Appendix M – NWS Pre and Post Fire Hydrology Modeling for Fisher Fire

Hydrology modeling completed for the Fisher Fire by the National Weather Service.

This report can also be downloaded from the Nez Perce Soil and Water Conservation District website at: http://www.nezperceswcd.org/Portals/2/WildfireRestoration/2015Fire/Report/
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SUBJECT: Summary of Fisher fire flood risk assessment

The Fisher Fire burned approximately 33 square miles across Lewis and Nez Perce Counties and the Nez Perce Reservation in the Big Canyon Creek watershed in 2015. The town of Peck is situated on Big Canyon Creek, just upstream of its confluence with the Clearwater River, and is protected by levees. This memo summarizes the key points of a quick analysis completed by the NWS and a much more in-depth analysis completed by Gregg Teasdale, P.E. (see “Reconnaissance Hydrologic Analysis of the Big Canyon Watershed and the Fisher Fire Burn Area in Nez Perce County, Lewis County, and the Nez Perce Reservation, ID” which can be retrieved from https://www.sendspace.com/pro/dl/ufw805).

- The Fisher Fire burned approximately 15% of the Big Canyon Creek watershed, but only 1% - 2% of the watershed is classified as high or moderate burn severity. While even low burn severity areas have an higher risk of erosion and increased runoff immediately after the fire, these areas are typically quick to recover, often reestablishing grasses (ground cover) before winter or by spring, which protects the soil from raindrop impacts, reducing the magnitude of erosion, flash floods, and debris flows risk in subsequent years.

- USGS debris flow analysis showed a low hazard rating for debris flows in the Fisher Fire burned area (http://go.usa.gov/cnNBH). Note that a debris flow is a specific phenomenon that is different from flash floods, mass wasting and mud or landslides.

- Peck is approximately 11 stream miles from the closest boundary of the fire and 21 stream miles from the upper portion of the fire. A flash flood initiated in the burned area by a localized thunderstorm would have to travel at least 11 miles to impact the town of Peck. A flood wave traveling this distance would attenuate and be reduced before reaching the town.
  - A flash flood in the burn scar caused by intense rain from a thunderstorm would be significantly increased, as much as 500%. However, due to the nature of this type of localized flooding (ie; rain only falling in portions of the basin at once), by the time the peak flow from the burn scar for a 10 or 25 year thunderstorm event reaches Peck, it would likely be within the ballpark of an average spring runoff flow. The greatest risk from these types of events would be within or immediately downstream of the burned area.

- A widespread, long duration flood event (ie, a 24hr fall/winter/spring rain event) that would impact the entire watershed would show only a moderate flow increase at Peck.
due to the fire, because only a very small percentage of the overall watershed experienced high and moderate burn severity (1% - 2%).

Increased Risk

- The most severely burned areas within the fire perimeter are also on the steepest slopes. This means that there is a high potential for erosion and slides during rainfall events, particularly given the documented history of landslides and slope movement in the area. Any private or county roads or trails, structures and people directly below the burned steep slopes could be at risk, particularly if there are single ingress/egress points that could wash out and leave people stranded in the valley bottom.
- It is likely that there will be large amounts of sediment delivered to Big Canyon Creek from the burned slopes. Over the years this sediment may work its way downstream and could begin to fill in the channel near the community of Peck. This could reduce the capacity of the stream channel there to pass high flows and potentially increase flood risk. This will require long term monitoring and assessment.
- There is a possibility that dams could form on Big Canyon Creek in the event of a debris jam (from woody debris from the fire), or a slope failure or landslide that fills the channel. If a dam forms, it will eventually breach and release a flood wave downstream. However, due to the distance from the fire perimeter to Peck, any flood wave would have some attenuation before reaching Peck. If rapid drops in stream flow are noted on the creek, it may indicate a dam has formed upstream and precautions should be taken until the cause can be determined.
- To fully understand the increased flood risk to the town of Peck from post-fire flooding a hydraulic model would need to be created to understand how the increased flows in the burn scar would translate to increased flows at Peck many miles downstream.

While there is not an extreme increase in flood risk to Peck, the way that fire changes landscapes and hydrology can lead to unpredictable outcomes in storm events. Heightened awareness, a review of emergency plans, and monitoring of conditions is prudent until the landscape has recovered (3 to 5 years). Community members should monitor weather forecasts and flood outlooks/watches/warnings (via web, media, NOAA Weather Radio, etc) and maintain awareness of weather and streamflow conditions. Forecasts for the Lewis and Nez Perce Counties are created by the Spokane Weather Forecast Office (www.weather.gov/spokane) while forecasts for Idaho and Clearwater Counties are created by the Missoula Weather Forecast Office (www.weather.gov/missoula).

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