Protecting clean water and native fish in the waters of the Rogue.

Thomas Imeson, Chair
Oregon Board of Forestry
2600 State Street
Salem, OR 97310

January 7, 2019

Re: Public Comment on Agenda Item No. 3 Update on Siskiyou Streamside Project

Dear Chair Imeson and Members of the Board:

Thank you for the opportunity to provide public comment on Agenda Item Number 3: Update on Siskiyou Streamside Project regarding work completed by Oregon Department of Forestry (ODF) staff since the March 2018 Board meeting. Rogue Riverkeeper is a non-profit organization that works to protect and restore clean water and fish in the waters of the Rogue through advocacy, accountability, and community engagement.

In light of the recent staff report from ODF ("Update on the Siskiyou Streamside Protections Review") and the initial list of literature both included and excluded from the Systematic Review (SR), we have significant concerns about the highly constrained number of studies approved for inclusion, the limited geographic extent, and the inclusion criteria. Rogue Riverkeeper first addressed many of these concerns in our comments submitted on the draft protocol released in September 2018 and have included those comments (see Appendix I). Specifically, we strongly disagree with the statement from ODF that the Board's November 2015 decision to exclude the Siskiyou from the new stream buffer rule is equivalent to direction from the Board to narrowly restrict the geographic scope of the SR to the Siskiyou. This concern is discussed in more detail below.[1]

In summary, we ask the Board to direct ODF to:

- Expand the geographic extent of the SR to include western Oregon and northern California;
- Include studies, data, and other relevant information related to the legal framework and requirements under the Clean Water Act regarding compliance with state water quality standards;

[1] See p. 3 in ODF staff report: "Multiple comments indicated that the SR should be expanded to a larger geographic scope. However, the Board made a policy decision in November 2015 to not extend the SSBT rule change and the associated monitoring and research available in the rest of western Oregon to the Siskiyou. ODF staff are aligning with this decision unless directed otherwise." (p. 3).

- Expand inclusion criteria and provide more information regarding inclusion criteria, number of studies, and field visits; and
- Clarify content of the final systematic review and what will be presented to the Board in April.

Compliance with the Protecting Cold Water (PCW) Water Quality Standard in the Siskiyou Georegion

The Rogue River watershed stretches across more than 3 million acres, from its headwaters near Crater Lake to the mouth of the river along Oregon's southern coast at Gold Beach. The Rogue Basin includes approximately 1 million acres of private forest land managed under the Oregon Forest Practices Act. The 2002 statewide sufficiency analysis and the results of the RipStream study in 2011 demonstrated that current stream buffer rules under the Forest Practices Act are not protective of stream temperature and violate the Protecting Cold Water (PCW) water quality standard.[2] Under ORS 527.765(1), the Board is required to establish regulations and best management practices to "insure that to the maximum extent practicable" water quality standards are achieved and maintained. Critically, the PCW water quality standard applies statewide in streams that support salmon, steelhead, and bull trout (SSBT) and to upstream stream reaches necessary to meet the criterion downstream. Excluding the Siskiyou region is a serious concern in light of the compelling evidence that existing rules were inadequate to prevent logging that warms water temperatures in violation of the Protecting Coldwater Criterion (PCW), a fundamental component of the state's water quality standard for stream temperature.[3]

Comments Regarding the Siskiyou Streamside Protections Review Stream Temperature, Shade, and Desired Future Condition: A Systematic Review

At the March 2018 Board of Forestry meeting, the Board directed ODF to move forward with the Siskiyou Riparian Protection Review to specifically conduct a systematic literature review of the effectiveness of the Oregon Forest Practices Act's (OFPA) riparian protections for 1) desired future conditions (DFC) and 2) stream temperature and shade for both small- and medium-sized fish-bearing streams in the Siskiyou region. Rogue Riverkeeper provided detailed comments on the draft protocol released in September 2018 and have included those comments (see Appendix I).

We support the use of systematic reviews (SR) for literature reviews related to policy issues and the opportunity to provide comments throughout the review process. However, we are concerned that the SR has been designed to exclude a number of critical data sources, from the pivotal 2011 Groom et al. study (known as the "RipStream" study) that was the impetus for the stream buffer rule change to Total Maximum Daily Loads (TMDLs) for the Rogue, that would inform this review regarding both scientific evidence and applicable legal frameworks.

1. The Board should direct ODF to expand the geographic extent of the SR to include western Oregon and northern California.

[2] Groom et al. 2011. *Response of Western Oregon (USA) stream temperature to contemporary forest management*, Forest Ecology and Management, 262: 1618-1629.
[3] Groom et al. 2011. *Response of Western Oregon (USA) stream temperature to contemporary forest management*, Forest Ecology and Management, 262: 1618-1629.

As previously addressed in our October 2018 comments on the draft protocol, we are concerned that the geographic scope of the SR is artificially narrow and constrained. ODF should not narrowly restrict its literature review to studies located only in the Siskiyou region. We are specifically concerned about language in the staff report for this Board meeting that states:

> "Multiple comments indicated that the SR should be expanded to a larger geographic scope. However, the Board made a policy decision in November 2015 to not extend the SSBT rule change and the associated monitoring and research available in the rest of western Oregon to the Siskiyou. ODF staff are aligning with this decision unless directed otherwise." (p. 3).

The November 2015 decision by the Board to exclude the Siskiyou should not be conflated with a decision to limit the geographic extent of the SR. The Board's decision to exclude the Siskiyou in the rule change is not the same as direction from the Board to limit the study scope and geographic extent of the SR. The Board should direct ODF to include relevant studies, data, scientific literature, and models that are located in western Oregon and northern California (e.g. Klamath Basin, Siskiyou County, and relevant portions of Del Norte County). If the SR remains narrowly constrained by geography, the ODF review will exclude critical sources of information that would inform the policy questions.

For example, the current SR excludes:

- **The Groom et al. (2011) "RipStream" study:** Due to the study location in the Oregon Coast Range, the Groom et al. (2011) study ("RipStream") has been excluded under the current SR. As Groom et al. write, "Our analysis indicated that timber harvested according to minimum FPA standards along medium or small fish-bearing streams resulted in a 40.1% probability that a preharvest to postharvest comparison of 2 years of data will detect a temperature increase of >0.3C."[4] These results are directly relevant to the policy question: "For small and medium fish-bearing streams in the Siskiyou region, what are the effects of near-stream forest management on stream temperature and shade?" The Board should direct ODF to reconsider the narrow geographic extent of the SR and to include studies located in western Oregon and northern California. There is no credible scientific rationale for excluding the results of Groom et al. 2011 or other monitoring data from regions north of the Siskiyou. If this evidence exists, ODF should clearly provide it with a detailed rationale for excluding this analysis.

- **Other relevant studies based on artificially narrow geographic extent:** In addition to excluding the RipSteam study, the SR excludes other studies based solely on geographic extent that would directly inform the policy questions. For example:
    - The Park et al. study from 2008 ("Changes to Angular Canopy Density from Thinning with Varying No Treatment Widths in a Riparian Area as Measured Using Digital Photography and Light Histograms") is excluded because, although it is located in the Rogue River-Siskiyou National Forest, it is not in the Georegion.
    - As Lewis et al. (1999) write, "Canopy has been widely acknowledged as influencing stream temperature. It has been shown that forest harvesting or road

[4] Groom, Jeremiah, Liz Dent, and Lisa Madsen. (2011). Stream temperature change detection for state and private forests in the Oregon Coast Range. Water Resources Research. Vol. 47. P. 9.

building that removes riparian vegetation (canopy) increases the water temperature of the adjacent stream."[5] Despite the relevancy of this type of analysis, because this study is located in northern California, it has been excluded due to geographic extent.

- As Johnson (2004) writes, "Changes in vegetation near streams can have major impacts on stream temperature (Brown and Krygier 1970; Beschta and Taylor 1988; Johnson and Jones 2000)."[6] This study has also been excluded due to its location in the H.J. Andrews Forest in western Oregon.

a. ODF should rank studies and other relevant information in the SR by geographic relevance

In the draft protocol in Table 7 (p. 15), ODF ranks studies from the Siskiyou as H=high and studies from the Klamath Mountains as L = low. No other regions are given a ranking. However, in the spreadsheet of literature reviewed by ODF, studies are given either a Y = yes or N = no ranking regarding geographic extent. Studies located outside of the Siskiyou region should be given a weighted ranking and still be included in the analysis. However, under the current approach, all studies that are not directly within the Siskiyou are totally excluded.

2. The Board should direct ODF to include studies, data, and other relevant information related to the legal framework and requirements under the Clean Water Act regarding compliance with state water quality standards.

We are significantly concerned that multiple Total Maximum Daily Loads (TMDLs) and other water quality data from DEQ have been excluded from the SR. In response to the thematic comment from multiple commenters on the draft protocol that TMDLs should be directly incorporated into the SR, ODF states in the staff report:

> "ODF staff are incorporating the TMDL process and its findings into this rule review process by giving the Department of Environmental Quality (DEQ) a scheduled Board agenda item on this topic. ODF staff will ensure that TMDL findings are part of the record for the Board's decision making planned for April 2019." (p. 3).

Allowing DEQ to present to the Board is not equivalent to actually including DEQ data and TMDLs into the SR. ODF specifically excluded TMDLs and data from DEQ in the SR, without any transparency or explanation. These sources were marked as missing relevant data. The Board should direct ODF to coordinate with DEQ, include TMDLs and data from DEQ in the SR, and include any timber harvest monitoring with respect to shade loss and temperature according to DEQ protocols and required under the relevant TMDLs.

[5] Lewis T. E., D. W. Lamphear, D. R. McCanne, A. S. Webb, J. P. Krieter, and W. D. Conroy (1999), Executive summary: Regional assessment of stream temperatures across northern California and their relationship to various landscape-level and site-specific attributes, Forest Science Project report, 14 pp., Humboldt State Univ. Found., Arcata, Calif. P. 13.

[6] Johnson S. L. (2004), Factors influencing stream temperatures in small streams: Substrate effects and a shading experiment, Can. J. Fish. Aquat. Sci., 61, 913–923.

3. The Board should direct ODF to expand the study inclusion criteria and provide more information regarding inclusion criteria, number of studies, and field visits.

The study inclusion criteria are narrow and restrict the SR by excluding critical factors that inform the policy questions and objectives, such as climate change, disturbances, and large woody debris. These factors may all potentially contribute to stream temperature and shade, and should be considered as part of the systematic literature review.

a. Expand the study inclusion criteria to include climate change and disturbance.

Regarding the scope of review as it relates to desired future conditions (DFC) under OAR 629-642-0000(2),[7] impacts related to climate change should be considered in scope. The regulations clearly state that "The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, ***over time, average conditions across the landscape*** become similar to those of mature streamside stands."[8] Warmer spring and summer temperatures, increased wildfire activity, reduced precipitation, reduced snowpack, and earlier spring snowmelts are all trends that are projected for the Siskiyou region.[9] Changes and shifts in these "average conditions" that occur "over time" would also reflect any impacts from a changing climate. In order to appropriately consider "over time, average conditions across the landscape" as part of DFC, ODF should include potential impacts of climate change and other disturbances as part of its review. Further, if as the draft protocol states "there are no RMA basal area targets for hardwoods" and the Siskiyou region "may be an exception due to high prevalence of hardwoods in the riparian management area (RMA)," it is even more important to consider the impact of changing conditions where current conditions may not be adequately addressed. ODF points to the lack of a Board policy on climate change as the rationale for excluding climate change from the study inclusion criteria.[10] The Board should clarify that this is not a rationale for excluding climate change and, additionally, should develop a climate change policy.

b. Expand the study inclusion criteria to include large woody debris.

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[7] See OAR 629-642-0000(2) The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, over time, average conditions across the landscape become similar to those of mature streamside stands. Oregon has a tremendous diversity of forest tree species growing along waters of the state and the age of mature streamside stands varies by species. Mature streamside stands are often dominated by conifer trees. For many conifer stands, mature stands occur between 80 and 200 years of stand age. Hardwood stands and some conifer stands may become mature at an earlier age. Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall.

[8] OAR 629-642-0000(2). Emphasis added.

[9] Breen, Brandon. Hotter, Drier, No Less Wild: Protecting Public Land and Biodiversity in the Klamath-Siskiyou Region in the Era of Climate Change. Klamath-Siskiyou Wildlands Center. October 2017. P. 7. See also e.g. Snover, Amy K. et al. Climate-Change Scenarios for Water Planning Studies Pilot Applications in the Pacific Northwest. American Meteorological Society. November 2003; Westerling, A.L. and B.P. Bryant. Climate Change and Wildfire in California. Climatic Change (2008) (Suppl 1): S231-S249; Damschen et al., Climate Change Effects on an Endemic-Rich Edaphic Flora: Re-Surveying Robert H. Whittaker's Siskiyou Sites (Oregon, USA). Ecology. 2010. 91(12): 3609-3619.

[10] From ODF staff report: This reasoning makes sense. However, there is no Board policy on climate change, and it is not currently part of the FPA. We therefore have no goal with which to assess effectiveness of the FPA in regards to climate change. (p. 3).

The scope of review should include an assessment of large woody debris, root masses, snags, and litter fall, identified as "functional outputs" in the draft protocol. Although, as the draft protocol states, these may not be considered primary characteristics of a functional stand, they should be considered important characteristics of stream health and shade. In fact, large woody debris, channel-influencing root masses, snag, and litter fall are all explicitly identified in the regulations for DFC. OAR 629-642-0000(2) states:

> "Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall."

The description of a "mature standard" under DFC clearly includes large woody debris, root masses, snags, and litter fall, and therefore these factors should be included.

Additionally, as stated by Johnson (2004):

> "Riparian vegetation influences microclimatic conditions through biological functions such as evapotranspiration and release of water vapor as well as through physical means such as decreasing wind speeds. Vegetation also provides bank stability, which can impact width to depth ratios and the exposed surface area of the stream. ***Accumulations of large organic matter inputs have an effect on hydraulic retention times.*** Although incoming radiation levels in dense natural forests can be as low as those under the experimental shade, riparian forests would have more variability of incoming light levels because of the shape and structure of the vegetation." (p. 919).[11]

ODF should include large woody debris, root masses, snags, and litter fall as part of the SR for both stream temperature and shade as well as for DFC.

c. Increase transparency by providing data extraction tables: Regarding the study inclusion criteria, the Board should direct ODF to ensure that the standards of transparency established in the draft protocol have been fulfilled. For example, according to the draft protocol, "For transparency, the inclusion or exclusion of studies, and the basis for this decision, will be documented."[12] In reviewing the preliminary results of the SR, it is not clear why some studies were excluded for missing relevant data. According to the draft protocol Data Extraction Strategy, ODF was to compile a data extraction table that includes relevant information about each study (e.g. study design, site history, ecosystem type, notes concerning study quality with evidence based reasoning). Will the data extraction tables be made available? The Board should direct ODF to make these data extraction tables publicly available to increase transparency.

d. Clarify how Objective 4 has been addressed in the preliminary results of the SR: Objective 4 does not appear to be included in the draft spreadsheet with the preliminary

[11] Johnson S. L. (2004), Factors influencing stream temperatures in small streams: Substrate effects and a shading experiment, Can. J. Fish. Aquat. Sci., 61, 913–923. *Emphasis added.*

[12] Siskiyou Streamside Protections Review Stream Temperature, Shade, and Desired Future Condition: A Systematic Review. September 2018. P. 13.

results of the SR. Can ODF clarify how Objective 4 under the draft protocol was addressed?

e. Clarify how field visits were conducted: ODF should provide clarification regarding how field visits will be used to inform the SR. Additionally, ODF should increase transparency by clarifying where the field visits were conducted and what information was gathered.

f. Clarify the number of studies for inclusion in SR: We request clarification regarding how ODF will determine what constitutes "an insufficient number of studies" for the SR. In the spreadsheet provided by ODF that includes the included and excluded studies, ODF has preliminarily identified 15 studies for inclusion. ODF states on the first tab that "Note: if an insufficient number of studies are found during the search process, this strict exclusion threshold may be re-examined." We suggest that the Board review these narrow results and direct ODF to expand its search.

Thank you for the opportunity to provide these comments on Agenda Item No. 3 Update on Siskiyou Streamside Project. We look forward to a response from the Board regarding:

- Expanding the geographic extent of the SR to include western Oregon and northern California;
- Including studies, data, and other relevant information related to the legal framework and requirements under the Clean Water Act regarding compliance with state water quality standards;
- Expanding inclusion criteria and provide more information regarding inclusion criteria, number of studies, and field visits; and
- Clarifying content of the final systematic review and what will be presented to the Board by ODF in April.

Sincerely,

Stacey Detwiler
Conservation Director
Rogue Riverkeeper

Appendix I. October 9, 2018 Rogue Riverkeeper Comments on Draft Protocol September 2018

October 9, 2018

RE: Public Comments on Siskiyou Streamside Protections Review Stream Temperature, Shade, and Desired Future Condition: A Systematic Review Draft Protocol September 2018

Dear Mr. Freuh:

Thank you for the opportunity to provide public comment on the "Siskiyou Streamside Protections Review Stream Temperature, Shade, and Desired Future Condition: A Systematic Review Draft Protocol" released in September 2018. Rogue Riverkeeper is a non-profit organization that works to protect and restore clean water and fish in the waters of the Rogue through advocacy, accountability, and community engagement. The Rogue River watershed stretches across more than 3 million acres, from its headwaters near Crater Lake to the mouth of the river along Oregon's southern coast at Gold Beach. The Rogue Basin includes approximately 1 million acres of private forest land managed under the Oregon Forest Practices Act and is located within the Oregon Department of Forestry (ODF) Siskiyou Georegion. On behalf of our more than 3,500 members and supporters, we remain concerned that the Siskiyou region's salmon, steelhead, and bull trout streams are currently left with weaker protections than those in the rest of western Oregon, following the Board of Forestry's November 2015 decision to exclude our region from its new stream buffer rule. Excluding the Siskiyou region is a serious concern in light of the compelling evidence that existing rules were inadequate to prevent logging that warms water temperatures in violation of the Protecting Coldwater Criterion ("PCW"), a fundamental component of the state's water quality standard for stream temperature.[13]

At the March 2018 Board of Forestry meeting, the Board directed ODF to move forward with the Siskiyou Riparian Protection Review to specifically conduct a systematic literature review of the effectiveness of the Oregon Forest Practices Act's (OFPA) riparian protections for 1) desired future conditions (DFC) and 2) stream temperature and shade for both small- and medium-sized fish-bearing streams in the Siskiyou region. We appreciate the opportunity to provide comment on the draft protocol released in September 2018 and have included our responses in the table below.

At a fundamental level, this monitoring review must investigate any scientific basis for why the findings of the RipStream study cannot be extrapolated to the Siskiyou. What credible scientific evidence is there that the results from the RipStream study do not apply to the Siskiyou? In a 2016 review of existing data, evidence in the scientific literature does not demonstrate that the relationship between stream warming and shade in the Siskiyou is any different than in the rest of western Oregon (Coast Range, South Coast, Interior, and Western Cascade geographic regions, *see* OAR 629-635-0220).[14] Additionally, we are very concerned that this draft protocol

[13] Groom et al. 2011. *Response of Western Oregon (USA) stream temperature to contemporary forest management*, Forest Ecology and Management, 262: 1618-1629.

[14] Frissell, Chris and Rich Nawa. 2016. Protecting Coldwater for Salmon and Steelhead on Private Timberland Streams of Oregon's Siskiyou Region: A Synoptic Scientific Look at Stream Warming, Shade, and Logging.

has been designed to effectively exclude many studies, including the RipStream study itself. This review must clearly address and analyze any decision to exclude the RipStream data.

Reviewer Name, Organization: Stacey Detwiler, Rogue Riverkeeper	
Section #	**Comments**
1.1 Background	We are concerned that the draft protocol attempts to revise history regarding the decision to exclude the Siskiyou region. The Board of Forestry's January 4, 2012 finding was not specifically limited to only western Oregon and did not become formally limited in writing until 2015. For example, the "Rule Analysis Process for Riparian Protection Standards on Small and Medium Fish Streams" states: "The science review will evaluate the appropriateness of extrapolating RipStream research findings to the Interior, Western Cascades, South Coast, and Siskiyou georegions" (p. 10).[15] Regarding the rationale for excluding the Siskiyou in the draft protocol, it is also inaccurate to state that "this geographic limitation is due to differences in landscape characteristics (e.g. riparian vegetation, climate, geology, hydrology) between the location of the RipStream study and those of the Siskiyou and eastern Oregon regions" (p. 2) when the Board did not make a statement of findings or state a scientific basis for excluding the Siskiyou. As demonstrated in "Protecting Coldwater for Salmon and Steelhead on Private Timberland Streams of Oregon's Siskiyou Region: A Synoptic Scientific Look at Stream Warming, Shade, and Logging" by Frissell and Nawa, evidence in the scientific literature does not demonstrate that the relationship between stream warming and shade in the Siskiyou is any different than in the rest of western Oregon (Coast Range, South Coast, Interior, and Western Cascade geographic regions, *see* OAR 629-635-0220).[16] The following assertion in the Introduction provides no credible scientific justification for excluding the Siskiyou region: "The rules do not apply to the Siskiyou and eastern Oregon regions. This geographic limitation is due to differences in landscape characteristics (e.g., riparian vegetation, climate, geology, hydrology) between the location of the RipStream study and those of the Siskiyou and eastern Oregon regions. See 1.2 Review Purpose for additional scope limitations" (p. 2). Although the Siskiyou may have higher air temperatures that persist for a longer summer drought period than other areas of western Oregon, this would support greater forest protections rather than less. **Recommendation:** In order to address this, ODF should include air temperature monitoring to evaluate the following: On average, do private land Siskiyou

[15] Rule Analysis Process for Riparian Protection Standards on Small and Medium Fish Streams
[16] Frissell, Chris and Rich Nawa. 2016. Protecting Coldwater for Salmon and Steelhead on Private Timberland Streams of Oregon's Siskiyou Region: A Synoptic Scientific Look at Stream Warming, Shade, and Logging.

	region streams have significantly higher air temperatures than other regions that received the increased forest protection? Additionally, the Introduction states that "Studies must have been located in regions similar to the Siskiyou region in Oregon" (p. 2). There is no credible scientific rationale for excluding the results of Groom et al. 2011 or other monitoring data from regions north of the Siskiyou. The Siskiyou may have hotter and longer summers, which would be identified in an assessment of air temperature, but is similar to all regions in western Oregon regarding vegetative shade effects related to stream temperature. Regions in northern California would also be similar, and should be included. If this is not the case, then ODF should provide evidence of this difference. **Recommendation:** ODF should include relevant studies, data, scientific literature, and models that are located in western Oregon and northern California (e.g. Klamath Basin, Siskiyou County, and relevant portions of Del Norte County). ODF should not narrowly restrict its literature review to studies located only in the Siskiyou region.
1.2.2 Desired Future Conditions	Climate change and disturbances: Regarding the scope of review as it relates to desired future conditions (DFC) under OAR 629-642-0000(2), [17] impacts related to climate change should be considered in scope. The regulations clearly state that "The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, ***over time, average conditions across the landscape*** become similar to those of mature streamside stands."[18] Warmer spring and summer temperatures, increased wildfire activity, reduced precipitation, reduced snowpack, and earlier spring snowmelts are all trends that are projected for the Siskiyou region.[19] Changes and shifts in these "average conditions" that occur "over time" would also reflect any impacts from a changing climate. In order to appropriately consider "over time, average conditions across the landscape" as part of DFC, ODF should include potential impacts of climate change and other disturbances as part of its review. Further, if as the draft protocol states "there are no RMA basal area targets for hardwoods" and the Siskiyou region "may be an exception due to high prevalence of hardwoods in the riparian management

[17] *See* OAR 629-642-0000(2) The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, over time, average conditions across the landscape become similar to those of mature streamside stands. Oregon has a tremendous diversity of forest tree species growing along waters of the state and the age of mature streamside stands varies by species. Mature streamside stands are often dominated by conifer trees. For many conifer stands, mature stands occur between 80 and 200 years of stand age. Hardwood stands and some conifer stands may become mature at an earlier age. Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall.

[18] OAR 629-642-0000(2). *Emphasis added.*

[19] Breen, Brandon. Hotter, Drier, No Less Wild: Protecting Public Land and Biodiversity in the Klamath-Siskiyou Region in the Era of Climate Change. Klamath-Siskiyou Wildlands Center. October 2017. P. 7. *See also e.g.* Snover, Amy K. et al. Climate-Change Scenarios for Water Planning Studies Pilot Applications in the Pacific Northwest. *American Meteorological Society*. November 2003; Westerling, A.L. and B.P. Bryant. Climate Change and Wildfire in California. *Climatic Change* (2008) (Suppl 1): S231-S249; Damschen et al., Climate Change Effects on an Endemic-Rich Edaphic Flora: Re-Surveying Robert H. Whittaker's Siskiyou Sites (Oregon, USA). *Ecology*. 2010. 91(12): 3609-3619.

area (RMA)," it is even more important to consider the impact of changing conditions where current conditions may not be adequately addressed.

Recommendation: ODF should consider climate change and disturbances within the scope of its review.

Large woody debris, root masses, snags, and litter fall:

Similarly, the scope of review should include an assessment of large woody debris, root masses, snags, and litter fall, identified as "functional outputs" in the draft protocol. Although, as the draft protocol states, these may not be considered primary characteristics of a functional stand, they should be considered important characteristics of stream health and shade. In fact, large woody debris, channel-influencing root masses, snag, and litter fall are all explicitly identified in the regulations for DFC. OAR 629-642-0000(2) states:

> "Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall."

The description of a "mature standard" under DFC clearly includes large woody debris, root masses, snags, and litter fall, and therefore these factors should be included.

Additionally, as stated by Johnson (2004):

> "Riparian vegetation influences microclimatic conditions through biological functions such as evapotranspiration and release of water vapor as well as through physical means such as decreasing wind speeds. Vegetation also provides bank stability, which can impact width to depth ratios and the exposed surface area of the stream. ***Accumulations of large organic matter inputs have an effect on hydraulic retention times.*** Although incoming radiation levels in dense natural forests can be as low as those under the experimental shade, riparian forests would have more variability of incoming light levels because of the shape and structure of the vegetation." (p. 919).[20]

As the draft protocol is currently written, it is difficult to determine whether large woody debris, root masses, snags, and litter fall are considered under 1.2.1 Stream Temperature and Shade.

Recommendation: ODF should consider these "functional outputs" (large woody debris, root masses, snags, and litter fall) as part of a systematic literature review for both DFC and for stream temperature and shade.

[20] Johnson S. L. (2004), Factors influencing stream temperatures in small streams: Substrate effects and a shading experiment, Can. J. Fish. Aquat. Sci., 61, 913–923. *Emphasis added.*

	Include ODF's own data for timber harvest (including young stands 40-80 years) with respect to shade loss, temperature increases, and windthrow: Additionally, the draft protocol fails to clearly provide ODF with direction to search and review their own files for monitoring data of past timber harvest with respect to shade loss, temperature increases, and windthrow. ODF should include and review DEQ requirements for shade monitoring in the Rogue TMDL and restoration plan. ODF should clearly include any timber harvest monitoring with respect to shade loss and temperature according to DEQ protocols and required under the relevant TMDLs. ODF should also include young stands within the scope of studies because many stands that are 40-80 years are also being harvested on private forestlands under the OFPA. **Recommendation:** ODF should include any timber harvest monitoring with respect to shade loss and temperature according to DEQ protocols and required under the relevant TMDLs. ODF should include young stands (40-80 years) in addition to mature stands (80-200 years). Contextual information: It is unclear from the draft protocol whether the identified "contextual information," specifically regarding fish status and trend will be included in the literature review, either related specifically to DFC or to DFC and to stream temperature and shade. ODF should include contextual information related to water quality and fish status and trends in its review of the literature. **Recommendation:** ODF should include contextual information related to water quality and fish status and trends in its review of the literature.
1.5 Review Objectives	In general, the review objectives are aligned with the identified primary questions under Section 1.4. However, ODF should expand the scenarios in literature and extracted data (metrics) for both stream temperature and shade as well as for DFC. Additionally, the review should include the effects modifiers discussed in Section 1.5.1. It is not clear from the draft protocol how effects modifiers will be evaluated. Additionally, the protocol should be expansive enough to ensure that all ODF studies are included. ODF should include relevant studies, data, scientific literature, and models that are located in western Oregon and northern California (e.g. Klamath Basin, Siskiyou County, and relevant portions of Del Norte County). ODF should not narrowly restrict its literature review to studies located only in the Siskiyou region. Further, ODF should include any timber harvest monitoring with respect to shade loss and temperature according to DEQ protocols and required under the relevant TMDLs. ODF should also include young stands (40-80 years) in addition to mature stands (80-200 years). ODF should consider climate change, disturbances, and "functional outputs" (large woody debris, root masses, snags, and litter fall) within the scope of its review.

	Specific comments related to the objectives in Tables 2 and 3 are included below. <u>Table 2. Objective components for reviewing Siskiyou stream temperature and shade:</u> The scenarios in the literature for both Objective 1 and 2 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall). These factors may all potentially contribute to stream temperature and shade, and should be considered as part of the systematic literature review. Additionally, this section would be strengthened by clearly identifying the policy goal(s) for Objectives 1 and 2, as demonstrated under Table 3 for Objectives 3 and 4. ODF should also ensure that all data collected with respect to Objectives 1 and 2 should be made available, regardless of its quality. The monitoring protocol should not artificially constrict the accessibility of data because it does not meet a protocol standard. The metrics for Objective 1 should be expanded beyond absolute temperature and change in temperature to include other measurable data, including but not limited to: baseline temperatures, 303(d) listings, existing TMDLs, impacts of changing temperature and precipitation related to climate change, base flow, vegetation, climate, hydrologic conditions, conditions of the surrounding terrain, harvest practices (e.g. clearcut, thinning), and identified assimilative capacity of the stream. The metrics for Objective 2 should similarly be expanded to include measurable data such as distance from streams, distribution of trees, number of trees/acre, tree species, understory vegetation, DBH, basal area/acre, live crown ratio, and patchiness of vegetation. It is unclear under Section 1.4 whether the "contextual information" related to fish status and trends and water quality will be included in Objectives 1 and 2. ODF should include this information in its review of these objectives that would inform the effectiveness of the FPA rules in protecting stream temperature and shade in the Siskiyou for small and medium *fish-bearing streams*. Further, this is aligned with the stated purpose and goals under OAR 629-635-0100(1): "The policies of the Forest Practices Act, including encouraging economically efficient forest practices, are best achieved by focusing protection measures in riparian management areas, where the emphasis is on providing ***water quality and fish and wildlife habitat***."[21] And further, under OAR 629-635-0100(7):

[21] OAR 629-635-0100(1). Emphasis added.

(7) The overall goal of the water protection rules is to provide resource protection during operations adjacent to and within streams, lakes, wetlands and riparian management areas so that, while continuing to grow and harvest trees, the ***protection goals for fish, wildlife, and water quality*** are met.

Recommendation: ODF should clearly state the policy goals for Objectives 1 and 2. ODF should also ensure that all data collected is made available, regardless of its quality. The scenarios in the literature for both Objective 1 and 2 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall). The review objectives for reviewing Siskiyou stream temperature and shade should expand the stated metrics to include other measurable data that can impact both stream temperature and shade, as well as to take into account fish status and trends related to water quality that are aligned with the purpose and goals of the FPA.

Table 3. Objective components for reviewing Siskiyou desired future conditions (DFC)

The scenarios in the literature for both Objective 3 and 4 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall). These factors are related to DFC, as stated in the regulations under OAR 629-642-0000(2).[22] Specifically, Objective 4a should include "functional outputs" (large woody debris, root masses, etc.) as part of the review. OAR 629-642-0000(2) states:

> "The desired future condition for streamside areas along fish use streams is to grow and retain vegetation so that, ***over time, average conditions across the landscape*** become similar to those of mature streamside stands."
>
> …
>
> "Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall."[23]

Additionally, the metrics for Objectives 3 and 4 should incorporate data including but not limited to impacts of changing temperature and precipitation related to climate change, impacts of disturbances, base flow, vegetation, climate, hydrologic conditions, and conditions of the surrounding terrain. ODF should also include a review of the "contextual information" related to fish

[22] See OAR 629-642-0000(2): "Mature stands provide ample shade over the channel, an abundance of large woody debris in the channel, channel-influencing root masses along the edge of the high water level, snags, and regular inputs of nutrients through litter fall."

[23] OAR 629-642-0000(2). *Emphasis added.*

	status and trends and water quality, as discussed previously regarding Objectives 1 and 2. **Recommendation:** ODF should expand the stated metrics to include other measurable data that can impact DFC, as well as to take into account fish status and trends related to water quality that are aligned with the purpose and goals of the FPA. ODF should also ensure that all data collected is made available, regardless of its quality. The scenarios in the literature for both Objective 1 and 2 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall). Finally, it is concerning that the draft protocol states on page 8 that: "Narrative FPA goals for DFC do not have clear thresholds upon which to assess rule sufficiency. This lack of thresholds makes the review complex…" (p. 8). How does ODF determine compliance or rule sufficiency without such thresholds?
1.5.1 Effects Modifiers	It is unclear how the effects modifiers identified in Section 1.5.1 and in Appendix A will be incorporated into the systematic literature review. ODF should clarify whether a review of these effects modifiers will be incorporated into the four review objectives, or whether the effects modifiers will be reviewed separately. **Recommendation:** ODF should clarify how effects modifiers will be addressed and include them in its review. ODF should prioritize studies that document windthrow, which is identified as a potential effects modifier. Studies need to have monitored over sufficient time post-logging to capture effects of windthrow that would reduce shade and increase stream temperatures. ODF should evaluate studies that determine whether a wider buffer would substantially reduce windthrow irrespective of region.
2.1 Search Strategy	Regarding the Methods section under 2.1 Search Strategy, ODF should clarify the timeframe within which studies will be included or excluded. Section 2.1 states that "for temperature and shade searches, new searches will be conducted to capture literature produced since the previous search for the EPA/Siskiyou information tally (2016 to present)." It is not clear whether the literature review for stream temperature and shade will be restricted to studies from 2016 to the present. ODF should expand the timeframe for its literature review to include studies prior to 2016. **Recommendation:** ODF should expand the timeframe for its literature review to include studies prior to 2016.

2.4 Study Inclusion Criteria	Regarding the study inclusion criteria, ODF should include reviews, meta-analyses, and the agency's own data to inform the literature review. It is inaccurate to describe meta-analyses as "authors' interpretation of evidence." Hoffman (2015) defines meta-analysis as: "…a set of techniques used 'to combine the results of a number of different reports into one report to create a single, more precise estimate of an effect' (Ferrer, 1998). The aims of meta-analysis are 'to increase statistical power; to deal with controversy when individual studies disagree; to improve estimates of size of effect, and to answer new questions not previously posed in component studies' (Hunter and Schmidt, 1990)."[24] **Recommendation:** ODF should expand the study inclusion criteria to include primary studies, reviews, meta-analyses, gray literature, DEQ data, ODF data, and other existing data.
2.6 Quality and Relevance	ODF should include relevant studies, data, scientific literature, and models that are located in western Oregon and northern California (e.g. Klamath Basin, Siskiyou County, and relevant portions of Del Norte County). ODF should not narrowly restrict its literature review to studies located only in the Siskiyou region. **Recommendation:** Regarding Table 7 (p. 15), ODF should re-evaluate the Geography section regarding a ranking of H = high for Siskiyous and L = low for Klamath Mountains. No other regions are given a ranking and it is unclear why studies located in the Klamath Mountains would receive a "low" ranking. ODF should not only expand the scope of locations to include western Oregon and northern California, but should also create a more nuanced scale to differentiate the relevance of these locations.

In summary, we recommend the following:

- Evidence in the scientific literature does not demonstrate that the relationship between stream warming and shade in the Siskiyou is any different than in the rest of western Oregon (Coast Range, South Coast, Interior, and Western Cascade geographic regions, *see* OAR 629-635-0220).[25] Higher air temperatures that persist for longer in the Siskiyou would support greater forest protections rather than less. ODF should include air temperature monitoring to evaluate the following: On average, do private land Siskiyou region streams have significantly higher air temperatures than other regions that received the increased forest protection?
- ODF should include relevant studies, data, scientific literature, and models that are located in western Oregon and northern California (e.g. Klamath Basin, Siskiyou County,

[24] Hoffman, Julien I.E. (2015). Biostatistics for Medical and Biomedical Practitioners.
[25] Frissell, Chris and Rich Nawa. 2016. Protecting Coldwater for Salmon and Steelhead on Private Timberland Streams of Oregon's Siskiyou Region: A Synoptic Scientific Look at Stream Warming, Shade, and Logging.

and relevant portions of Del Norte County). ODF should not narrowly restrict its literature review to studies located only in the Siskiyou region.

- ODF should consider climate change and disturbances within the scope of its review.
- ODF should consider these "functional outputs" (large woody debris, root masses, snags, and litter fall) as part of a systematic literature review for both DFC and for stream temperature and shade.
- ODF should include any timber harvest monitoring with respect to shade loss and temperature according to DEQ protocols and required under the relevant TMDLs. ODF should include young stands (40-80 years) in addition to mature stands (80-200 years).
- ODF should include contextual information related to water quality and fish status and trends in its review of the literature.
- ODF should clearly state the policy goals for Objectives 1 and 2. ODF should also ensure that all data collected is made available, regardless of its quality. The scenarios in the literature for both Objective 1 and 2 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall). The review objectives for reviewing Siskiyou stream temperature and shade should expand the stated metrics to include other measurable data that can impact both stream temperature and shade, as well as to take into account fish status and trends related to water quality that are aligned with the purpose and goals of the FPA.
- ODF should expand the stated metrics to include other measurable data that can impact DFC, as well as to take into account fish status and trends related to water quality that are aligned with the purpose and goals of the FPA. ODF should also ensure that all data collected is made available, regardless of its quality. The scenarios in the literature for both Objective 1 and 2 should be expanded to include climate change, disturbances, and "functional outputs" (e.g. large woody debris, root masses, snags, and litter fall).
- ODF should clarify how effects modifiers will be addressed and include them in its review. ODF should prioritize studies that document windthrow, which is identified as a potential effects modifier.
- ODF should expand the timeframe for its literature review to include studies prior to 2016.
- ODF should expand the study inclusion criteria to include primary studies, reviews, meta-analyses, gray literature, DEQ data, ODF data, and other existing data.
- Regarding Table 7 (p. 15), ODF should re-evaluate the Geography section regarding a ranking of H = high for Siskiyous and L = low for Klamath Mountains. No other regions are given a ranking and it is unclear why studies located in the Klamath Mountains would receive a "low" ranking. ODF should not only expand the scope of locations to include western Oregon and northern California, but should also create a more nuanced scale to differentiate the relevance of these locations.

In conclusion, we appreciate the opportunity to provide public comment on the draft protocol. Additionally, we have attached a literature review we conducted in February 2018 and the Frissell and Nawa memo from 2016 for your review.

Sincerely,

Stacey Detwiler
Conservation Director
Rogue Riverkeeper