Reducing Fire Risks to Save Fish – A Question of Identifying Risk

A Position Paper by the Western Montana Level I Bull Trout Team

In the past year, much attention has been focused on forest management as it relates to reducing the risks of large-scale, intense wildfires. This heightened emphasis is largely a result of the 2000 fire season, during which parts of the west experienced larger than normal forest fires. There is mounting public concern that fires in our national forests are out of control. The Forest Service and the Bureau of Land Management have responded to this concern with the National Fire Plan, which addresses this threat and proposes a path to reduce the risk of catastrophic wildfires in our forests. At a more regional scale, the Northern Region of the Forest Service is in the process of developing a "Cohesive Strategy" to implement the National Fire Plan.

The Western Montana Level I Bull Trout Team recently met with one of the Cohesive Strategy Team members to discuss the concept of reducing fire risks and its role in native fish species recovery. There has been much discussion regarding this issue. One theory expressed by many people is, because fires can result in increased erosion, they are a threat to fish habitat, and therefore reducing the occurrence or intensity of forest fires will result in improved conditions and reduced risks to fish. It is this subject that we feel we need to comment on, because much of the post fire planning is at least partially dependent on it, and we feel that our collective discussion regarding this issue could prove useful in NEPA projects related to the fires. It is also our desire to work closely with the Cohesive Strategy team in developing a strategy that accomplishes both the social and ecological goals of the plan.

First, we want to re-emphasize the importance of wildfire, including large-scale, intense wildfire, in creating and maintaining stream systems and stream habitat. In western Montana, the two primary natural disturbance mechanisms responsible for initiating stream dynamics that ultimately increase habitat complexity and diversity are fires and floods. In the short-term, fires trigger other processes, such as erosion and woody debris recruitment, which are critical in the formation of young, biologically rich stream systems. Over longer time periods, fires recycle nutrients, regulate forest development and biomass, and maintain biological pathways (Keane, et. al. 1999). The effect of fire on these processes is ultimately transferred to stream channels. Fires, and the ecological processes associated with them, are thus an integral part of maintaining our native fish populations.

From this point, we often catapult into a discussion of whether or not the recent fire activity observed in the west is outside the range of variability. The question here is "if fires burned hotter or over larger areas than in the past, do they necessarily have more negative impacts on fish, and therefore would reducing them be better for fish?" To answer this question, we must first identify the timeframe of reference. In this case, since we are concerned with native fish species viability, the timeframe would aptly be several thousand years because species such as bull trout and cutthroat trout have been in western Montana for at least this long. There have been countless periods where wildfires have been much more severe and widespread than we are currently experiencing, and these fish have survived. At a regional scale, at least two periods just within the last century were significantly worse than the fires we are observing now. Clearly, the fires we have recently experienced, by themselves, do not pose the risk to fisheries that has been inferred in some circles.

That said, however, it is imperative to recognize that most existing aquatic conditions are drastically different than they were when past periods of intense fire activity occurred, and the impacts to fish may be different as well. There are four distinct differences between current and past conditions that play directly into this discussion – fragmentation, habitat degradation, exotic species, and fire suppression. While there are other factors that relate to fires potential effect on fish, these four are generally the most predominant in this area, and will therefore be focused on in the following paragraphs.

Many native fish habitats are currently fragmented to varying degrees by dams, road culverts, stream dewatering, or temperature barriers. Historically, fish were able to avoid localized fire effects by moving to unburned areas. If local extirpations did occur, these areas were quickly refounded by nearby populations in the open stream network. Presently, many populations are functionally isolated, and when natural disturbances occur the effects are therefore much greater than they would have been historically.

Habitat conditions are another factor that has changed significantly. In general, fish habitat quality is much less diverse and complex than historic, and native fish populations are therefore less fit and less resilient to watershed disturbances. Roads, more than any other factor, are responsible for the majority of stream habitat degradation on National Forest Lands in this area (USDA 1997). Historically, roads were not present in watersheds and did not affect hydrologic or erosional patterns. Now, however, extensive road networks in many of our watersheds contribute chronic sediment inputs to stream systems, and these effects are exacerbated when fires remove the vegetation that filters road runoff.

Exotic species have a similar effect as habitat degradation, in that they suppress or eliminate native populations in certain areas, thereby reducing the resiliency of these populations and their ability to recover from natural disturbance events.

Finally, our efforts to suppress fires can have significant effects on native fish populations. Fire lines, water drafting, and fuel spills can have significant short and long-term impacts on stream systems, especially the smaller streams where much of the activity usually takes place. Dozer lines can have similar impacts as roads designed below standards. Historically, none of these impacts occurred when fires burned across the landscape.

Note that in each of the four cases described above, the real risk to fisheries is not the direct effects of fire itself, but rather the existing condition of our watersheds, fish communities, and stream networks, and the impacts we impart as a result of fighting fires. Therefore, attempting to reduce fire risk as a way to reduce risks to native fish populations is really subverting the issue. If we are sincere about wanting to reduce risks to fisheries associated with future fires, we ought to be removing barriers, reducing road densities, reducing exotic fish populations, and re-assessing how we fight fires. At the same time, we should recognize the vital role that fires play in stream systems, and attempt to get to a point where we can let fire play a more natural role in these ecosystems.

In addition to not addressing the true risks to aquatic systems, most proposals to reduce fire risk involve fuel reduction treatments that can, themselves, result in significant risks to fisheries. Salvage of burned trees is often proposed to reduce future fuel loading. While salvage can be accomplished with minimal impacts in some areas, many burned areas are already extremely sensitive to ground disturbance due to the loss of vegetation. Further disturbance can result in increased erosion, compacted soils, and a loss of nutrients from these areas (USDA 2000, Beschta et al. 1995). Large-scale thinning or construction of fuel breaks in non-burned forests may have

fewer direct impacts than salvage, if it occurs from existing roads and outside of riparian areas, but it still won't reduce risks to aquatics, because it's not addressing the source of the problem. Finally, constructing new roads may directly contradict objectives aimed at improving watershed or native fish conditions.
Although mechanical fuel removal and salvage is more likely than wildfire to adversely affect fishes and their habitat, the Team understands that in some areas (such as urban interface zones), mechanical fuel management may be the most practical option. In these cases, we recommend that fishery and fuels specialists work closely together to achieve project goals while minimizing impacts to fishes.

Based on this, we believe, in most cases, proposed projects that involve large-scale thinning, construction of large fuel breaks, or salvage logging as tools to reduce fuel loadings with the intent of reducing negative effects to watersheds and the aquatic ecosystem are largely unsubstantiated. Post-fire activities such as these that increase the probability of chronic sediment inputs to aquatic systems pose far greater threats to both salmonid and amphibian populations and aquatic ecosystem integrity than do fires and other natural events that may be associated with undesired forest stand condition (Frissell and Bayles 1996). There are undoubtedly exceptions to this position. Examples might include direct urban interface environments where natural fire processes are clearly not an option and road systems cannot be removed, or areas where native fish populations are nearly extinct and isolated to an extremely small watershed and reconnection to other populations is not an option. Another exception might be where funds generated from thinning would be directly used to obliterate roads or remove barriers. In general, however, fish populations will respond better to projects directed at reducing the immediate risks – barriers, roads, exotic species, and suppression – than to projects aimed at reducing fire intensity or scale.

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Subject: Re: fire and fish

Brian et al.,

I think this position paper is excellent. I don't see anything that I would change or anything that is really missing. One point that may be worth pursuing in your discussions is that it is not necessary or even possible to pursue fuels management in all watersheds. Because fuels management must be prioritized there may be opportunities to begin to disconnect large expanses of fuels without risking key watersheds. By focusing work in some areas you may generate benefits from both perspectives, but only if the Forest Service really believes that ecosystem management means whole systems rather than trees. There should be opportunities to leverage aquatic restoration through road obliteration and culvert removal as part of this approach, but it will require some flexibility on both sides (e.g. aquatic and fuels... see the paper in Environmental Management for a discussion of this thinking) .

You've stated the issues and made the point about as effectively and efficiently as I think possible. The point that we are not addressing the real issues in aquatic management is not new, but this makes it more forcefully than it has been made in the past. If you need any other support from the Forest Service's own research we and others have attempted to address the same general issues in several papers on fire as well as in the ICBEMP reports. The paper by Rieman and Dunham emphasizes the need for connection and the full expression of life history. The paper by Bob Gresswell is a great synthesis on fire and aquatic ecosystems and comes to the same general conclusions. I assume that you've seen Rieman and Clayton since you sent the note to us. If you need any of the others let me know.

I strongly support what your doing with this position. If I can do anything to help please let me know.

Good Job!
-Bruce-

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Subject: fire and fish

Hi. About a month ago, the Montana Level I Bull Trout Team put together this position paper regarding fire, land management, and fish conservation. It was meant to be a simple, straight forward representation of our views on the issue, based on our experience and literature we've reviewed. The objective was to develop some consistency in how we're dealing with post-fire projects across the forests. It's in draft format.
The paper has generated considerable discussion, and the Forest Supervisors want to meet with the Level I Team to discuss what the paper says on September 6. That's where you come in.
I'd like to ask you each to take a few minutes and read this thing (it's only 2 pages) and let me know if it makes sense, or if there's something that we're saying that's off base. Any further thoughts you might have would help also. This isn't a real technical paper, I think it just reiterates what's been said before, but I'd like to get some feedback from you all just to make sure. Thanks, b.