

Glenda Wiles

From: Jeff Burrows
Sent: Thursday, December 20, 2018 3:18 PM
To: 'bwilmore@fs.fed.us'; 'gdillon@fs.fed.us'
Cc: Ken Miller; Ravalli County Commissioners Office
Subject: FW: Wildfire Hazard Analysis
Attachments: Expected_Wildfire_Hazard.pdf; Methodology Report.docx; Wildfire_Hazard_Potential.pdf

Brenda, Greg,

Your names were recommended as resources to help us understand the attached wildfire maps. I believe you were copied on some final correspondence between the Ravalli County Commission and Economic Headwaters (EH). Our concern originated after an initial look at the EH study that showed nearly 90% of Ravalli County homes are "high" fire hazards. After a preliminary look at the expected wildfire hazard map data used by EH, we could see it was severely flawed and as expressed to EH, there are swamp and river bottom in these high fire hazard areas.

We used USDA Forest Service Wildfire Hazard Potential maps and using the same addressing came out with a significantly different outcome.

We would appreciate any help on understanding this large discrepancy in map data.

Thanks,
Jeff

From: Jeff Burrows <jburrows@rc.mt.gov>
Sent: Tuesday, December 4, 2018 4:13 PM
To: 'kelly@headwaterseconomics.org' <kelly@headwaterseconomics.org>
Cc: Ravalli County Commissioners Office <commissioners@rc.mt.gov>; Ken Miller <kmiller@rc.mt.gov>
Subject: Wildfire Hazard Analysis

Ms. Pohl,

We have completed our initial analysis of the data and information in regards to the study performed by Headwaters. Our initial results are magnitudes different than the results from Headwaters. Attached are two maps and methodology for the creation of the two maps, but I will summarize in Layman's terms.

The fundamental difference between our analysis and Headwaters was we used our local GIS address data verse DOR data. Our address data is up to date and the Headwaters data is from 2016. The Headwaters data had 15,551 total homes in Ravalli County and our address data had 21,534 unique address points, some of which may not be residential structures. This data was used for consistency and for a "worst case" analysis.

We utilized Headwaters Expected Wildfire Hazard map data and overlaid our address data, then counted addresses in the high fire hazard area. The Headwaters data resulted in 18,064 of a total of 21,534 addresses located in a high fire hazard area, approximately 84%. This number is relatively close proportionally to the DOR home data used initially which was 13,597 homes in a high fire hazard area out of 15,551 which is approximately 87%.

Next, we utilized USDA Forest Service Wildfire Hazard Potential map data and overlaid our address data, then counted addresses in the high and very high hazard areas. This exercise resulted in 1,396 of a total of 21,534 addresses located in high fire hazard areas or approximately 6.5%.

At first glance the Headwaters Hazard map was very concerning as nearly the entire valley was considered high fire hazard with a number of very recognizable discrepancies of areas of dense timber areas being identified as low fire hazard to swap and floodplain being identified as high fire hazard. The USDA data appears to be a much more accurate representation of the fire hazard in Ravalli County.

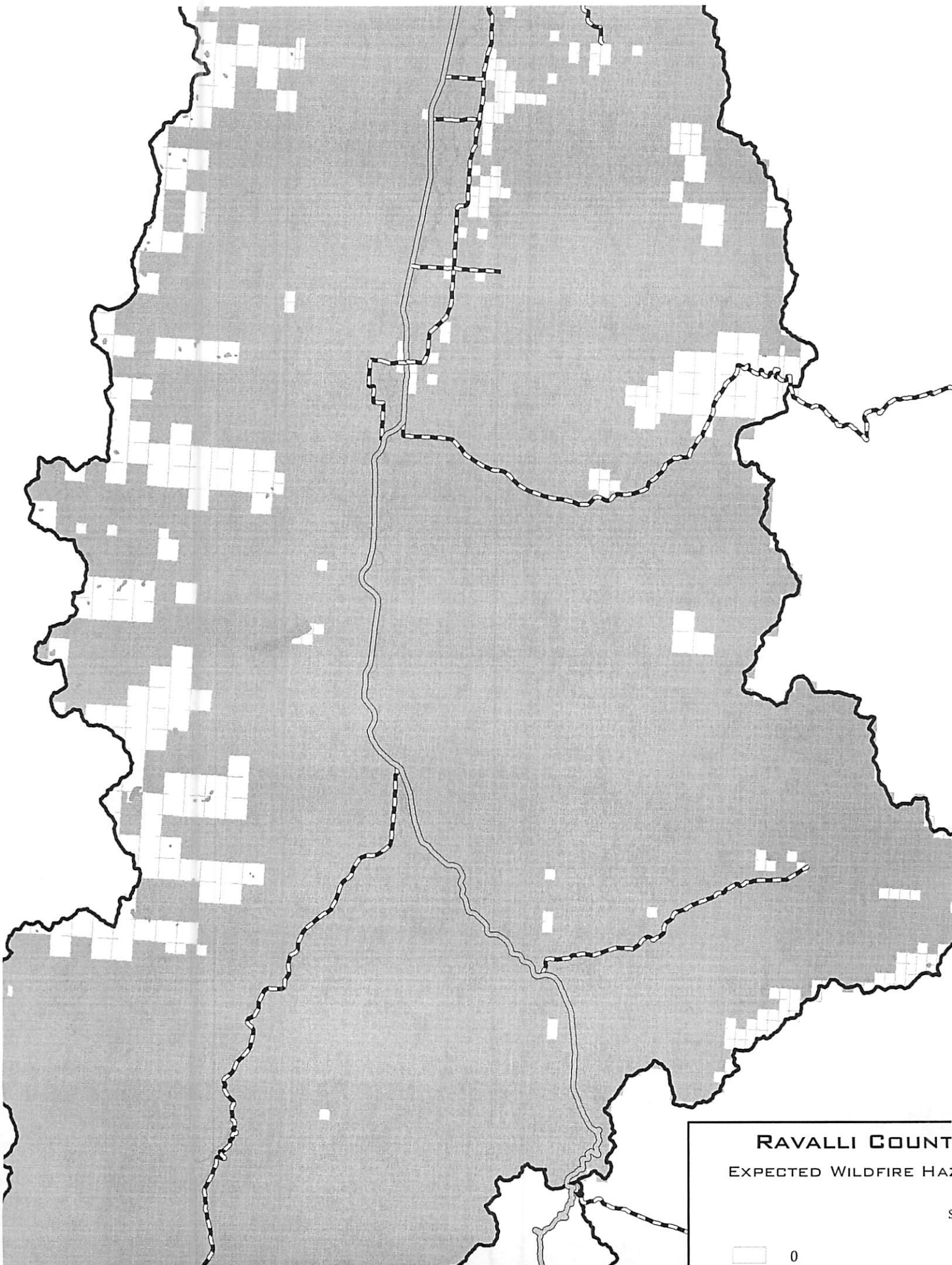
When I initially questioned the validity of your data and findings you replied: "Looking at the variability within an individual county was beyond the scope of our study, but is something you could pursue using the same wildfire hazard data." I understand the scope of your project was a regional analysis, but you published findings at a county level. I feel confident our analysis is a fair representation of the fire hazard in our community. At a high level analysis I could expect a 10%, 50% or even a 100% margin of error, but nearly 13 times seems like there is a fundamental flaw in the analysis.

It is possible that your professional researchers see a flaw in our analysis, but the variance between the two wildfire hazard maps seems too large for both to be right.

I look forward to your reply.

Thank you,
Jeff

Jeff Burrows
Ravalli County Commissioner
(406)-375-6503



RAVALLI COUNTY
EXPECTED WILDFIRE HAZARD

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Wildfire Hazard Map Methodology

This document describes the methodology used to create the map titled, "Expected Wildfire Hazard" which was generated using a Shapefile sent by Kelly Pohl from Headwaters Economics. The map displays areal extent of no fire hazard and high fire hazard as defined by Headwaters Economics and provides a count of address points within each category. This document also describes the methodology involved in the creation of the map titled, "Wildfire Hazard Potential" which displays the wildfire hazard potential in Ravalli County as defined by the USDA Forest Service, Rocky Mountain Research Station. The map also indicates the number of address points found within each hazard category.

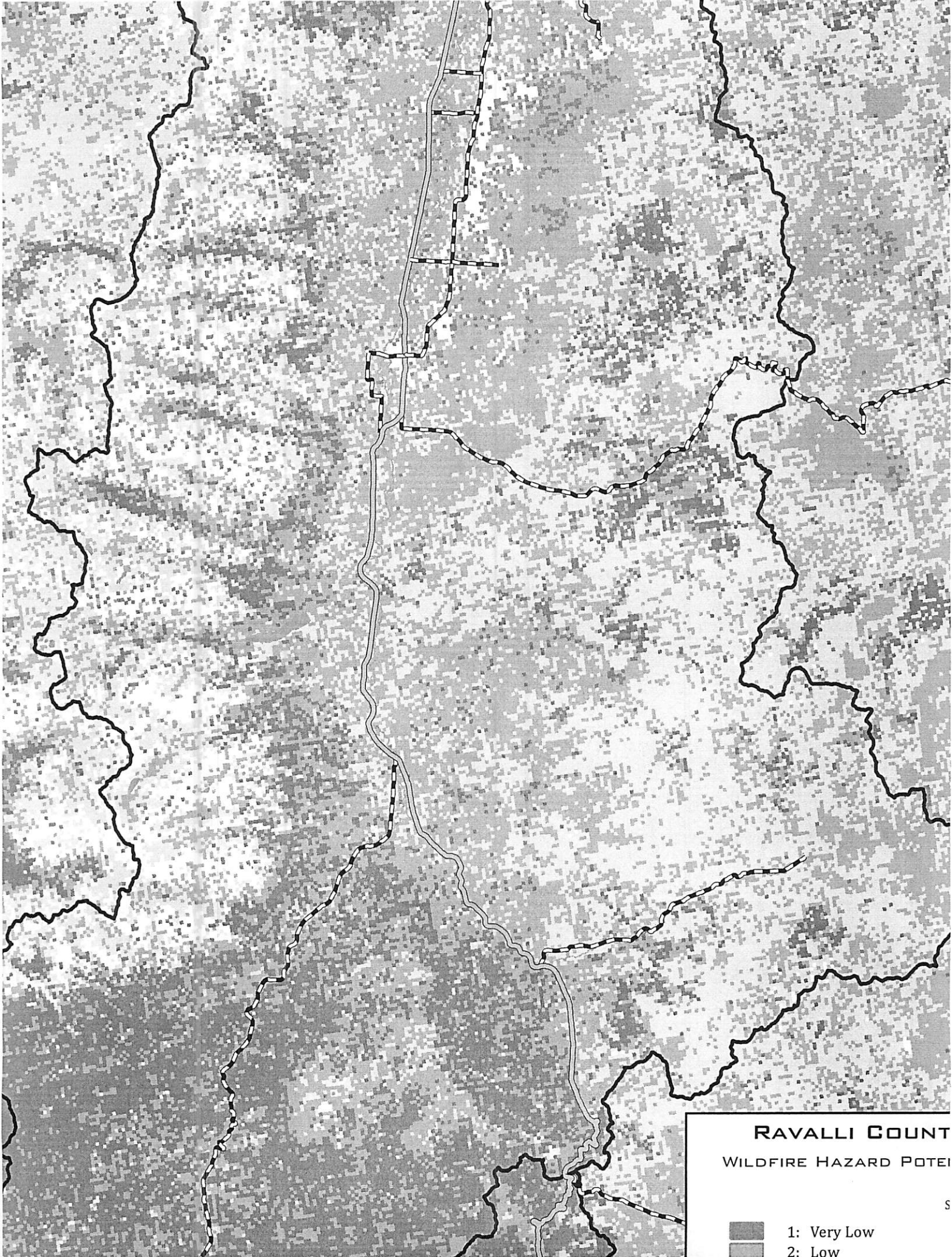
The address points referenced in this document are contained in a Shapefile created and maintained by the Ravalli County GIS Department. This Shapefile contains points for all addresses within Ravalli County that are field-verified as well as newly-issued. For this study the original file was modified to remove duplicate points located on a single structure where multiple addresses contain the same street number but a unique unit number. The purpose of this was to better depict each addressed structure by one point only.

As mentioned, the "Expected Wildfire Hazard" map displays the Fire Hazard classification created by Headwaters Economics. The information used to symbolize the data is contained in the column titled, "FireHazHi" of the attribute table of the Shapefile provided. Note that this Shapefile appears to be a subset of a larger study. It is my understanding that the areas classified as High Fire Hazard are those areas in the upper 20th percentile of an equal interval classification of the column titled, "ExtFireHaz" contained in the same attribute table. It is also my assumption that the classification was performed using data from the larger study.



The Expected Wildfire Hazard Shapefile attribute table contains a column titled, "SF_Homes" that indicates the number of single-family homes (as determined by Headwaters Economics' analyses) that lie inside each polygon of the Shapefile. I chose to perform the same analysis using our address points by creating a new column, "Num_Pts" and counting the number of points that lie in each polygon. The data symbolization and point count are self-evident on the map.

The map, "Wildfire Hazard Potential" presents data gotten from the following URL: <https://www.firelab.org/document/classified-2018-whp-gis-data-and-maps>. I downloaded the data from the link, "Raster GIS Data (23MB; zipped ESRI Grid)" and created a rectangular subset of the area immediately surrounding Ravalli County. I then converted this subset grid to a polygon Shapefile using the Raster to Polygon tool from ArcToolbox. To ensure that the converted polygon features conformed exactly to the edges of the original raster cells I unchecked the "Simplify polygons" check box. This allowed me to perform a point-in-polygon analysis similar to that described above. The resulting polygon Shapefile attribute table contained a column, "Gridcode" that allowed me to symbolize the data according to wildfire hazard potential.

In the Shapefile attribute table I created a new column, "Num_Pts" and ran the same process as above to count the number of points in each polygon. Again, the data symbolization and point count are self-evident on the associated map.



RAVALLI COUNTY
WILDFIRE HAZARD POTENTIAL

-  1: Very Low
-  2: Low

Glenda Wiles

From: Wilmore, Brenda L -FS <bwilmore@fs.fed.us>
Sent: Friday, December 21, 2018 9:14 AM
To: Jeff Burrows; Dillon, Greg -FS
Cc: Ken Miller; Ravalli County Commissioners Office
Subject: RE: Wildfire Hazard Analysis

Jeff,

The purpose of the FS regional risk assessment was to create an objective level playing field to evaluate wildfire hazard across the national forests in the Northern Rockies region. This scientific, objective assessment is being used to help identify and prioritize critical cross-boundary hazard fuels project areas across the region. It is a key tool when forests apply for special project funding.

I have talked with the contractor that provided the wildfire potential analysis for the R1 region-wide risk assessment that was used in the Headwaters Economics analysis. Please see explanation below:

Just a couple of quick observations regarding this issue...

Several aspects of the WHP specifically emphasize forested settings as being more hazardous than grasslands. I would argue that it *over-emphasizes* forests with respect to potential for home destruction. For example, the WHP gives very strong weights to higher flame lengths compared to lower flame lengths (by a factor of up to 75). The lightly loaded valley-bottom grasslands produce only low-to moderate flame lengths, so they do not rate highly in WHP. For the analysis we did for the Region, we weighted flame lengths using far less contrast between flame-length classes. Our weights were developed based on science regarding home destruction (e.g., Jack Cohen's work) and the experience of firefighters and fire managers. Our weights show lower likelihood/degree of home loss with lower flame lengths, but not to the extent that WHP would imply. It is worth noting that there is a great amount of home destruction in grassland areas (Texas, Oklahoma, etc.) and in deciduous forest settings where fire intensity is only low to moderate. That is often because home susceptibility is sometimes so high that a home cannot resist even low intensity fire. Also, the resistance-to-control input to WHP further reduces WHP values in grasslands. The fire modeling we did for the Region used a newer version of FSim that had a feature that essentially duplicates the RTC *within* the fire modeling.

Lastly, there is a statistical issue that could lead to a discrepancy between the maps of WHP and the Regional results in this area. The class breaks for WHP were made based on data for the whole country, whereas the class breaks for the Regional assessment were based on western Montana only, I believe. Ravalli County could be in a relatively hazardous portion of western Montana, but less so nationwide. It is correct that all nominal class breaks are arbitrary--there's no way around that. At least your classification is transparent in that what you call "high" is simply the top quintile of within the analysis domain. Looking at the WHP methods paper, they specifically placed 2/3 of the country into the "low" or "very low" classes. That, too, is arbitrary. And there's no good way around it.

I hope this helps.

Happy Holidays.



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Caring for the land and serving people

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