

**From:** Laurie, Gregory -FS <glaurie@fs.fed.us>  
**Sent:** Tuesday, May 27, 2014 10:32 AM  
**To:** Carter, Katharine@Waterboards  
**Cc:** Williams, Thomas@Waterboards; Prat, Dean@Waterboards; Fitzgerald, Rebecca@Waterboards; Blessing, Dan S -FS  
**Subject:** RE: Questions about Some KNF Reference Watersheds  
**Attachments:** Boxplots of grazed and ungrazed ref streams 2013.docx; FinalSoilBurnSeverityMap.pdf; Hardwood resprout off 48N20.JPG; LWD bucked in floodplain Photo.JPG; Trends and causes of severity, size, and number of fires in NW CA(Miller\_2012).pdf; Trends and causes of severity, size, and number of fires in NW CA - RESEARCH BRIEF.pdf; Sediment budget 1997 flood.docx; Does Wildfire Threaten Extinction for Salmon (Rieman 1997).pdf; A disturbance based approach to maintaining habitat (reeves 1995).pdf; A Tree-ring Based Fire History of Riparian Reserves in the Klamath Mountains (Skinner 2003).pdf

Katharine,

See my responses to your e-mail questions below. Supporting documents are attached. Please give me a call if you have questions.

**From:** Carter, Katharine@Waterboards [<mailto:Katharine.Carter@waterboards.ca.gov>]  
**Sent:** Wednesday, May 14, 2014 9:11 AM  
**To:** Laurie, Gregory -FS  
**Cc:** Williams, Thomas@Waterboards; Prat, Dean@Waterboards; Fitzgerald, Rebecca@Waterboards  
**Subject:** Questions about Some KNF Reference Watersheds

Hello Greg,

As you are likely aware, we released the Public Review Draft 2012 Integrated Report in March for public review. The review and comment period ended on April 18<sup>th</sup> and we are working on extracting and responding to the comments.

Some of the comments are related to a few of the reference streams that are proposed for delisting, and we have some questions that we are hoping you can help answer.

Grazing Questions:

-The QAPP does not give a % of watershed threshold for how much grazing can occur, however the monitoring reports state that no more than 10% of the reference watershed area are grazed. We have been using this 10% number as the threshold. Can you please confirm that no more than 10% of any of the reference watersheds has grazing?

-How much of the Canyon 1 reference watershed has grazing (what %)? I have looked at a map of the current grazing allotments, but it is difficult to tell how much, of that reference water body has grazing.

-How much (what %) of the Wooley Creek reference watersheds are grazed (Wooley 3, Wooley 2, and NFk Wooley)? I have looked at a map of the current grazing allotments, but it is difficult to tell how much of those reference watersheds have grazing.

The map I'm looking at to determine if grazing is occurring is located at the following link, please let me know if there is a different map I should refer to about grazed areas:

[http://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5445034.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5445034.pdf)

It seems to me the areas marked as "grazing allotment" are the only areas grazed, is that correct?

- A large portion of some watersheds are within grazing allotments but only a small portion is actually grazed. For example most of Mill/Etna Creek is within an allotment boundary but most of the watershed is steep and heavily forested, does not support grass, and is not grazed. Grazing occurs mostly in meadow pastures which we estimated to be less than 10% of the drainage area. Since this is only an estimate and we do not have actual data the 10 percent grazed area should not be interpreted as a quantified threshold.
- Forest Service staff have visited these watersheds to confirm that there are no large sediment sources or shade impacts that would cause them to be excluded from the reference pool. A couple of years ago we hiked the entire length of the Canyon 1 watershed with the staff from the Regional Water Board and found only minor and isolated impacts.
- Some of the grazed reference streams have had random BMP effectiveness evaluations completed. None of the reference streams have known BMP violations that would disqualify them as a reference.
- A comparison of sediment data from reference streams with and without grazing shows that grazing has no effect on in-stream sediment. See attached boxplots.

#### Fort Goff and Portuguese Creeks Fires:

It is our understanding that Fort Goff Creek and Portuguese Creek have had recent (2012) fires. I understand that Tom Williams did a limited inspection after the fire and have read his May 10, 2013 Inspection Report. It appears that the fire line was constructed within the riparian reserve and that snags were felled in the riparian zone and that a lack of LWD was noticeable in the streams. There was no discussion about if the fires and fire management activities were expected to result in increased sediment delivery or decreased riparian shade in the Fort Goff or Portuguese Creek watersheds.

-Tom's Inspection Report states "The Goff Fire apparently burned in a natural mosaic that was within the range of natural variability for a mixed conifer ecosystem." Do you feel the fire was severe enough for the Fort Goff and Portuguese Creek water bodies to be considered for removal from the reference pool until they can recover from the effects of the fires or are data still being collected in these streams?

- The Goff Fire burned at a low-severity over most of the watershed (see attached map). Out of 8286 acres in the watershed only 522 acres burned at a high severity (6%). The fire backed into stream channels and most of the riparian areas burned at a low severity except for a few first-order channels in the headwaters that burned at a high-severity. In most areas fuel loads were reduced in drainages while enough ground cover was retained to prevent erosion. Stream shade was retained due to a lack of stand-replacing crown fire except in a few headwater channels where torching removed stream shade in small patches. Most of these areas are brush fields that had already resprouted and shade was recovering by the following spring (see photo).
- In my judgment the Goff Fire did not burn hot enough to impact water quality in Portuguese and Goff Creeks. The burn pattern is generally beneficial to the aquatic ecosystem and is exactly the type of natural disturbance that should be included in the pool of reference streams to represent the natural range of variability.

- The Forest Service has post-fire sediment data for Portuguese and Ft. Goff Creeks but unfortunately it was taken before the first storms so it does not tell us much about the effects of the fire or suppression. We are scheduled to re-measure Ft. Goff and Portuguese again next year and can make a more definitive assessment of the post-fire sediment impacts then.

-Is there evidence of increased sediment delivery or decreased riparian shade as a result of the Goff fire and fire fighting activities?

- Field visits during and after the fire did not reveal any significant sediment sources due to fire suppression activities. Resource Advisors including a Soil Scientist were assigned during the fire suppression activities to assure that BMPs were in place and to avoid suppression impacts to erodible soils and unstable areas. Potential sediment sources from firelines were repaired prior to the first rains.
- Fireline construction did have an impact on in-stream wood where snags were felled in the riparian area and logs in the floodplain were bucked. The length of stream affected was about 100 ft. The attached photo shows that the impact to stream shade was minimal. Felled snags were left on the ground and in some cases added wood to the stream. The greatest impact will be during the next flood when the bucked logs will be easily mobilized by high stream flows. However there are many standing snags in the immediate area that will provide future wood recruitment to the channel.

- Has the severity of fires increased in the last 100 years due to active management of the forests? Any insight you have into fires and fire history would be helpful.

- Recent published research of fire severity trends in the Klamath Region did not detect any increase in fire severity (Miller et al, 2012, attached). Figure 2 in this paper shows a declining trend in fire severity, which is the opposite of the trends found in the Sierra (Miller et al, 2009). The attached research brief suggests that because fire burns at a low-to-moderate severity, wildfire can be used to meet management objectives (CA Fire Science Consortium). These findings are the opposite of the conventional wisdom that views wildfire as a “catastrophic” threat to water quality based largely on the literature from the Sierra.
- Forest-wide, wildfire represents 16% of the total sediment budget which is small when compared to the much larger contribution from roads (See attached sediment budget for the KNF). Most of the sediment supplied to streams from wildfire is natural, but some fraction of the 16% may be attributed to forest management and an increase in forest density and burn severity caused by past fire suppression. It is difficult to estimate the portion of the wildfire sediment budget caused by management but we know that it supplies only a small percentage of the total sediment yield.
- It is important that the reference pool include watersheds that experience high-severity wildfire in order to account for natural variability. Sediment from wildfires is a natural disturbance that is critical to the maintenance of salmon habitats and productivity (Rieman, 1997 attached). The paper by Reeves (1995) should be the conceptual basis for interpreting desired conditions in disturbed reference streams. Both the managed and the reference pools contain watersheds that are in various stages of recovery from disturbance, so the reference pool should represent the same range of natural disturbances that are occurring in the managed streams.

-I have reviewed the section of the “National Best Management Practices for Water Quality Management of National Forest System Lands” guidance pertaining to Wildland Fire Management Activities. Can you please give us an update on the actions that are being taken post-fire to protect water quality in the Fort Goff and Portuguese Creek watersheds?

- Immediately following the fire, fire repair was completed to address the effects of fire suppression activities. Rock was applied to the road surface at water drafting sites. Two roads were closed that were opened to access the fire off of road 18N01 and fill was removed from a slide area on 18N01. Firelines that were constructed with bulldozers were waterbared and the berms pulled back onto the fireline. Areas of bare soil including handlines, spike camps, staging areas, safety zones and helicopter landing sites were repaired by pulling back soil, rock, duff, and vegetation and scattering vegetative debris to blend with surrounding natural landscape.
- A Burned Area Emergency Response (BAER) was completed to address the effects of the fire on water quality (as opposed to the earlier fire repair which addressed the effects of suppression). Road drainage was improved on 2.5 miles of FS road 48N20 in Seiad Creek to reduce the potential for erosion or landslides caused by increased runoff from the fire. Work included upsizing culverts to pass the 100-year flow, constructing dips and outsloping the road surface to prevent diversion of streams, and rocking the road surface. Drainage on hiking trails was improved to disperse runoff from the burn.

Thank you for your thoughts on these matters, and please call or e-mail if you want to discuss or have any questions.

In summary the minor impacts we observed in the grazed reference streams and in Portuguese and Ft. Goff Creeks meet the criteria for minimally disturbed conditions as defined in the SWAMP guidance. While not pristine, we believe that the reference streams identified in the Forest Service monitoring program are the very best aquatic conditions available in the Klamath Region and set a very high standard for evaluating water quality in more managed watersheds.

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