board decisions, (2) summary of riparian rules for neighboring states, (3) the Decision Matrix, (4) and the Oregon Forest Industries Council's Proposal for Protecting Cold Water, April 2015.

I am a Senior Fishery Scientist at the Columbia River Inter-Tribal Fish Commission (CRITFC). In this capacity among other things, I am a Project leader for a Bonneville Power Administration-funded project—"Monitoring recovery trends in key spring Chinook habitat." This is a 10-year effort to monitor change in habitat factors limiting spring Chinook production in the Grande Ronde basin in NE Oregon and model fish production in relation to habitat conditions and trends. I direct this project relative to work efforts of ten professional staff. The key limiting factors in the Upper Grande Ronde River and Catherine Creek basins are excessive water temperatures, lack of pools, lack of large woody debris, and reduced streamflows.

I have been a member of NOAA Fisheries Interior Columbia River Technical Recovery Team; been a member of the Oregon Department of Environmental Quality Water Temperature Committee and the EPA Regional Water Temperature technical committee; co-developed a screening process for potential use on land management actions under Section 7 and 10 consultation by NMFS; developed a monitoring plan for use in federal land management; co-developed a model of fish habitat quality/fish survival; studied, published, and presented on water temperature effects on salmonids since 1990; evaluated carrying capacity of salmon in the Columbia River; studied and researched in the field of watershed analysis; published on salmon habitat monitoring; evaluated life cycle impacts of water temperature increases in mainstem Columbia River and tributary habitats; analyzed water temperature impacts of Hells Canyon Complex dams on Snake River fall Chinook; conducted technical analysis of land/aquatic management procedures (especially US Forest Service land management plans); reviewed and developed monitoring and cumulative effects analysis procedures; evaluated fish production potential in freshwater environments; done technical review and editing of professional journal and public agency publications; represented the Commission on technical committees charged with fish habitat protection and monitoring such as Washington's Timber/Fish/Wildlife Program; developed theoretical principles and practical procedures for classification of watersheds and streams. I also have been a technical consultant to the State of Colorado in its triennial review of water temperature criteria.

1. **Comments on the ODF Decision Matrix and the process behind it**

The fish biologist responses in the Decision Matrix are the product of a flawed process and, as presented by ODF, the results are susceptible to misinterpretation and could mislead decision makers into erroneously using them as justification for removal of riparian shade, which removal would be harmful to salmon, steelhead and bull trout.

As presented, the responses create an impression that fishery biologists are so conflicted in their opinions that they cannot provide anything but uncertainty in the discussion about the impact of shade reduction in riparian management. This is largely the result of the flawed questioning process, not the state of the science, and I am concerned that the answers may be used inappropriately by policymakers to erroneously justify non-retention of riparian shade.

a. Dunham Panel Response.

The size and/or diversity of the Dunham panel, along with poorly framed questions, likely led to the lack of unified conclusions by the group, which could erroneously be read as a lack of perceived benefits from the proposed actions.

The panel that Dr. Jason Dunham convened apparently held highly diverse opinions. The composition of this panel was not revealed, so it is difficult to evaluate the affiliations and expertise provided by this team. The size and heterogeneity of this team alone apparently led to conflicting views and a high level of uncertainty as a joint expression of the team.

In a group exercise such as this - it is important for the questions to be framed correctly to elicit meaningful responses; however, the questions to the Dunham Panel were poorly framed. Particularly, the questions left open the many scientific assumptions that are associated with the primary question. These include: (1) spatial scale of the impact being discussed, (2) statistical ability to demonstrate an effect, (3) the complexity of natural systems and the number of other factors that could potentially have an impact that must be controlled, (4) whether the question is about the absolute impact of 0.3°C temperature increase, or whether the question is about the positive or negative sign of impact for temperature increases greater than 16°C, (5) whether the impact is on a portion of the population or on the entire population, (6) whether cumulative effects are considered, (7) whether the questions pertain to specific locations or to general locations and average conditions. All these considerations and the varying assumptions that need to be made clearly affected the ability of the group to formulate consistent and meaningful responses.

Jason Dunham, on his own, is uniquely qualified to provide substantial answers to questions about population response to changes in thermal regime. Even though Dr. Dunham was assumed to be responsible for summarizing a response, it appears that he attempted to defer to the group and not interject his own knowledge when he knew it to conflict with a group average. Dr. Dunham may also have concluded that no unified view could be represented if one or more individuals had significantly

diverging opinions. Depending upon how this group was constituted, it may have had a flawed composition, making a group decision impossible.

Without knowing who constituted the group and what sideboards were used to elicit a group response (majority? unanimous?), it is difficult to determine what weight to give a "non-response". Add to this the complexity of the issue, the multiple assumptions that underlie it, and the failure to adequately understand what assumptions were intended from the panel questions, and the group's response becomes meaningless.

b. Bilby Response:

As discussed below, the Bilby response:

- Relies on studies that do not reflect conditions on the industrial forest landscape and/or apply only to hypothetical, site-specific scenarios, and therefore do not provide a basis for extrapolation across the landscape.
- Defies logic: e.g. that stream temperatures stressful to fish can be fixed by increasing light and causing further warming or that increased large woody debris in a system starved of this critical habitat component can be harmful.
- Conflicts directly with his previously published opinions.

Dr. Robert Bilby (Weyerhaeuser) provided a single-person response as an industry biologist. This alone precludes gaining a useful comparison between his response and a group-think result like the Dunham Panel.

Bilby states that temperature increases up to 1.45°C will have "relatively small impacts on fish populations unless baseline temperatures are approaching levels stressful for salmonid fishes." This statement retains a level of scientific uncertainty (i.e., what is the definition of "relatively small" and "stressful"), but has nonetheless been translated by ODF management as indicating no impact when buffers are ≥ 70 ft (i.e., a temperature change of up to 0.88°C) and a beneficial impact when temperatures are ≤ 16°C. However, in his response, Bilby actually said that the optimum temperature for coho is 14°C (Riparian Rule Analysis [Attachment 2], p.41), so 16°C is already well beyond optimal. His comments should be understood in the context of increases in temperature where the stream is < 14°C vs. > 14°C, not 16°C as presented.

Bilby also states that growth rates are comparable with food availability that can provide 60 to 100% of full ration. However, when food availability decreases from 100% to 30%, the optimum growth temperature declines by ≥ 4°C (Edsall[1] et al. 1999, Sullivan[2] et al. 2000). This would mean that if food

[1] Edsall, T.A., A.M. Frank, D.V. Rottiers, and J.V. Adams. 1999. The effect of temperature and ration size on the growth, body composition, and energy content of juvenile coho salmon. J. Great Lakes Research 25:355-363.

availability were at a level providing 30% of satiation (a level not unrealistic for natural streams) the optimum growth temperature would decline by 4°C from the optimum growth temperature for coho. Under conditions of food limitation, salmonids require colder temperatures to achieve the same growth rates. Higher temperatures exact a metabolic cost that result in lower growth rates (Edsall et al. 1999, Sullivan et al. 2000).

Bilby also claims a beneficial impact of warming waters; but this requires an implied restriction of spatial scale to a very small stream reach with no other upstream impacts to and no downstream impacts from the warmed water. It implies that fish habitat downstream is currently in very good condition, so that the ability to further limit the downstream extent of salmonids is negligible. The spatial extent of potentially fish-bearing streams with summertime temperatures < 16°C is typically small in current heavily managed forests. To take a hypothetical scenario that applies to isolated and infrequent cold streams, ascribe to it a benefit of warming and then apply it to all other streams (i.e., the majority that already exceed critical biological limits and do not meet WQ standards) is a misapplication of science of fish physiology.

Bilby states, *"in stream reaches where water temperature is elevated to levels potentially stressful for fish after harvest [i.e., timber harvest], increased light levels may mitigate negative effects of warmer water."* The studies that led to this concept (e.g., Murphy, Hawkins) were of small clearcuts amidst old growth forest. They did not have stressful water temperatures that could be mitigated by increased light (i.e., increased food production). In Bilby's scenario, the increased light upstream caused stressful temperatures entering another clearcut in which it is assumed that increased light ameliorates the effect of high temperatures. This presumably is due to an ability to provide greater food supply. While there are grains of scientific truth in these concepts, it becomes much less likely that stressful temperatures can be fixed by even greater increases in light that would also create further warming. The Dunham panel screened out such statements as having too many uncertainties. It could have easily stated that in most cases increasing light and temperature under already thermally stressful conditions exacerbates the fish growth issue. Bilby's statement does not make clear that his is an unlikely scenario. ODF management inappropriately takes it as an indication of no effect.

It is common among aquatic science experts to consider riparian buffer protection in terms of what is needed to provide shade, protect streambanks, reduce sediment delivery from upslope, provide microclimate protection, restrict the flow of nutrients into the stream, support long-term LWD inputs, create a redundancy in protection of the RMZ to allow for stream lateral migration and side-channel development, protect riparian-dependent vertebrates, protect hyporheic flow generation by floodplain maintenance, and reduce sediment delivery from streamside roads. The Decision Matrix seems to

[2] Sullivan, K., D.J. Martin, R.D. Cardwell, J.E. Toll, and S. Duke. 2000. An analysis of the effects of temperature on salmonids of the Pacific Northwest with implications for selecting temperature criteria. Sustainable Ecosystems Institute, Portland Oregon.5w

concern itself only with shade. The consideration for allowing variable retention, narrow buffers, and one-sided buffers ignores the need to provide all other riparian functions**.**

Bilby provides scientific uncertainty in the LWD portion of his response to management by stating that LWD generally provides a positive response by salmonids, but LWD can also provide no response or a negative response. Bilby does not explain the circumstances that could lead to a negative response from increased LWD. It may be that he is referring to a scenario where a gathering of salmonids occurs by placement of LWD in a single stream locale which results in increased competition and lowered fish growth rates, as was argued in the OFIC proposal, April 2015 (see discussion below), but this does not really indicate that LWD produces a net negative result. It essentially demonstrates that the stream is starved for LWD and that LWD needs to be distributed more widely and in much greater quantities to improve overall carrying capacity.

Bilby also states that prediction of how much LWD will result in fish production is very uncertain. This may be uncertain, but it is my long experience that the typical biologist would indicate that generally the more LWD the better. LWD provides critical bedform heterogeneity. It creates pools that are used by adults to hold, juveniles to rear, and gravel sorting to create suitable spawning habitat. The uncertainties come about by what other habitat features may be present that can also create pools or other habitats necessary to salmon production. For example, channel meanders can create pools by hydraulic action. Tributary inputs can be locations for sediments to deposit in a main channel and where pools can form. Undercut banks can create good rearing environments, but may not be as good as pools due to lesser amounts of drifting food. There are always reasons for uncertainty, but if the management team were actually focused on what the predominant case would be instead of a list of exceptions, different answers would be elicited from these biologists.

c. Jepsen Response:

Dave Jepsen provided a response for Oregon Department of Fish and Wildlife. His responses were consistent with those of Chris Frissell. Jepsen stated that wider riparian buffers provide more certainty that the Protecting Cold Water criteria can be achieved. They also ensure recruitment of LWD to stream channels, large size trees that can be recruited as LWD, improve connection between subsurface and surface flows, create high quality and complex habitats, reduce delivery of fine sediment to the channel, and increase salmonid habitat capacity. Despite these responses, which are reflective of best available scientific literature, ODF summarized Jepsen's comments as supporting a positive response of fish to all riparian buffer widths. I believe ODF misrepresents Jepson's response in the Decision Matrix summary tables. This error is discussed more below in part (e).

d. Frissell Response:

It seems that the answers provided by Dr. Chris Frissell were the only ones conforming to precisely asked questions. These responses are based on fully stated assumptions and context. Other respondents

allowed the complexity of context to muddle their answers and create a default position where everything was too complex to formulate an answer.

e. Critique of Response Solicitation from Biologists.

Solicitation of responses from biologists concerning the effect of temperature increases in streams due to riparian buffer width alternatives was not handled in a way to generate a meaningful conclusion. The answers collected therefore appear highly divergent. This may allow management to erroneously conclude that either so little is known about salmonid requirements that increased timber harvest may even be good for fish, or that answers range from one extreme to another so that keeping rules the same is just fine.

Dr. Frissell's comments were the only ones that were responsive to ODF questions specifically. Jepsen's comments were aligned with Frissell's, yet they were misrepresented in the Decision Matrix table in a way that claimed the opposite. The tabulation of all responses by ODF places Dr. Frissell's comments as one bookend with Dr. Bilby's as the other and with abundant uncertainty in the middle.

ODF's tabulation of response is inconsistent, confusing, and full of errors. For Bilby's responses, ODF indicated that Bilby suggested a negative response to a 50-ft riparian buffer only when temperatures were already >16°C. For all other buffer widths, Bilby's comments supported a no effect when temperatures were >16°C, despite temperature increases up to 0.88°C. For Jensen's comments, ODF interpreted these in a reverse fashion. Even though Jepsen supported wider buffers in all cases to provide a myriad of important biological functions, ODF reported that Jepsen said that all buffer widths benefited fish populations, which is not consistent with his statement.

Frissell's and Jepsen's responses were the only ones not obfuscated by preoccupation with exceptions to the rule or a variety of considerations of context-specific matters of scientific uncertainty. To be specific, Frissell provided direct responses to questions about the impact of no-entry buffer prescriptions of 50, 70, 80, 90, and 100 feet, variable retention, and alternate prescriptions. Because context for these questions was not provided by ODF, Frissell laid out all critical modes of biological responses to be considered (abundance, survival, distribution, life history diversity, population productivity); the presumed spatial and temporal context of timber harvest over multiple years within a watershed; the presumed current status of timber stands and fish habitat relative to anticipated temperature response to buffer treatments. Although Frissell admits that there can be points within a stream network where temperature increases could be beneficial locally, he makes it clear that these situations are infrequent and atypical. His comments provide managers with the typical, frequent case, not the exceptional. By contrast, comments by Bateman, a participant in the Dunham panel, such as *"this is pretty complex and expected responses are very context dependent"* and *"a prescription may have positive implications for fish in some places and negative implications at another"* are not helpful in managing forests, water quality or fish and not helpful in understanding watershed science.

If ODF had asked questions in a more explicit manner, very clear answers would have been generated. The staff report (July 23, 2015) states relative to the biologists' responses, *"accurately attempting to predict fish response on a watershed scale without including factors such as large wood recruitment, food availability, climate change, cumulative effects, and a host of other variables was a barrier to response predictions."* Yet, despite these problems stemming from a lack of context in questions provided, the biologists' responses were summarized for use in the Decision Matrix.

For example, Bilby's and the OFIC (2015) comments acknowledge the general view that there is an optimum growth temperature depending upon salmonid species and that as temperatures exceed the optimum, growth rates decline. Given this fact, if there are temperature increases (even small ones) that occur from timber harvest when the water temperature is greater than 16°C, by definition there is a negative impact on potential growth rate. If temperatures are less than 16°C, a temperature increase could produce an increase in growth rate depending on food availability, but this effect is highly localized and could be negative if food availability were limited (considered by most scientists as the most frequent situation). As this temperature increase is added to other increases in the same and future harvest seasons, there will be reductions in growth rates downstream where temperatures are greater than 16°C. The higher the temperatures, the greater the magnitude of impact will be on growth rates with a given temperature increase. There are so few locations in current forests where temperatures are less than 16°C during summer that opportunities to "improve" growth rates even at a site-specific location are minimal to non-existent. If such locations exist, they may not be fish bearing, in which case raising their temperatures would contribute to elevating temperatures downstream in salmonid-bearing streams. In addition, such locations could support native bull trout having optimum growth temperatures of 12°C.

Bilby claims in his response to ODF that any temperature increase of < 1°C, where mean maximum temperatures exceed 16°C, are mitigated by increased light, which improves primary productivity, and thereby fish growth. This implies that no matter how high the temperature may be, additional small increases in temperature, even cumulative impacts within the watershed producing successive small increments of temperature, would improve fish production further. This is a nonsensical assumption, and is not supported by scientific literature. It seems to extrapolate from localized studies that find a benefit from increasing light in streams operating below the optimum growth temperature to all stream reaches where temperatures are well above the growth optimum.

The idea that temperatures can be raised with benefit to a population where temperatures are ≤ 16°C is based on a misunderstanding of water temperature standards. The standards for salmonid rearing in Oregon's rule (12, 16, 18, 20°C) apply to geographic locations. Upstream of these locations, temperature increases are limited to 0.3°C so that cumulative effects will not lead to increases at points of maximum impact that will alter the ability to achieve the criteria at all checkpoints representing the historic thermal regime in the basin. Condoning temperature increases in headwater areas with the expectation

that the population somehow benefits would require compensatory reductions in temperature downstream where temperatures exceed the natural regime. Aside from restoring all naturally occurring riparian vegetation (potential height and canopy cover), it would not be possible to re-establish natural thermal regimes and LWD delivery and maintenance processes.

Realized growth rate depends upon the availability of food. Although there is always uncertainty in what food availability would be for any specific location, it is commonly thought that food is always limiting in stream environments. If food were very limiting at a specific location due to a history of logging that led to a fining of streambed substrates, for example, the temperature at which negative impacts of thermal increases would start to occur would decline. That is, under food limitation, growth rates could be negatively affected by riparian harvest at temperatures of 13°C rather than 16°C. The magnitude of this effect depends on food availability. Increased temperature due to shade loss results in reduction in growth above 16°C under full feeding levels and even more reduction in growth under typical, low food availability situations**.** (McCullough[3] 1999, McCullough[4] et al. 2001).

The Dunham panel may have thought it was being scientifically precise in its language by its focus on uncertainty (i.e., it is impossible to know for sure how limiting food is in a stream unless this is studied), but when a manager comes away placing question marks in all cells of the matrix, the value of the science is unfairly discounted. Basically, this panel was discounted by not asking them questions that would generate appropriate answers for management.

Response to no cut buffer widths on salmonid abundance at temperatures above and below 16°C was also tallied by ODF management as primarily question marks. Dunham's extensive research on bull trout shows a strong decline in bull trout abundance as temperatures increase above the bull trout optimum growth temperature. Similar relationships have been found for all major salmonids (see compilation by McCullough here in Section 4). Salmonid densities decrease from temperatures at which the various species find their optimum growth rates to approximately 22 to 25°C, at which point the densities typically reach zero. Reasons for this linear decrease involve many ecological effects rolled together. They include thermal death, avoidance behavior, increasing predator abundance, limitations in food abundance, increases in disease, reduced growth rates, tendency of fish to migrate to locations where they can maximize their growth rates within the constraints of the current system, and increases in competition. Whatever the reasons for decline in abundance with temperature, if timber harvest causes

[3] McCullough, D.A. 1999. A review and synthesis of effects of alterations to the water temperature regime on freshwater life stages of salmonids, with special reference to Chinook salmon. EPA 910-R-99-010. Prepared for the USEPA, Region 10, Seattle, Washington. 279 p. (available at www.critfc.org)

[4] McCullough, D.A., S. Spalding, D. Sturdevant, M. Hicks. 2001. Summary of technical literature examining the physiological effects of temperature. EPA Regional Temperature Technical Committee technical issue paper. Available at http://yosemite.epa.gov/R10/WATER.NSF/webpage/Water+Issues+in+Region+10

additional temperature increases, additional losses in fish abundance will occur and useable habitat will shrink (McCullough 2010[5]).

The gray zone involved in this management interpretation is: are the impacts large, are they biologically significant at a small point in space, can cumulative effects be left out of consideration, or can it be said that the population will still be viable even with impacts? It is not legitimate for ODF to acknowledge that temperature increases when the baseline is ≥ 16°C cause a reduction in growth rate, but then assume the role of fish population manager by weighing the predicted impact on population viability against foregone timber harvest or claiming that the beneficial use is sufficiently protected despite known impacts. The listed species populations managed by NOAA under the ESA have stream networks and watersheds assigned to them as historic range needed to support the population. Because of an extensive history of timber harvest, road building, and other watershed impacts that have increased water temperatures longitudinally, these populations typically do not utilize their historic summer rearing habitats now (see comments on OFIC document for "protecting" cold waters, below). This creates a *de facto* loss of beneficial use (see McCullough 2010) that is not ameliorated by permitting further thermal impacts at a network scale.

2. **Excerpts from a peer-reviewed document authored by Bilby[6] et al. (2007) on the need to protect all riparian shade.**

The following statements by Bilby et al. (2007) reflect a cross-section of accepted scientific understanding about the importance of fully protecting riparian condition and are at odds with the misleading views expressed in Bilby's responses given to ODF in their Decision Matrix for evaluating changes to the Forest Practices Act.

p. vii. In general, mitigating for changes in hydrology and temperature in tributaries that are caused by climate change will involve many of the same approaches that have been initiated in the basin to date. Any action that can help minimize water temperatures increases or augment stream flow during summer and autumn would contribute to this end. Specifically, protection of cold-water refugia for migrating salmon and restoration of riparian habitats in headwater reaches should have high priority.

p. 25. The expected effects of climate change on riparian areas and wetlands are exacerbated by simultaneous changes in land use and human population. In the West overall, and in the Columbia River Basin, human population, land development, and private land ownership are concentrated disproportionately along waterways, thus introducing sources of conflict between human population and

[5]McCullough, D.A. 2010. Are coldwater fish populations of the United States actually being protected in water quality standards? Freshwater Reviews 3:147-199.

[6] Bilby, R. et al. 2007. Climate Change Impacts on Columbia River Basin Fish and Wildlife. ISAB Climate Change Report. ISAB 2007-2.

natural resources and biodiversity (Gude et al. 2006, Hansen et al. 2000, Hansen et al. 2002, Smith and Wachob 2006).

p. 35. In some streams an increase in temperature may improve conditions for salmon and trout. In very cold streams, time of spawning and egg incubation may be delayed until well into summer resulting in small fry at the onset of winter and reduced survival (Harig and Fausch 2002). Increased spring and summer water temperatures caused by climate change could alleviate this problem to some extent by enabling earlier spawning and fry emergence and a longer growth period. Thus, fish would be larger at the end of summer provided adequate food is available. Winter mortality associated with anchor ice also might be reduced (Meisner at al. 1988). These types of positive effects would likely be limited to aquatic systems at the highest elevations in the Columbia Basin and would influence few stream occupied by anadromous species.

p. 85. Temperature increases in some tributaries may be minimized by implementing measures to retain shade along stream channels and augment summer flow. Adequate protection or restoration of riparian buffers along streams is the most effective method of providing summer shade. This action will be most effective in headwater tributaries where shading is crucial for maintaining cool water temperatures. Expanding efforts to protect riparian areas from grazing, logging, development, or other activities that could impact riparian vegetation will help reduce water temperature increases. It will be especially important to ensure that this type of protection is afforded to potential thermal refugia. Removing barriers to fish passage into thermal refugia also should be a high priority. The possible effect of increased fire and insect damage on riparian vegetation due to warming climate was discussed earlier in this report and could reduce the effectiveness of this strategy. Nonetheless, implementing measures to ensure adequate levels of shade will be one of the most effective approaches to limiting temperature increases.

p. 86. Protecting and restoring wetlands, floodplains, or other landscape features that store water also will provide some mitigation for declining summer flow as the climate warms. Watersheds with extensive groundwater reservoirs will be among the most resistant to the impacts of climate change, due to the relatively constant release of cool water from the aquifers that feed the channel networks (Jefferson et al. 2006). Protecting these groundwater systems, and restoring them where possible, may provide refugia for cool-water species, like salmon, during periods of warm temperatures and low flows. Identification and protection of such thermal refugia may be one of the most effective strategies available to mitigate for climate change impacts on salmon and trout. Such locations are utilized by large numbers of fish or by stocks, some that are critically imperiled. These cool-water refugia include many tributaries along the mainstem Columbia where migrating adult salmon and steelhead fish congregate, especially during warm years. These areas need protection as sanctuaries for migrating salmonids, and they might be considered for purchase or conservation easements to ensure that they are buffered from human impacts.

3. Comments on OFIC's[7] views on meeting WQ standards on forest land

OFIC (2015) compiled a number of arguments in its "Proposal for protecting cold water" for minimal changes to current rules for protection of cold water:

a) water temperature standards are not an appropriate tool for managing Non-Point Source (NPS) pollution
b) causing increases in water temperature actually improves growth rates of salmonids and is beneficial
c) shade recovers to initial levels within 5 years
d) water quality standards are not a regulatory tool for non-point source problems
e) ODF or the Board should be able to decide on a case-by-case basis whether beneficial uses are met by BMPs, and that the BMPs are practicable
f) ODF or the Board should have authority to decide whether BMPs protect beneficial uses and whether exceeding current water quality (WQ) standards is a problem worth fixing with improved regulations.

These and other statements in OFIC's arguments for why cold water is adequately protected by current forest practices are based on highly selective and narrow views of the environment and fish needs, and conflict with the stated purposes of the FPA standards.

ODF and ODEQ (2002) stated that "The FPA standard as it relates to habitat modification is "to grow and retain vegetation [along fish-bearing streams] so that, over time, average conditions across the landscape become similar to those of mature streamside stands;" and "to have sufficient streamside vegetation [along non fish-bearing streams] to support functions and processes that are important to downstream fish use waters and domestic water use."(OAR 629-640-0000). ODF and ODEQ (2002) also state that Oregon forest practices are aimed at achieving water quality standards, ensuring that practices do not contribute to water quality problems in listed streams, and that waters of the State can be removed from the 303-d list. In fact, ODF and ODEQ (2002) state clearly that "The protection goal for water quality (as prescribed in ORS 527.765) is to ensure through the described forest practices that, to the maximum extent practicable, non-point source discharges of pollutants resulting from forest operations do not impair the achievement and maintenance of the water quality standards." This leaves no doubt that meeting WQ standards is the intended goal of forest practices.

OFIC's arguments rely heavily on the current best management practices (BMPs), as prescribed in state standards, and would give significant deference to the states to make case-by-case determinations. ODEQ and ODF[8] have been erroneously operating for years under an assumption that by merely implementing BMPs, WQ standards are met. The RipStream study has confirmed that this was true only

[7] OFIC. 2015. Oregon Forest Industries Council Proposal for Protecting Cold Water. April 2015.
[8] ODF and ODEQ. 2002. Oregon Department of Forestry and Department of Environmental Quality Sufficiency Analysis. A statewide evaluation of Forest Practices Act effectiveness in protecting water quality.

as a matter of policy and not in fact. A feedback loop – adaptive management – is required between setting WQ standards that are known to be biologically protective to the most sensitive species and the BMPs that are required to produce those conditions. However, adaptive management requires that the best available science be used to improve management.

OFIC misinterprets a stated view of Dr. Robert Beschta that WQ standards were not intended to be a direct regulatory tool for NPS problems as a means to attack the use of the standards themselves. Dr. Beschta was undoubtedly referring to the way that NPS regulation was "directly" carried out. However, this does not discount the need to adaptively adjust BMPs so that they reflect the best scientific knowledge. In his statements, Dr. Beschta goes on to say that BMPs are intended to prevent problems.

The failure of BMPs to meet WQS for temperature is evidenced by the number of SSBT populations that are on the ESA list and by the extensiveness of the State 303-d list for water temperature violations. OFIC attempts to paint the blame for this situation on overfishing, but the role of timber harvest and associated road building in the decline of habitat quality supporting listed SSBT populations is well documented. Impacts from these activities are multifaceted, including basinwide elevation of water temperatures, reduction of in-channel LWD, damage to streambanks, loss of riparian vegetation and shade associated with streamside road building, increased turbidity and fine sediment delivery to channels, loss of pools due to increased sediment delivery and lack of LWD. Full protection and restoration of riparian condition and reduction in road density on a basin scale are needed to remedy all these timber harvest impacts.

While it is reasonable to apply BMPs to achieve a *de minimis* impact to the thermal regime in a watershed (see EPA[9] 2003), a water temperature standard is surely the basis for creation of that BMP. If BMPs are applied consistently, it eliminates any perceived need to be making innumerable site-specific decisions about what it takes to protect beneficial uses and what level of impact to riparian areas will result in no more than a 0.3°C temperature increase.

OFIC implies that because the most common temperature loggers are no more accurate than about 0.2°C (Onset Tidbits) to 0.5°C (Onset Pendant) or that natural variation at a site can be great, timber harvest in riparian zones should be able to have impacts >0.7°C (the mean impact shown in the RipStream study). There are multiple problems with this logic. Temperature impacts are directly related to amount of riparian cover removal that reduces shade. The purpose of the process in which ODF is now engaged is to devise riparian protection rules to result in no greater canopy loss than would produce ≤ 0.3°C change in water temperature. If greater amounts of canopy removal resulted in 1°C temperature increases, it is straightforward that a smaller canopy removal would reduce the temperature increase. Consequently, canopy loss can be adjusted to ensure that specific small amounts of water temperature increase are not exceeded.

[9] U.S. Environmental Protection Agency. 2003. EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards. EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA.

Also, the known probabilities of pollutant (heat) introduction should not be confused with natural variation. If a water body has a high natural level of mercury, it could be argued that adding more could not be statistically detectable because natural levels vary from day to day, there are variations in chemical detection, etc. However, increased Hg concentrations do not contribute to maintaining safe conditions downstream. In terms of water temperature, the streams of Oregon are extensively listed as 303-d WQ limited due to water temperature, sediment, or nutrients. Stream networks from the smallest headwater tributaries to large mainstem rivers are connected spatially (EPA 2015). Mercury as well as water temperature (heat) pollution introduced at any point travels downstream. Impacts from current and historic land uses throughout watersheds and their riparian systems occur extensively on the landscape, making cumulative thermal effects difficult to control. For this reason, it does not make sense to inconsistently apply BMPs on a site-specific basis with the idea that timber crews can judge each site's geomorphology, hydrology, and fish populations individually so that rules can be "tailor-made" to each situation. The multitude of human-caused impacts creates a situation where cumulative effects can be significant. The 0.3°C temperature increase allowed at the point of greatest impact is meant to limit cumulative effects from linked activities within a watershed. However, the ability of a basin management plan, reliant on BMPs, to actually restore the historic thermal condition in a watershed is tenuous and depends upon not aggravating an already damaged watershed as well as restoring shade to natural potential levels. It is not at all certain that cumulative activities will be controlled so that impacts in one year are not compounded with impacts in subsequent years, but it is only via consistent application of best BMPs, prevention of needless stream heating, and concerted efforts at restoration that thermal regimes can be restored.

Longitudinal connectivity at the scale of the stream network has been well documented by EPA (2015) in a peer reviewed publication:[10]

> *"The incremental effects of individual streams and wetlands are cumulative across entire watersheds and therefore must be evaluated in context with other streams and wetlands. Downstream waters are the time-integrated result of all waters contributing to them. For example, the amount of water or biomass contributed by a specific ephemeral stream in a given year might be small, but the aggregate contribution of that stream over multiple years, or by all ephemeral streams draining that watershed in a given year or over multiple years, can have substantial consequences on the integrity of the downstream waters. Similarly, the downstream effect of a single event, such as pollutant discharge into a single stream or wetland, might be negligible but the cumulative effect of multiple discharges could degrade the integrity of downstream waters."* EPA (2015, p. 6-10).

[10] EPA. 2015. Connectivity of streams & wetlands to downstream waters: a review & synthesis of scientific evidence. EPA/600/R-14/475F. Office of Research and Development. Washington, D.C.

The fact is that water temperatures are increasing annually due to climate change. Adding additional temperature increases due to forest practices that may be devised to provide minimal levels of protection (e.g., minimal buffers that do not allow for development of site potential tree heights or natural canopy densities, or narrow buffers subject to blowdown, or allowing narrow buffers that provide insufficient and non-redundant shade that are unable to mitigate for internal natural thinning) will not lead to long-term improvement in thermal regime at a basin scale. Restoration of watersheds and their thermal regimes will require more than implementing plans to do further timber harvest in riparian areas. Application of only high risk activities is not a basin management plan that will result in protection of beneficial uses**.**

OFIC also implies that stream restoration, such as addition of large wood (LWD) is counterproductive based on one study and that increasing water temperatures are actually good for fish (as noted above these comments match those submitted also by Bilby to the "Decision Matrix" but are in conflict with Bilby's published statements). For addition of LWD to be able to create a situation where salmonid densities are so high that competitive interactions become high enough to reduce growth rates is not a sign that LWD used in channel restoration is a bad thing as implied by OFIC. It is more likely a sign that the remainder of the stream channel is so deprived of LWD that fish would congregate to this extent and not distribute themselves to maximize their growth rates. This conclusion comes from viewing the stream from the viewpoint of a tiny spatial scale.

Likewise, the extensive comments by OFIC stating that it is wise to increase stream temperatures to improve SSBT growth rates makes sense only in a similarly small spatial scale. The studies cited by Murphy and Hawkins may have found increased biomass of salmonids in small clearcuts, but if this scenario is generally applied to entire watersheds, the results would mimic those found in many extensively logged watersheds—vast areas with extremely poor habitat barely capable of supporting listed salmonids with salmonid production confined largely to cold headwater areas (see Figures 1 and 2 below for examples of extensively altered watersheds). If all stream sites having waters colder than the standard are increased to the standard in order to match thermal physiological optima, there is no way to reduce temperatures downstream to meet the same optima. Meeting standards on a basin scale means generally not exceeding target WQ conditions anywhere within the watershed on a longitudinal path from headwaters to a downstream point at which the WQ standard is applied by ODEQ. Exceedances upstream translate downstream, thereby constraining and eliminating beneficial uses within the historic range of the SSBT species as habitat at the lower end of the historic range becomes uninhabitable (McCullough 2010). Restoration of a species is not furthered by constriction of available habitat. In addition, it must be remembered that meeting a WQ standard (e.g., rearing standards of 12, 16, and 18°C) at all designated locations within drainages in Oregon requires adjusting BMPs so that the standard is met in 9 years out of 10. This standard allows for natural variation and probabilities of exceedance of standards.

OFIC goes to great lengths to infer that streams in the PNW are too cold and too shaded and that by warming them, greater fish production will occur. The OFIC (2015) document supports this claim with

the statement that temperatures of 40 to 66 °F are supportive of positive growth but warmer temperatures begin the downward trend in growth rates. The fact is that temperatures ≤ 66°F (i.e., 18.9°C) are rare in heavily logged watersheds (e.g., see Figures 1 and 2) during summer. OFIC also points out that old growth streams have greater light penetration to the streambed than do mature second growth forests adjacent to streams. This again is a misleading leap from an isolated fact to a general conclusion that runs contrary to overall environmental protection. Old growth forests have a variety of benefits to overall ecosystem function that are not afforded by a narrow and short riparian buffer amidst an extensive clearcut. The old growth forest, without upstream clearcuts and riparian shade reduction, typically has cold water. It also would tend to have minimal rates of sediment delivery and natural rates of LWD delivery to the channel that can sustain channel structure, pool development, and sediment storage. Such forests would also have natural, moderate, sustainable rates of nutrient flux from the watershed. By pointing out only the slightly higher insolation in old growth forests than in young second growth, OFIC discounts the value of being able to maintain all elements of water quality and fish habitat by protecting diverse, mature, and sufficiently wide riparian buffers to reduce light levels on a systemic basis to those typical of later seral forests.

Figure 1. Typical Oregon coastal forest land north of Hinkle Creek at 45.5226° lat, -123.0311° long.

Figure 2. And another typical Oregon westside forest tract at 43.6988, -123.7101.

4. Cumulative Thermal Effects and the Ability to Restore Temperatures and Salmonid Beneficial Uses to a Basin Using Natural Potential Vegetation Shade Conditions, an Example:

The CRITFC research on the Upper Grande Ronde River basin discussed below represents a good case study for the value of fully protecting and restoring riparian buffer zones at a basin scale. It is also a prime example of the absolute loss in spring Chinook beneficial uses of major portions of the river by cumulative increases in water temperature. Further increases in water temperature at any point along the river continuum that could result from inadequate buffer widths and allowances for riparian thinning would thwart recovery that could occur at other locations.

In northeastern Oregon, cumulative thermal effects are a pervasive problem that are constraining the ability of listed spring Chinook salmon, summer steelhead, and bull trout populations from recovering. CRITFC conducted a LiDAR flight in 2009 and a FLIR flight in 2010 in the Upper Grande Ronde River basin and in Catherine Creek. Watershed Sciences, Inc. (WSI; now Quantum Spatial) produced a water temperature model with these remote sensing data sets and an extensive network of temperature loggers installed by our CRITFC stream monitoring team, using Heat Source as the modeling framework. WSI calibrated the model with concurrent summer water temperature data. This model allowed us to predict future restored conditions based on potential natural vegetation.

Current water temperature conditions were color-coded (Figure 3) for maximum weekly maximum temperature (same as the 7-DADM temperature used in ODEQ's standards). The upper Grande Ronde historically had bull trout, but the current population is essentially confined to the extreme headwaters of the basin. Historic spawning conditions, prior to development of the basin extended far downriver to La Grande. Historic rearing conditions existed throughout the mapped stream network, but are currently limited in summertime to the river upstream of Meadow Creek. Current spawning is limited primarily to the upper end of the mainstem because water temperatures are too warm elsewhere in mid-August to mid-September when these fish spawn. Using relationships between water temperature and salmonid density, we calculated current potential rearing density as a percentage of the potential rearing density under historic thermal conditions. Currently, the potential rearing density with all cumulative thermal effects is only 14.6% of the restored thermal condition. The extensive loss of summer rearing potential for salmonids in the lower river constitutes a loss of beneficial use. This river corridor maintains its use in spring as a migration corridor, but it becomes useless for summer rearing in July and August.

Application of the Heat Source temperature model reveals that there is a great potential to restore water temperatures during the summer period at a basin scale. Currently, temperatures (MWMT) reach about 23°C within the first 20 km of travel downstream from the headwaters. By restoring potential natural vegetation, water temperatures can be maintained at non-stressful conditions throughout the entire length of the river. This would result in the maximum useable rearing area rather than confining all salmonid spawning and rearing to headwater areas and converting the remainder of the river to a warmwater fish zone, as is currently the case. This modeled scenario does not even take into consideration the benefits to thermal restoration that would accrue with reduction in road density in the watershed or restoration of channel width, which would further limit the solar insolation in the wetted stream area.

The Upper Grande Ronde stream network shows a general increase in water temperature from upstream to downstream, but with some minor variations longitudinally. When the river enters a long canyon stretch, temperatures decline somewhat. However, temperature increases with direct solar radiation are much easier to add than they are to reduce when a stream enters a shaded reach. The upper Grande Ronde also has some cold refuges that have been mapped by CRITFC using FLIR imagery. Fishery managers hold out hopes that cold refuges are frequent enough that they may act as a safety mechanism to protect listed fish in years when extreme air temperatures and low water levels occur, such as in 2015, and where a watershed has already been significantly altered by clearcutting, road building, and implementation of minimal buffers. Unfortunately, the stream area providing cold refuges (i.e., with temperatures 2°C, or more, colder than ambient) is very slight, and many of these are present as sloughs chocked with algae and emergent aquatic vegetation that are supported by hyporheic flows. The best hope to recovery the listed species in the Upper Grande Ronde is to restore the thermal regime systemically, starting from the headwaters and working downstream using natural potential vegetation (vegetation height and cover) as the model for restoration potential.

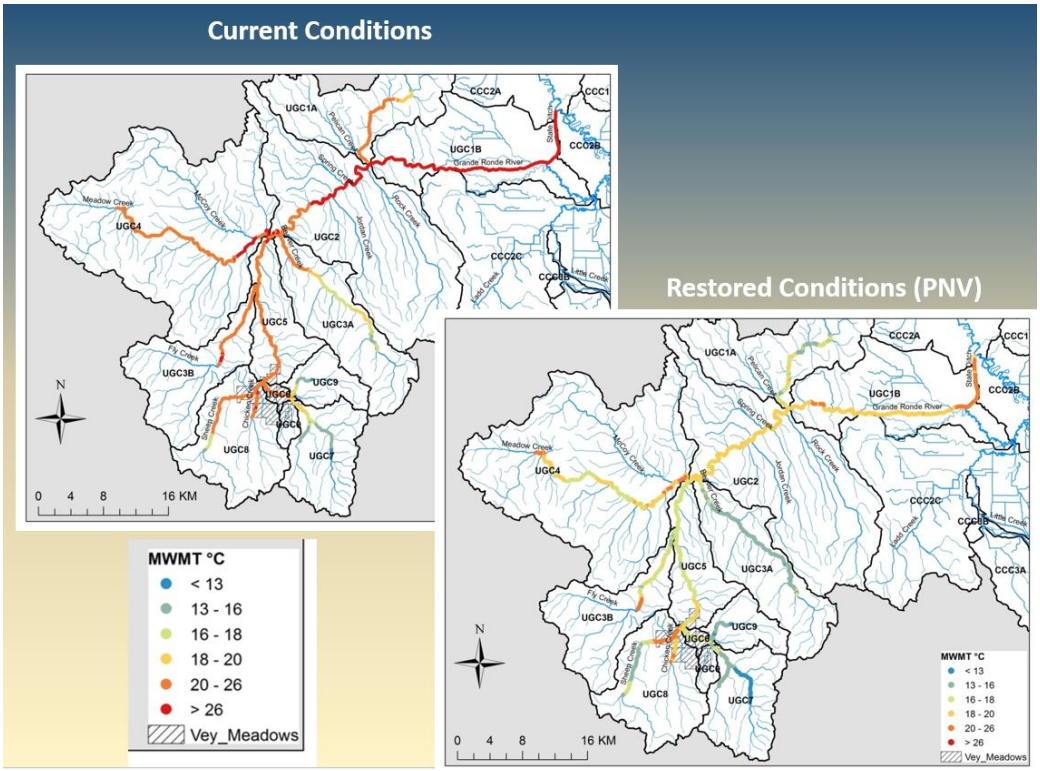


Figure 3. Current and future restored thermal conditions on the Upper Grande Ronde River.

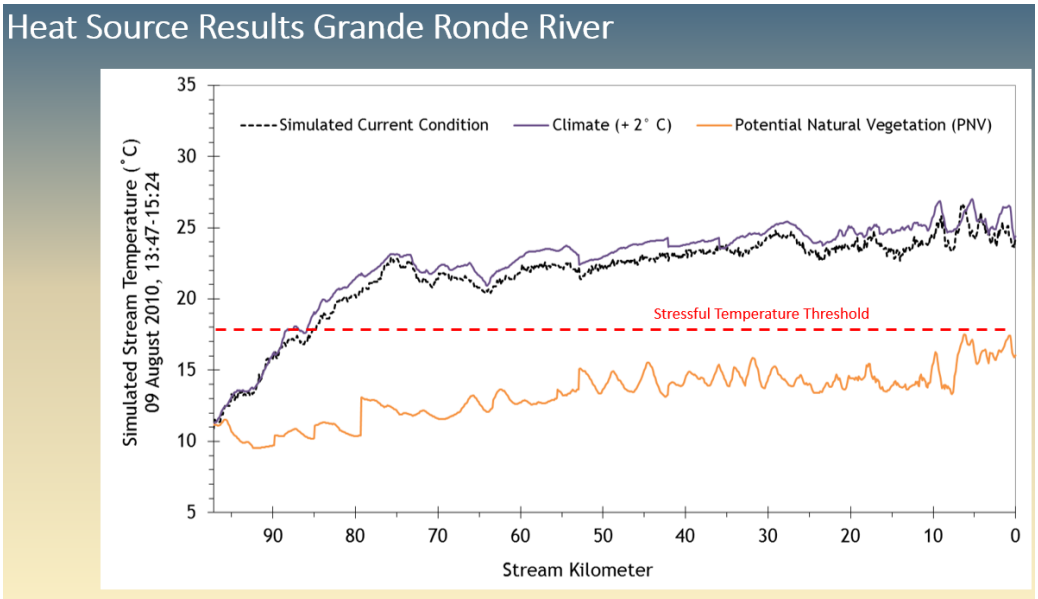


Figure 4. Current and future restored thermal conditions (potential natural vegetation conditions) on the Upper Grande Ronde River, plus a simulated condition where air temperatures warm by 2°C.

5. Compilation of scientific literature demonstrating the decline in salmonid abundance with increases in water temperature

The figures below illustrate the relationships found in the literature between juvenile salmonid density and water temperature for a wide variety of salmonids. These relationships appear to be highly consistent and indicate that salmonid density tends to decline from approximately 12 to 15°C, where density is a maximum value at optimum water temperatures to 22-25°C, where juvenile density reaches extinction. Land management impacts that increase water temperatures cumulatively at a rate that exceeds the natural rate of heating cause overall fish population abundance to be reduced at a basin scale and also causes a shrinkage in useable rearing area while the point at which salmonids are no longer present moves headward.

Lessard, J.L. and D.B. Hayes. 2003. Effects of elevated water temperature on fish and macroinvertebrate communities below small dams. River Research and Application 19(7):721-732.

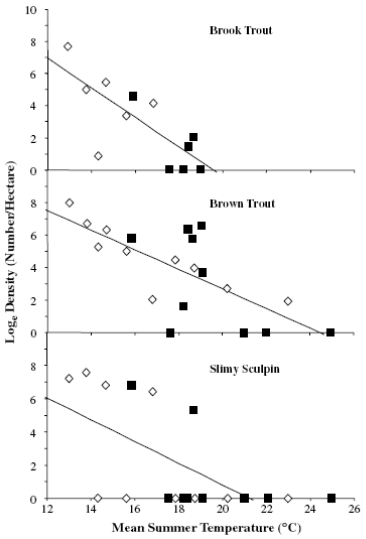


Figure 3. Mixed modelling analysis relating the $\log_e$ transformed brook trout, brown trout and slimy sculpin population densities to mean summer temperature (°C). Upstream (open diamonds) and downstream (closed squares) samples are indicated, but position was not significant. Brook trout model is based on the six streams that contained brook trout and the brown trout and slimy sculpin models are based on all ten study streams

Li, H.W., G.A. Lamberti, T.N. Pearsons, C.K. Tait, J.L. Li, and J.C. Buckhouse. 1994. Cumulative effects of riparian disturbances along high desert trout streams of the John Day Basin, Oregon. Trans. Am. Fish. Soc. 123:627-640.

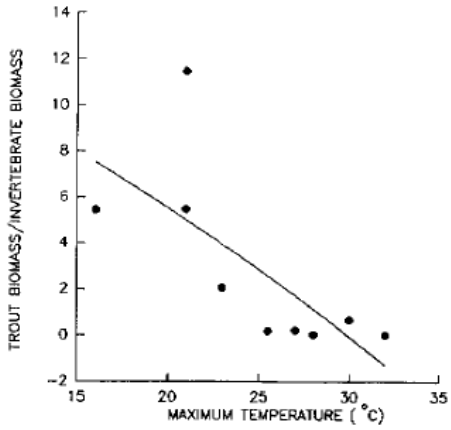


FIGURE 7.—Regression of trout biomass : invertebrate biomass ratio on maximum daily temperature for all reaches combined; $r = -0.71$, $P < 0.05$.

Douglas Drake

Multivariate Analysis of Fish and Environmental Factors in the Grande Ronde Basin of Northeastern Oregon

File: ODEQ-Grande Ronde-multivariate analysis-fish-environmental factors-Bio012.pdf

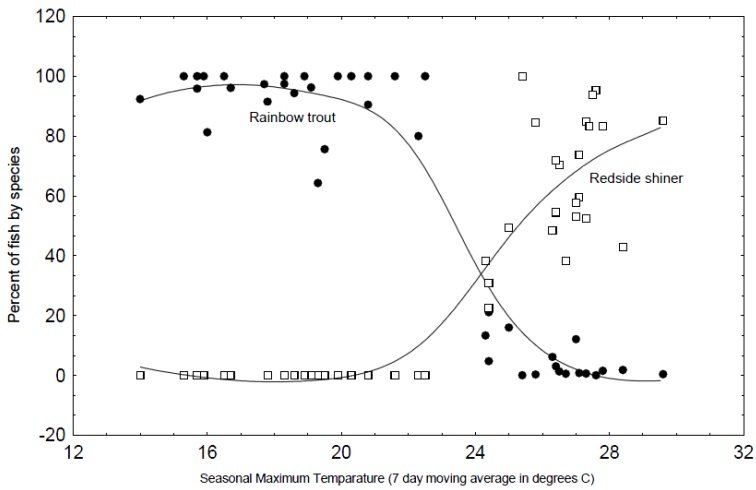


Figure 7. Relationship between percent of Rainbow trout (Oncorhynchus mykiss) and Redside shiner (Richardsonius balteatus) versus the seasonal maximum temperature. A distance weighted least squares line was used as a best fit model.

Thompson, L.C., J.L. Voss, R.E. Larsen, W.D. Tietje, R.A. Cooper, and P.B. Moyle. 2012. Southern Steelhead, Hard Woody Debris, and Temperature in a California Central Coast Watershed. Transactions of the American Fisheries Society 141(2):275-284.

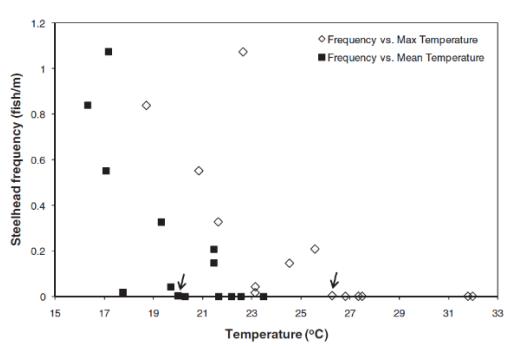


FIGURE 2. Steelhead density plotted against mean water temperature and maximum water temperature. The value producing D_{KBS} (the maximum difference between the observed and theoretical bivariate distribution) for each predictive variable is denoted by an arrow.

We surveyed large wood volumes in relation to the distribution and density of rainbow trout Oncorhynchus mykiss and steelhead (anadromous rainbow trout) in 15 stream reaches in the upper Salinas River watershed, California, which represents the southern end of the species f range. The main tree species contributing to large wood were hardwoods: coast live oak *Quercus agrifolia*, California sycamore *Platanus racemosa*, red willow *Salix laevigata*, and valley oak *Q. lobata*. Large wood jams were important in pool formation and typically had red willow as their key pieces. Temperatures were exceptionally warm during the study period. No steelhead were observed at sites where the mean water temperature exceeded 21.5°C or the maximum water temperature exceeded 26°C. The combined importance of high temperatures and large wood on the distribution and abundance of southern steelhead indicates that suitable habitat may be reduced if climate change continues on its present course of warming and the frequency of fires increases.

Madriñán, L.F. 2008. Biophysical Factors Driving the Distribution and Abundance of Redband/Steelhead Trout (Oncorhynchus mykiss gairdneri) in the South Fork John Day River Basin, Oregon, USA. Ph.D. Thesis. Department of Fish and Wildlife, Oregon State University, Corvallis, Oregon. 113 p.

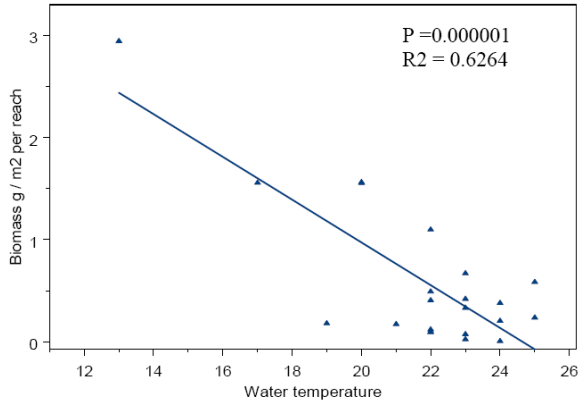


Figure 4.6 (B): Regression analysis between maximum temperature and trout biomass by stream reach

Several studies have shown that maximum stream temperature is negatively associated with trout density (Li et al. 1994, Ebersole et al. 2003); however, most of them did not use biomass because they were unable to identify fish size segregation between patches and assumed that all trout were of equal size. The classification of juvenile salmonids in different size classes is particularly important when their response to water temperature is being considered.

Ebersole, J.L, Liss, W.J, and Frissell, C.A. 2003. Thermal heterogeneity, channel morphology, and salmonid abundance in northeastern Oregon streams. Canadian Journal of Fisheries and Aquatic Sciences 60: 1266 – 1280.

Ebersole et al.

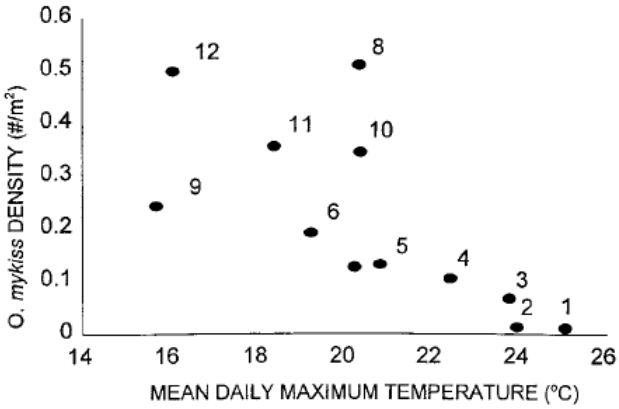
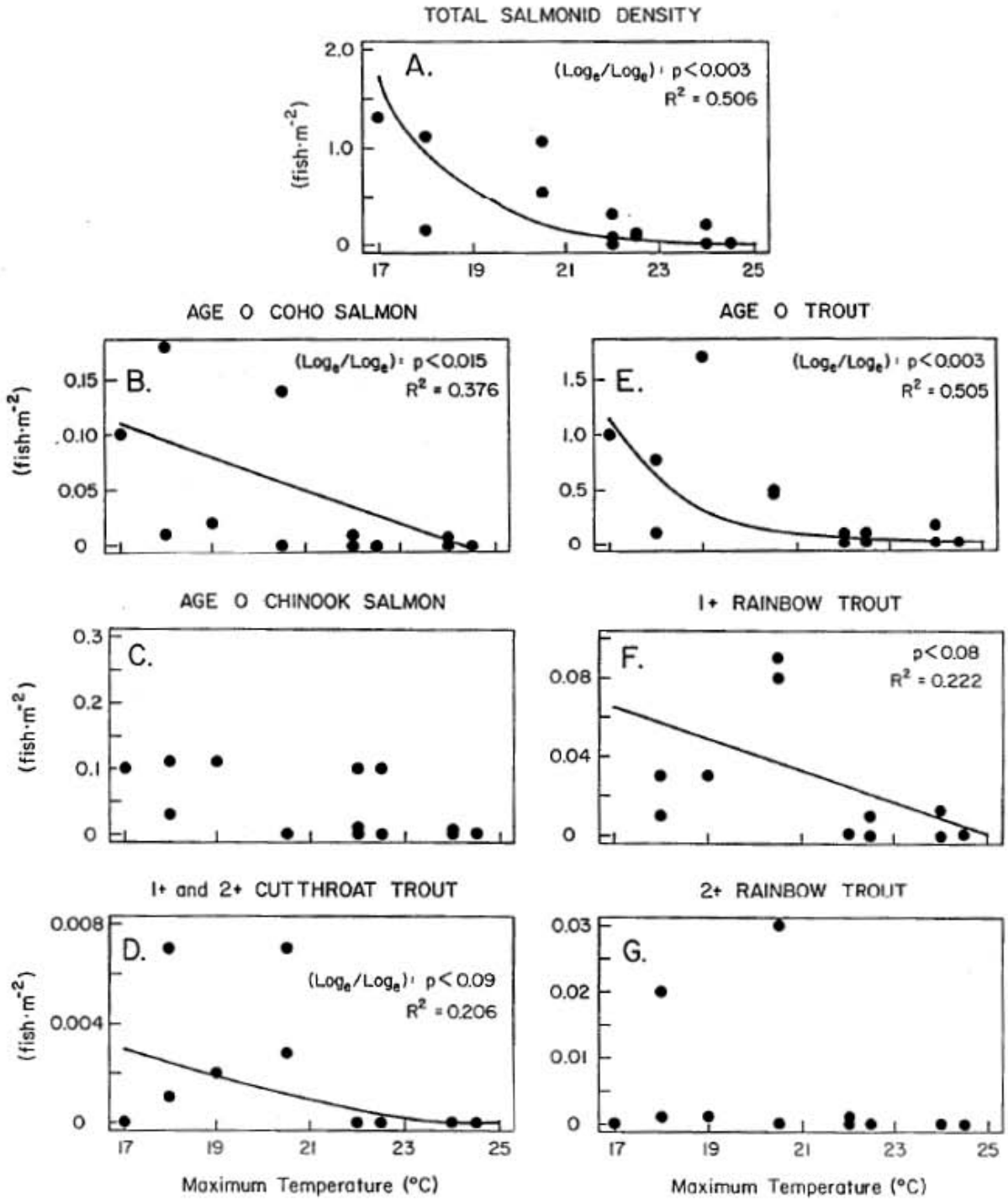


Fig. 3. Relationship between mean rainbow trout density and mean daily maximum water temperatures of 12 study reaches. The numbers refer to map codes for study reaches listed in Table 1.

Frissell, C.A. 1992. Cumulative effects of land use on salmon habitat in southwest Oregon coastal streams. PhD. Thesis. Oregon State University, Corvallis, Oregon. 227 p.



Dunham, J., B. Rieman, and G. Chandler. 2003. Influences of temperature and environmental variables on the distribution of bull trout within streams at the southern margin of its range. North American Journal of Fisheries Management 23(3):894-904.

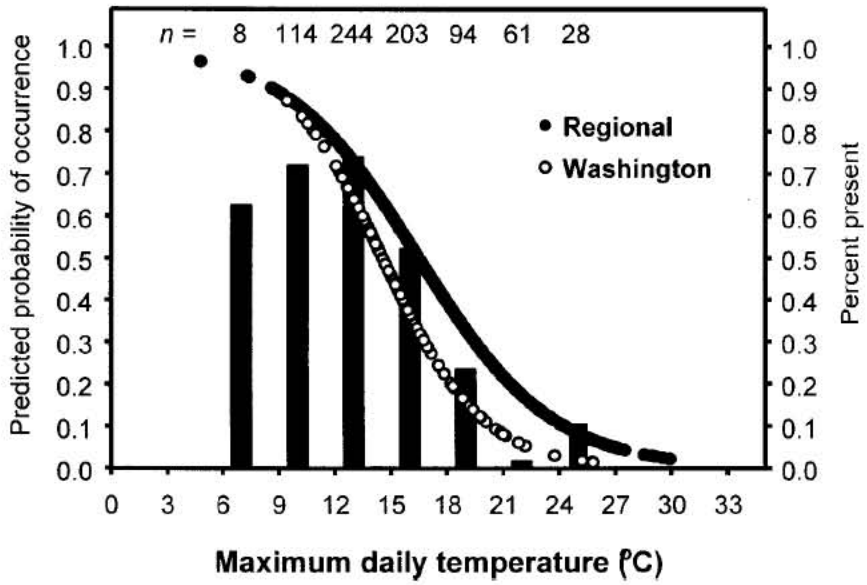


FIGURE 2.—Occurrence of small bull trout in relation to temperature. The left y-axis shows the predicted probability of occurrence in relation to maximum daily temperature for the regional and Washington 2000 data sets (indicated by circles). The right y-axis shows the percentage of sites (both data sets; n = 752 sites) where small bull trout were observed (indicated by bars). Bars are centered on 3°C bins with sample sizes indicated above each.

Implications of Changes in Riparian Buffer Protection for Georgia's Trout Streams

Judy L. Meyer,
Krista L. Jones,
Geoffrey C. Poole,
C. Rhett Jackson,
James E. Kundell
B. Lane Rivenbark,
Elizabeth L. Kramer,
and William Bumback

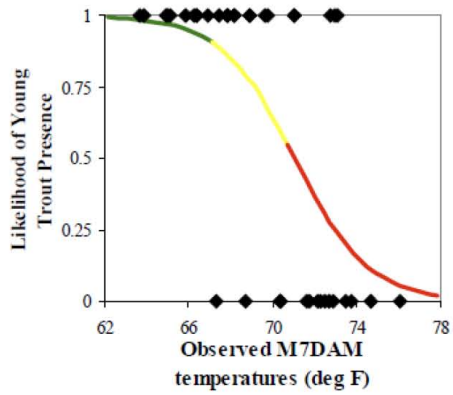


Figure 2-2. Likelihood of young trout presence versus observed M7DAM stream temperatures (°F) for sites sampled in 2001 and resampled in 2002. n = 38; p value <.0001

Likelihood of Young Trout Presence (at M7DAM Temperature X°C) =

$$e^{(7.094 - 1.027*X)} / [1 + e^{(7.0944 - 1.027*X)}]$$

2.3 Relationships Between Young Trout and Stream Temperature

Since stream temperature is such a strong influence on trout, we first used a simple regression model to relate the biomass[4] of young trout to M7DAM stream temperature (Figure 2-1). Young trout biomass declines predictably as stream temperatures warm. 2001 and 2002 M7DAM stream temperatures alone explain 53% of the variation observed in young trout biomass.

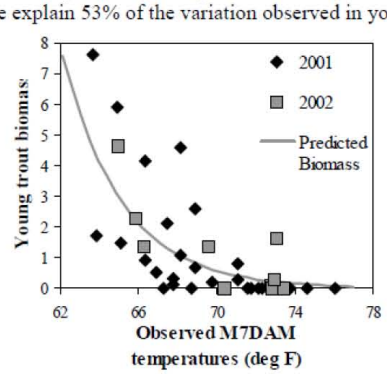


Figure 2-1. Young trout biomass (kg per hectare of streambed) versus observed M7DAM stream temperatures (°F) for sites sampled in 2001 and resampled in 2002. n = 38; r^2 = 0.53; p value <.0001

Log Young Trout Biomass (grams / 100 m^2) = 6.178 + (-0.265)(M7DAM Temperatures °C)

Welsh, H.H., G.R. Hodgson, B.C. Harvey, and M.F. Roche. 2001. Distribution of juvenile coho salmon in relation to water temperatures in tributaries of the Mattole River, California. North American Journal of Fisheries Management 21(3):464-470.

Abstract: In an attempt to define the upper thermal tolerance of coho salmon Oncorhynchus kisutch, we examined the relationship between the presence of this species and the summer temperature regime in 21 tributaries of the Mattole River of northwestern California, USA, for 1 to 5 years starting in 1994. We characterized the temperature regime of each tributary by determining the highest average of maximum daily temperatures over any 7-d period (maximum weekly maximum temperature, MWMT) and the highest average of mean daily temperatures over any 7-d period (maximum weekly average temperature MWAT), by the use of hourly measurements throughout the summer. Coho salmon presence was determined by divers in late summer. Both variables that were used to describe the temperature regime provided good-fitting models of the presence or absence of coho salmon in separate logistic regressions, and both correctly determined the presence or absence in 18 of 21 streams, given the previous probability of a 50% likelihood of coho salmon presence. Temperature regimes in the warmest tributaries containing juvenile coho salmon had MWMT of 18.0°C or less or MWAT of 16.7°C or less; conversely, **all of the streams where MWMT was less than 16.3°C or MWAT was less than 14.5°C contained juvenile coho salmon. These results, combined with historical and current watershed conditions that affect stream temperatures, suggest that management strategies to restore and conserve coho salmon in the Mattole River drainage should focus on the water temperature regime.** Such a focus is also likely to benefit other declining species requiring cold water, including the tailed frog *Ascaphus truei* and southern torrent salamander *Rhyacotriton variegatus*.

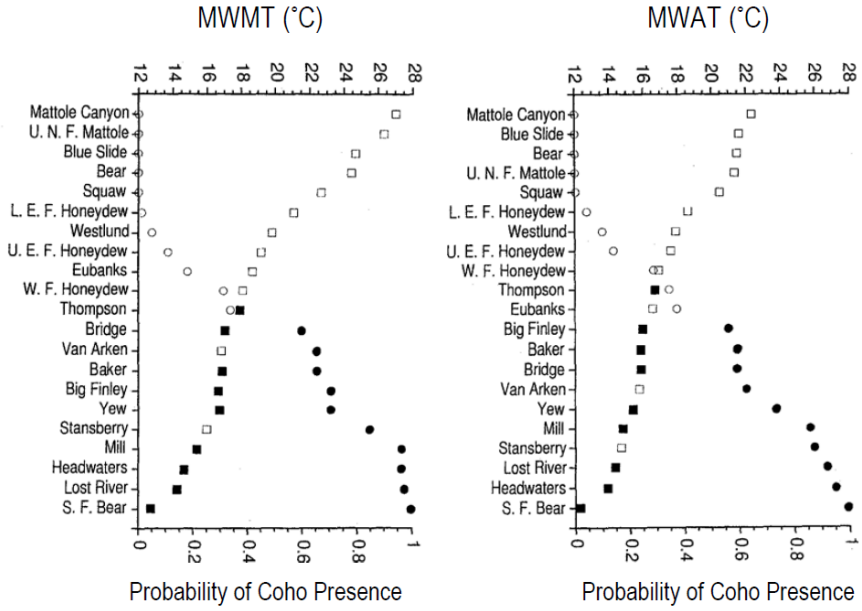


FIGURE 2.-Logistic regression of coho salmon presence or absence in 21 tributaries of the Mattole as predicted by (a) the maximum weekly maximum temperature (MWMT) and (b) the maximum weekly average temperature (MWAT). Data points for the independent variable (MWMT or MWAT) indicate the actual presence (filled squares) or absence (open squares) of coho salmon. Data points representing the probability of coho salmon presence indicate the predicted presence (filled circles) or absence (open circles). Abbreviations are as follows: L. E. F. = Lower East Fork, S. F. = South Fork, U. E. F. = Upper East Fork, U. N. F. = Upper North Fork, and W. F. = West Fork.

July 21, 2015

Tom Imeson, Chairman
Oregon Board of Forestry
Oregon Department of Forestry
2600 State Street
Salem, Oregon 97310
BoardofForestry@oregon.gov

Dear Chairman Imeson and Oregon Board of Forestry Members:

The Columbia River Inter-Tribal Fish Commission (Commission) was created by and serves the Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes and Bands of the Yakama Nation, and the Nez Perce Tribe. As part of its mission, the Commission is charged with helping its member tribes to protect the salmon and lamprey that migrate through the Columbia River and spawn and rear within its interior tributaries.

Attached are the technical comments, of Dale McCullough, Ph.D., Senior Fishery Scientist with the Commission, regarding the review of the action titled "Developing Riparian Rule Prescriptions", which is scheduled for the Board of Forestry (Board) review on July 23, 2015. Included with the comments is a summary of Dr. McCullough's extensive technical background and experience with stream temperature, water quality, fisheries biology (including the relation to temperature and water quality), fish habitat monitoring and cumulative effects of land management on salmon habitat conditions.

Although the action before the Board would apply only to areas in western Oregon (i.e., Coast Range, South Coast, Interior or Willamette Valley, Western Cascades, and Siskiyou), the Commission is concerned with the Board's decision and its future implications on lands in eastern Oregon (i.e., Eastern Cascades and Blue Mountains) where the Commission's member tribes have significant interests. Stream temperatures and riparian protections are important issues affecting eastern Oregon streams and the fish and fisheries they support. The Commission hopes that as a next step, the Board takes a look at the protections afforded to streams and associated habitats in forested lands in the eastern part of the state. However, we are extremely concerned about the science and analyses being implemented in the current review before the Board. We fear that this will lead to bad decisions for Oregon's western forest lands, and that those decisions will be repeated when looking at riparian protections in eastern Oregon.

Thank you for the opportunity to provide this input on your decision. If you have any questions, please feel free to contact Dale McCullough or Christine Golightly at our offices.

Sincerely,

Babtist Paul Lumley
Executive Director

Cc: Richard Whitman, Governor's Office, Natural Resources Policy Director
Peter Daugherty, Oregon Department of Forestry, Ex-officio Chief, Private Forests