Final Recommendations to Reduce Wildfire Risk to Communities:
La Plata County, Colorado

COMMUNITY PLANNING ASSISTANCE FOR WILDFIRE

PREPARED BY:
Wildland Professional Solutions, Inc.
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ABOUT

Community Planning Assistance for Wildfire Program

The Community Planning Assistance for Wildfire (CPAW) program works with communities to reduce wildfire risks through improved land use planning. The CPAW program is a partnership between Headwaters Economics and Wildfire Planning International. It is funded by grants from the USDA Forest Service and private foundations.

Author Information

CPAW engages qualified professionals with expertise in land use planning, forestry, risk modeling, and fire behavior. This report was produced by:

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Acknowledgments

CPAW relies on collaboration with local stakeholders to provide meaningful feedback throughout the process. Our team would like to thank the La Plata County Steering Group members who contributed their time and expertise to our CPAW process.

Cover Image Credit

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CONTENTS

ACRONYMS

COWRAP	Colorado Wildfire Risk Assessment Portal
CPAW	Community Planning Assistance for Wildfire
CWPC	Community Wildfire Planning Center
CWPP	Community Wildfire Protection Plan
FPD	Fire Protection District
HUC	Hydrological Unit Code
HVRA	Highly Valued Resources and Assets
ICC	International Code Council
IWUIC	International Wildland-Urban Interface Code
NFPA	National Fire Protection Association
RMRS	Rocky Mountain Research Station
SCWC	Summit County Wildfire Council
SIZ	Structure Ignition Zone
USDA	United States Department of Agriculture
WUI	Wildland-Urban Interface

EXECUTIVE SUMMARY

Wildfires across Colorado can pose a danger to life and property, particularly in the wildland-urban interface (WUI) where conditions allow for the spread of fire from wildland vegetation to development. Effective land use planning strategies can affect where and how development occurs, altering these conditions and disrupting the WUI disaster cycle.[1] To support the development and implementation of better land use planning strategies, the Community Planning Assistance for Wildfire (CPAW, pronounced "SEE-PAW")) program provides technical assistance to communities across the country.

La Plata County, Colorado was selected to receive CPAW assistance in 2020. Assistance focused on: analyzing local land use documents that have implications for the WUI; providing an updated countywide hazard assessment as a tool for land use planning and related activities, and; recommending future actions for the County to take to increase its wildfire resilience. This report identifies three key recommendations that La Plata County can implement to address its WUI, as summarized in Table 1.

TABLE 1. SUMMARY OF RECOMMENDATIONS

Recommendation	Why This Matters	Key Points
1. Adopt Wildfire Hazard Assessment and Apply to Future Land Use Decisions	La Plata County is relying on the 2006 La Plata County Fire Risk-Communities of Concern Map to support land use planning decisions. This map no longer provides the most up-to-date conditions to make informed development decisions, such as where and how mitigation requirements should apply to minimize wildfire risk to property. CPAW has developed new countywide hazard maps to provide updated information to inform planning activities at multiple scales and at different stages in the decision-making process.	• Landscape-Level Hazard Maps inform planners on the general areas where fires are most likely to occur and where collaborative fire management planning for large-scale fires and mitigation are necessary • Local Wildfire Hazard Maps inform planners on the relative worst-case wildfire exposure that can be expected in any given polygon where development exists or is planned. • Mitigation Difficulty Maps inform planners on the general potential success and challenges of mitigation when aligning with the mitigation requirements of the Wildland-Urban Interface regulatory requirements. • WUI Maps provide the spatial delineation of where the WUI regulations apply.
2. Adopt Wildland-Urban Interface Requirements	La Plata County does not have a uniform approach to regulating the built environment to address its susceptibility to wildfire.	• A phased approach to the adoption of new WUI regulations includes education and training, implementation of a voluntary, parcel-level assessment program, and

[1] Mowery, M., A. Read, K. Johnston, and T. Wafaie. 2019. Planning the Wildland-Urban Interface. American Planning Association, PAS Report 594.

TABLE 1. SUMMARY OF RECOMMENDATIONS		
Recommendation	Why This Matters	Key Points
	Adopting a minimum set of requirements for development at the building, parcel, and subdivision scales has been shown to reduce property damage and losses in WUI fires.	adoption of regulations that are tailored to the unique needs of the County. • Adoption of the International Wildland-Urban Interface Code (IWUIC) aligns with the County's existing suite of International Code Council (ICC) codes. The IWUIC should be amended to incorporate local needs and focus on the Structure Ignition Zone (SIZ). • In conjunction with the IWUIC, the County can adopt wildfire requirements in the Land Use Code that are appropriate for administration by the County Planning Department and apply to subdivision scale features.
3. Transition County's CPAW Steering Group to a Dedicated Wildfire Council	Creating a dedicated group to regularly meet and coordinate wildfire planning activities can provide multiple benefits to other related activities, such as informing the future update of the County's Community Wildfire Protection Plan (CWPP) and fostering broad support for WUI planning activities and adoption of regulations.	• The County should formalize a wildfire council through a local resolution adopted by the Board of County Commissioners to establish the council's purpose, anticipated roles and responsibilities.

PART 1. OVERVIEW

Since its founding in 2015, the national CPAW program has assisted dozens of communities across the U.S. in reducing wildfire hazard and risk by providing technical land use planning assistance. The program is funded by the U.S. Forest Service and private foundations, which allows communities to participate in the program and receive assistance at no direct cost. CPAW teams bring expertise in planning, forestry, wildfire hazard, and other related skills to assist communities in considering how land use planning can effectively address the WUI.

Figure 1. La Plata County, Colorado

In November 2019, La Plata County was selected as one of six communities to receive technical assistance by the CPAW program for the following calendar year (2020). The scope of CPAW's assistance included:

- Conducting a review and analysis of applicable land use and wildfire-related documents and materials, including video footage of local WUI conditions provided by the County steering group.
- Facilitating multiple conference calls and virtual meetings with the County steering group to discuss local conditions that exist across the County which may contribute to current or future wildfire risk.
- Providing a virtual hazard assessment workshop to obtain feedback from local subject matter experts on local wildfire hazard to inform the development of a countywide wildfire hazard assessment.

This report is a culmination of the CPAW process and provides a set of recommendations to reduce wildfire risk in La Plata County. Recommendations also include delivery of a countywide wildfire hazard assessment developed by the US Forest Service Rocky Mountain Research Station, which can be used to inform local planning decisions as further detailed in this report. Participation in CPAW is voluntary, and implementation of CPAW recommendations is fully under the local jurisdiction having authority over land use decisions.

COMMUNITY CONTEXT

La Plata County is located in southwest Colorado (see Figure 1) and has a land area 1,692.08 square miles[2]. The County's demographics, land ownership patterns, and fire environment are important considerations when developing appropriate wildfire risk reduction recommendations, as highlighted in this section.

[2] U.S. Census Bureau QuickFacts. Accessed July 2020. https://www.census.gov/quickfacts/laplatacountycolorado

Demographic Information

The total population of La Plata County grew from 51,335 residents in 2010 to 56,221 in 2019[3]. This is nearly a 10% increase in population. However, the Colorado State Demography Office expects that the growth rate may slow between 2020 and 2040 to account for an aging population and changes in the proportion of the population in childbearing ages.[4] In 2017, the government sector accounted for 17% of jobs. Other job sectors include healthcare and social assistance (12%), retail trade (11%), accommodation and food services (10%) and construction (9%).[5] Table 2 summarizes demographic and housing information.

TABLE 2. Demographic Information in La Plata County

Category	Statistic
Population Estimate (2019)	56,221 people[a]
Population Growth (2010-2019)	+9.5%
Population Forecast (2040)	79,764 [b]
Population Density	30.3 persons per square mile[a]
Median Age	39.7 years [b]
Median Household Income	$62,533[b]
Number of Housing Units	28,581 units[a]
Average Household Size	2.44 persons per household[a]
Owner-Occupied Housing Unit Rate	70.6%[a]
Median House Value	$356,700 [b]
Total Employment	35,008 [b]

Sources:

a. *U.S. Census Bureau QuickFacts. Accessed July 2020.*

b. *Colorado Department of Local Affairs State Demography Office – Community Profile for La Plata County (2/11/2019).*

Housing Trends

The majority of owner-occupied housing types are single family structures (82%), followed by mobile homes (16%); rental housing is more broadly dispersed among single family (52%), multi-family (30%), and mobile homes (18%).[6] In 2019, the County issued 151 permits for single family structures and 55 permits for mobile homes. Since 2008, no permits have been issued for multi-family structures.[7] The ratio and type of owner-occupied and rentals units, in addition to growth trends in types of units, can help inform communication and outreach strategies related to property mitigation programs and land use requirements. For example, growth trends that show preferences for single-family structures and mobile homes should ensure that this type of land use and building permit process incorporates wildfire mitigation at appropriate times during the application, review, and inspection stages.

[3] U.S. Census Bureau QuickFacts. Accessed July 2020. https://www.census.gov/quickfacts/laplatacountycolorado
[4] Colorado Department of Local Affairs State Demography Office – Community Profile for La Plata County (2/11/2019). Accessed July 2020: https://www.colorado.gov/pacific/sites/default/files/La%20Plata%20County%20Community%20Profile%20Report%202019-02-11.pdf
[5] Ibid.
[6] Ibid.
[7] Data provided by La Plata County Planning Department to CPAW (July 2, 2020)

Land Use

Approximately 41% of La Plata County land is in public ownership and managed by land management agencies—many of these lands are in the northern third of the County and removed from areas where most development occurs.[8] In addition, around 18% of land in the southern portion of the County is tribally owned, primarily by the Southern Ute Indian Tribe.[9]

Economic activities have historically relied on land uses that supported resource extraction, agriculture, timber harvesting and similar activities. Beginning in the 1960s, many agricultural lands in the County began being sold and converted into rural residential subdivisions. The County anticipates continuing to see a decline in traditional agriculture lands and an increase in dispersed residential properties.[10] The County also relies on the scenic character of the landscape to support recreation and tourism throughout all four seasons.

Fire Environment

Generally, the probability of wildfire occurrence in any given area of the County is highly likely. La Plata County has a high diversity of vegetation cover, ranging from sage/grassland through pinyon-juniper, ponderosa pine, aspen and spruce-fir forests depending on elevation, topography, and moisture regimes. The majority of these vegetation types are either fire dependent, or fire adapted with fire being the dominant historical natural disturbance type. As with most other fire dependent and fire adapted ecosystems in North America, historical fire suppression policies have significantly altered the "natural" variability of these historical fire regimes, leading to higher intensity wildfires that negatively impact both the natural ecosystems and human development. To compound the issue, significant growth in recent years has resulted in a higher potential wildfire exposure to human development. This is further exacerbated by recent successive drought and forest health impacts, and the increasing influence of climate change.

The long history of wildfires within La Plata County shows evidence of the active fire regime within the County (Table 3). The most significant fire in recent La Plata County history in terms of property destruction and personal damage was the 2002 Missionary Ridge Fire that spread to 73,121 acres, leaving one dead and 52 injured, destroying 56 homes and 22 structures and resulting in $40.8 million in losses. More recently, the "416 Fire" that broke out on June 1, 2018, during record drought conditions, grew to 54,000 acres and became Colorado's sixth largest wildfire.

The 416 Fire did not result in homes being directly damaged or lost due to the fire; in fact, it provided a demonstration of how effective mitigation combined with fire response successfully averted losses in the Falls Creek Ranch Firewise/USA® community. It should be noted that although structures were not lost to wildfire, post-fire flooding did result in residential property damages. Furthermore, businesses in Durango reported significant tourism revenue losses through the month of June when the fire was most active. These losses were primarily due to smoke and highway closures.[11]

[8] La Plata County Comprehensive Plan. 2017.
[9] Ibid.
[10] Ibid.
[11] La Plata County Multi-Jurisdictional Hazard Mitigation Plan- 2018 Update

TABLE 3. Significant La Plata County Wildfires Over Ten-Year Period (2009-2018)			
Date	Fire Name	Location	Size (acres)
8/9/2009	Pinon	Southern Ute Tribe, bordering Fort Lewis Mesa FPD	111
8/24/2011	Sambrito 2	15 miles SE of Bayfield, Southern Ute Tribe, bordering Los Pinos FPD	522
10/12/2012	Vallecito	16 miles Northeast of Durango, Vallecito, Upper Pine River FPD	1400
10/6/2012	Goblin Fire	North of Durango	800
6/23/2012	State Line Fire (Fire ID: 641185)	North of NM State Line, Florida Mesa, Durango FPD	550
7/22/2012	Air Park Fire	Ridge Basin reservoir, Southern Ute Tribe, bordering Durango FPD;	500
6/23/2012	Stateline Fire: (Fire ID: 637721)	Florida Mesa, Durango Fire District	350
10/16/2012	Vallecito Fire	Vallecito, Upper Pine River FPD	1,400
7/3/2017	Lightner Creek Fire	WNW of Durango, Durango FPD	412
6/1/2018	416 Fire	Animas Valley, Durango FPD	54,129
Source: La Plata County Multi-Jurisdictional Hazard Mitigation Plan (2018 Update)			

FINDINGS

During discussions with the La Plata County Steering Group and through an internal analysis of County planning documents, CPAW team members identified several challenges and opportunities for addressing wildfire through land use strategies.

Challenges

- The County has a range of vegetation types and terrain that can make treatment of hazardous fuels difficult in some areas. Further, forest health conditions such as beetle kill or areas previously burned with standing dead timber can also impede mitigation and response activities.
- Many existing residential areas throughout the County were not built with consideration for effective wildfire evacuation and response. Some subdivisions or single-family lots have narrow roads with one egress/ingress, long, steep driveways, and limited water pressure. In addition, transportation routes are not always well-maintained and can have overgrown vegetation alongside the roads, further limiting visibility and safety during an evacuation.

- As a rural County, many landowners must also consider other factors such as animal evacuations and sheltering options during a wildfire event, which can add additional complexity to wildfire response planning, especially in areas where access is already limited.

Opportunities

- La Plata County has an opportunity to take a proactive approach towards future land use changes that convert agricultural lands to residential neighborhoods by adopting appropriate risk reduction measures that apply to future development. The Colorado State Forest Service has noted that the biggest single reason for Colorado's increased fire risk is the conversion of agricultural land to other uses.[12]
- County stakeholders participating in CPAW have expressed general support for making improvements to the County's regulatory approach for wildfire by recognizing that land use requirements for structures, access, and water supply can improve public and first responder safety.
- Successful examples, such as the Falls Creek Ranch Firewise/USA® community that was threatened during the 416 Fire, help illustrate the effectiveness of wildfire mitigation efforts combined with an efficient response. These examples, along with other effective land management activities such as prescribed fire, help build awareness and support for a comprehensive approach toward creating fire adapted communities.

[12] Colorado Public Radio News. Half of All Coloradans Now Live in Wildfire-Prone Areas As City Sprawl Grows. November 26, 2018.

PART 2. RECOMMENDATIONS

The following recommendations address existing gaps identified by CPAW at multiple scales in the County to provide a more comprehensive approach toward wildfire risk reduction.

1. ADOPT WILDFIRE HAZARD ASSESSMENT AND APPLY TO FUTURE LAND USE DECISIONS

Currently, County planning staff are relying on the 2006 *La Plata County Fire Risk-Communities of Concern Map*[13] to support land use planning decisions. At the time that the map was developed it was very locally relevant and provided an accurate assessment of the wildfire risk conditions present. However, the conditions upon which the map was developed have likely changed the landscape significantly since its development. Changes to the vegetation through disturbance from fires, forest health, land-clearing, human development, or simply just changes over time, have altered the fuel model inputs that were used when the map was developed. In addition, the science and technology that supports wildfire risk analysis has evolved and now offers more accurate analysis tools.

The Colorado Wildfire Risk Assessment Portal (COWRAP) also offers a risk mapping tool. Although COWRAP is useful for many other wildfire management applications, it is not specifically applicable to supporting local government in land use planning decisions as COWRAP was completed at the state scale and does not account for locally adjusted conditions.

With this information, the CPAW team moved forward in engaging with the USDA Forest Service Rocky Mountain Research Station (RMRS) to develop a suite of wildfire hazard assessment tools that can support the County in land use planning, as well as other wildfire mitigation activities. These tools were developed using the most recent science and industry best practices with locally vetted data and input to ensure that they reflect the local wildfire environment as accurately as possible.

What is Wildfire Risk?

Wildfire risk can be visualized as a triangle consisting of three components:

1. Likelihood of a wildfire occurring based on topography, weather, and ignition patterns; this can also include ignition sources from hazardous land uses (e.g., sawmills or propane storage facilities);
2. Predicted intensity of a wildfire (usually measured in flame length) based on vegetation type and weather conditions;
3. Susceptibility of values (for land use planning purposes, values consist of communities, structures, and infrastructure).

Together, these components complete the wildfire risk triangle (Figure 2).

[13] La Plata County Community Wildfire Protection Plan 2006

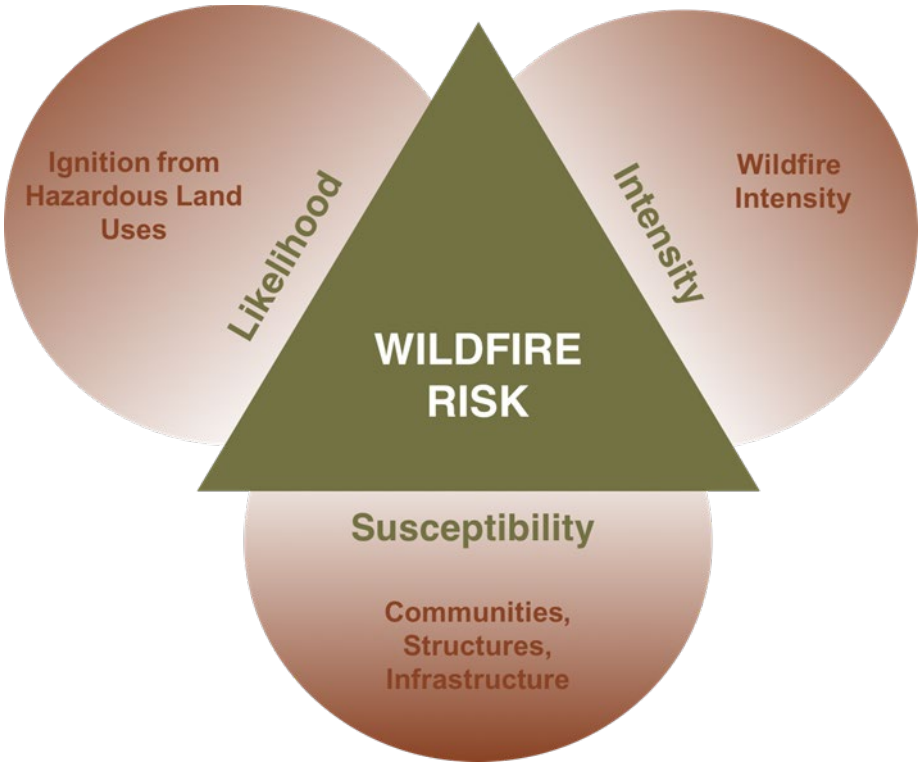

Figure 2. Components of the wildfire risk triangle

Land use planning largely focuses on mitigating the susceptibility portion of the wildfire risk triangle. There are two important susceptibility inputs that should be evaluated to appropriately determine wildfire risk in the context of land use planning:

- The location and density of structures and infrastructure.
- The ignition potential of individual structures and infrastructure.

Implementing this recommendation will provide a clear definition of La Plata County's WUI and integrate a hazard assessment map as a component of the decision support tool for land use policies and regulations. The further incorporation of a property-specific assessment system to complement the hazard assessment with a built environment susceptibility component will provide a comprehensive risk assessment.

USFS Risk and Hazard Assessment

As part of the CPAW program, RMRS provides wildfire risk and hazard assessment support. After assessing the current need, the CPAW team engaged the RMRS to undertake an updated and refined countywide hazard assessment (likelihood and susceptibility) to support this project. As a component of the hazard assessment, the RMRS is also undertaking the SILVIS Lab's approach to spatially define the WUI in La Plata County.

Parcel-Level Susceptibility Assessments

Individual Parcel-Level Assessments complete the risk triangle by providing the susceptibility component. This focuses on assessing each structure and the immediate surroundings, or Structure Ignition Zone (SIZ).

Implementation Guidance

As part of the CPAW process, RMRS staff engaged with local wildfire risk subject matter experts to achieve three main objectives:

1. Validate the RMRS spatial fuels layers.
2. Explore RMRS tools that can be used to develop a single countywide hazard mapping product to better support land use planning and other wildfire risk reduction efforts.
3. Spatially define the WUI.

This collaborative engagement was undertaken in the form of workshops in which local subject matter experts worked with RMRS and CPAW team members to determine the appropriate parameters and tools that would be useful in supporting local risk-reduction efforts. As a result of this collaborative work, RMRS has calibrated the spatial fuel layer and developed a methodology utilizing a spatial hazard assessment to support the implementation of land use planning policy and regulations.

Wildfire Hazard Assessments and Mapping

To provide an effective decision-support tool for the County and its partners, RMRS developed the following wildfire hazard mapping outputs. Three maps are provided at two scales: the Landscape-Level Wildfire Hazard (120-meter pixel resolution), Local-Level Wildfire Hazard (90-meter pixel resolution) which includes ember zones, and Mitigation Potential (30-meter pixel resolution). A summary of the methodology used to develop these outputs can be found in Appendix A.

Landscape-Level Wildfire Hazard

This scale (120-meter pixel resolution) represents the likelihood (probability) of a fire occurring and the intensity of the fire at the landscape-level based on the inherent landscape characteristics, including broad existing vegetation, biophysical settings, fire regimes, and fire histories. To provide the assessment in a format that is easily interpreted by the expected users (public, developers, land use planners), the pixelated display was summarized to polygon boundaries based on the U.S. Geological Survey Hydrological Unit Code (HUC) 12 (sub-watershed) boundaries. The landscape-level hazard assessment (Figure 3) is delineated into the following rankings:

- MODERATE
- HIGH
- VERY HIGH

The factors influencing these rankings can be used to determine the potential landscape-level exposure to which a development will be subject. The ranking at this scale is difficult to change at the local/parcel level. Change at this scale typically occurs as a result of large-scale disturbances such as insect mortality or fires, or the implementation of landscape-level mitigation projects.

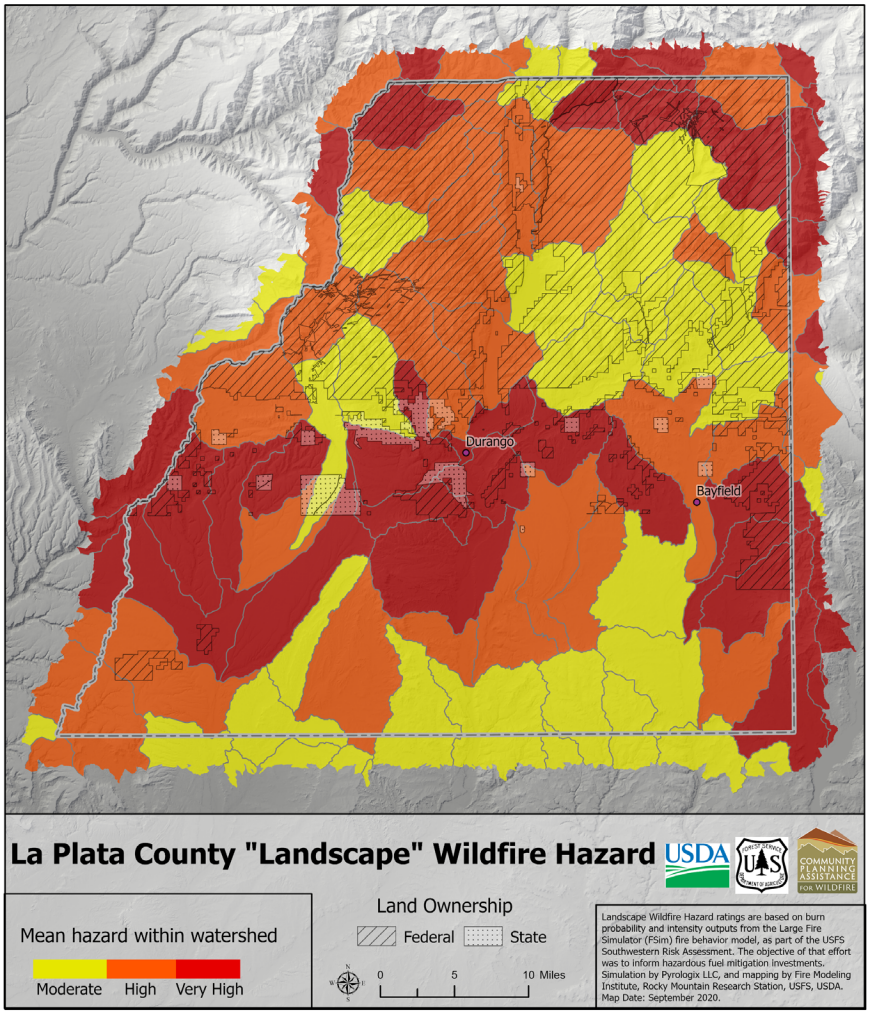

Figure 3. La Plata County Landscape Wildfire Hazard Map

Land Use Planning Application: Application of the landscape wildfire hazard map informs land use planners on the general areas where fires are most likely to occur and where collaborative, multi-agency, large-scale fire management planning and mitigation are necessary.

Local-Level Wildfire Hazard

This scale (90-meter pixel resolution) is based on an extreme event (i.e. worst fire days). To provide the assessment in a format that is easily interpreted by the expected users (e.g., public, developers, land use planners), the pixelated display was summarized to polygon boundaries based on the catchment boundaries within the HUC 12 boundaries (Figure 4). This does not show the likelihood of a fire occurring but does show where fires are likely to burn at high intensity. For example, a fire that starts in an area where the local hazard is high can spread fast and burn at high intensity creating significant wildfire exposure to any structures in the area. The same rankings used at the landscape scale are used at this local scale:

- MODERATE
- HIGH
- VERY HIGH

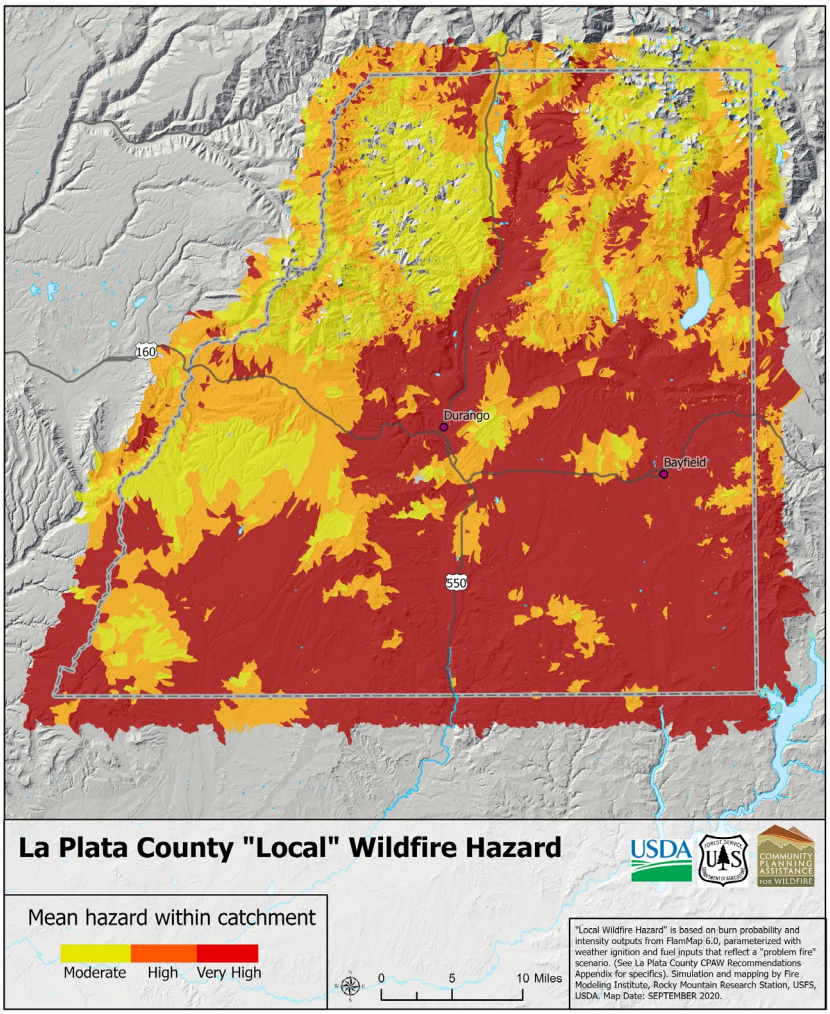

Figure 4. La Plata County Local Wildfire Hazard Map

Land Use Planning Application: Application of the local wildfire hazard map informs land use planners on the relative worst-case (i.e. hottest, driest, windiest days during a fire season) wildfire exposure (radiant, convective, and ember) that can be expected in any given polygon where development exists or is planned.

Mitigation Difficulty

The Mitigation Difficulty component (30-meter pixel resolution) uses the life form (grass, shrubs, trees), slope, and crown fire potential to classify the potential mitigation difficulty of any given 30-meter pixel on the map (Figure 5). This is represented by nine categories (Table 4).

TABLE 4. Mitigation Difficulty Classes and Descriptions		
Class	Characteristics	Mitigation Discussion
1	Sparsely vegetated, or developed, with potential for ember impact	Barren ground/water/developed/ sparse vegetation or land that lies within potential spotting distance of a wildfire. Mitigation will involve appropriate structure ignition zone and structure construction.
2	Herbaceous on a shallow slope (<15%)	Fires are typically easier to suppress in these areas. However, high winds combined with dry conditions lead to potentially dangerous, fast-moving, high-intensity fires. Mitigation may involve a combination of irrigation, mechanical (mowing) treatment, frequent burning, and fuel breaks in conjunction with appropriate structure ignition zone and structure construction.
3	Herbaceous on moderate slope (≥15 to <30%)	Harder to construct fuel breaks, increased difficulty in mechanical (mowing) treatment, increased potential for erosion, increased rate of spread and intensity may make frequent burning and other mitigation more difficult. Focus should be on appropriate slope setbacks, structure ignition zone, and structure construction mitigation.
4	Herbaceous on steep slope (≥ 30%)	Significant challenges in fuel break construction, unlikely option for mechanical (mowing) treatment, significant potential for erosion, high rate of spread and intensity potential may make frequent burning and other mitigation difficult. High winds combined with short-term drying conditions lead to potentially dangerous, fast-moving fires with fire fighter access concerns. Mitigation potential may involve a combination of frequent burning and fuel breaks in conjunction with slope setback, appropriate structure ignition zone, and structure construction.
	Shrub on shallow slope (<15%)	Fires are typically harder to suppress than grassfires in these areas. High winds combined with dry conditions lead to potentially dangerous, fast-moving, high-intensity fires with fire fighter access concerns. Mitigation may involve a combination of frequent burning and fuel breaks in conjunction with appropriate structure ignition zone and structure construction.
5	Shrub on moderate slope (≥15 to <30%)	Harder to construct fuel breaks, increased difficulty in mechanical (mastication) treatment, increased potential for erosion, increased rate of spread and intensity may make prescribed burning more difficult. Focus should be on a combination of appropriate mechanical treatment and burning, slope setbacks, structure ignition zone, and structure construction mitigation.

TABLE 4. Mitigation Difficulty Classes and Descriptions		
Class	Characteristics	Mitigation Discussion
6	Shrubs on steep (≥30%) slopes	Significant challenges in fuel break construction; unlikely option for extensive mechanical (mastication) treatment. Significant potential for erosion or slope instability resulting from treatments is a likely mitigation challenge. Increased rate of spread and significant intensity may make prescribed burning more difficult. Focus should be on a combination of appropriate mechanical treatment and burning, slope setbacks, structure ignition zone, and structure construction mitigation.
	Tree on shallow slope (<15%)	Open canopy must be maintained to prevent increased crown fire potential. Surface fuels must be treated/maintained in a state that reduces the chances of fast-moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone, and structure construction mitigation.
7	Tree on moderate slope (≥15 to <30%)	Open canopy must be maintained to prevent increased crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated/maintained in a state that reduces the chances of fast-moving surface fires. Increased potential for erosion or slope instability resulting from treatments can be a mitigation challenge. Mitigation should also include appropriate slope setbacks, structure ignition zone, and structure construction mitigation.
	Tree on shallow slope (<15%) with potential for crown fire	Dense canopy needs to be thinned to reduce crown fire potential. Surface fuels must be treated to reduce risk of fast-moving surface fires. Mitigation should also include appropriate structure ignition zone and structure construction mitigation.
8	Tree on moderate slope with potential for crown fire (≥15 to <30%)	Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast-moving surface fires. Increased potential for erosion or slope instability resulting from treatments can be a mitigation challenge. Mitigation should also include appropriate slope setbacks, structure ignition zone, and structure construction mitigation.
	Tree on steep slope (≥30%)	Open canopy must be maintained to prevent increased crown fire potential, which can be significantly difficult due to the slope. Surface fuels must be treated/maintained in a state that reduces the chances of fast-moving surface fires. Significant potential for erosion or slope instability resulting from treatments is a likely mitigation challenge. Mitigation should also include appropriate slope setbacks, structure ignition zone, and structure construction mitigation.

TABLE 4. Mitigation Difficulty Classes and Descriptions		
Class	Characteristics	Mitigation Discussion
9	Tree on steep slope (≥30%) with potential for crown fire	Dense canopy needs to be thinned to reduce crown fire potential, which may be extremely difficult if not prohibitive due to the slope. Surface fuels must be treated to reduce risk of fast-moving surface fires. A very high potential for erosion or slope instability resulting from treatments is a likely mitigation challenge. Mitigation should also include appropriate slope setbacks, structure ignition zone, and structure construction mitigation.

Land Use Planning Application: Application of the mitigation difficulty map informs land use planners on the general potential success and challenges of mitigation when aligning with the mitigation requirements of WUI regulations. For the most practical integration of the mitigation difficulty spatial information, it is typically summarized to the parcel level.

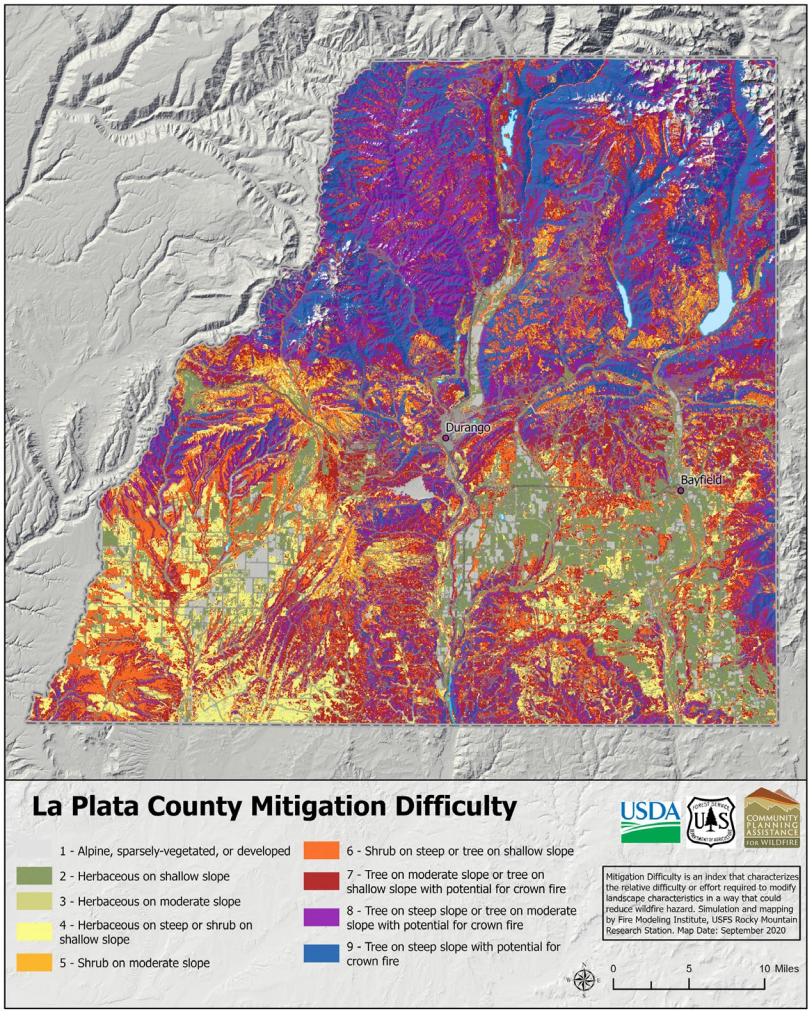

Figure 5. La Plata County Mitigation Difficulty Map

Parcel-Level Assessment

Parcel-level wildfire assessments require a "boots on the ground" approach for assessing the SIZ. It would be beneficial to the County if a standardized and comprehensive approach were adopted by all partners across the County. In developing or adopting this tool, consideration should be given to:

- Incorporating the assessment of SIZ susceptibility (Figure 6) into the overall risk assessment.
- Reflecting the most current best practices.
- Collecting data in a format that can be easily tracked and integrated with mitigation difficulty and local hazard assessment maps, and can provide meaningful risk reduction direction to property owners and land managers.

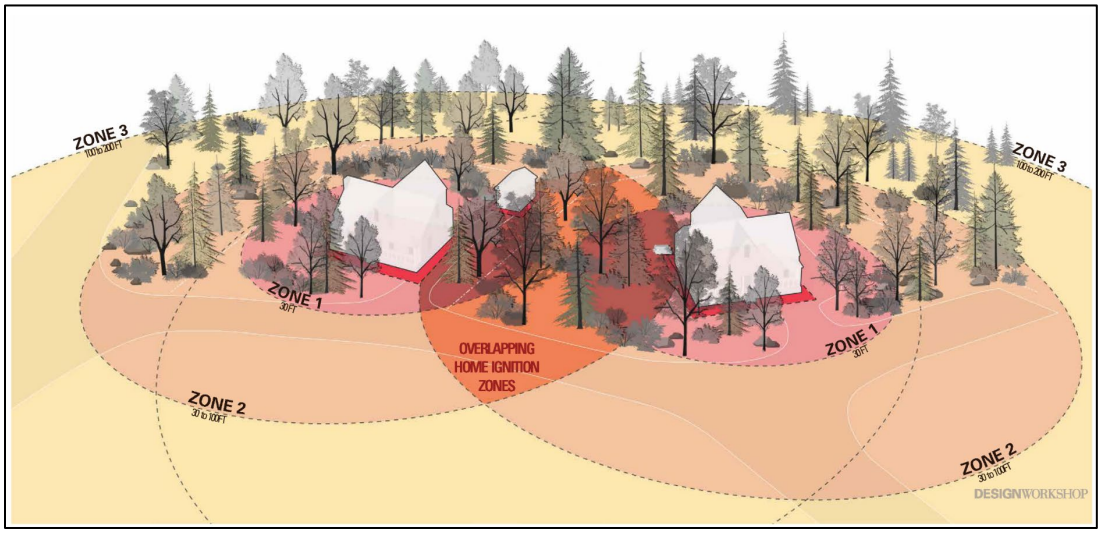

Figure 6. Diagram depicting unmitigated overlapping Structure Ignition Zones (SIZ) of neighboring properties

Defining the WUI

A general WUI definition used across all policies, plans, and regulations should account for the "set of conditions" where vegetation (wildland fuels) and structures or infrastructure (built fuels) are influenced by weather and topography to allow fire to ignite and spread through the WUI environment. To provide the basis for a true understanding of the risk that La Plata County faces, the WUI should be more accurately defined as:

Any developed area where conditions affecting the combustibility of both wildland and built fuels allow for the ignition and spread of fire through the combined fuel complex.

In order to provide a spatial reference in defining the WUI, the CPAW/ RMRS team modified the SILVIS lab's approach for spatially defining the WUI. The SILVIS lab's approach originated in the Federal Register report[14] on WUI communities at risk from fire. This approach was modified by the CPAW/RMRS team to the following parameters:

[14] USDA and USDI. 2001. Urban wildland interface communities within vicinity of Federal lands that are at high risk from wildfire. Federal Register 66:751–777.

- **WUI Intermix**: Areas with ≥1 house per acre and ≥50 percent cover of wildland vegetation. These areas have a potential for exposure to radiant and convective heat, as well as airborne embers.
- **WUI Interface:** Areas with ≥1 house per acre and ≤50 percent cover of vegetation and within 1.5 mi of area with >= 75% wildland vegetation.
- **Non- WUI Vegetated (no housing):** Areas with ≥50 percent cover of wildland vegetation and no houses (e.g., protected areas, steep slopes, mountain tops).

Based on these definitions, all of the developed areas (i.e. areas currently with habitable structures), or platted subdivisions without structures—known as potential WUI, within La Plata County have been classed as **WUI Intermix**. All areas outside of federal land ownership—including areas currently defined as "state, county, or local land ownership (grey areas on map)"—also have the potential to become WUI if development is planned. Although these areas of land ownership are not currently developed, the County should consider including these areas as the spatially defined WUI.

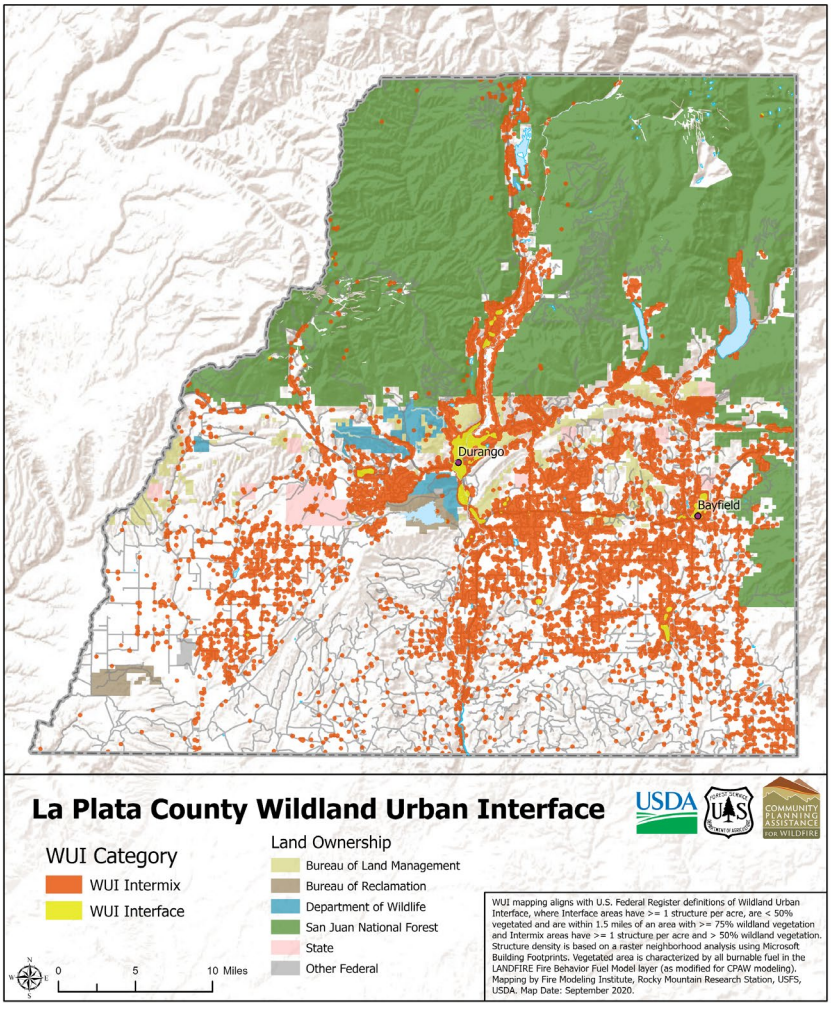

Figure 7. La Plata County Map of the Wildland Urban Interface (Intermix)

Using the Hazard Assessment to Support Land Use Policy and Regulation

The landscape-level and local-level wildfire hazard maps, as well as the mitigation difficulty and WUI maps, will be supplied as a geodatabase to the County. This allows the user to explore a hierarchy of hazard/exposure metrics including all of the elements described above. For example, when a user clicks on a watershed polygon or mitigation pixel, the user will see the elements that contribute to the calculation of the final hazard rating. The display of pixel-level model outputs at finer display scales will also allow end-users to examine the spatial variability of factors contributing to hazard and exposure with any watershed. The local-level and mitigation difficulty maps provide the opportunity for planners to assess a future or existing development for wildfire exposure and require the appropriate mitigation. It also provides a ranked scale to guide implementation of a WUI code (see Recommendation 2) with regards to the degree of standards that must apply based on exposure and mitigation and whether the area is within the ember zone. Finally, these maps support a parcel-level assessment program that can be integrated into completing a comprehensive risk assessment and offer a "steppingstone" for developing a phased approach toward the adoption of regulations.

Tips and Additional Resources

The hazard assessment tool will be provided in the form of a geodatabase for addition to the County's geomatics servers as an Esri ArcGIS layer. For the data to be made available to land use planners and the development community, the expertise of a GIS specialist will be required to ensure it is in the appropriate format for access and consumption by these groups.

Note: Once the new hazard assessment is adopted, any current County documents (e.g., the La Plata County Comprehensive Plan) that reference older hazard assessments should be updated to reference this new hazard assessment.

The hazard assessment tools must be kept up to date to be relevant. A minimum default five-year update schedule is recommended, unless updates are required to occur sooner, based on the following:

- Significant wildland fire activity;
- Significant fuel management activity;
- Significant forest health impacts, or other disturbances that alter large-scale vegetation structure;
- Significant urban growth.

A best practices document (Appendix A) provides guidance to the County on the methodology for updating the assessment. The hazard assessment outputs should be strongly linked as a decision support tool for implementing the proposed WUI requirements and planning policies.

2. ADOPT WILDLAND-URBAN INTERFACE REQUIREMENTS

La Plata County is a statutory county that derives its powers from the State of Colorado. Colorado Revised State Title 29, Article 20, Section 101 (§29-20-101) provides statutory counties with their granted jurisdictional authority (referred to as the Local Government Land Use Control Enabling Act of 1974). Each local government within its respective jurisdiction has the authority to plan for and regulate the use of land by regulating development and activities in hazardous areas, as well as other activities designated under §29-20-104, *Powers of local governments*. As a result, counties are not prohibited from adopting local WUI or wildfire

mitigation requirements such as those that address wildfire susceptibilities on the structure and surrounding vegetation.

Many jurisdictions use a model code or set of standards as the basis for developing wildfire mitigation requirements, such as the International Code Council International Wildland-Urban Interface Code (IWUIC) or National Fire Protection Association (NFPA) standards for wildland fire protection and structural risk reduction. For example, the IWUIC establishes minimum requirements for land use and the built environment in designated WUI areas using prescriptive and performance-related provisions. The IWUIC is based on data collected from tests and fire incidents, technical reports and mitigation strategies from around the world.

In Colorado, local jurisdictions who seek to adopt the IWUIC may make amendments to align with local conditions and their community's organizational approach to development reviews and permits. For example, because the IWUIC contains provisions for both structures and infrastructure (water supply, roads), there may be multiple departments and agencies engaged in the review process. Communities can adopt the IWUIC as part of their fire code, building code, or land use code, or a combination thereof.

IWUIC Adoption

CPAW recommends that La Plata County adopts the IWUIC with local amendments to align with its existing suite of International Code Council codes (building code, residential code, etc.). Future updates to the IWUIC can occur within the cycle of the County's ICC code adoptions.

This approach is designed to address a number of wildfire mitigation gaps in the County's existing regulations, which currently do not provide a consistent or comprehensive approach to development that may be exposed to wildfire hazard. A consistent countywide set of regulations administered by the County also reduces confusion across departments, fire districts, developers, and landowners.

While adoption of the IWUIC reduces staff workload in the long-term due to the predictable nature of the regulatory process, CPAW recognizes the sensitivity within the community regarding adoption of new regulations. To support a more successful adoption process, CPAW recommends a phased implementation approach that builds local buy-in, as outlined below.

Land Use Code Update: La Plata County is undergoing an update to its Land Use Code and has reserved a section for land use requirements pertaining to the avoidance of natural hazards and protection of sensitive lands. This future section is appropriate to address land use planning topics related to wildfire hazard, including: siting of new development in relation to wildfire hazard; fire protection requirements for water supply and access; vegetation management along roads, driveways, and structures; conditions of approval on temporary, vulnerable, and hazardous uses; strategic location and maintenance of other land uses such as parks and open space in relation to other development.

Some of these topics are addressed in the IWUIC. To avoid duplication or confusion, CPAW recommends that the County review the IWUIC and determine which provisions are appropriate to administer through the Planning Department (rather than through the Building Department). For those applicable provisions, the County can include these in the Land Use Code. The IWUIC could then be amended to focus on the designation of the WUI (Chapter 3) and Special Building Construction Requirements (Chapter 5) and would be administered by the County's Building Department. Both codes would require cross-references.

Phased Implementation

A phased implementation should include the following steps:

1. Initiate an education-based, voluntary effort focused on training.
    a. Provide training to County staff and fire protection district staff on land use planning and regulatory tools for addressing wildfire risk. The CPAW team will undertake the first step by offering a "Wildfire Ignition Susceptibility Basics and Community Planning Tools" workshop in Fall 2020 as part of this assistance.
    b. Engage stakeholders, such as residents, developers, realtors, builders and landscapers with an outreach an education program on wildfire mitigation through a regulatory approach.
2. Initiate and integrate a voluntary parcel-level assessment program as part of the development approval process and for existing residential properties.
    a. Offer training to County planning and building staff, fire protection district staff and local contract qualified wildfire professionals on the assessment program.
    b. Provide a prescriptive parcel-level assessment that can be undertaken by "non-qualified professionals" (i.e. professionals who don't meet standard criteria for qualification).
    c. Offer a performance-based, parcel-level assessment to offer flexibility in meeting wildfire risk reduction objectives, particularly on non-conforming lots or other instances that require alternative methods of compliance.
3. Adopt the IWUIC with local amendments (see next section) within a 5-year time period that is administered by the County with technical review support from the Colorado State Forest Service and fire protection districts. The resulting code will help transition the voluntary, parcel-level assessment program into a codified set of requirements for the building (and applicable elements of the SIZ). The voluntary program should continue to be implemented to support existing homes across the County that may otherwise not go through the permitting process.
4. In conjunction with the adoption of the IWUIC with local amendments (#3 above), review the La Plata County Land Use Code to determine specific provisions that are best suited for administration by the County Planning Department. These may include subdivision requirements for access, water supply, and vegetation management, as well as hazardous roadside vegetation.

Local Amendments to IWUIC

Many communities adopt the IWUIC with local amendments to better reflect their needs, such as creating a local definition of the WUI and referencing an appropriate wildfire risk or hazard assessment. CPAW recommends that La Plata County adopt the IWUIC, with the following modifications:

<u>Replace IWUIC Fire Hazard Severity Rating with CPAW Hazard Assessment Tools</u>

Within the IWUIC, the Fire Hazard Severity methodology is used to determine appropriate mitigation requirements. The critical fire weather threshold within this rating defines all of La Plata County as "Extreme"; however, within the local environment, it does not account for the

differences between heat transfer (radiant, convective, conductive) exposure of individual structures.

Heat transfer exposure and general mitigation guidance can be better demonstrated using the CPAW-generated Local Wildfire Hazard and Mitigation Difficulty maps to support land use planning and regulation within the County. The use of the wildfire hazard assessment for guiding the application of the IWUIC (2018) will link required mitigation actions to expected wildfire exposure (see Recommendation 1). The County should consider integrating the newly developed wildfire hazard assessment to determine the appropriate application of the proposed adopted IWUIC (2018) through the following process**:**

A. Determine the local-level wildfire hazard summarized ranking in which the proposed development is located to understand the likelihood of the building exposure to high-intensity fire.

B. Determine the mitigation ranking (0 to 9) of the parcel in which the proposed development is located and the parcel(s) immediately adjacent to it.

C. Use the following table (Table 5) to determine the appropriate IWUIC mitigation standards to apply.

TABLE 5: LA PLATA COUNTY CPAW MITIGATION POTENTIAL/ IWUIC HAZARD CROSSWALK

Local Wildfire Hazard	Table 603.2 Minimum Required Defensible Space (site/slope adjustment required)[1]	CPAW Mitigation Difficulty and Slope % category			24.301.181(21) Minimum IR Construction		
		<15	**15≤ to <30**	**>30**	**Non-Conform**[2]	**Conform**	**1.5x Conform**
Moderate	30 ft.	1, 2, 4	1, 2, 3, 5	4	IR 1	IR 2	IR 3
High[3]	50 ft.	6	7	6	IR 1 (N.C.)	IR 2	IR 2
Very High	100 ft.	7	8	8, 9	IR 1 (N.C.)	IR 1	IR 2

Table Notes:

(1) “Distances are allowed to be increased due to site-specific analysis based on local conditions and the fire protection plan” (Figure 603.2- 2012 IWUIC).

(2) **Non-conforming** indicates that the minimum slope-adjusted defensible space distances with appropriate mitigation cannot be achieved from the structure to vegetative fuels, or minimum water supply requirements cannot be achieved; as opposed to **conforming** in which the defensible space distances with appropriate mitigation and minimum water supply requirements can be achieved.

(3) High hazard is also used where non-conforming structures are present within 50 ft of the primary structure.

N.C. = requires rated Non-Combustible materials; including tempered glass.

Parcel-Level Assessments and Wildfire Mitigation Plan

The IWUIC offers a minimum set of standards primarily organized through a prescriptive approach. Adopting the hazard assessment maps provided by CPAW (Recommendation 1) to guide the implementation of the IWUIC will provide a streamlined approach in most cases.

However, the IWUIC also offers an alternative, performance-based approach where, either:

1. The specific site conditions do not align with the hazard mapping, or
2. The proposed development cannot comply with the prescribed regulations.

These scenarios require that an on-site SIZ assessment be performed and a wildfire mitigation plan that outlines the performance-based approach be prepared. To address the County's limited capacity to conduct these activities, CPAW recommends that the County undertake the following activities:

1. Establish minimum qualified professional requirements for the individuals performing assessments and reporting; and
2. Determine the best of the option, or combination of options, to implement, such as:
    - Charging an inspection fee, and providing the qualified professional to undertake the assessment and plan development;
    - Requiring the proponent to engage an independent qualified professional to undertake the required assessments and report.

These minimum standards also assume applicability to new construction. To apply these standards to existing development, such as renovations or additions that trigger a building permit, the County must determine the extent of compliance required by an applicant. For example, some jurisdictions only require the specific addition or renovation to meet the WUI regulations, other jurisdictions require that the WUI regulations extend to defensible space or require additional upgrades to the structure depending on the threshold (e.g., size of upgrade in terms of square footage or percent of home value).

Tips and Additional Resources

Parcel-Level Assessments and Wildfire Mitigation Plan

The Community Wildfire Planning Center (CWPC), a Colorado-based non-profit organization, offers the REALFire® program. REALFire® is a parcel-level assessment program that aligns with the most current wildfire mitigation research and best practices for reducing structure loss, and is ideal for supporting voluntary or regulatory assessments on existing and new development. The program provides training and a mobile application with database connection and web portal access to the database. Assessments are conducted by trained staff or qualified professionals using the REALFIRE® mobile device application and online platform with an integrated reporting function. Through this program, SIZ mitigation advice is provided during the on-site assessment and in a customized wildfire mitigation report. After a property owner completes their customized mitigation recommendations, assessors conduct a follow-up inspection using the same program technology to confirm work has been completed. The program also issues a certificate recognizing successful completion of all mitigation work. The REALFire® platform can easily link with property records (typically with the parcel identification number), so records can seamlessly be transferred to new ownership.

The REALFire® program is being undertaken in Eagle County, Colorado (more information is available at realfire.net). Boulder County's Wildfire Partners program uses similar technology

and incorporates the same SIZ science (more information is available at wildfirepartners.org). The latter program is directly integrated into Boulder County's land use and building code regulatory process.[15] Additionally, these property level assessments have also been used in other jurisdictions to successfully improve property owner's insurance outcomes. Direct benefits to homeowners can also been offered through the program, such as reimbursement of mitigations costs (Wildfire Partners FEMA grant) and off-setting debris disposal with chipping programs (Summit County) or log-sort programs (Boulder County).

Establishing a working relationship between La Plata County and CWPC with regards to the REALFire® program would support a standardized and comprehensive SIZ assessment program to integrate with the development review process.

3. TRANSITION CPAW STEERING GROUP TO A DEDICATED WILDFIRE COUNCIL

La Plata County has relationships with many agencies and organizations that play a critical role in managing, preparing, researching, and responding to wildfires, including but not limited to the local fire protection districts, USDA Forest Service, Bureau of Land Management, Colorado State Forest Service, Wildfire Adapted Partnership, Mountain Studies Institute, and more.

These stakeholders were convened to participate in the CPAW process as steering group members to provide expert feedback and multi-disciplinary perspectives on wildfire mitigation. While recommendations in this report are primarily intended for implementation by the La Plata County Planning and Building Departments, with technical review assistance by the local fire protection districts and Colorado State Forest Service, the success of regulatory efforts also hinges on the support of a local coalition of stakeholders. In addition, creating a dedicated group to regularly meet and coordinate wildfire planning activities can provide multiple benefits to other related activities, such as informing the future update to the County's Community Wildfire Protection Plan (CWPP).

CPAW therefore recommends that La Plata County transition the current CPAW steering group into a long-term, dedicated wildfire council to ensure a broad base of support, consistent communication, and a collaborative approach toward current and future wildfire mitigation activities.

Council Formation

The County can formalize a wildfire council through a local resolution adopted by the Board of County Commissioners. This resolution identifies the purpose of the council and establishes responsibilities, such as:

- Providing input, guidance, and oversight on mitigation planning activities, such as CWPP development and implementation, coordinating outreach messages, and aligning the timing of any countywide mitigation priorities;
- Tracking progress and convening periodic reviews of applicable plans to review and update mitigation actions;
- Conducting knowledge exchanges to update council members on relevant research, activities, or initiatives.

[15] See Boulder County's Ignition-Resistant Construction guide, accessible at: https://assets.bouldercounty.org/wp-content/uploads/2017/03/b37-ignition-resistant-construction.pdf

Council members ideally include a broad range of stakeholders that will bring wildfire expertise and related perspectives to the planning process. La Plata County may also want to reach out to any other potential industries who were not represented during the CPAW process but could play a role in a future council, such as representatives from the insurance, building, landscaping, and real estate industries.

Example County Wildfire Council / Committee Resolutions

Two relevant examples of counties that have formed a wildfire council (or committee) are Summit County, Colorado and Mariposa County, California. In both cases, these are formal entities that regularly meet and discuss wildfire mitigation activities.

- Summit County, CO, established the Summit County Wildfire Council (SCWC) in 2006. The council was established by a coalition of local stakeholder organizations, and includes representatives from the U.S. Forest Service, Colorado State Forest Service, local fire protection districts, towns, river basins, and Summit County government. The council meets multiple times a year to discuss and plan wildfire mitigation activities. The council also administers community wildfire grants to residents to reduce wildfire risk. The council's charter is contained in the Summit County Community Wildfire Protection Plan: https://www.summitcountyco.gov/907/Wildfire-Council.
- Mariposa County, CA, passed a resolution (2019-415) to establish the Mariposa County Fire Advisory Committee, which is facilitating the update, implementation and maintenance of their Countywide Community Wildfire Protection Plan. The Committee is chaired by a senior planner from the Mariposa County Planning Department. A copy of the resolution, which includes roles and responsibilities of the committee, is available here: https://www.mariposacounty.org/DocumentCenter/View/79367/Agenda-Item-4--BOS-RES-MCFAC-COMMITTEE-ESTABLISHED-.

CONCLUSION

As part of this report, CPAW identified three strategies for La Plata County to address its WUI through short and long-term changes to its land use planning activities:

- Adoption of new countywide hazard assessments maps that can be used to more accurately inform land use planning and related activities.
- Implementation of a phased approach toward the adoption of WUI regulations, which includes the development of a robust and voluntary parcel-level assessment program that targets new and existing homes.
- Formation of a dedicated wildfire council to coordinate ongoing wildfire activities.

These proposed recommendations are intended to supplement other activities undertaken by the County and its partners, such as the ongoing development and implementation of CWPPs, which plan for wildfire hazard and prioritize risk reduction actions through a collaborative and organized process. Through its assistance, CPAW also provided additional information on funding resources and local examples to support the County in increasing its capabilities to implement these efforts. These combined efforts are critical for a comprehensive, fire-adapted approach that will support La Plata County in long-term outcomes that reduce risk to its local communities.

Figure 8. La Plata County wildland-urban interface (Image credit: Dyar Drone and Digital Media Services).

APPENDIX A: HAZARD ASSESSMENT METHODOLOGY

Eva Karau, USDA Forest Service, Rocky Mountain Research Station, Fire Modeling Institute

A1. Overview

The U.S. Forest Service's Rocky Mountain Research Station collaborated with the group of planners and analysts leading the Community Planning Assistance for Wildfire (CPAW) effort for La Plata County, CO to provide spatial wildfire hazard assessments to support CPAW recommendations for wildfire planning codes and regulations.

In this analysis we used current wildfire hazard and risk science to inform our fire behavior modeling, data analysis and mapping methods. We provide two evaluations of wildfire hazard, one intended as a broad scale decision support tool, and one that incorporates customized fire behavior modeling informed by wildfire management experts from La Plata County. Ancillary products include a community scale Wildland Urban Interface map, and a spatial index that characterizes wildfire mitigation difficulty. This appendix details those methods and describes all map products, beginning with a brief background of wildfire hazard and risk terminology.

Background – Wildfire Hazard and Risk

How likely is it that a place will burn? How hot is it likely to burn? And, at different fire intensity levels, what would the effects be on something we care about? These questions describe the three fundamental components needed to assess wildfire risk: likelihood, intensity, and effects (sometimes termed "susceptibility"). Scott et al. (2013) conceptualize this as the wildfire risk triangle (Figure A1). If we can gather quantitative information on all three legs of this triangle, then we can quantify the risk to the thing we care about.

Figure A1. Wildfire Risk Triangle

For the purposes of this analysis, we focus on two sides of the wildfire risk triangle: *likelihood* and *intensity*. Together, those two pieces of information represent wildfire *hazard*. To map likelihood and intensity across a landscape, we use outputs from two different, but related, fire behavior models. The fire modeling application most often used for large-scale landscapes is called the Large Fire Simulator, or FSim (Finney et al. 2011). FSim draws upon weather and fire

occurrence data from recent decades to generate statistically possible weather for 10,000 or more simulated fire seasons. Within each of these simulated years, ignitions are placed on the landscape informed by observed fire occurrence patterns, fires are spread using spatial data for fuels, topography, and simulated weather, and a set of many thousand possible fire perimeters are generated.

Whereas FSim provides a synoptic, "landscape scale" assessment of fire behavior and estimates annualized probabilities of the occurrence and intensity of large fires, another model, FlamMap (Finney 2006), computes a localized, and specialized view of potential fire behavior under a specific set of environmental conditions. If a user parameterizes FlamMap for conditions representative of when problem wildfires have occurred, fire behavior outputs represent a "problem fire" scenario at a "local scale". Including characterizations of wildfire hazard at both landscape and local scales affords a two-pronged assessment of potential fire behavior; we see what kind of fire behavior we could experience under a range of conditions that have occurred in recent history, and we also get a picture of fire behavior that could occur under extreme conditions.

A2. Wildfire Hazard Characterization for La Plata County

Wildfire hazard is a measure of the likelihood that an area will burn combined with the likely intensity of the burn, given that a fire occurs. For La Plata County, we present two evaluations of wildfire hazard: landscape level and local level.

Landscape Level Wildfire Hazard – Modeling and Maps

For the purpose of evaluating wildfire likelihood and intensity for the landscape level analysis, we used FSim modeling work completed for the Bureau of Land Management SW Colorado District, completed in 2018. Though CPAW objectives do not align directly with those of the BLM effort, we chose to incorporate the FSim data, as it was locally calibrated by a BLM Fire Management Specialist to reliably reflect broad scale fire behavior patterns in the region. At the scale of these data, only large disturbances will make noticeable changes in landscape burn probability patterns.

Pyrologix LLC conducted the FSim simulations using spatial input data that reflects fuel conditions as of 2012. For our landscape wildfire hazard assessment, we acquired the 120m-resolution FSim modeling outputs, extracted for a rectangular spatial extent surrounding La Plata County.

Landscape Level Summary Zone

To summarize the spatial metrics of likelihood, intensity, and hazard for the landscape level analysis, we chose sub-watersheds from the national USGS Watershed Boundary Dataset (https://nhd.usgs.gov/wbd.html) as the polygon summary unit. Sub-watersheds are designated by 12-digit hydrologic unit codes, and are often referred to as "HUC12" watersheds. The HUC12 summary unit is commonly used to summarize landscape attributes; is devoid of administrative boundaries; and is based on the areal extent of surface water draining to a point. Using a summary unit is important because an individual spot on the landscape will have an individual value, but that one spot is inevitably impacted by the values of its neighbors; summarizing the raster FSim outputs and the derived hazard index to these polygons allows for broad-scale patterns to emerge that may not be immediately visible in the raw pixel datasets.

Landscape Wildfire Likelihood

Landscape Fire Likelihood, or burn probability (BP), is the FSim-modeled annual likelihood that a wildfire will burn a given point or area. It is calculated as the number of times a pixel burns during a simulation, divided by the total number of iterations. The landscape level burn probability map represents the average of all 120-meter pixel values within each sub-watershed, classified into five levels, with the chance of a wildfire occurring during any given fire season increasing with each level (Figure A2).

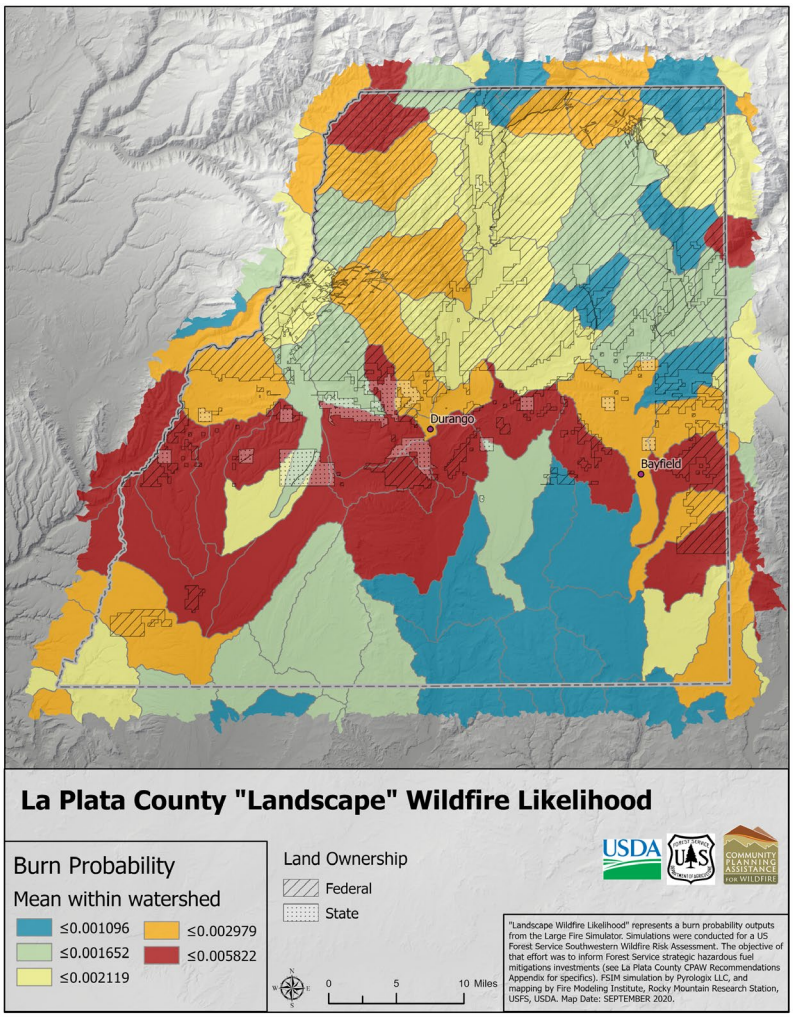

Figure A2. Landscape wildfire likelihood

Landscape Wildfire Intensity

FSim can apportion burn probability into fire intensity levels (FILs) and produce estimates of the probability of a certain flame length level (FLP), given a fire burns a pixel. Following Scott et al. (2013), Conditional flame length (CFL) is the sum of all flame length probabilities that FSim simulated for each 120-meter pixel, weighted by a flame length category midpoint:

$$CFL = \sum_{i=1}^{n} FLP_i * FL_i \quad (1)$$

where FLP_i is the conditional probability of FIL$_i$ and FL_i is the flame length that characterizes FIL$_i$. We summarized the pixel level CFL values within sub-watersheds by calculating the average CFL for each sub-watershed polygon. Map classes represent ranges of conditional flame length (in feet) (Figure A3).

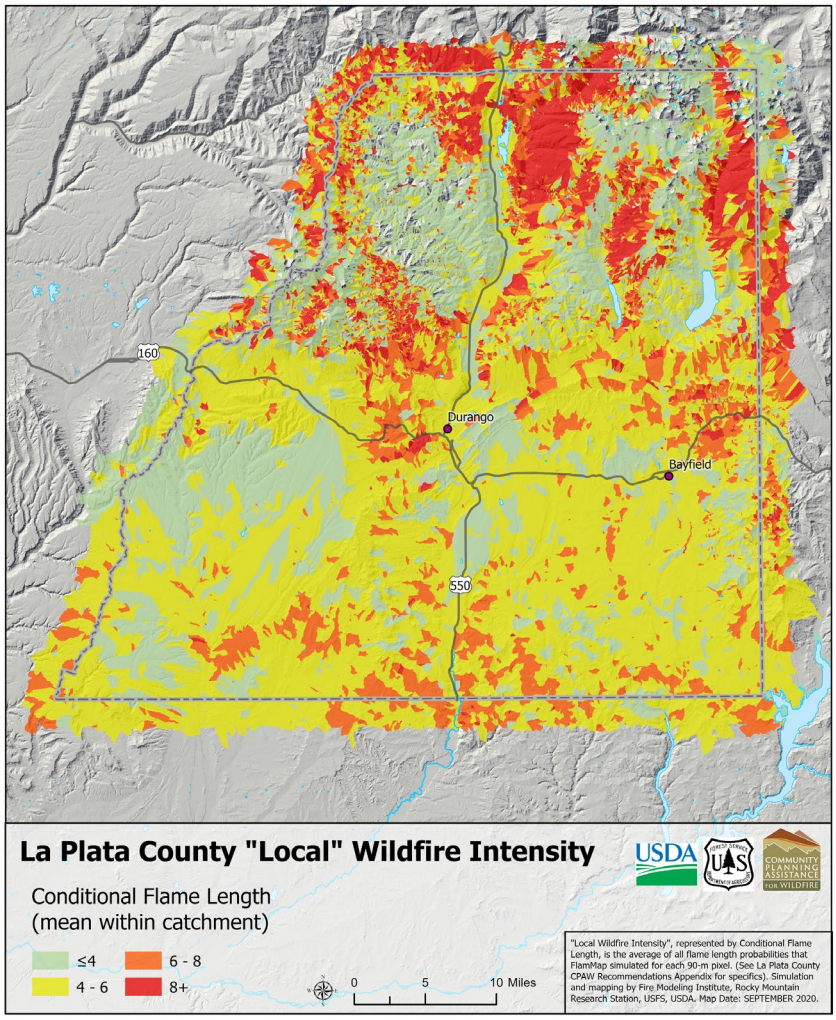

Figure A3. Landscape Wildfire Intensity (conditional flame length) map.

Landscape Wildfire Hazard

Wildfire hazard is an integration of likelihood and intensity, quantified as the product of burn probability (BP) and conditional flame length (CFL). We calculated hazard at the pixel scale and then summarized values to the HUC12 sub-watershed scale by calculating the mean hazard in each sub-watershed polygon. We then classified the values into three classes (Moderate, High, and Very High) based on quantiles in the distribution of values in the analysis area (all sub-watersheds that intersect with the La Plata County boundary) (Figure A4). The actual numeric values of hazard are less directly interpretable than BP or CFL. Instead, they provide a relative depiction of hazard across a landscape.

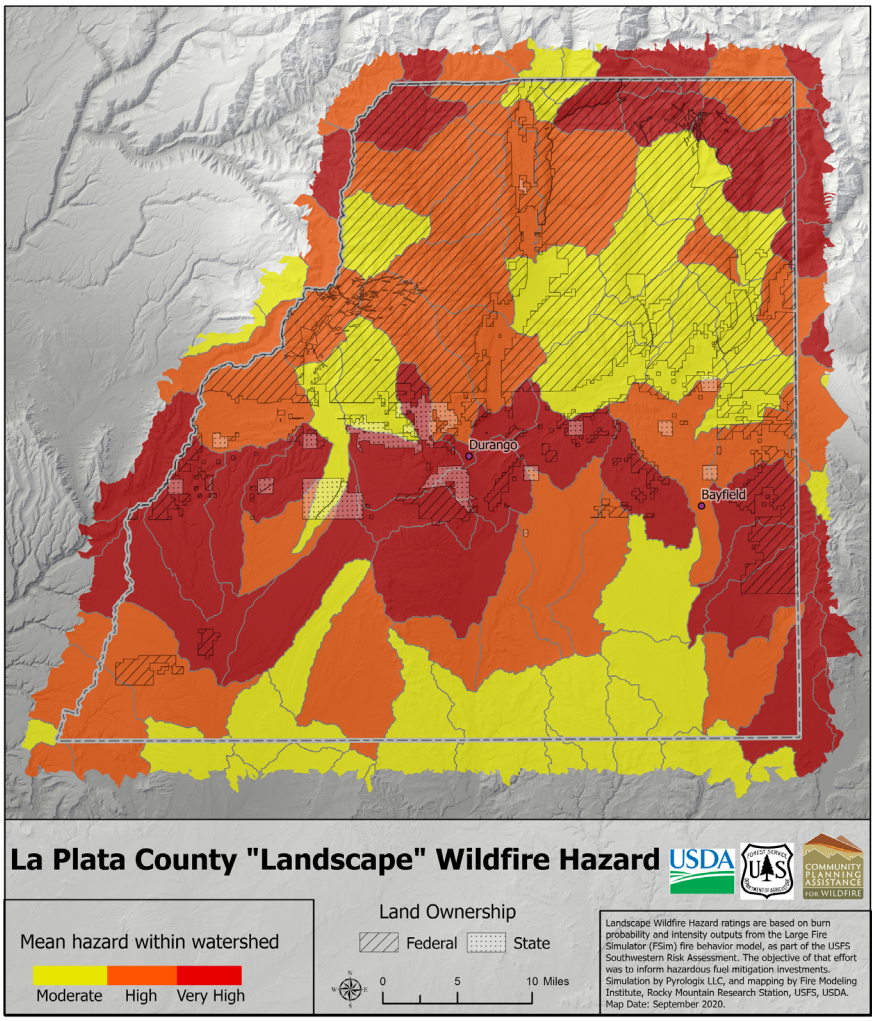

Figure A4. La Plata Landscape Wildfire Hazard map

Local Level Wildfire Hazard – Modeling and Maps

FlamMap Model Initialization

For the local level hazard assessment, we used FlamMap 6.0 to model wildfire behavior within a ~3.2 million acre simulation extent surrounding La Plata County. We initialized the Minimum Travel Time (MTT) module within FlamMap with ~50,000 fire ignitions, using:

- WindNinja (embedded in FlamMap) to generate 90-meter resolution wind vectors,
- a maximum simulation time of 480 minutes per ignition (equating to an 8-hr burn period),
- a calculation resolution of 90-meters,
- an interval for Minimum Travel Paths of 500-meters, and
- a 0.02 spotting probability.

We executed the simulation three times using the same spatial fuel and topography input layers, but varying the weather and fuel moisture conditions for three elevation zones. We then merged the outputs into a final set of raster and vector maps to characterize “problem fire”

hazard. We used the flame length probability output file to generate burn probability, conditional flame length and hazard metrics and spatial layers.

Wind, Weather and Fuel Moisture Parameters

FlamMap requires information regarding fuel moisture, wind and weather to initialize a simulation. Based on information from subject matter experts (SMEs) gleaned during our virtual site visits, as well evaluation of records from weather stations the La Plata County vicinity, we chose to base our weather and wind-related modeling inputs on records from eight Remote Automated Weather Stations (RAWS): Chapin, Morefield, Log Chute, Big Bear Park, Devil Mountain, San Doval, Mesa Mountain, and Albino Canyon (Figure A5).

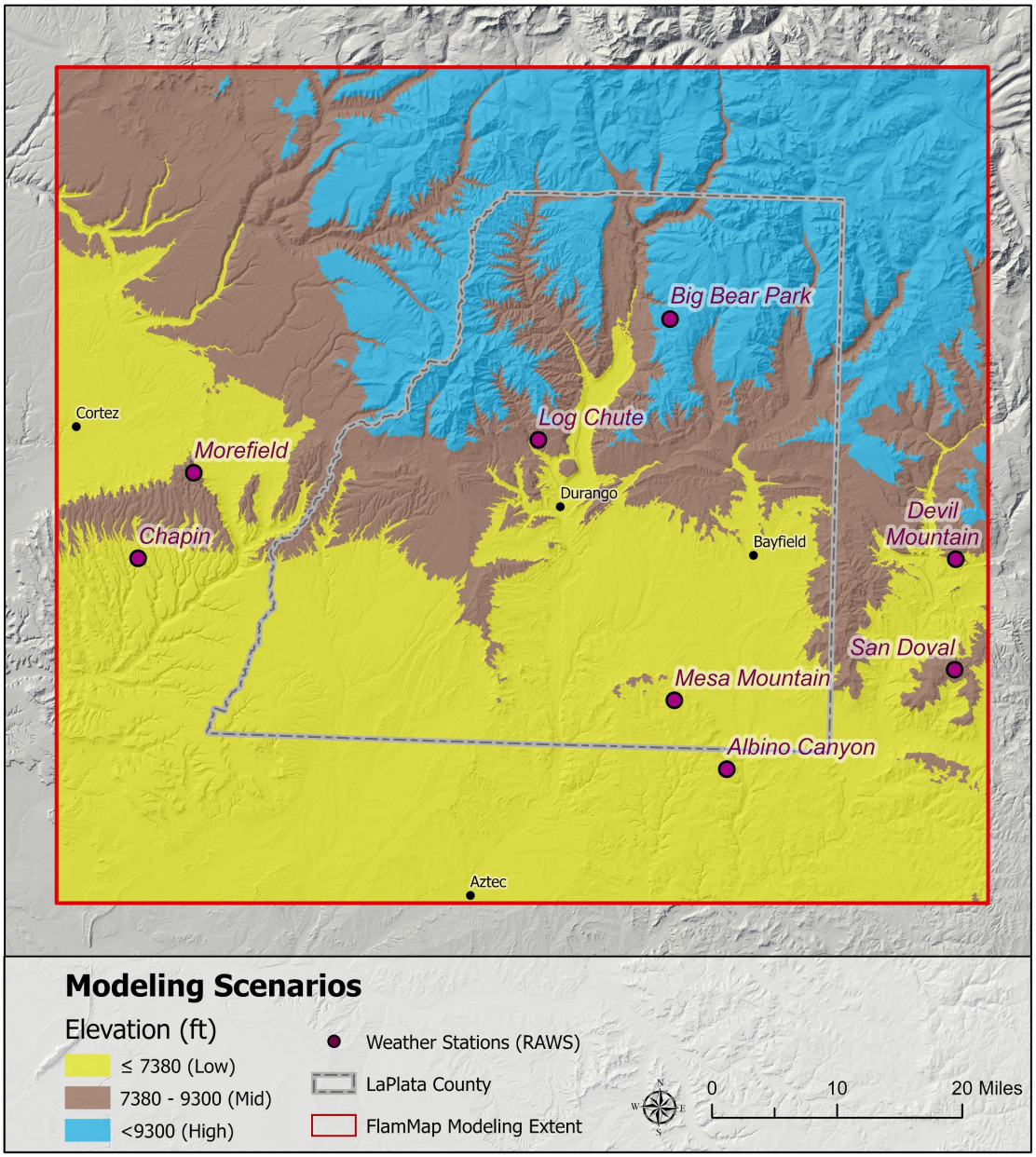

Figure A5. RAWS weather station locations and scenarios used for the La Plata County FlamMap modeling

Because La Plata County includes a mix of high and low elevation fuel types exposed to a range of wind and weather conditions, we chose to run three simulation scenarios to account for some of the climate and fuels variation. We based the scenario zones on elevation gradient (low, mid, high); each zone is roughly dominated by specific vegetation/fuel distributions: Colorado Plateau Pinyon Juniper Woodland or Shrubland comprises 48% of the low elevation zone (< 7,380 ft), Southern Colorado Ponderosa Pine Woodland comprises 30% of the mid elevation zone (7,380 – 9,300 ft), and Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland comprises 52% of the high elevation zone (> 9,300 ft). Subject matter experts indicated that using these three zones would be an adequate way to subdivide the landscape based on how fuel moisture and weather conditions are expected to influence fire behavior within the modeling extent. A RAWS exists in each of the elevation zones (Mesa Mountain, Log Chute and Big Bear Park representing the low, mid and high elevation respectively), and we ran the FlamMap model for weather and fuel moisture conditions representative of each zone, then merged the results together, such that outputs from each run are applied in the appropriate zone.

Our FlamMap modeling objective for the local wildfire hazard assessment was to represent a "problem fire" scenario. To choose a time period for fuel moisture estimates and the weather records used for fuel moisture conditioning, we evaluated trends in the Energy Release Component (ERC; a fire danger metric with higher values indicating seasonal dryness trends in large fuels, especially in timbered areas), to find conditions that would represent potential for "problem" fire activity. For all three modeling scenarios, we selected June 11-19, 2012 as the fuel conditioning period, as those days are coincident with the days preceding the Weber fire, with ERCs well above average at Mesa Mountain and Log Chute RAWS, and record-setting ERCs at Big Bear Park (Figure A6).

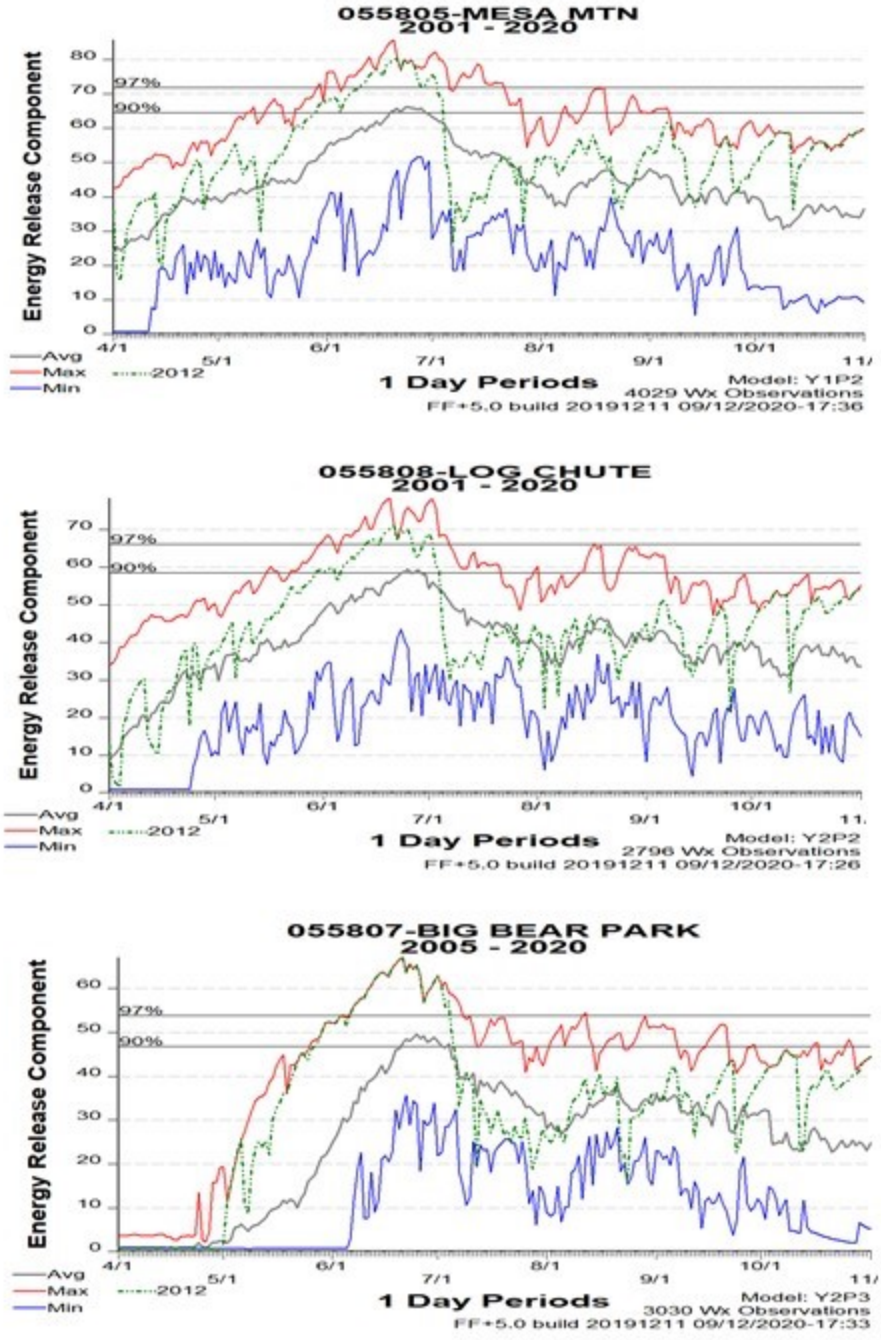

Figure A6. 9s

We selected initial fuel moisture settings for both modeling scenarios and all fuel categories using relationships established in FireFamilyPlus (Bradshaw 2018) and with critical input from local subject matter experts (Table A1).

Table A1. Initial fuel moisture values for FlamMap modeling (%)

	RAWS/Modeling Scenario		
Fuel Category	**Mesa Mountain/ Low Elevation**	**Log Chute / Mid Elevation**	**Big Bear Park / High Elevation**
1-hr	4	4	4
10-hr	5	5	5
100-hr	7	6	7
Herb	30	60	75
Woody	60	90	105

Analysis of wind roses using ten minute average winds for time periods representing pre-monsoon (01APR-29JUN) and monsoon (29JUN-12SEP) conditions for all area RAWS (for a 15+ year period of record) indicate that winds generally are generally from WSW or SW, though this varies depending on monsoon condition, with the monsoon season including some RAWS that show a WNW wind direction dominance (Table A2). Local SMEs reported that winds during "problem fire" conditions in La Plata County are predominantly from the southwest. We selected pre-monsoon wind directions (as analyzed from RAWS data) for each of our model runs: WSW for low elevation (Mesa Mountain), WSW for mid elevation (Log Chute), and SW for High elevation (Big Bear Park).

Table A2. Wind direction and speed recorded at weather stations in the La Plata County vicinity

		Dominant Wind Direction		97th Percentile Wind Speed (mph)	
RAWS	**Elevation (ft)**	**Pre-monsoon 01APR-28JUN**	**Monsoon 29JUN-12SEP**	**Pre-monsoon 01APR-28JUN**	**Monsoon 29JUN-12SEP**
Albino	6,600	WSW	WSW	15	11
Chapin	7,126	SW	NW	11	8
Devil Mountain	7,360	WNW	WNW	12	11
Mesa Mountain	7,380	WSW	WNW	19	13
Morefield	7,820	S	WNW	16	11
Log Chute	8,250	WSW	SW	14	11
San Doval	8,491	SSW	S	15	10
Big Bear Park	10,400	SW	SW	16	12

For each RAWS in our analysis, wind speeds were faster in the pre-monsoon period than the monsoon period (Table A2). We selected the maximum 97th percentile wind speed recorded at the weather stations within each elevation scenario (19, 14, and 16 mph for the low, mid, and high scenarios, respectively).

Spatial Input File Layers

FSim and FlamMap fire modeling systems require a set of raster geospatial layers that characterize landscape topography (elevation, slope and aspect) and fuels attributes (fuel

model, canopy cover, canopy height, crown base height, and crown bulk density). A local level analysis allows for fine-scale modifications of the landscape file (surface and canopy fuel attributes) to represent the current landscape conditions with more specificity than is possible in a broader scale analysis. For La Plata County, we acquired 30-meter resolution fuels and topography spatial data from Pyrologix LLC, who had been in the process of developing a "fuelscape" for a risk mapping effort for the USFS Colorado All Lands. Pyrologix conducted a fuels calibration workshop with fire and fuels subject matter experts from the state. They started with LANDFIRE Remap (LF 2.0.0) and modified those layers to reflect SME input about local conditions. Pyrologix made a few changes to the original LANDFIRE fuelscape that are particularly relevant to our CPAW La Plata County modeling effort. The following LANDFIRE Existing Vegetation Type (EVT) categories comprise the majority of all EVT area in the modeling extent:

2016 Tr Colorado Plateau Pinyon-Juniper Woodland (22%) – Colorado SMEs consider native LANDFIRE fuel models (GR and SH; Scott and Burgan 2005) as producing fire behavior that is unrealistically intense for this EVT. Instead, TL models were substituted and potential for active and passive crown fire was enabled.

2054 Tr Southern Rocky Mountain Ponderosa Pine Woodland (11%) – In southern Colorado, Gambel Oak is often present in the ponderosa pine understory, so SMEs suggested modification of LANDFIRE rules to reflect a shrub component at low-mid canopy cover, ramping up in fire behavior until 50% cover, when the fuel model is then changed to TL8, with a low canopy base height to allow transition to crown fire.

2055 Tr Rocky Mountain subalpine dry-mesic spruce-fir woodland (13%) – default LANDFIRE surface fuel model rules were accepted here, but SMEs noted a significant "red stage" insect impact in some areas. Within polygons delineated by a local SME as "red stage", and where the surface fuel model is TL3, the initial values in the canopy bulk density layer were multiplied by 2.5 to increase potential for active crown fire which may be more likely in areas recently impacted by insects (within 2-3 years).

Pyrologix made several other important modifications to LANDFIRE Remap 2016 data layers:

1. Agricultural areas were modified to reflect fire potential in row crops and wheat fields by representing them with GR1 and GR2, respectively. In discussions with La Plata County SMEs and stakeholders, there was agreement to continue to represent these two agricultural land types as burnable, as those areas could carry fire, especially at times of extreme drought, or when fields are not irrigated.
2. Recognizing the potential for wildland fire to burn into urban areas, pixels identified as non-burnable urban or developed in LANDFIRE were changed to TL3 (for roads) and Timber Litter 9 (for urban developed areas likely to include structures).
3. Some EVTs classified as ruderal (or "semi-natural") were adjusted to more adequately represent fire potential than was mapped initially in LANDFIRE.
4. LANDFIRE Remap (LF 2.0.0) represents circa 2016 ground conditions and accounts for disturbances that occurred prior to satellite image collection. To render the LF 2.0.0 landscape current to 2019 conditions, Pyrologix incorporated fuel disturbances occurring after 2016 into the modeling fuelscape. Hazardous fuels treatments conducted on US Department of Interior and US Forest Service lands were incorporated into the fuelscape.

We also wanted to represent local fuel treatments conducted by state, county and individual homeowners in our fuelscape. It can be difficult to gather these datasets because they are typically managed by different data stewards in a variety of formats. The fuels treatment datasets that we were able to acquire for this effort were from Southern Ute Indian Tribe (Hay Gulch, Anderson, Cherry Creek East, and Cherry Creek South), Wildfire Adapted Partnerships (Durango 2 West Open Space, Sailing Hawks, Edgemont, Rafter J), Upper Pine HOA, and Durango Ridge Ranch Firewise. Not all records include details about what type of treatment was conducted, how much surface or canopy fuel was removed, or if there was a change in fuel model, so we made the following assumptions to make changes to the fuelscape for these areas: canopy fuel reduced by 50%, canopy base height increased to 3 meters, and surface fuel model changed to one that produces lower intensity and slower rates of spread than the original.

Ignitions

Using the MTT module, FlamMap generates fire perimeters from a set of ignition points. We parameterized La Plata County FlamMap simulations with a fire list file that includes random start locations, along with locations influenced by local fire occurrence. First, we created an ignition density grid based on locations of wildfires that burned between 1992 and 2019 within the modeling extent (1992 – 2017 fires from Short 2018, and 2018-2019 fires from Cary Newman (San Juan National Forest Fire Management Planning Specialist). We then generated a set of ignition points using a method that weights selection based on the density grid, such that areas with historically higher ignition density values were more likely to produce points. Next, we generated a set of completely random points, then merged all historically informed and completely random points, and finally selected ~50,000 points from the merged file to comprise the FlamMap fire list file.

Local-Level Summary Zone

To summarize the spatial metrics of likelihood, intensity, and hazard for the “local-level” analysis, we used catchments from the USEPA and USGS National Hydrography Dataset Plus V2 (https://www.epa.gov/waterdata/nhdplus-national-hydrography-dataset-plus). Catchments are local level drainage areas and typically subdivide HUC12 watersheds into smaller polygon units. Using a summary unit is important, because an individual spot on the landscape will have an individual value, but that one spot is inevitably impacted by the values of its neighbors; summarizing the raster FlamMap outputs and the derived hazard index to these polygons allows for broad-scale patterns to emerge that may not be immediately visible in the raw pixel datasets.

Local Wildfire Likelihood

Local wildfire likelihood, or burn probability (BP), is the FlamMap-modeled likelihood that a wildfire will burn a given point or area. It is calculated as the number of times a pixel burns during a simulation, divided by the total number of iterations. Because we parameterized FlamMap with a "problem fire" scenario, BP from our FlamMap run represents those specific conditions. The local level burn probability map represents the average of all 90-meter pixel values within each catchment, classified into five categories (based on quantiles), with the chance of a wildfire occurring during any given fire season increasing with each class level (Figure A7).

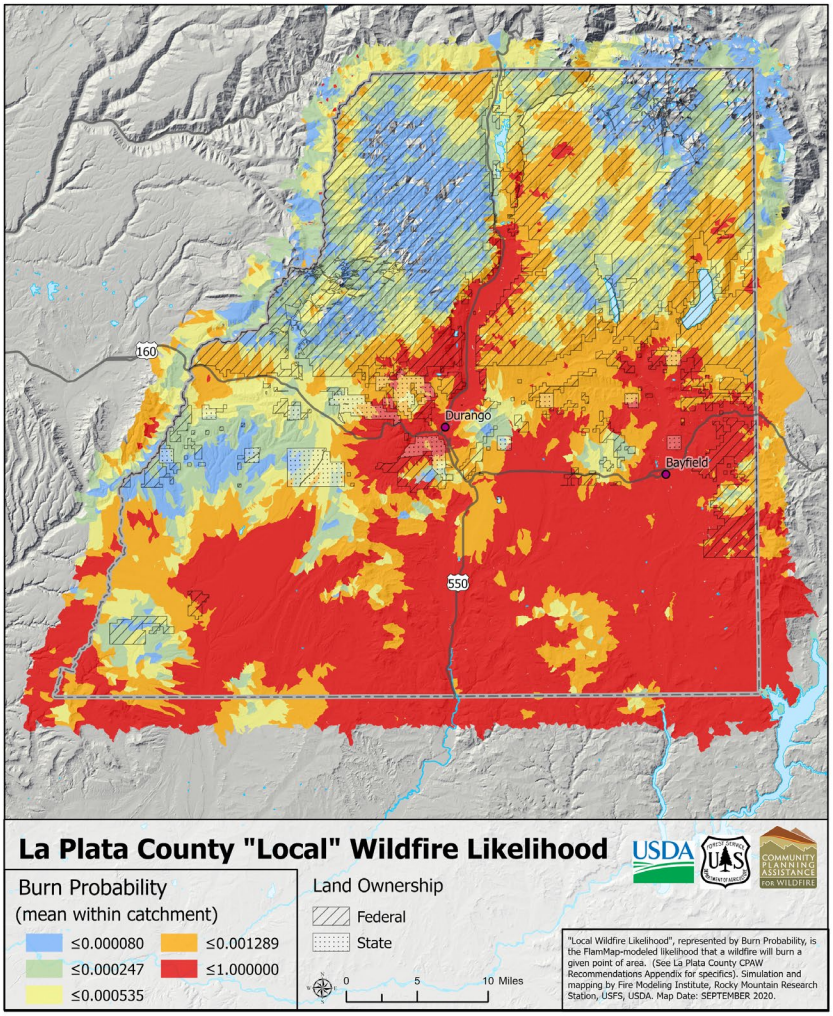

Figure A7. La Plata County mean burn probability likelihood map

Local Wildfire Intensity

Like FSim, FlamMap can apportion burn probability into wildfire intensity levels and produce estimates of the probability of a certain flame length level, given a fire burns a pixel. Local Conditional Flame Length (CFL) is the average of all flame length probabilities that FlamMap simulated for each 90-meter pixel, calculated as in Equation 1. We summarized the pixel level CFL values within catchments by calculating the average CFL for each catchment polygon. Map classes represent ranges of conditional flame length (in feet) (Figure A8).

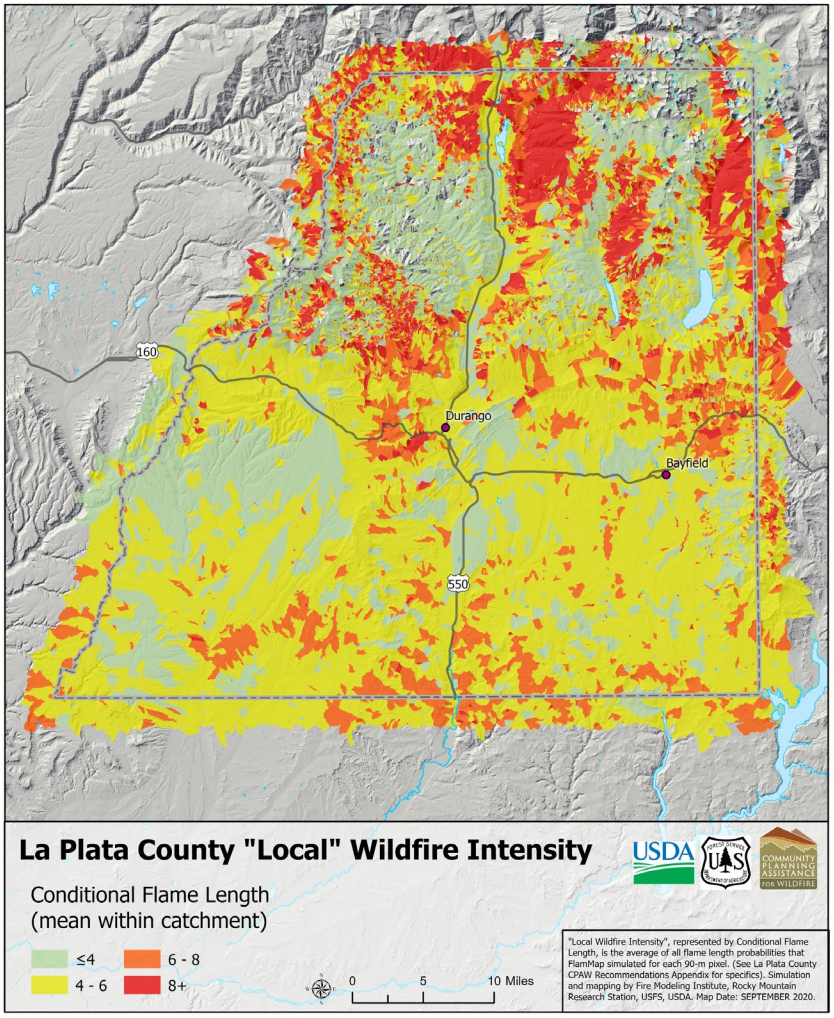

Figure A8. La Plata County local mean conditional flame length map

Local Wildfire Hazard

Local wildfire hazard is an integration of likelihood and intensity, and we calculated it as the product of BP and CFL. We calculated local hazard at the pixel scale and then summarized values to the catchment scale by calculating the mean CFL in each catchment polygon. We then classified the values into three categories (Moderate, High, and Very High) based on quantiles in the distribution of values in the analysis area (Figure A9). The actual numeric values of hazard are less directly interpretable than BP or CFL. Instead, they provide a relative depiction of hazard across a landscape.

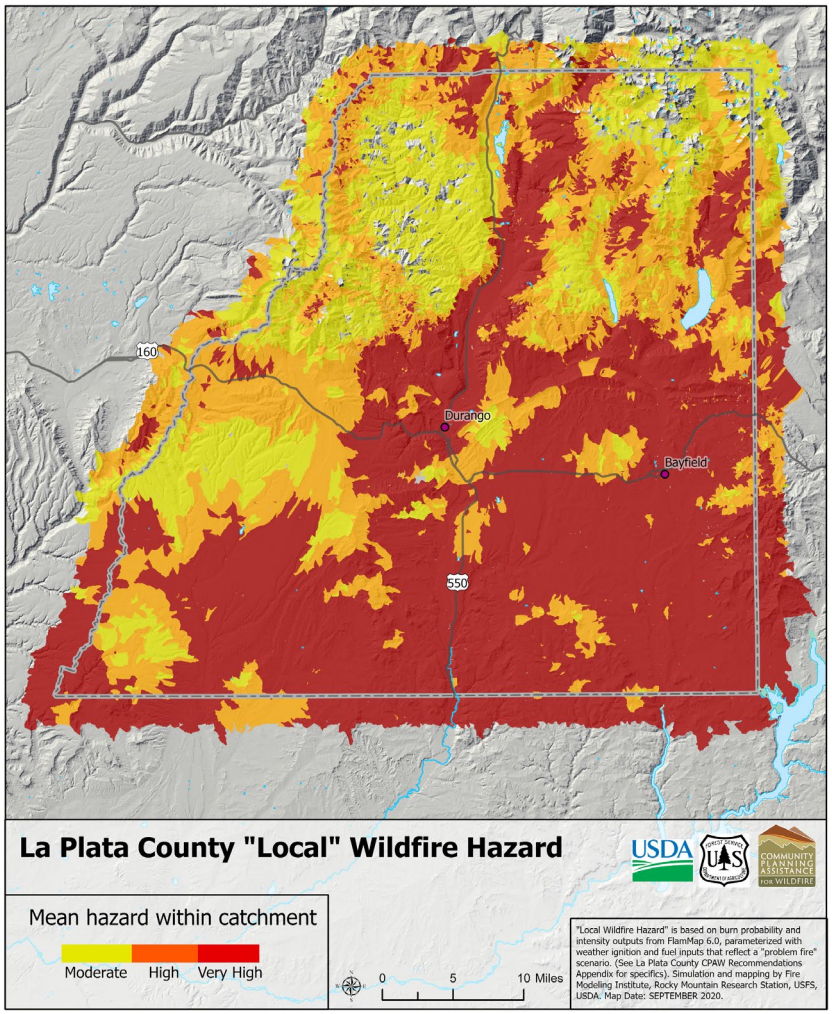

Figure A9. La Plata County local wildfire hazard map

A3. Wildland Urban Interface zones

We mapped categories of structure density integrated with wildland vegetation to characterize where structures are in or near burnable vegetation in La Plata County (Figure A10).

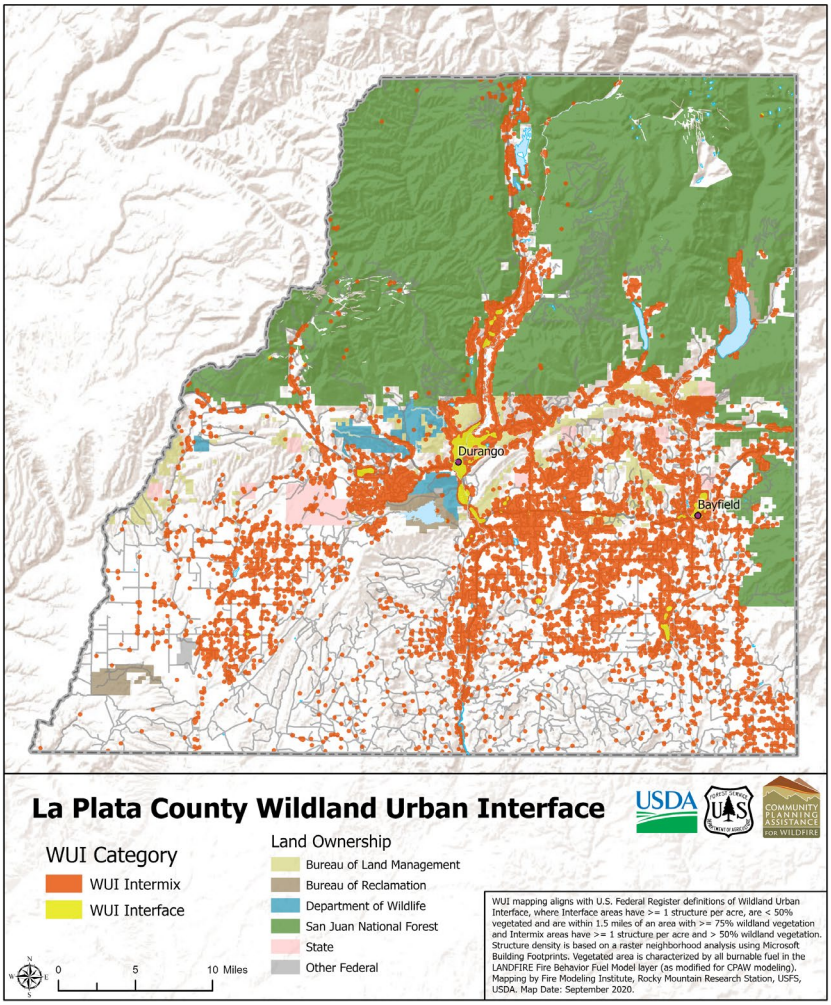

Figure A10. La Plata County wildland-urban interface zones

Though we generally followed methods that mimic Federal Register Wildland Urban Interface (WUI) definitions as adapted by Martinuzzi et al. 2015, we customized our WUI mapping to represent rural developed areas with more precision. To avoid bias introduced when using a summary zone for population density calculations, we used an approach based on structure locations to create a structure density surface (Bar-Massada et al 2013), using Microsoft Building Footprint polygons (converted to points) to represent individual structures.

We defined wildland vegetation as anything that is classed with a “burnable” fuel model in the same fuel model raster data that we used in our FlamMap modeling, with one exception. Pyrologix modified the LANDFIRE Remap 2016 to represent urban and developed areas as burnable fuel types for fire behavior modeling, but we needed to change those areas back to a non-burnable fuel type for the purposes of the WUI map in order for the Interface category to map appropriately. Resultant non-burnable fuel model categories for the WUI map include urban/developed, snow/ice, agriculture, water, and barren surfaces. To quantify the percentage

of vegetation within an area, we used the ArcGISFocal Statistics tool (ESRI 2017) to calculate the percentage of burnable fuel within a 40 acre moving window around each pixel, and assign that value to the center pixel. We reclassified the percent vegetated raster into three categories: greater than 50%, less than or equal to 50% and greater than or equal to 75%, to then build the vegetation density categories necessary for Federal Register WUI classes.

Structure density and vegetation raster layers were combined to map the WUI, with the map categories as described in Table 5. One modification that we made to rules outlined in Martinuzzi et al. 2015 was to include the "Vegetated Very Low Density" category with the WUI Intermix category. This decision reflects the Federal Register statement that "intermix exists where structures are scattered throughout a wildland area" (USDA and USDOI 2001) and our intent to include isolated structures in rural areas as WUI.

Table 5. Description of mapping ruleset for Wildland Urban Interface zones.

WUI Category	Structure Density Description	Structure Density Range (structures/ac)	Vegetation Description
Interface	Very Low to High Density	>= 1	Wildland vegetation <= 50% and within 1.5-mi of area with >= 75% wildland vegetation
Intermix	Very Low to High Density	>= 1	Wildland vegetation > 50%
Non-Vegetated	Medium or High Density	> 8	Wildland vegetation <= 50%
	No, Very Low, or Low Density	0 - 8	
Vegetated	Uninhabited	0	Wildland vegetation > 50%

Though the scientific community is still working on a way to quantify the probability of wildfire ember impact to structures, in the La Plata County mapping extent with fuels mapped as described for our FlamMap modeling, virtually every structure is within a distance from wildland fuels that could produce embers. Since the entire community could possibly be impacted by embers, we did not include an "ember zone" as it would add no substantial value to the final WUI map.

A4. Mitigation Difficulty

As a complement to the landscape and local wildfire hazard assessments, we calculated an index that characterizes the relative difficulty or effort involved in modifying landscape characteristics in a way that could reduce wildfire hazard. To create the components necessary to map mitigation difficulty, we developed three 30-meter resolution spatial datasets, as follows:

Vegetation Life Form – We integrated the fuel model data set (initially built to parameterize our FlamMap modeling), with the Fuel Vegetation Type (LANDFIRE 2.0.0) data set to produce four life form classes: 1. Barren/Developed/Sparsely Vegetated/ Irrigated Agriculture, 2. Grass, 3. Shrub, and 4. Tree.

Slope – We classified the same slope dataset that was used to parameterize our fire behavior modeling landscape (LANDFIRE 2.0.0) into three classes: 1. Steep slopes - Slopes greater than or equal to 30%, 2. Moderate slopes – slopes greater than or equal to 15% and less than 30%, and 3. Shallow slopes – slopes less than 15%.

Crown Fire Activity – We used the Crown Fire Activity (CFA) raster output layer from our FlamMap modeling to represent potential for crown fire. The logic used in calculating CFA within FlamMap takes into account the potential for fires burning in surface fuels to transition into tree crowns, and then it uses mapped tree crown characteristics and modeled wind speeds to determine whether that pixel could experience passive (fire is limited to individual tree torching) or active (fire spreads through crowns from tree to tree) crown fire. For the mitigation index, we collapsed the CFA raster into two categories:

1. No crown fire potential
2. Potential for either passive or active crown fire.

We integrated the spatial layers described above to create map categories representing the difficulty to mitigate wildfire hazard within the La Plata County mapping extent (Figure A11). Map classes range from 0 to 9, increasing with difficulty to mitigate wildfire hazard:

1 – Sparsely vegetated or developed:
Barren ground, sparse vegetation or developed surfaces.

2 – Herbaceous on a shallow slope:
Fires are typically easier to suppress in these areas. However high winds combined with dry conditions leads to potentially dangerous fast moving high intensity fires. Mitigation potential may involve a combination of irrigation, mechanical (mowing) treatment, frequent burning, and fuel breaks in conjunction with appropriate structure ignition zone and IR structure construction.

3 – Herbaceous on moderate slope:
Harder to construct fuel breaks, difficulty in mechanical (mowing) treatment, increased potential for erosion, increased rate of spread and intensity may make frequent burning more difficult. Focus should be on appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

4 – Herbaceous on steep slope:
Fires are typically harder to suppress than grassfires in these areas. High winds combined with dry conditions leads to potentially dangerous fast moving high intensity fires with fire fighter access concerns. Mitigation potential may involve a combination of mechanical (mastication) treatment, moderately frequent burning, and fuel breaks in conjunction with appropriate structure ignition zone and IR structure construction.

4 – Shrub on shallow slope:
Harder to construct fuel breaks, difficulty in mechanical (mastication) treatment, increased potential for erosion, increased rate of spread and intensity may make frequent burning more difficult. Focus should be on a combination of appropriate mechanical treatment or burning, slope set-backs, structure ignition zone and IR structure construction mitigation.

5 – Shrub on moderate slope:
Open canopy must be maintained to prevent increase crown fire potential. Surface fuels must be treated/maintained in a state that reduces the chances of fast moving surface fires in conjunction with appropriate structure ignition zone and IR structure construction mitigation.

6 – Shrub on steep slope:
Open canopy must be maintained to prevent increased crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated/maintained in a state that reduces the chances of fast moving surface fires. Mitigation should also

include appropriate slope set-backs, structure ignition zone and IR structure construction mitigation.

6 – Tree on shallow slope:

Dense canopy needs to be thinned to reduce crown fire potential. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate structure ignition zone and IR structure construction mitigation.

7 – Tree on moderate slope:

Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

7 – Tree on shallow slope with potential for crown fire:

Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

8 – Tree on moderate slope with potential for crown fire:

Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

8 – Tree on steep slope:

Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

9 – Tree on steep slope with potential for crown fire:

Dense canopy needs to be thinned to reduce crown fire potential, which may be more difficult due to the slope. Surface fuels must be treated to reduce risk of fast moving surface fires. Mitigation should also include appropriate slope setbacks, structure ignition zone and IR structure construction mitigation.

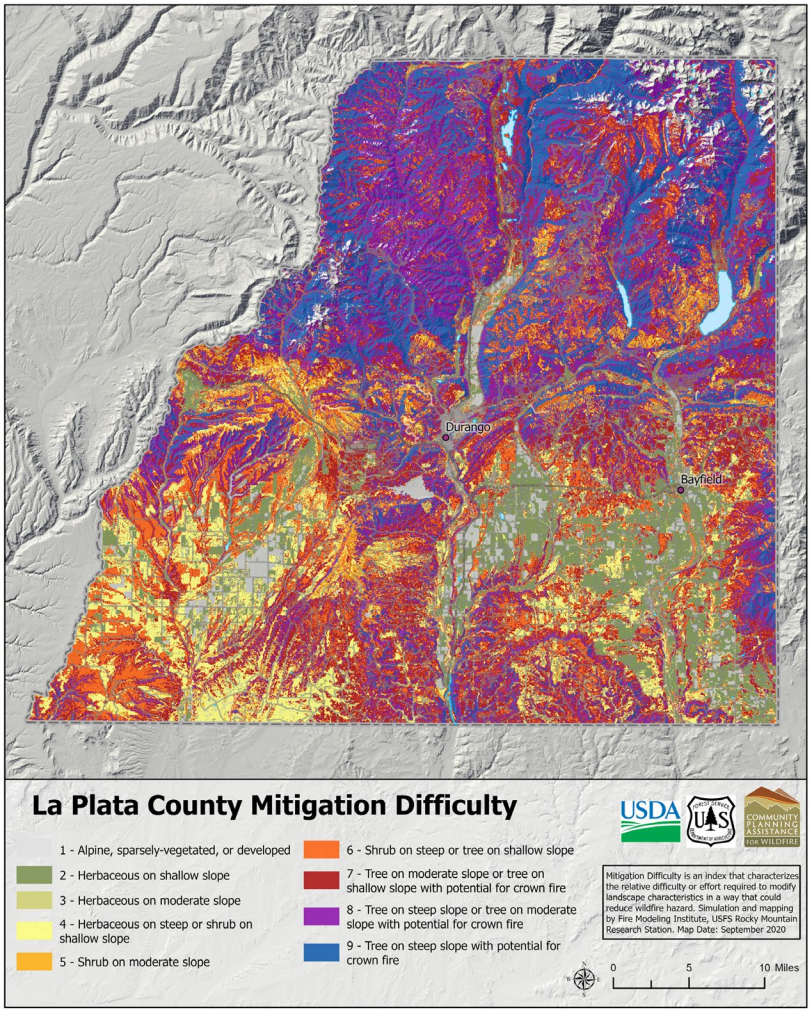

Figure A11, La Plata County local wildfire mitigation difficulty map.

A5. Final Considerations

In this report, we presented two complementary representations of wildfire hazard in La Plata County. The landscape level assessment addresses the question of "what is the annual chance of a fire occurring?" anywhere on a landscape. As such, this part of the assessment sets the context for a broad picture of wildfire hazard. The local level assessment used a more focused approach to model fire behavior under a "problem fire" scenario. It brings the benefit of integrating local stakeholder input that customizes the modeling landscape and represents the potential for local fire behavior at a finer spatial resolution. The local hazard map indicates where wildfire could cause a problem in a community, given the specific set of weather conditions selected for our modeling scenarios.

We encourage users to consider this hazard assessment as "living data." Now that we have established the methodology for mapping the local wildfire hazard, there is opportunity for local analysts to implement the methods on updated or modified datasets, either to refine the current picture of hazard or to compare current vs. past assessments to assess progress toward landscape changes that decrease hazard in the community.

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