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**THE WATERSHED IMPACTS OF FOREST TREATMENTS
TO REDUCE FUELS AND MODIFY FIRE BEHAVIOR**

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Summary of Findings and Recommendations

Findings

- Forest treatments to reduce fuels and modify fire behavior on public lands are of concern due to direct, indirect, and cumulative watershed effects. For example, mechanical fuels treatments will cause damage to riparian areas resulting in the loss of large wood and channel complexity, and the alteration of thermal regulation, stream substrate quality, and water quality.
- Treatments do not always reduce fire severity. At the scale of large fires, fuel reduction is highly unlikely to be effective in reducing fire severity since it is statistically improbable that the treated area will actually be subject to intense fire. On average, it is expected that about 3.9% of fuel treatments would encounter high-to-moderate-severity fire, and about 1.9% would encounter high-severity fire within 20 years of treatment. This indicates that if treatments were randomly placed on the landscape, on average, they only have the potential to reduce fire severity about 2-4% of the time. In the remaining area (96-98%), treatments have negative effects on watershed and aquatic resources that are not counterbalanced by reduced fire severity.
- Low-severity fire has minimal impacts on watershed and aquatic resources. Low-severity fire comprises a significant portion of most fires, including large fires that burn during extreme fire weather.
- In some forest types, treatments are highly unlikely to be effective. The transient effects of treatments on fuels, coupled with the patchy nature of fire, greatly limit their potential effectiveness. As a result, in the majority of treated areas, treatments will only have negative watershed effects without providing any compensatory benefits from reduced fire severity.
 - Even where there is convergent evidence that fire regimes have been modified, there is uncertainty on how to treat these areas to restore natural fire regimes.
 - Some mechanical fuels treatments increase fire severity if fire affects treated areas during the operations and for some time later.
- The scale of treatments is likely to be extremely significant on Western public lands:
 - The U.S. Forest Service (USFS) has stated that it aims to treat more than 7 million acres on national forests annually to reduce fuels (equivalent to more than 50% of all such lands in the West) over the course of a decade.
 - Some scientists have suggested the need to treat fuels on more than 22 million acres on national forests in the Pacific Northwest and California. This is equivalent to more than 50% of all of these lands in the region.
 - At the watershed scale, it is estimated that about 20-50% of a watershed's area must be treated in order to provide some potential reduction in fire severity. Even using "strategic" fuel treatment placement, at least 20% of a watershed would likely be treated. Projects already have been proposed that affect more than 20% of a watershed's area.
 - These watershed disturbance levels, alone, contribute to adverse cumulative effects that are ecologically significant under any circumstances. However, it is in addition to significant levels of watershed disturbance from roads, logging, and grazing which already exist on public lands.

- The scale of cumulative disturbance and cumulative watershed effects are not relegated solely to the fuel removal on treated areas. Fuel treatments also inexorably involve the increased use and maintenance of numerous roads, which significantly elevate their aquatic impacts.
 - Due to the transient effects of treatments on fuels because of natural vegetative regrowth, treatments likely will be repeated over time, thereby increasing cumulative effects. For instance, the treatment of 20% of a watershed's area twice over a twenty-year period contributes as much or more sediment delivery than treating 40% of a watershed in a single entry.
 - Many proposed projects involve repeated entries for repeated treatments on the same area or sequential treatments of different areas. Such repeated entries increase the scale of cumulative effects and effective level of disturbance.
- Even if reductions in fire severity were realized, that will not provide long-term benefits for imperiled fish populations if the major causes of population decline, fragmentation, and habitat degradation continue unabated or are intensified.

Recommendations

➤ Some sideboards, if adopted, are likely to help reduce the adverse impacts of fuel treatments on public land watersheds without decreasing their potential effectiveness in reducing fire severity. These include:

- Restrict mechanized fuel treatments to areas of forests where they are most likely to encounter uncharacteristically severe fire and reduce its severity.
- Limit the scale of mechanized fuel treatments.
- Retain large trees.
- Restrict or eliminate grazing.
- Forego mechanized fuel treatments when proactive re-establishment of forest processes can restore altered fire regimes and implement mechanized fuel treatments only as part of wider efforts to restore fire regimes, including the use of prescribed and wildland fire.
- Avoid mechanized fuel treatments in areas and watersheds where adverse impacts are likely to be significant and enduring. Such areas include those with topographic or soil hazards, roadless and riparian areas, and watersheds with pronounced cumulative effects, high potential for restoration, high biodiversity, or imperiled aquatic populations.
- Constrain or prohibit the most damaging activities that consistently cause severe and persistent watershed damage, including machine piling and burning and the construction of roads and landings, including "temporary" ones.
- Undertake effective watershed restoration. Prime examples include road obliteration or decommissioning, attempting to hydrologically decouple roads from stream networks, removal of impassable barriers in streams, reduction of water withdrawals, and curtailing or eliminating livestock grazing.
- Credibly analyze and disclose likely cumulative effects of treatment versus non-treatment.

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