Glenda Wiles

From: Jeff Burrows
Sent: Tuesday, December 4, 2018 4:13 PM
To: 'kelly@headwaterseconomics.org'
Cc: Ravalli County Commissioners Office; Ken Miller
Subject: Wildfire Hazard Analysis
Attachments: Expected_Wildfire_Hazard.pdf; Methodology Report.docx; Wildfire_Hazard_Potential.pdf

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.

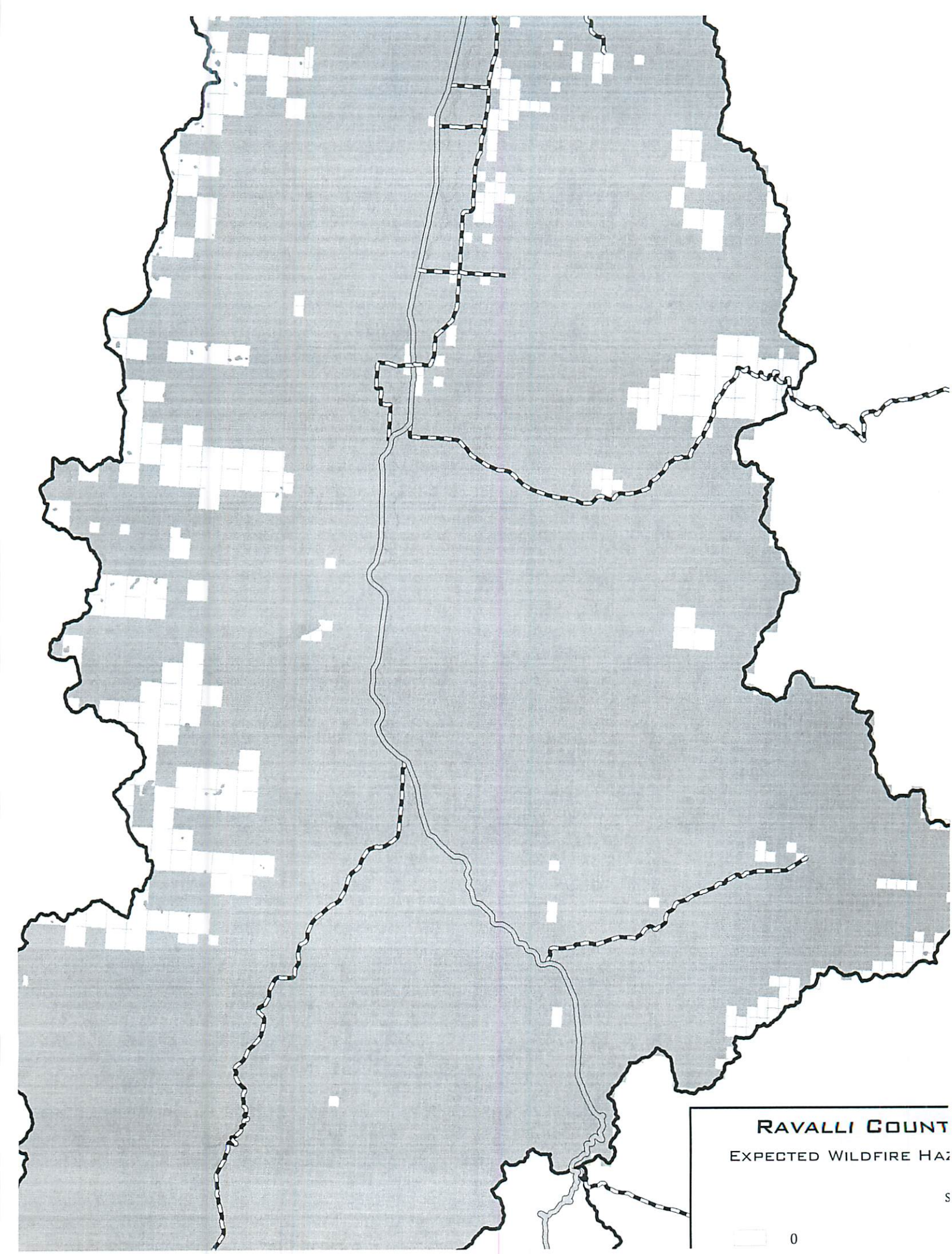
When I initially questioned the validity of your data and findings you replied: "Looking at the variability within an individual county was beyond the scope of our study, but is something you could pursue using the same wildfire hazard data." I understand the scope of your project was a regional analysis, 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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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.

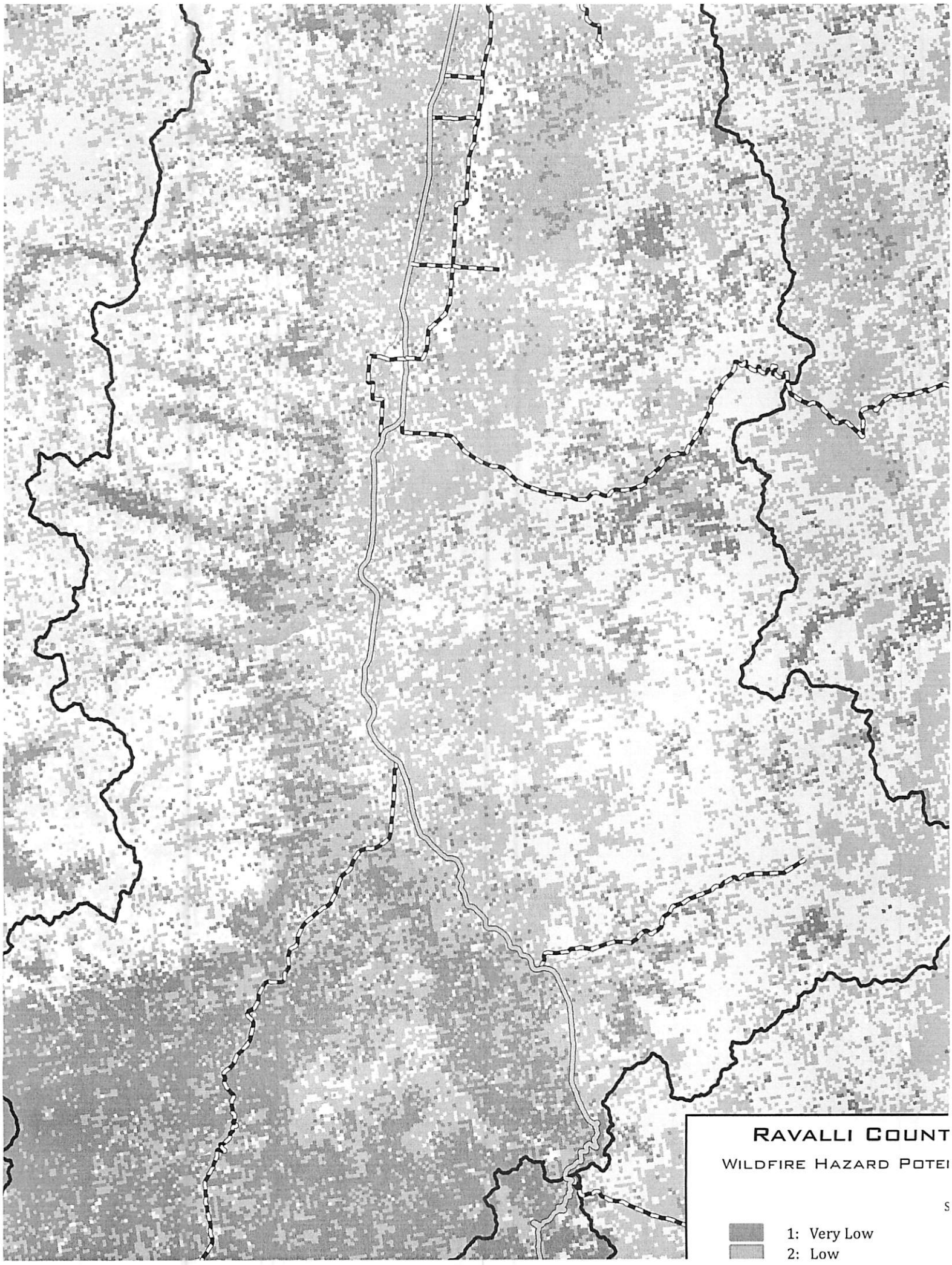
The address points referenced in this document are contained in a Shapefile created and maintained by the Ravalli County GIS Department. This Shapefile contains points for all addresses within Ravalli County that are field-verified as well as newly-issued. For this study the original file was modified 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 COUNT
WILDFIRE HAZARD POTEI
S
1: Very Low
2: Low

Glenda Wiles

From: Kelly Pohl <kelly@headwaterseconomics.org>
Sent: Wednesday, December 5, 2018 2:26 PM
To: Jeff Burrows
Cc: Ravalli County Commissioners Office; Ken Miller
Subject: RE: Wildfire Hazard Analysis

Dear Commissioner,

Thanks for your note. We appreciate seeing your results.

It is not surprising that you found different results when using different data. Based on your results, it appears the DOR housing data we used and the county address point data are relatively similar. Thus, the primary difference comes from the fact that we used two different wildfire hazard datasets.

There are substantial differences in the two wildfire hazard datasets, including how they define "hazard" and their scale.

The data we used were created by USFS Region 1 and are at the sub-state scale using locally refined information about fuels. It maps "expected loss of a residential structure if one were present" based on fire likelihood and intensity. It is focused on the vulnerability of homes and takes into account the fact that homes are most often lost from exposure to embers (not just radiant or convective heat from the fire front), and that homes are typically completely lost if they experience any damage at all.

The USDA Forest Service Wildfire Hazard Potential data you used were created by USFS Rocky Mountain Research Station for the entire country to be used at very large spatial scales ("millions of acres"). It maps "relative potential for wildfire that would be difficult for suppression resources to contain." It is focused on vegetative fuels with a higher probability of extreme fire behavior.

Because the two wildfire hazard datasets ask different questions and are defining different types of hazard, I think they *can* both be correct. Depending on the questions you want to investigate, each dataset can be helpful.

If you want to explore further, I encourage you discuss with the wildfire experts who created the hazard data:
USFS Region 1—Brenda Wilmore, bwilmore@fs.fed.us
USFS Rocky Mountain Research Station—Greg Dillon, gdillon@fs.fed.us

Best wishes,
Kelly

Kelly Pohl
Headwaters Economics
406-599-7841
kelly@headwaterseconomics.org
http://headwaterseconomics.org

Free, custom, socioeconomic profiles:
http://headwaterseconomics.org/eps/

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