

GREAVES SUBDIVISION FILING NO. 1
WILDLAND FIRE AND HAZARD MITIGATION REPORT

April 27, 2024

GENERAL DESCRIPTION

This Wildland Fire and Hazard Mitigation Report will include information for the parcel proposed to be platted as Greaves Subdivision Filing No. 1 located at 7030 Snow Mass Drive. The project is a Vacation and Replat of existing Lot 13, Wildwood Ranch Estates Filing 7. The project is intended to create two (2) five acre lots from the existing 10 acre lot. The site is located within the northwest one-quarter of Section 5, Township 12 South, Range 65 West of the 6th principal meridian in El Paso County, Colorado. The current El Paso County Assessor's schedule number for this property is 5205209004. A Vicinity Map is included in the Appendix for reference.

The site is 10.364± acres in area and situated on the north side of Snow Mass Drive, east of Wyandott Drive, and west of Wildridge Road. The adjacent and surrounding properties are all lots of Wildwood Ranch Estates which are also zoned RR-5 and vary in size from 5 acres to 10 acres. Most, but not all, of the surrounding lots have existing residences constructed. Adjacent Snow Mass Drive is located along the south side of the site and is an existing public gravel roadway within a 60 ft right-of-way.

The site previously had one residence located in the central portion of the site, which was destroyed during a past forest fire. Other than the existing well for the previous residence, the site is currently vacant. The ground cover consists of native grasses in fair to good condition. Tree coverage is nearly absent throughout the site with the majority of previously existing trees damaged or destroyed by fire. The existing site topography slopes to the south with grades that range from 2% to 15% and northeast with grades that range from 2% to 8%. There are no major drainage ways in the Greaves Subdivision Filing No. 1 site.

The proposed Greaves Subdivision Filing No. 1 development will add one additional lot and potential residences for a total of two (2) single-family rural residential lots. The average lot size for the 2 proposed lots is 5.18± acres. The gross density of the site is 0.19 units per acre. The site is located within the Black Forest Fire Rescue Protection District with an equipped and staffed fire station located within three miles of the site.

ACCESS, INGRESS, EGRESS AND EVACUATION

Public vehicular access to the two proposed single family residential lots will be via a single driveway connecting to Snow Mass Drive, a public county road. No new roadways are proposed for the project. A reduced copy of the subdivision plat is included in the Appendix showing road locations.

WATER SUPPLY

Residences within the proposed subdivision will utilize individual on site wells for their water supply.

VEGETATIVE CHARACTERISTICS

Previously, the site could have been characterized by stands of mature Ponderosa Pine interspersed with native grassland meadows. However, most trees previously existing on the site have been destroyed by forest fire. Very few significant trees are currently present, but the site is adjacent to forested area. Native grass growth has returned and it is likely that new trees will be planted with the construction of the new residences. Aerial mapping is attached showing the extent of forested coverage. The included Colorado Wildfire Risk Assessment Summary Report also contains vegetative cover descriptions specific to this site.

WILDFIRE RISK ASSESMENT

The Colorado Wildfire Risk Assessment Summary Report is included in the Appendix of this report. The Summary Report contains information on Wildland Urban Interface, Wildfire Risk, Threat, Fire Behavior, Fuels and Vegetation specific to this site.

FIRE MITIGATION

The “Black Forest Community Wildfire Protection Plan” dated September 2016 and prepared by Dahl Environmental Services & Associates LLC is a comprehensive strategic plan for wildfire protection. This plan contains information on wildfire response, evacuation routing and recommendations for creating defensible spaces within residential settings. Further information is contained in a document titled “The Home Ignition Zone, A guide to preparing your home for wildfire and creating defensible space” prepared by Colorado State Forest Service. Both documents may be obtained from the Black Forest Fire Rescue website (<https://www.bffire.org/>). The lots at Greaves Subdivision Filing No. 1 will observe these recommendation and guidelines to promote fire safety in the area.

It should be noted that there is no way to completely eliminate wild fire danger, however, there are several techniques that can be taken to reduce the spread of fire. These are summarized below:

Arrangement: Removing dead trees, fallen limbs, dead leaves, and other small organic debris. Because it may not be practical to remove these fuels from the entire property, it is prudent to do this within 50' of structures or in particularly vulnerable areas.

It is suggested that the reduction of most ignitable fuel be done in areas that are within fifty feet of building envelope of all residential structures. This will reduce the amount of small, flash fuel in close proximity. It will also slow the spread of fire toward adjacent property and provide suppression forces additional time to contain a fire. In the 50 foot defensible space, adequate thinning is reached when the outer edge of tree crowns are at least 10-12 feet apart. Occasional clumps of 2-3 trees are acceptable if more space surrounds them. Small patches of brush or shrubs may be left if they are separated by at least 10 feet of irrigated grass or noncombustible material. If the home is located on the crest of a steep hill, thin fuels at least 100 feet below the crest. The following additional measures are also suggested: Dispose of all slash and debris left from thinning. Remove dead limbs, leaves, and other ground litter within the defensible space. Store firewood uphill at least 15 feet from your home. Maintain an irrigated greenbelt immediately around your home. Within the defensible space, mow dry grasses and weeds to a height of 2 inches or less and keep well-watered, especially during periods of high fire

danger. Prune branches from trees within the defensible space to a minimum of 6-10 feet above the ground. Also remove shrubs, small trees or other potential “ladder fuels” from beneath large trees. Left in place, these can carry a brush fire into the tree crowns. Trim branches that extend over the eaves of your roof. Remove branches within 15 feet of a chimney. Clean roof and gutters of pine needles and leaves to eliminate a fuel source for blown embers. Reduce the density of the surrounding forest at least 100 feet out from your home. It is preferable to thin the entire lot. Thin tree crowns so they do not touch each other.

Continuity: Creating fire breaks, which remove continuous lines of fuel, help reduce the speed of spread. In this instance the fuel is generally continuous, although it does change fuels throughout. There are breaks created by roads and driveways in the properties adjacent to the east and west. Burgess Road to the north of the site provides a fire break between the site and the forested area to the north.

Topographic Considerations: As topography of the proposed development cannot be readily modified to any significant degree, the placement of the structures becomes important. Location of structures should be placed outside of drainage's, saddles, and other topographic risks.

Actual placement of structures is subject to change within that envelope due to other factors such as bed rock, views, accesses, and utilities. Occasionally, it will also be necessary for a structure to be located in a topographically more susceptible area. In this instances, it is recommended that more intense fuel modification be performed.

Construction: All new construction should consist of fire resistant materials and engineering as much as is practical. It is also recommended that owners explore fire safe construction options, which may include, but are not limited to, metal, tile, or other non-flammable materials for roofs, sprinkler systems in or around structures, and fire retardant exteriors, including stucco, brick, metal, and fire resistant siding. It is recommended that all decks at ground level be sealed off, in an effort to prevent flammable debris from getting underneath.

Inadequate addressing has been a common discrepancy when accessing a fire. Highly visible addresses for each individual site should be placed along roadways, with letters a minimum of 4” high.

Roads and driveways to individual lots should be no less than 24 feet wide, to allow for simultaneous access of emergency equipment and evacuation. Driveways should provide a minimum width of 12 feet and a minimum height of 15 feet. The entrance to any driveways from public roads should not exceed a ninety degree angle and a turnaround should be provided at all structure sites with driveways more than 150 feet long. Where driveways are over 200 feet and area less than 20 feet wide, it will be necessary to provide turnarounds along the drive.

Evacuation: Immediate evacuation from the subdivision will be by way of the private driveway, public Snow Mass Drive to the east or the west. An evacuation plan away from the neighborhood area should be developed in cooperation with local fire department officials.

Available Fire Fighting Resources:

Greaves Subdivision Filing No. 1 is located within the Black Forest Fire Rescue (BFFR) service area. The District currently serves the existing property at 7030 Snow Mass Drive. The district also participates in mutual aid response with surrounding fire districts and fire departments.

BFFR has two full service/full time manned fire stations. The closest station to Greaves Subdivision Filing No. 1 is Station 2, located at 16465 Ridge Run Drive, which is 2.8 miles north from the site via established public roads. Response times are difficult to predict due to traffic conditions, weather conditions and other factors. However, in favorable conditions, response time to the site is estimated to be 4 minutes. The department has two Fire Engines (Type 1, 750 gallons), two Bush Trucks (Type 6), one Tender (1800 gallons), two Medic (ambulance), one Wildland Vehicle (Type 3), and additional command vehicles. This department also has in reserve: one tender, one brush truck, and one medic.

BFFR has an overall protection Class 5 ISO rating for its entire protection district. For all properties located within 1000 feet of a fire hydrant, BFFR provides a Class 4 ISO rating as long as it is within 5 miles of the nearest station. This fire district has limited hydrant access and primarily uses hauled water for its firefighting source. There are no fire hydrants in the vicinity of Greaves Subdivision Filing No. 1. Therefore, the ISO rating for this property is 5.

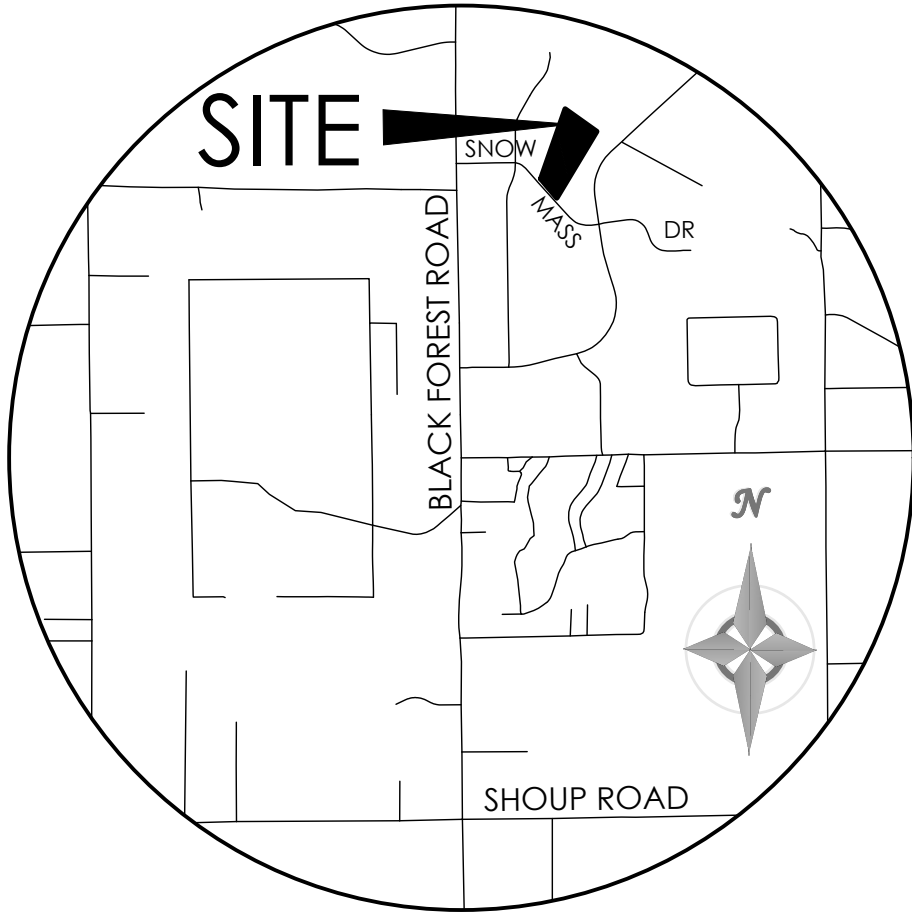
APPENDIX

Vicinity Map

Areal Photograph

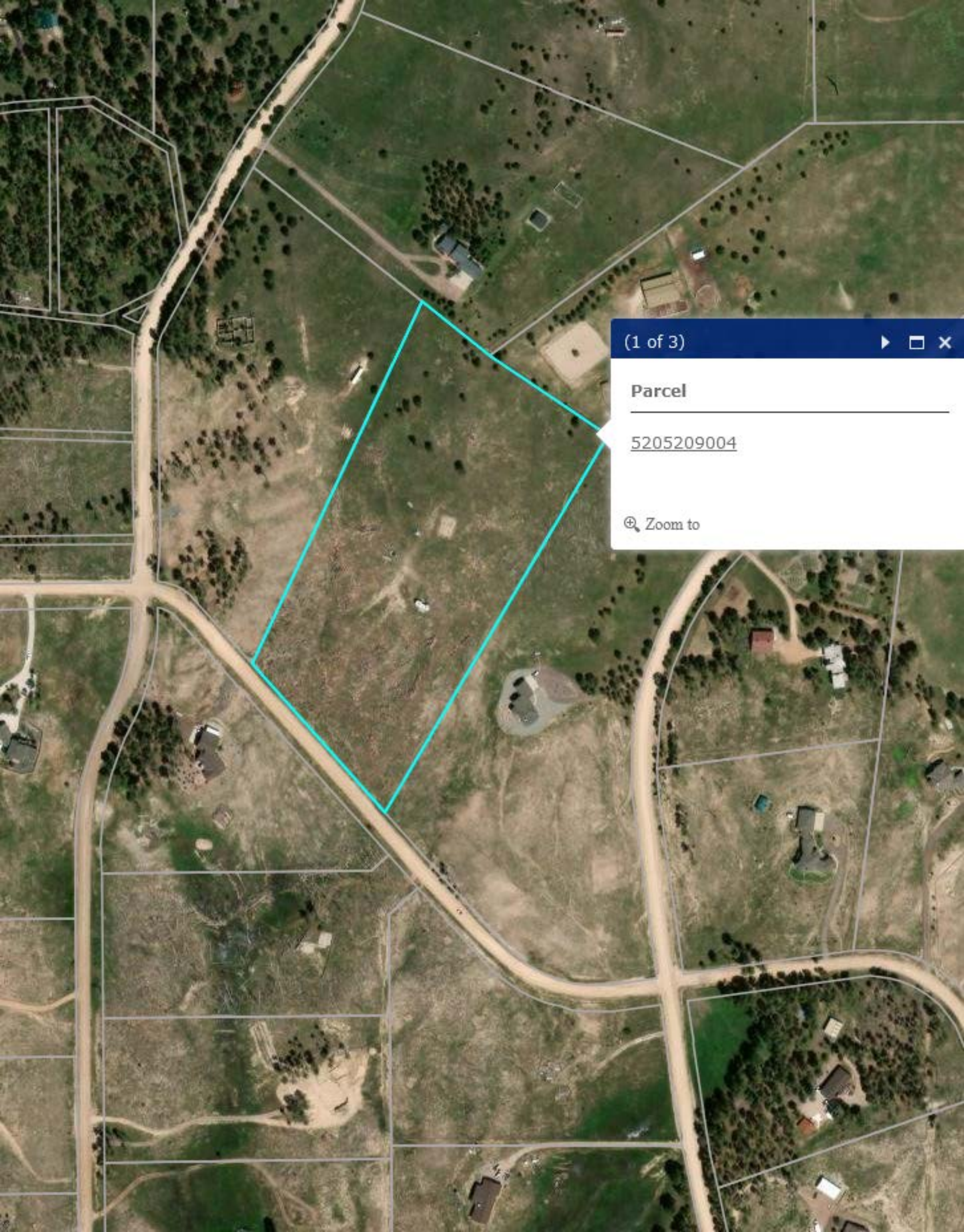
Reduced Greaves Subdivision Filing No. 1 Final Plat

Colorado Wildfire Risk Assessment Summary Report

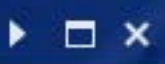


VICINITY MAP

NOT TO SCALE



(1 of 3)



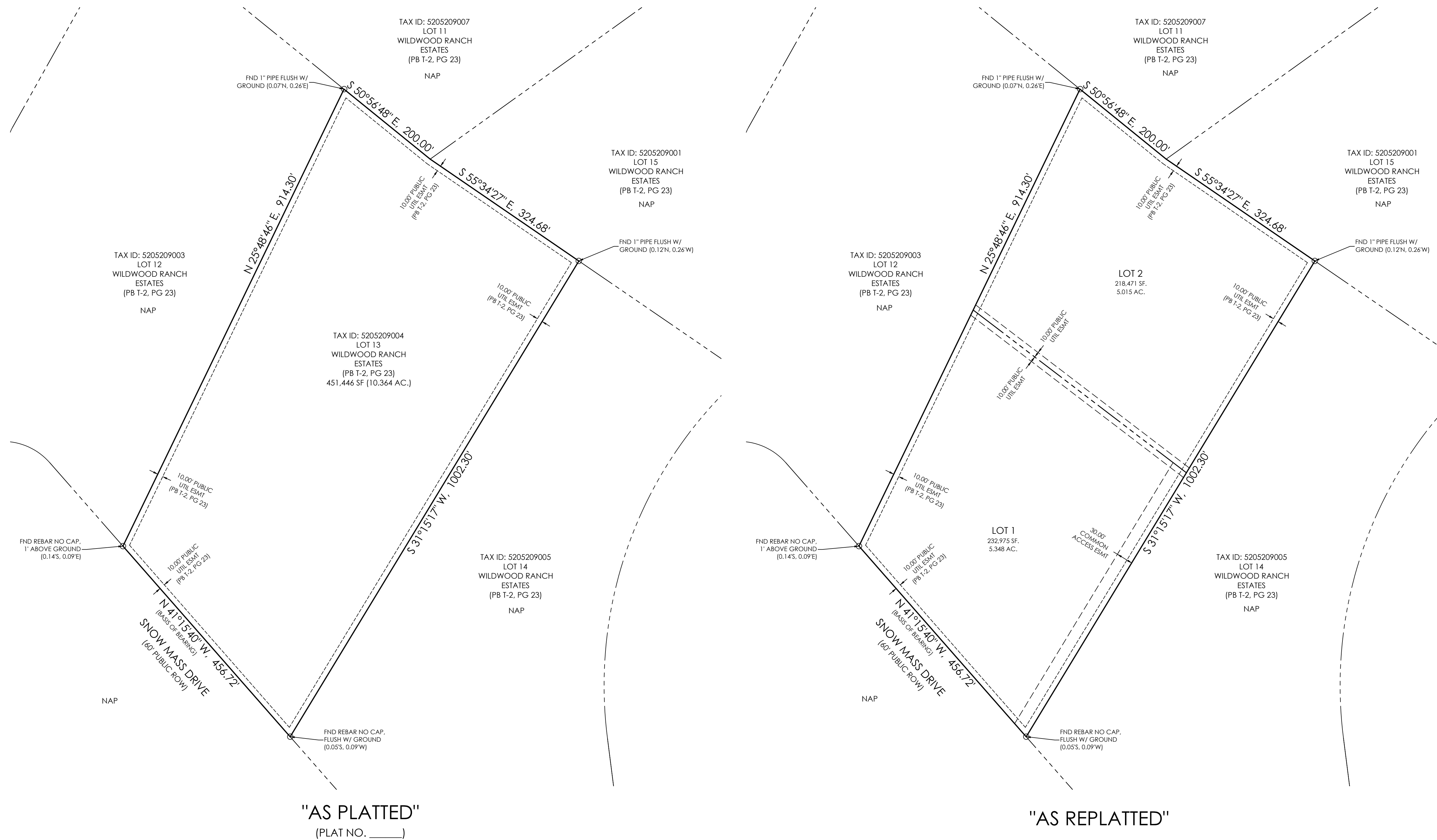
Parcel

5205209004

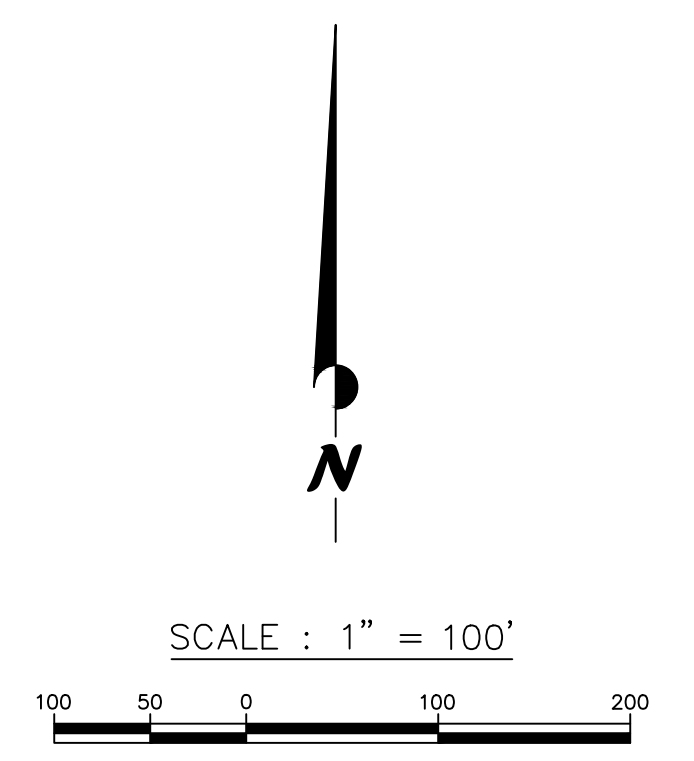
 Zoom to

GREAVES SUBDIVISION FILING NO. 1

A REPLAT OF LOT 13, WILDWOOD RANCH ESTATES FILING 7
 NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M.
 EL PASO COUNTY, COLORADO



- LEGEND**
- PROPOSED BOUNDARY LINE
 - - - PROPOSED LOT LINE
 - - - PROPOSED EASEMENT
 - - - SECTION LINE
 - FOUND CORNER AS SHOWN
 - SET #5 REBAR W/ ALUMINUM CAP MARKED "POLARIS, PLS 27605" FLUSH WITH THE GROUND
 - (15980) ADDRESS NUMBER
 - PUDE PUBLIC UTILITY AND DRAINAGE EASEMENT
 - NAP NOT A PART OF THIS SUBDIVISION (NO AREAS OUTSIDE OF THE SHOWN BOUNDARY ARE A PART OF THIS SUBDIVISION)

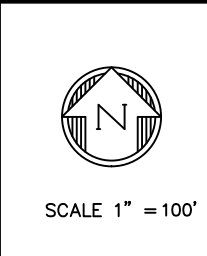


"AS PLATTED"
 (PLAT NO. _____)

"AS REPLATTED"

REGISTERED LAND SURVEYOR IN THE STATE OF COLORADO, NO 27605 FOR AND ON BEHALF OF POLARIS SURVEYING, INC. NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

GREAVES SUBDIVISION FILING NO. 1
 A REPLAT OF LOT 13, WILDWOOD RANCH ESTATES FILING 7
 NORTHWEST QUARTER OF SECTION 5, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M.
 EL PASO COUNTY, COLORADO



REVISIONS			
ZONE	REV	DESCRIPTION	DATE

DRAWN BY: TJW
 CHECKED BY: RDH
 JOB NO: 231102
 DATE: 12/27/2023
 DRAWING NO: 231102_PLAT
 SHEET: 2 OF 2

POLARIS SURVEYING, INC.
 1903 Lelary Street, Suite 102
 COLORADO SPRINGS, CO 80909
 (719)448-0844 FAX (719)448-9225

PCD FILE NO:
 GREAVES SUBDIVISION
 FINAL PLAT
 For:
 ALAN & JUDITH GREAVES

2022 Colorado Wildfire Risk Assessment Summary Report



Greaves
Subdivision Fil
No. 1

**Report was generated using
www.ColoradoForestAtlas.org**

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Disclaimer

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User should also note that property boundaries included in any product do not represent an on-the-ground survey suitable for legal, engineering, or surveying purposes. They represent only the approximate relative locations.

Introduction

Colorado Wildfire Risk Assessment Report

Welcome to the Colorado Wildfire Risk Assessment Summary Reporting Tool.

This tool allows users of the Risk Reduction Planner application of the Colorado Forest Atlas web portal to define a specific project area and generate information for this area. A detailed risk summary report can be generated using a set of predefined map products developed by the Colorado Wildfire Risk Assessment project which have been summarized explicitly for the user defined project area. The report is generated in PDF format.

The report has been designed so that information from the report can be copied and pasted into other specific plans, reports, or documents depending on user needs. Examples include, but are not limited to, Community Wildfire Protection Plans, Local Fire Plans, Fuels Mitigation Plans, Hazard Mitigation Plans, Homeowner Risk Assessments, and Forest Management or Stewardship Plans. Example templates for some of these reports are available for download on the Colorado Forest Atlas web portal.

The Colorado WRA provides a consistent, comparable set of scientific results to be used as a foundation for wildfire mitigation and prevention planning in Colorado.

Results of the assessment can be used to help prioritize areas in the state where mitigation treatments, community interaction and education, or tactical analyses might be necessary to reduce risk from wildfires.

The Colorado WRA products included in this report are designed to provide the information needed to support the following key priorities:

- Identify areas that are most prone to wildfire
- Plan and prioritize hazardous fuel treatment programs
- Allow agencies to work together to better define priorities and improve emergency response, particularly across jurisdictional boundaries
- Increase communication with local residents and the public to address community priorities and needs



Products

Each product in this report is accompanied by a general description, table, chart and/or map. A list of available Colorado WRA products in this report is provided in the following table.

COWRA Product	Description
Wildland Urban Interface	Housing density depicting where humans and their structures meet or intermix with wildland fuel
Wildland Urban Interface Risk	A measure of the potential impact on people and their homes from wildfire
Wildfire Risk to Assets	The overall composite risk occurring from a wildfire derived by combining Burn Probability and Values at Risk Rating
Burn Probability	Annual probability of any location burning due to wildfire
Terrain Difficulty Index	Reflects the difficulty to suppress a fire given the terrain and vegetation conditions that may impact ground resource access and capabilities
Characteristic Flame Length	A measure of the expected flame length of a potential fire
Fire Intensity Scale	Quantifies the potential fire intensity by orders of magnitude
Fire Type	Potential for canopy fire type for extreme weather conditions (canopy fire potential)
Rate of Spread	The speed with which a fire moves in a horizontal direction across the landscape
Surface Fuels	Characterization of surface fuel models that contain the parameters for calculating fire behavior outputs
Vegetation	General vegetation and landcover types
Watershed Protection Risk	A measure of risk to watershed protection areas based on the potential negative impacts from wildfire.
Riparian Assets Risk	A measure of the risk to riparian areas based on the potential negative impacts from wildfire
Forest Assets Risk	A measure of the risk to forested areas based on the potential negative impacts from wildfire

COWRA Product	Description
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Building Damage Potential

Estimates the potential for building loss

Defensible Space Index

The arithmetic mean of the three defensible space components: canopy, fuels, and slope. The colors shown represent the relative range and are the average for all of the buildings in the hexagon.

Wildland Urban Interface

Reflects housing density depicting where humans and their structures meet or intermix with wildland fuels

Colorado is one of the fastest growing states in the Nation, with much of this growth occurring outside urban boundaries. This increase in population across the state will impact counties and communities that are located within the Wildland Urban Interface (WUI). The WUI is described as the area where structures and other human improvements meet and intermingle with undeveloped wildland or vegetative fuels. Population growth within the WUI substantially increases the risk from wildfire.



The Wildland Urban Interface (WUI) layer reflects housing density depicting where humans and their structures meet or intermix with wildland fuels. In the past, conventional wildland-urban interface data sets, such as USFS SILVIS, have been used to reflect these concerns. However, USFS SILVIS and other existing data sources did not provide the level of detail needed by the Colorado State Forest Service and local fire protection agencies, particularly reflecting encroachment into urban core areas.

For the **Greaves Subdivision Fil No. 1** project area, it is estimated that **4** people or **100%** percent of the total project area population (4) live within the WUI.

A more detailed description of the risk assessment algorithms is provided in the Colorado Wildfire Risk Assessment (Colorado WRA) Final Report, which can be downloaded from www.ColoradoForestAtlas.com

The new WUI data set is derived using advanced modeling techniques based on the Where People Live (housing density) data set and 2021 LandScan USA population count data available from the Department of Homeland Security, HSIP data. WUI is simply a subset of the Where People Live data set. The primary difference is populated areas surrounded by sufficient non-burnable areas (i.e. interior urban areas) are removed from the Where People Live data set, as these areas are not expected to be directly impacted by a wildfire. Fringe urban areas, i.e. those on the edge of urban areas directly adjacent to burnable fuels are included in the WUI. Advanced encroachment algorithms were used to define these fringe areas.

Data is modeled at a 20-meter grid cell resolution, which is consistent with other CO-WRA layers. The WUI classes are based on the number of houses per acre. Class breaks are based on densities well understood and commonly used for fire protection planning.

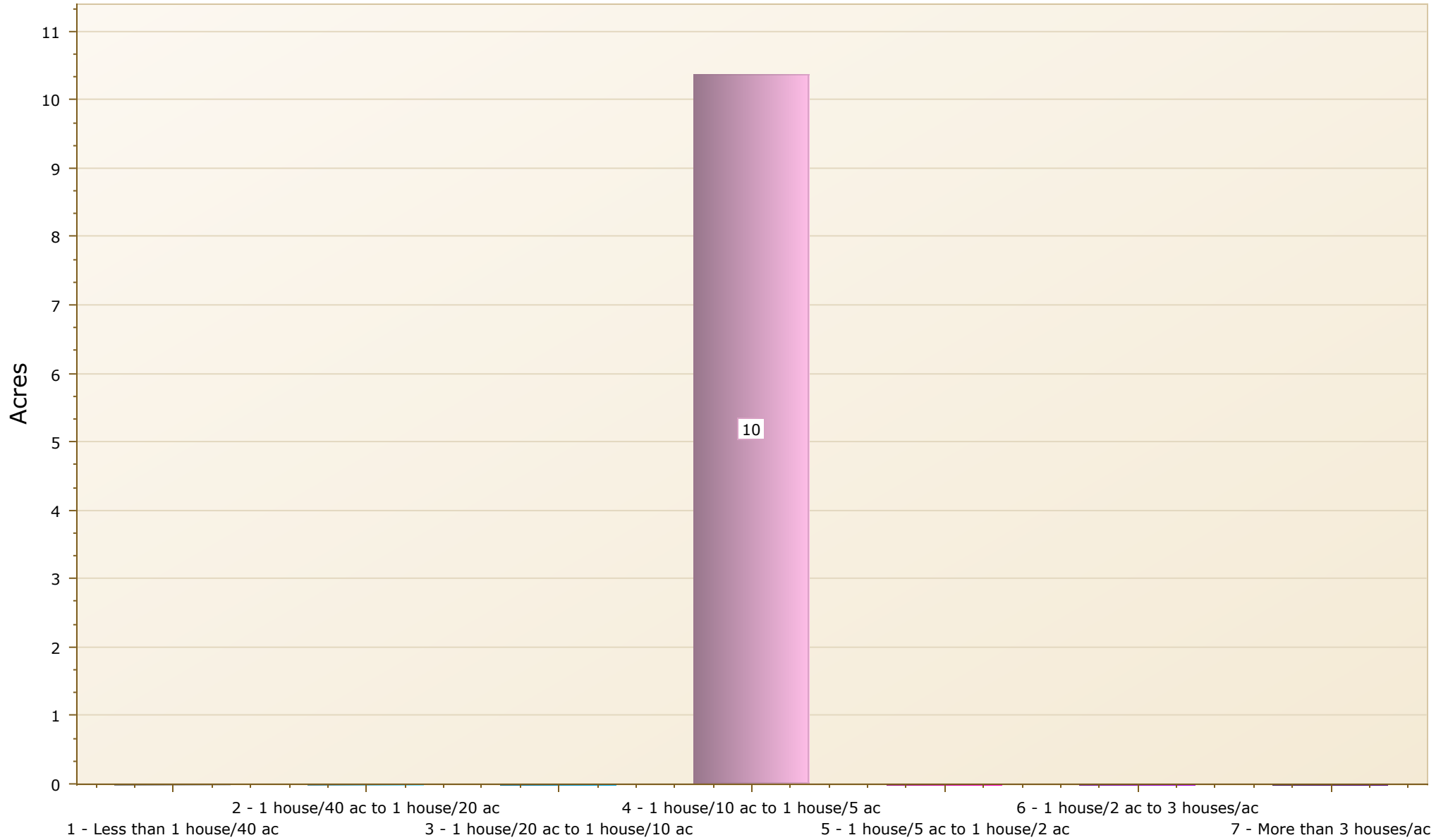


Housing Density	WUI Population	Percent of WUI Population
1 - Less than 1 house/40 ac	0	0%
2 - 1 house/40 ac to 1 house/20 ac	0	0%
3 - 1 house/20 ac to 1 house/10 ac	0	0%
4 - 1 house/10 ac to 1 house/5 ac	4	100%
5 - 1 house/5 ac to 1 house/2 ac	0	0%
6 - 1 house/2 ac to 3 houses/ac	0	0%
7 - More than 3 houses/ac	0	0%
Total	4	100%

Housing Density	WUI Acres	Percent of WUI Acres
1 - Less than 1 house/40 ac	0	0%
2 - 1 house/40 ac to 1 house/20 ac	0	0%
3 - 1 house/20 ac to 1 house/10 ac	0	0%
4 - 1 house/10 ac to 1 house/5 ac	10	100%
5 - 1 house/5 ac to 1 house/2 ac	0	0%
6 - 1 house/2 ac to 3 houses/ac	0	0%
7 - More than 3 houses/ac	0	0%
None	10	100%

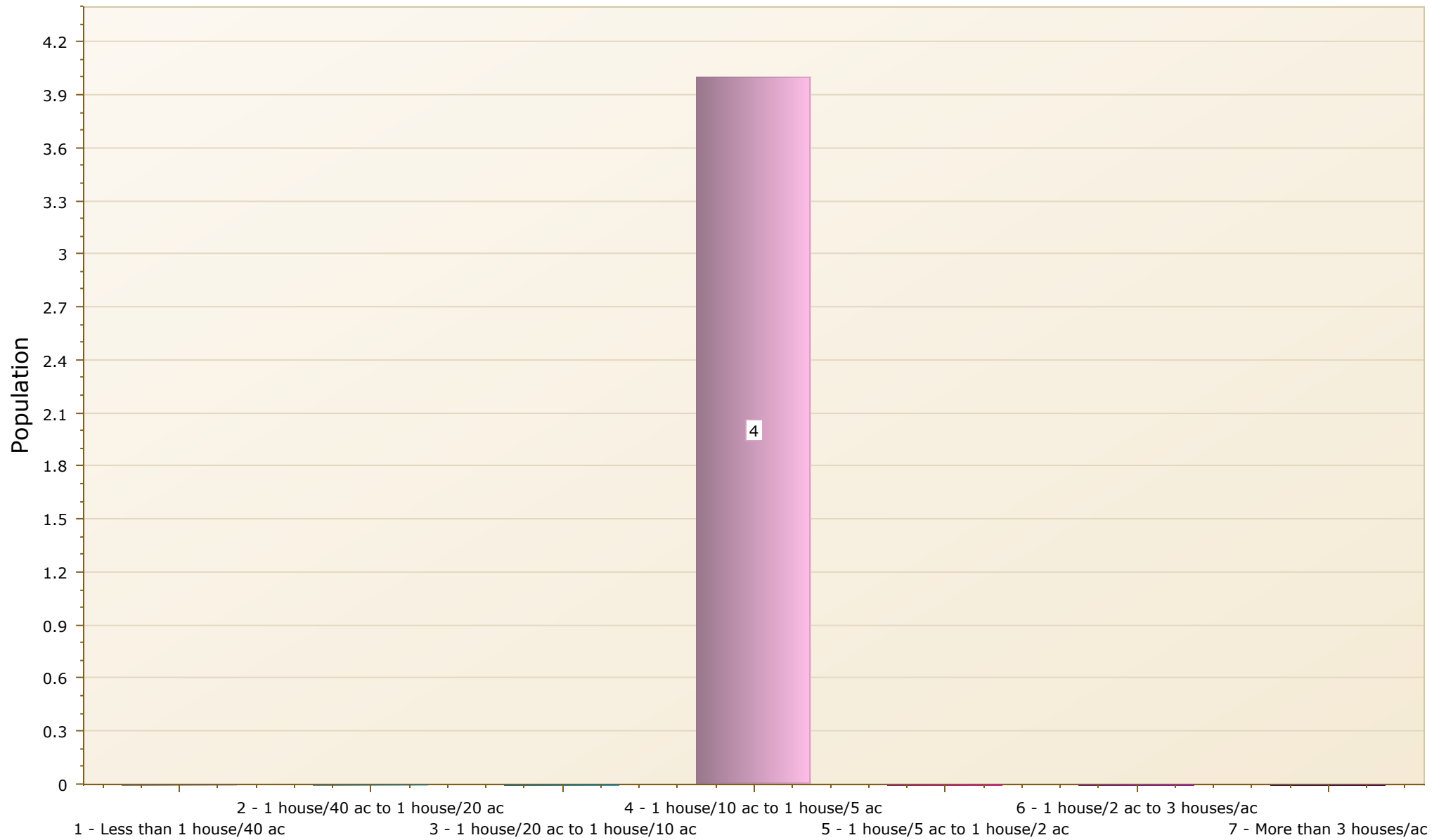
Wildland Urban Interface - Acres

Greaves Subdivision Fil No. 1



Wildland Urban Interface - Population

Greaves Subdivision Fil No. 1





Wildland Urban Interface (WUI) Risk

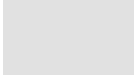



The Wildland-Urban Interface (WUI) Risk Index layer is a rating of the potential impact of a wildfire on people and their homes.

The key input, WUI, reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the wildland-urban interface and rural areas is essential for defining potential wildfire impacts to people and homes.

The WUI Risk Index is derived using a response function modeling approach. Response functions are a method of assigning a net change in the value to a resource or asset based on susceptibility to fire at different intensity levels, such as flame length.

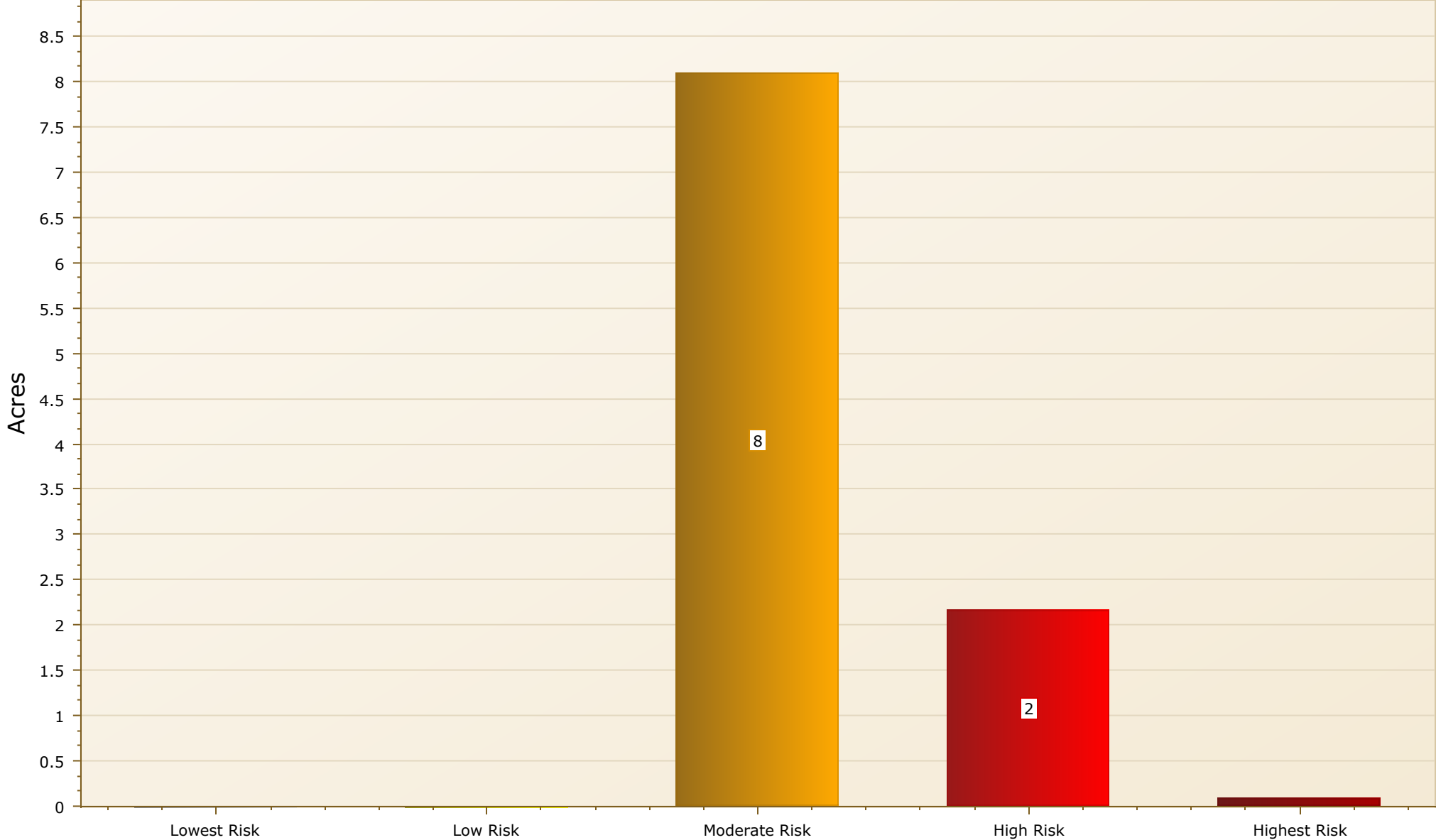
To calculate the WUI Risk Index, the WUI housing density data were combined with flame length data and response functions were defined to represent potential impacts. The response functions were defined by a team of experts led by Colorado State Forest Service mitigation planning staff. By combining flame length with the WUI housing density data, it is possible to determine where the greatest potential impact to homes and people is likely to occur. Customized urban encroachment algorithms were used to ensure those fringe urban areas were included in the WUI Risk outputs. Encroachment distances into urban areas were based on the underlying fuel models and their fuel types and propensity for spotting and spreading.

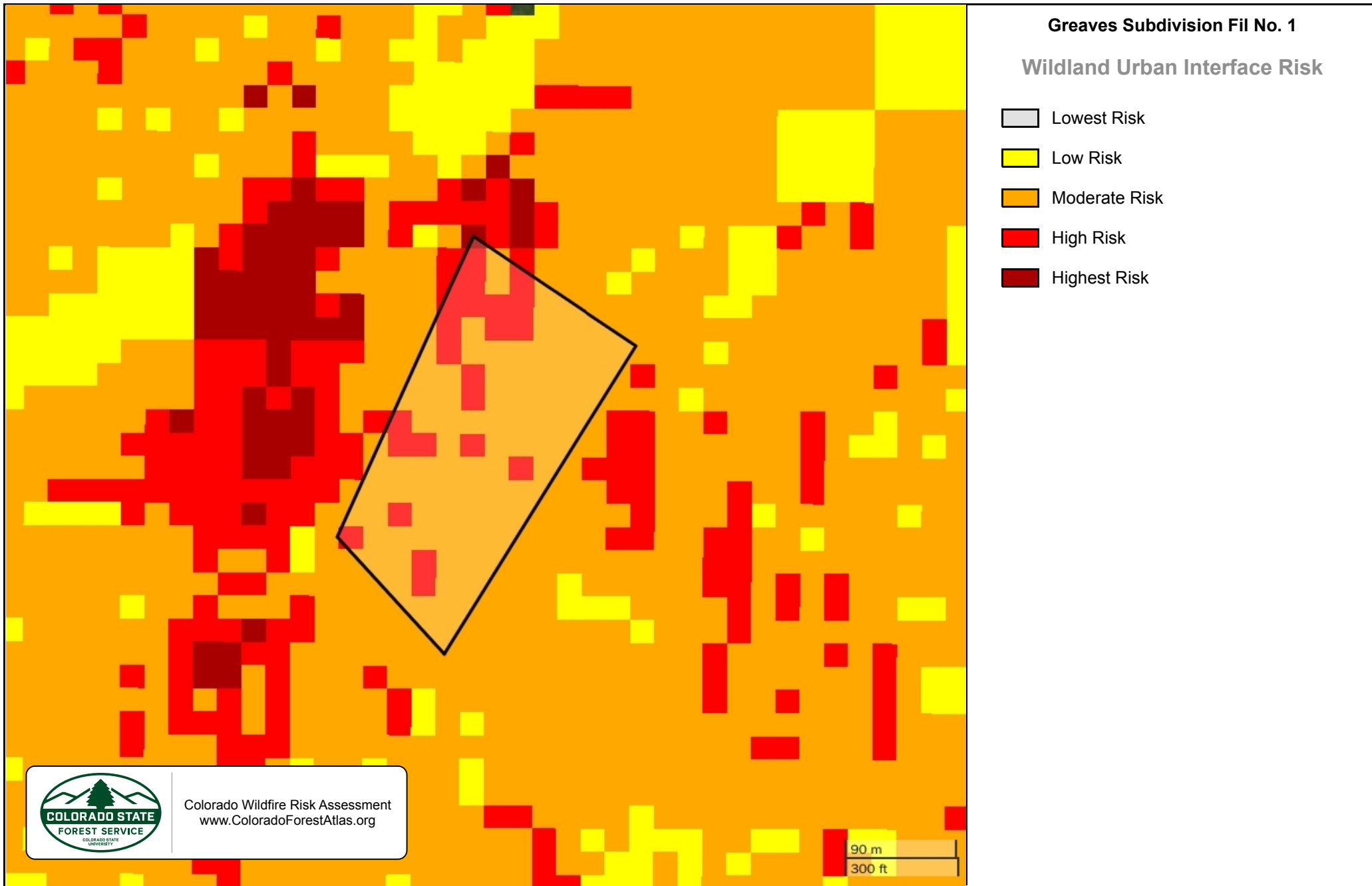
The WUI Risk Index has been calculated consistently for all areas in Colorado, which allows for comparison and ordination of areas across the entire state. Data is modeled at a 20-meter cell resolution, which is consistent with other CO-WRA layers.

WUI Risk Class		Acres	Percent
	Lowest Risk		0%
	Low Risk		0%
	Moderate Risk	8	78.1%
	High Risk	2	21%
	Highest Risk		1%
Total		10	100%

Wildland Urban Interface Risk

Greaves Subdivision Fil No. 1





Firewise USA Recognized Sites

Description

Firewise USA® is a national recognition program that provides resources to inform communities how to adapt to living with wildfire and encourages neighbors to take action together to reduce their wildfire risk. Colorado communities that take the following five steps can be recognized as Firewise:

1. Form a Firewise board or committee
2. Obtain a wildfire risk assessment from the CSFS or local fire department, and create an action plan
3. Hold a Firewise event once per year
4. Invest a minimum of \$24.14 per dwelling unit in local Firewise actions annually
5. Create a National Fire Prevention Association (NFPA) profile and follow the application directions located at <https://portal.firewise.org/user/login>

The Firewise USA® dataset defines the boundaries of the recognized communities. Mapping Firewise USA® boundaries will generally be completed by CSFS staff.

Note: These are estimated boundaries using a variety of methods with varying degrees of accuracy. These are not legal boundaries and should not be construed as such. The boundaries may overlap with CWPP areas and are subject to change over time as the communities develop, change, and continue to implement wildfire mitigation efforts. To learn more about the Firewise USA® recognition program or to fill out an application, visit <https://www.nfpa.org/Public-Education/By-topic/Wildfire/Firewise-USA> - OR <https://csfs.colostate.edu/wildfire-mitigation/colorado-firewise-communities/>



FIREWISE USA®
Residents reducing wildfire risks

The designated area does not contain data for this section.

Community Wildfire Protection Plans (CWPPs)

Description

A Community Wildfire Protection Plan (CWPP) is a document developed and agreed upon by a community to identify how the community will reduce its wildfire risk. CWPPs identify areas where fuels reduction is needed to reduce wildfire threats to communities and critical infrastructure, address protection of homes and other structures, and plan for wildfire response capability. The Colorado State Forest Service (CSFS) supports the development and implementation of CWPPs and provides resources, educational materials and information to those interested in developing CWPPs.

The CWPP dataset represents the boundaries of those areas that have developed a CWPP. Note that CWPPs can be developed by different groups at varying scales, such as county, Fire Protection District (FPD), community/subdivision, HOA, etc., and as such, can overlap. In addition, the CWPPs can be from different dates. Often a county CWPP is completed first with subsequently more detailed CWPPs done for local communities within that county or FPD. CO-WRAP provides a tool that allows the user to select the CWPP area and retrieve the CWPP document for review (PDF).

At a minimum, a CWPP should include:

- The wildland-urban interface (WUI) boundary, defined on a map, where people, structures and other community values are most likely to be negatively impacted by wildfire
- The CSFS, local fire authority and local government involvement and any additional stakeholders
- A narrative that identifies the community's values and fuel hazards
- The community's plan for when a wildfire occurs
- An implementation plan that identifies areas of high priority for fuels treatments

CWPPs are not shelf documents and should be reviewed, tracked and updated. A plan stays alive when it is periodically updated to address the accomplishments of the community. Community review of progress in meeting plan objectives and determining areas of new concern where actions must be taken to reduce wildfire risk helps the community stay current with changing environment and wildfire mitigation priorities.

If your community is in an area at risk from wildfire, now is a good time to start working with neighbors on a CWPP and preparing for future wildfires. Contact your local CSFS district to learn how to start this process and create a CWPP for your community: <http://csfs.colostate.edu/pages/your-local-forester.html>
For the **Greaves Subdivision Fil No. 1** test project area, there are 2 CWPPs areas that are totally or partially in the defined project area.

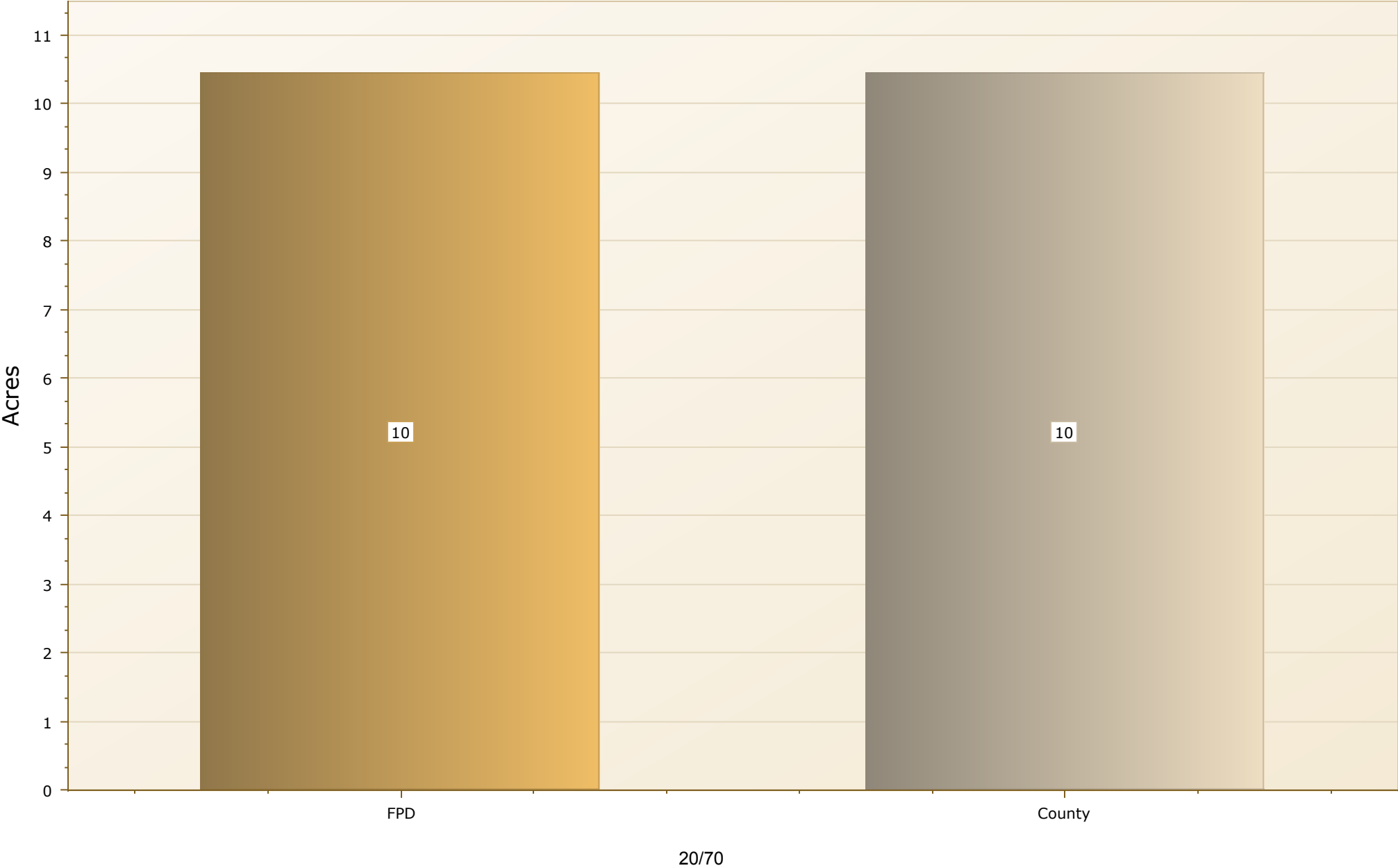


Community input is the foundation of a Community Wildfire Protection Plan that identifies community needs and garners community support.

CWPP Name	CWPP Type	CSFS District	Acres inside project area	Total Acres
Black Forest	FPD	Woodland Park	10	31,421
El Paso County	County	Woodland Park	10	1,361,917
Total Acres			21	1,393,339




Community Wildfire Protection Plans

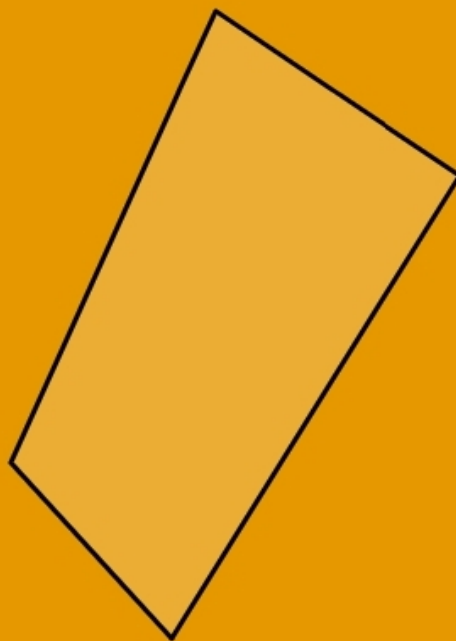
Greaves Subdivision Fil No. 1



Greaves Subdivision Fil No. 1

CWPP

-  Local
-  FPD
-  County



Colorado Wildfire Risk Assessment
www.ColoradoForestAtlas.org

90 m
300 ft

Wildfire Risk to Assets

Description

Wildfire Risk is a composite risk map created by combining the Values at Risk Rating and the Burn Probability layers.

It identifies areas with the greatest potential impacts from a wildfire – i.e., those areas most at risk when considering the four values layers.

The Values at Risk Rating is a key component of Wildfire Risk. It is comprised of several individual risk layers including Wildland Urban Interface (housing density), Forest Assets, Riparian Assets and Watershed Protection risk outputs. The WUI component is a key element of the composite risk since it represents where people live in the wildland and urban fringe areas that are susceptible to wildfires and damages. The found individual risk layers are weighted to derive the Values at Risk Rating layer.

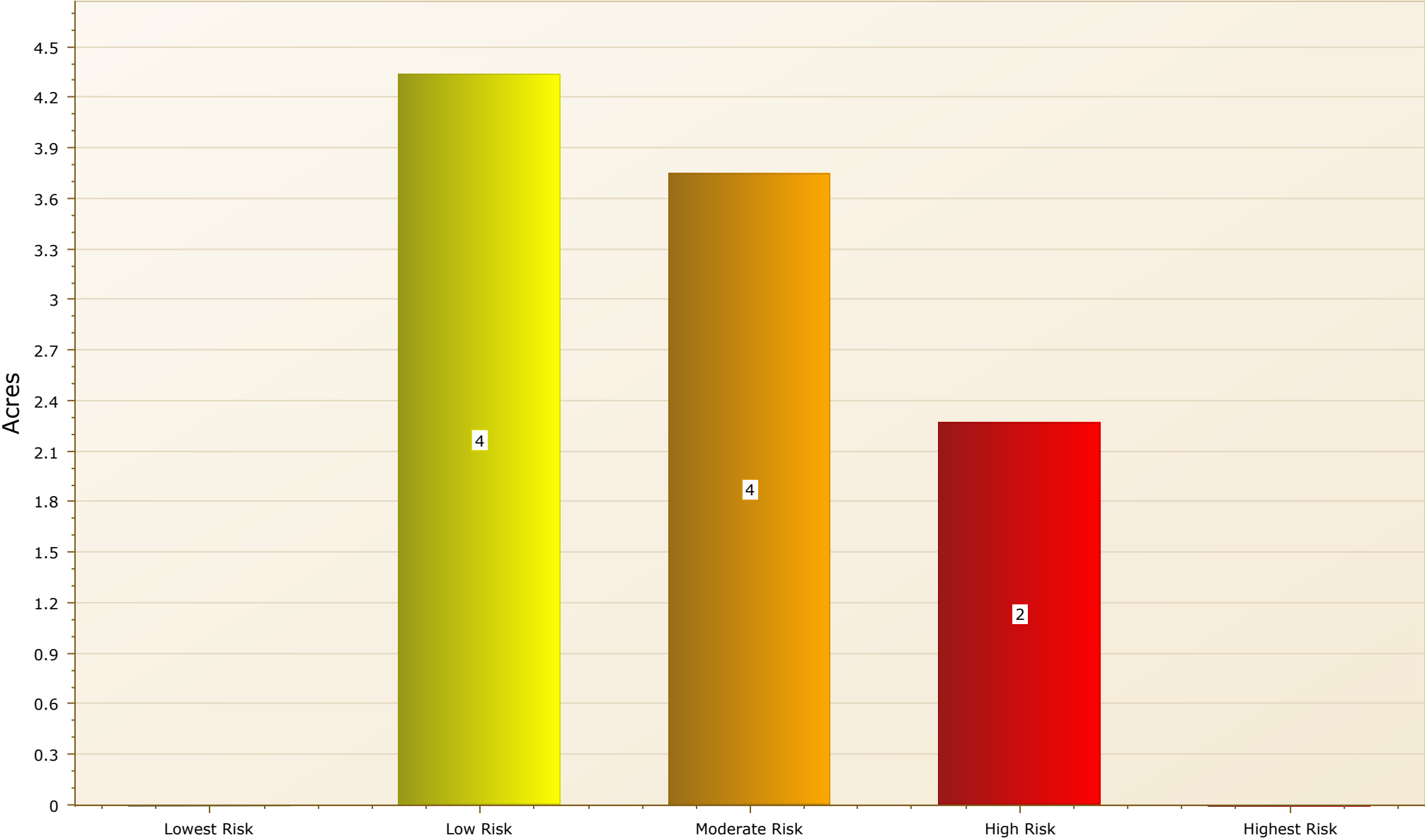
The risk map is derived at a 20-meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not appropriate for site specific analysis, it is appropriate for regional, county, or local planning efforts.

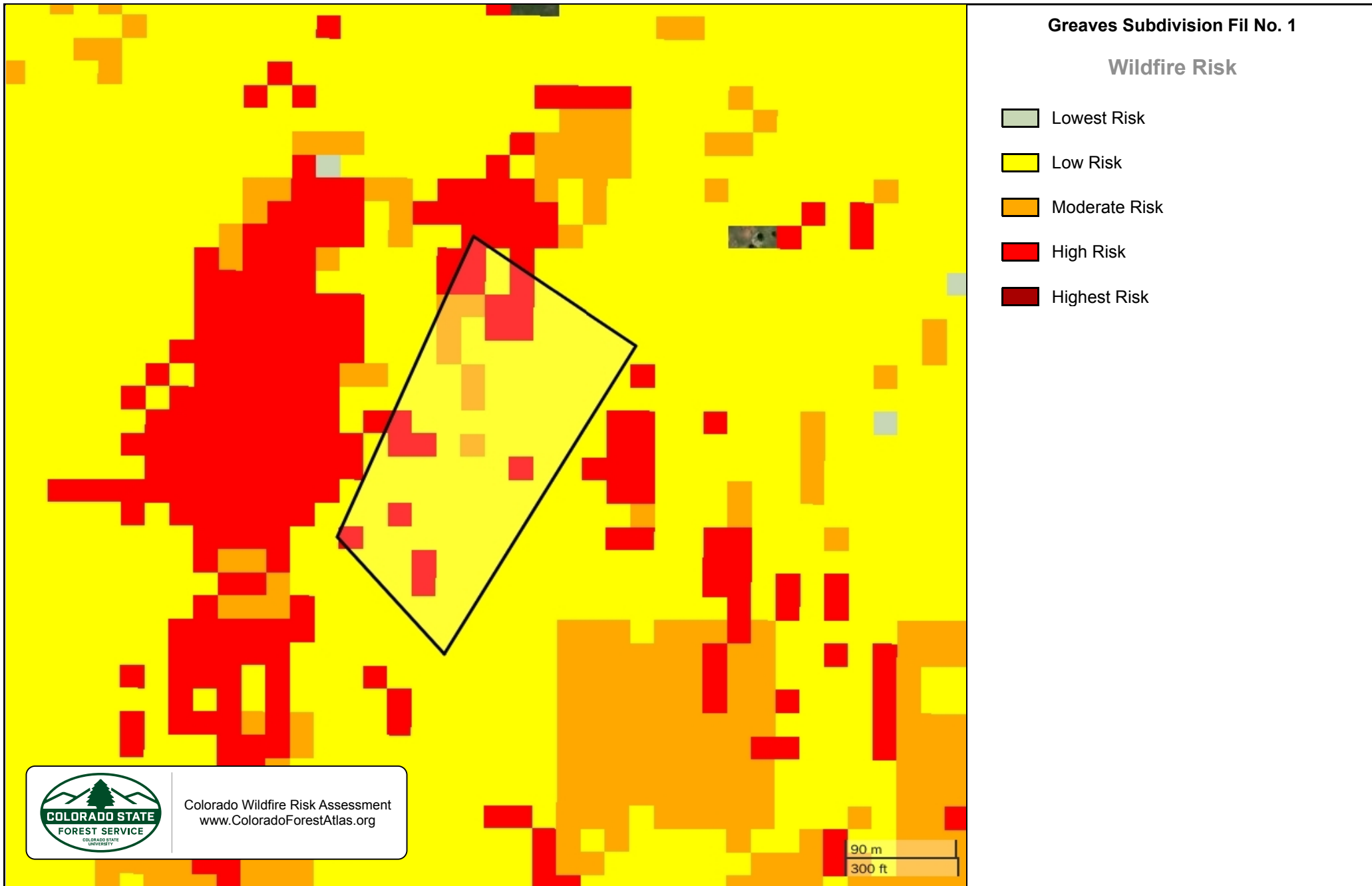


Wildfire Risk	Acres	Percent
Lowest Risk		0%
Low Risk	4	41.9%
Moderate Risk	4	36.2%
High Risk	2	21.9%
Highest Risk		0%
Total	10	100%

Wildfire Risk to Assets

Greaves Subdivision Fil No. 1





Burn Probability

Description

Burn Probability (BP) is the annual probability of any location burning due to a wildfire.

The annual BP was calculated as the number of times that a cell was burned and the number of iterations used to run the models. The annual BP was estimated for Colorado by using a wildfire simulation approach with Technosylva's Wildfire Analyst software ([Wildfire Analyst](#)). A total number of 2,342,334 fires were simulated (3,200,000 if we consider those fires outside the Colorado border which were used in a buffer area around the study area to compute BP) with a mean ignition density of 8.68 fires/km². The ignition points were spatially distributed evenly every 500 meters across the state. Only high and extreme weather conditions were used to run the single fires because they usually burn most of the annual burned area. All fires simulations had a duration of 8 h. After simulating all the fires, some cells were not burned by any simulated fire, resulting in a BP value of zero. Some cells were non-burnable due to the associated fuel type (i.e. water, roads, urban, agricultural areas, barren areas). However, the lowest BP value found in "burnable" cells was assigned to cells where the simulated fires did not reach.

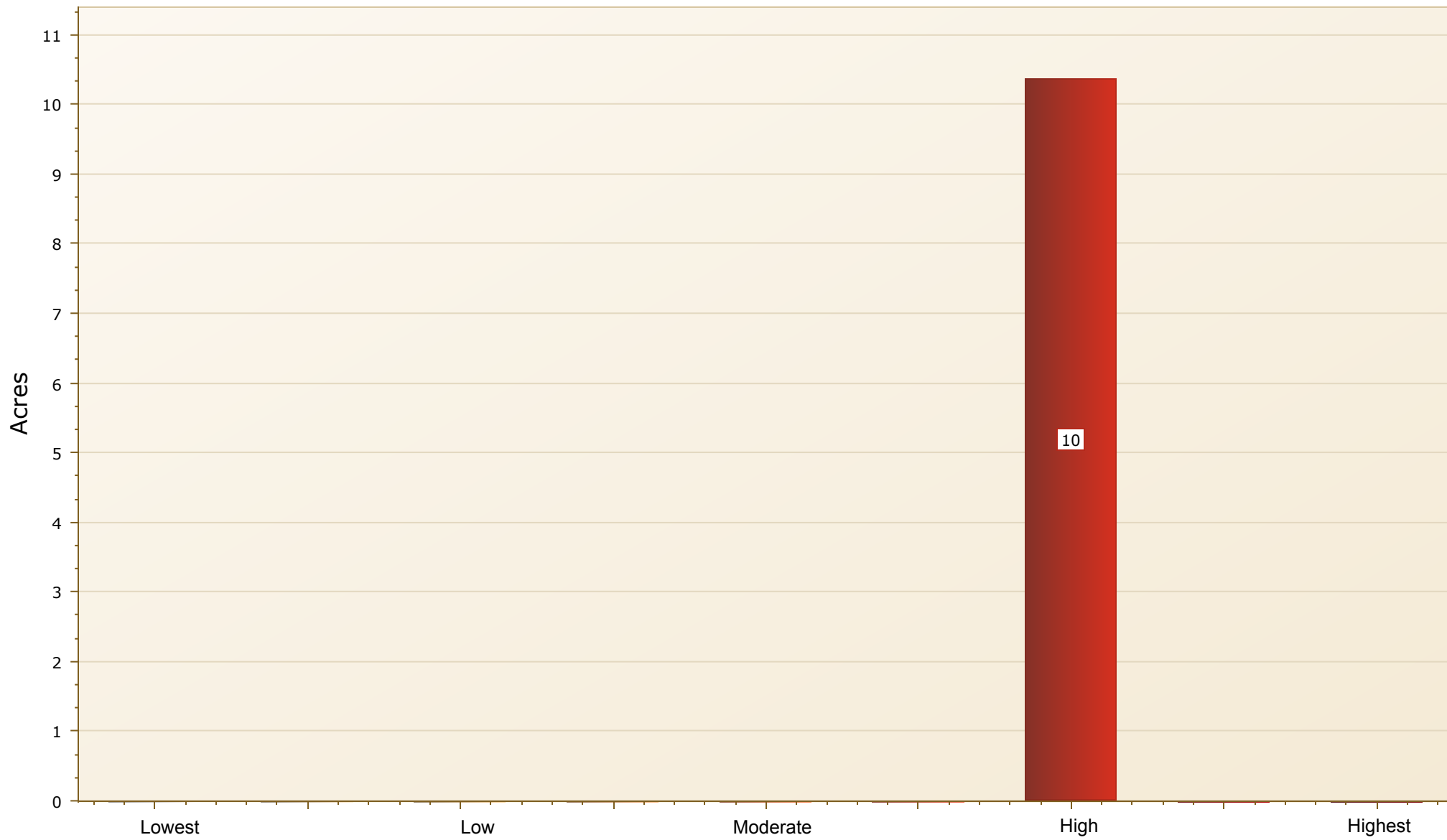
The Wildfire Analyst fire simulator considered the number of times that the simulated fires burned each cell. After that, results were weighted by considering the historical fire occurrence. The weighting was done by assessing the relation between the annual historical fire ignition density in Colorado and the total number of simulated fires with varying input data in high and moderate weather scenarios and the historical spatial distribution of the ignition points.

The probability map is derived at a 20-meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not appropriate for site specific analysis, it is appropriate for regional, county or local protection mitigation or prevention.

Burn Probability		Acres	Percent
Lowest			0%
			0%
Low			0%
			0%
Moderate			0%
			0%
High		10	100%
			0%
Highest			0%
Total		10	100%

Burn Probability

Greaves Subdivision Fil No. 1



Greaves Subdivision Fil No. 1

Burn Probability

 Lowest



 Low




 Moderate



 High



 Highest



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Terrain Difficulty Index

Description

The 2012 and 2017 CO-WRA included a simple metric that described suppression difficulty based on fireline dozer rates. For 2022 CO-WRA, this standalone metric has been updated to reflect a more enhanced definition of areas where access to fires and suppression from ground resources is difficult. Although not a component of the standard risk assessment outputs, this metric is provided as it helps inform which areas may have limited suppression capabilities, especially for initial attack, across the State.

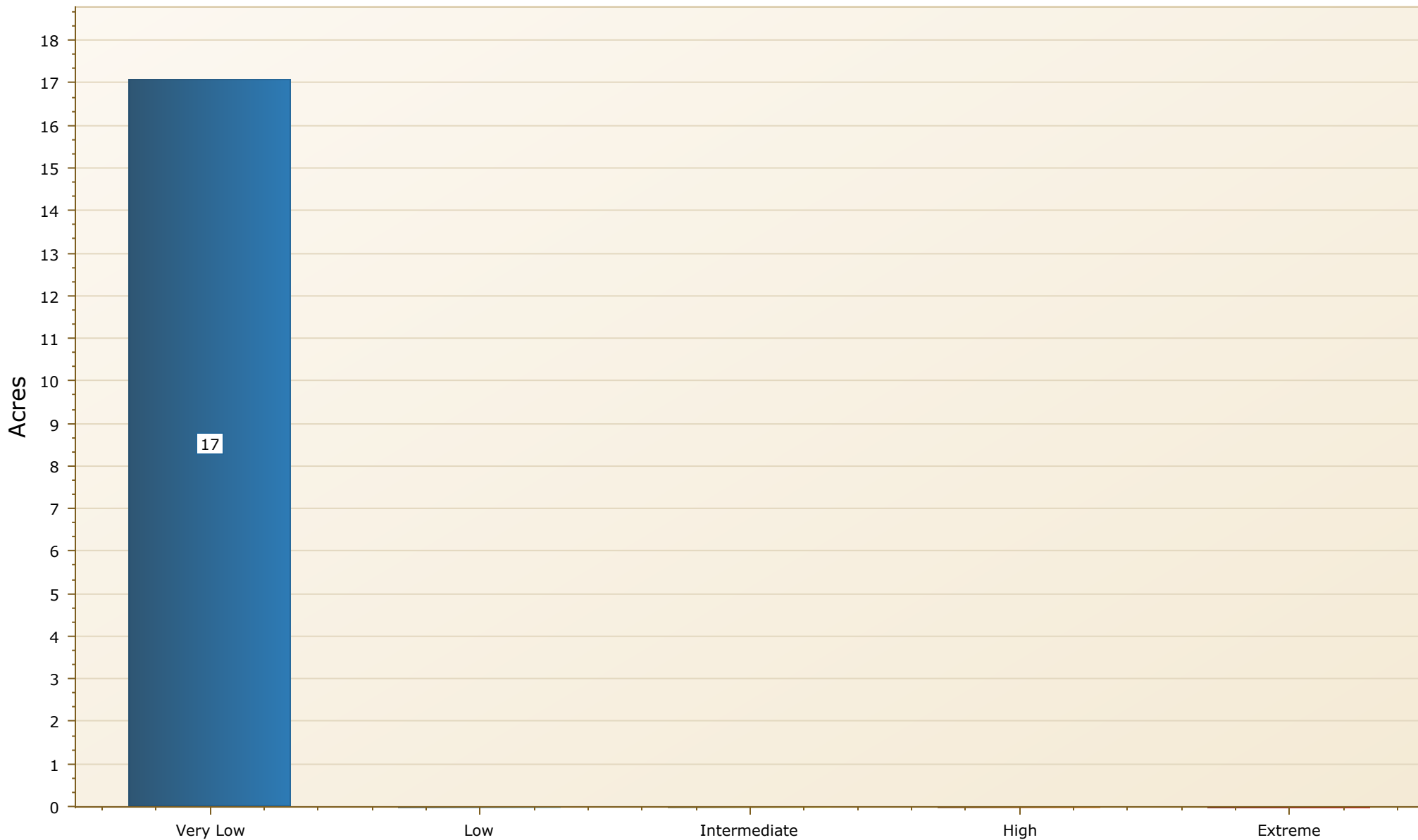
The Terrain Difficulty Index (TDI) is a metric that describes the characteristics of the landscape which evaluates the difficulty of extinction, especially in initial attack, although it can also be extrapolated to extended attacks. This static index quantifies the availability of access for the arrival of terrestrial means, the ability to penetrate the area where the fire originates, and the difficulty of extinguishing fuels.

Indicators such as the Accessibility Index, Penetrability Index and Fireline Opening Index (construction) have been used for the formulation of TDI. This index is based on other indices such as the Wildfire Suppression Difficulty Index (terrestrial) (SDIt) (Matthew P Thompson et al, 2018. Francisco Rodriguez and Silva et al, 2020.) which is a quantitative rating of the relative difficulty to perform fire control work. However, TDI is dynamic as it incorporates changes in surface fuels over time providing a less static perspective for a planning point of view.

Terrain Difficulty Index		Acres	Percent
Very Low		17	100%
Low			0%
Intermediate			0%
High			0%
Extreme			0%
Total		17	100%






Terrain Difficulty Index

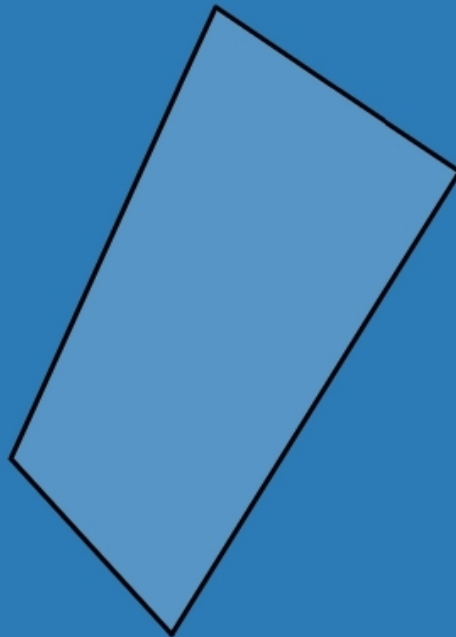
Greaves Subdivision Fil No. 1



Greaves Subdivision Fil No. 1

Terrain Difficulty

-  Very Low
-  Low
-  Intermediate
-  High
-  Extreme



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90 m
300 ft

Wildfire Behavior Outputs

Description

Fire behavior is the way a fire reacts to the following environmental influences:

1. Fuels
2. Weather
3. Topography



Fire behavior characteristics are attributes of wildland fire that pertain to its spread, intensity, and growth. Fire behavior characteristics utilized in the Colorado WRA include fire type, rate of spread, flame length and fireline intensity (fire intensity scale). These metrics are used to determine the potential fire behavior under different weather scenarios. Areas that exhibit moderate to high fire behavior potential can be identified for mitigation treatments, especially if these areas are in close proximity to homes, business, or other assets.

Fuels

The Colorado WRA includes composition and characteristics for both surface fuels and canopy fuels. Assessing canopy fire potential and surface fire potential allows identification of areas where significant increases in fire behavior affects the potential of a fire to transition from a surface fire to a canopy fire.

Fuel datasets required to compute both surface and canopy fire potential include:

1. Surface Fuels are typically categorized into one of four primary fuel types based on the primary carrier of the surface fire: 1) grass, 2) shrub/brush, 3) timber litter, and 4) slash. They are generally referred to as fire behavior fuel models and provide the input parameters needed to compute surface fire behavior. The 2022 assessment uses the latest 2022 calibrated fuels for Colorado. The following custom fuels were included to improve the fire modeling in timber, WUI and agricultural areas:

- Timber: 2 new categories (171 and 191)

- Urban: 7 new categories (911,912,913,914,915,916 and 919)

- Roads: 5 new categories (941,942,943,944 and 949)

- Agriculture: 4 new categories (931,932,938 and 939)

- Water: 3 new categories (981,982 and 989)

2. Canopy Cover is the horizontal percentage of the ground surface that is covered by tree crowns. It is used to compute wind-reduction factors and shading.

3. Canopy Ceiling Height/Stand Height is the height above the ground of the highest canopy layer where the density of the crown mass within the layer is high enough to support vertical movement of a fire. A good estimate of canopy ceiling height is the average height of the dominant and co-dominant trees in a stand. It is used to compute wind reduction to mid-flame height, and spotting distances from torching trees.



4. Canopy Base Height is the lowest height above the ground above which sufficient canopy fuel exists to vertically propagate fire (Scott & Reinhardt, 2001). Canopy base height is a property of a plot, stand or group of trees, not an individual tree. For fire modeling, canopy base height is an effective value that incorporates ladder fuels, such as tall shrubs and small trees. Canopy base height is used to determine whether a surface fire will transition to a canopy fire.

5. Canopy Bulk Density is the mass of available canopy fuel per unit canopy volume (Scott & Reinhardt, 2001). Canopy bulk density is a bulk property of a stand, plot, or group of trees, not an individual tree. Canopy bulk density is used to predict whether an active crown fire is possible.

Weather

Weather data (1979-2022) from gridMET was used to analyze potential weather scenarios in which assessing fire behavior and spread. gridMET is a dataset of daily high-spatial resolution (~4-km, 1/24th degree) surface meteorological data covering the contiguous US. Air temperature data at 2m, relative humidity at 2m, and wind speed and direction at 10 m were all downloaded and used.

After computing the weather percentiles of the gridMET variables, data was interpolated using IDW algorithms (Inverse Distance Weighting) at 20-meter pixel resolution.

Dead fuel moisture content was estimated using the model of Rothermel and Rinehart (1983). Both temperature and air relative humidity at 2m from gridMET was used to define the fuel moisture model. The model also considered elevation and aspect to take into account the accumulated solar radiation at 14h (local time). 1% and 2% were added to the 1h-dead fuel moisture content to estimate 10h and 100h dead fuel moisture content, respectively.

For the first time in CO-WRA risk assessments, both herbaceous and woody live fuel moisture content was modelled using Technosylva's proprietary models based on optical imagery, drought indices and phenology. The models were trained with the WFAS National live fuel moisture content. Foliar moisture content in the canopies was considered as a constant value (80%) across the entire state.

Wind speed at 10 m was estimated at 20 ft applying a wind adjustment factor to use 20-ft wind speed in the fire spread and behavior equations. Afterward, wind speed percentiles were computed to use these data in the FB analysis at 20-meter pixel resolution. Wind direction for Colorado was analyzed for a 40-year period (1979-2022) considering the calculated wind speed percentiles from gridMET data. Predominant wind direction is from SW to NE, especially when wind speed is high or very high.

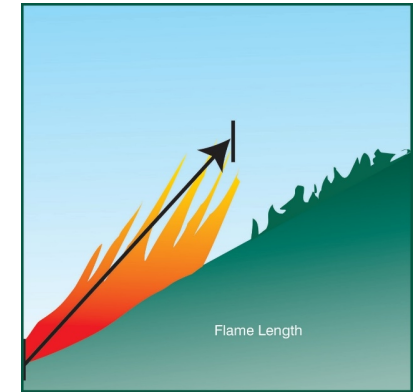
Characteristic Flame Length

The typical or representative flame length of a potential fire based on a weighted average of four percentile weather categories.

Flame Length is defined as the distance between the flame tip and the midpoint of the flame depth at the base of the flame, which is generally the ground surface. It is an indicator of fire intensity and is often used to estimate how much heat the fire is generating.

Flame length is typically measured in feet. Flame length is the measure of fire intensity used to generate the Fire Effects outputs for the CO-WRA and it is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for each 20-meter grid cell in Colorado.

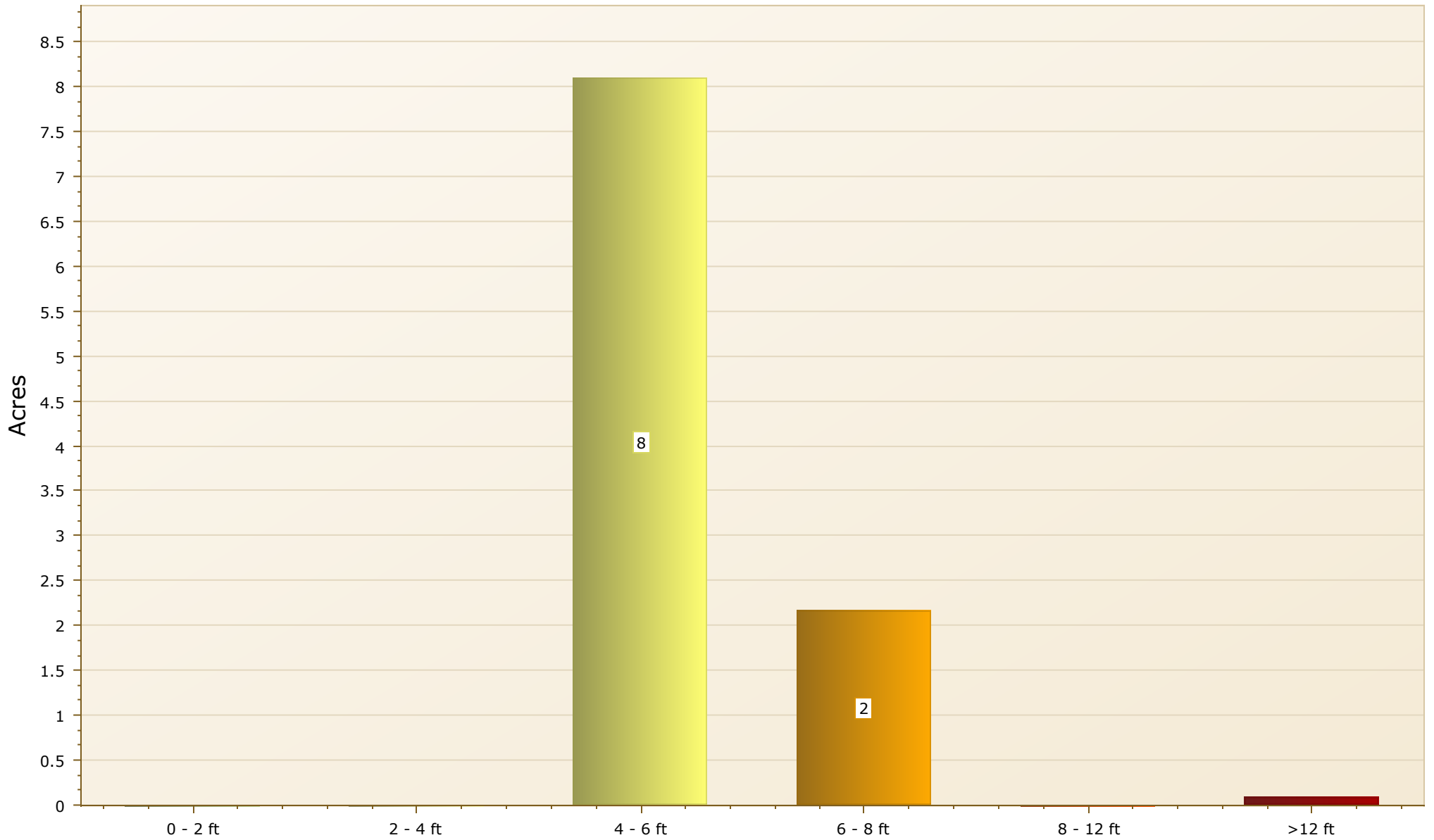
The Characteristic Flame Length represents the weighted average for all four weather percentiles. While not discussed in this report, the individual percentile weather Flame Length outputs are available in the CO-WRA data.

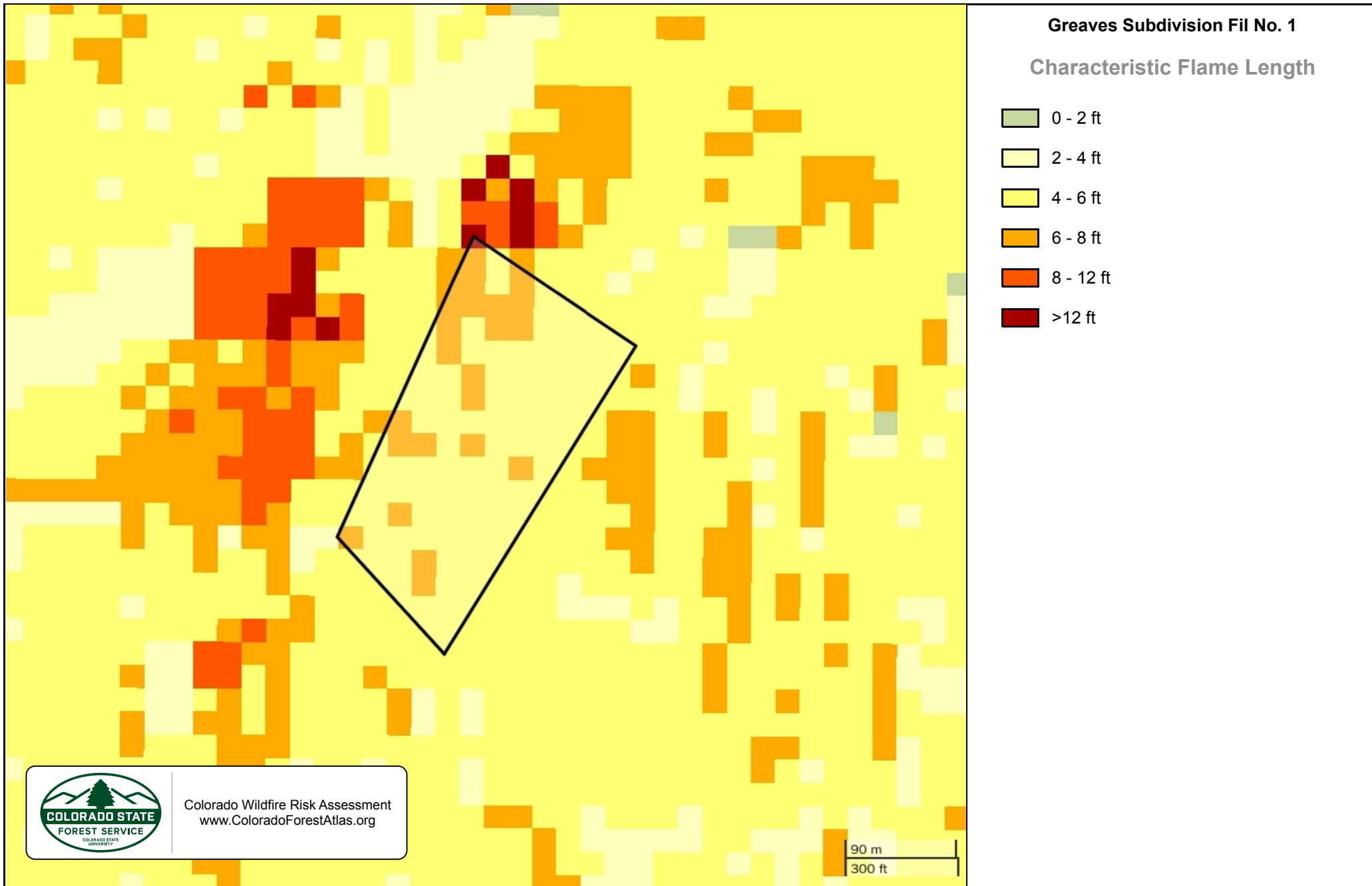


Characteristic Flame Length	Acres	Percent
0 - 2 ft		0%
2 - 4 ft		0%
4 - 6 ft	8	59.4%
6 - 8 ft	2	15.9%
8 - 12 ft		0%
>12 ft		0.7%
Total	10	76%

Characteristic Flame Length

Greaves Subdivision Fil No. 1





Fire Intensity Scale

Description

Quantifies the potential fire intensity by orders of magnitude.

Fire Intensity Scale (FIS) specifically identifies areas where significant fuel hazards and associated dangerous fire behavior potential exist. Similar to the Richter scale for earthquakes, FIS provides a standard scale to measure potential wildfire intensity. FIS consist of five (5) classes where the order of magnitude between classes is ten-fold. The minimum class, Class 1, represents very low wildfire intensities and the maximum class, Class 5, represents very high wildfire intensities.

1. Class 1, Lowest Intensity:

Very small, discontinuous flames, usually less than 1 foot in length; very low rate of spread; no spotting. Fires are typically easy to suppress by firefighters with basic training and non-specialized equipment.

2. Class 2, Low:

Small flames, usually less than two feet long; small amount of very short-range spotting possible. Fires are easy to suppress by trained firefighters with protective equipment and specialized tools.

3. Class 3, Moderate:

Flames up to 8 feet in length; short-range spotting is possible. Trained firefighters will find these fires difficult to suppress without support from aircraft or engines, but dozer and plows are generally effective. Increasing potential for harm or damage to life and property.

4. Class 4, High:

Large Flames, up to 30 feet in length; short-range spotting common; medium range spotting possible. Direct attack by trained firefighters, engines, and dozers is generally ineffective, indirect attack may be effective. Significant potential for harm or damage to life and property.

5. Class 5, Highest Intensity:


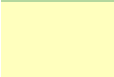


Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire-induced winds. Indirect attack marginally effective at the head of the fire. Great potential for harm or damage to life and property.

Burn Probability and Fire Intensity Scale are designed to complement each other. Unlike Wildfire Threat, the Fire Intensity Scale does not incorporate historical occurrence information. It only evaluates the potential fire behavior for an area, regardless if any fires have occurred there in the past. This additional information allows mitigation planners to quickly identify areas where dangerous fire behavior potential exists in relationship to nearby homes or other valued assets.

Since all areas in Colorado have fire intensity scale calculated consistently, it allows for comparison and ordination of areas across the entire state. For example, a high fire intensity area in Eastern Colorado is equivalent to a high fire intensity area in Western Colorado.

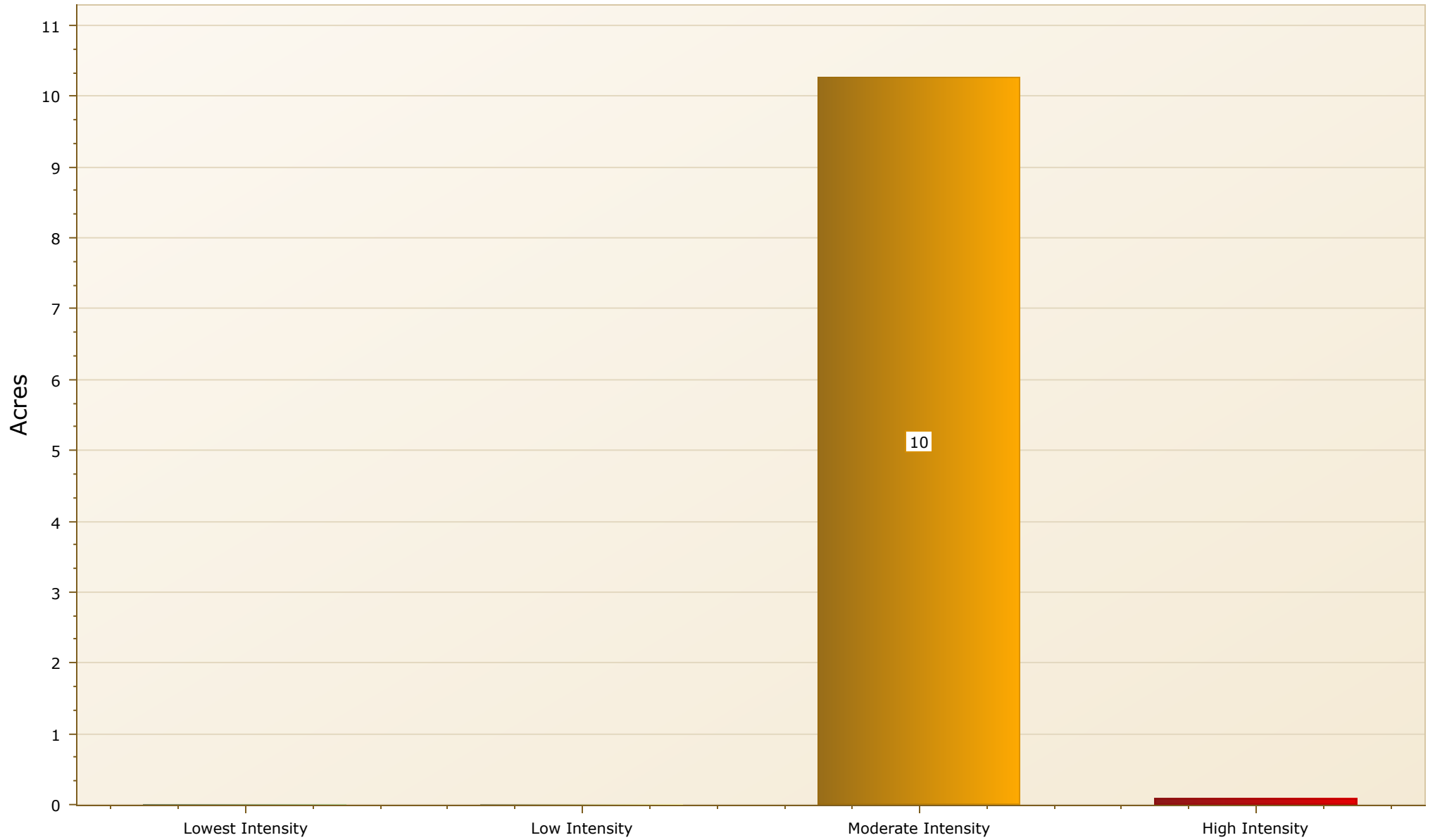
Fire intensity scale is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography – and the spread itself (back, flank or head fire influences fire behavior for a given pixel for a specific fire simulation). Weather is by far the most dynamic variable as it changes frequently. Thus, each pixel may burn many times with different fire spread patterns based on the aforementioned factors. The fire intensity scale maps represent an average fire intensity map.

The fire intensity scale map is derived at a 20-meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not appropriate for site specific analysis, it is appropriate for regional, county, or local planning efforts.

FIS Class		Acres	Percent
	Lowest Intensity		0%
	Low Intensity		0%
	Moderate Intensity	10	99%
	High Intensity		1%
Total		10	100%



Fire Intensity Scale

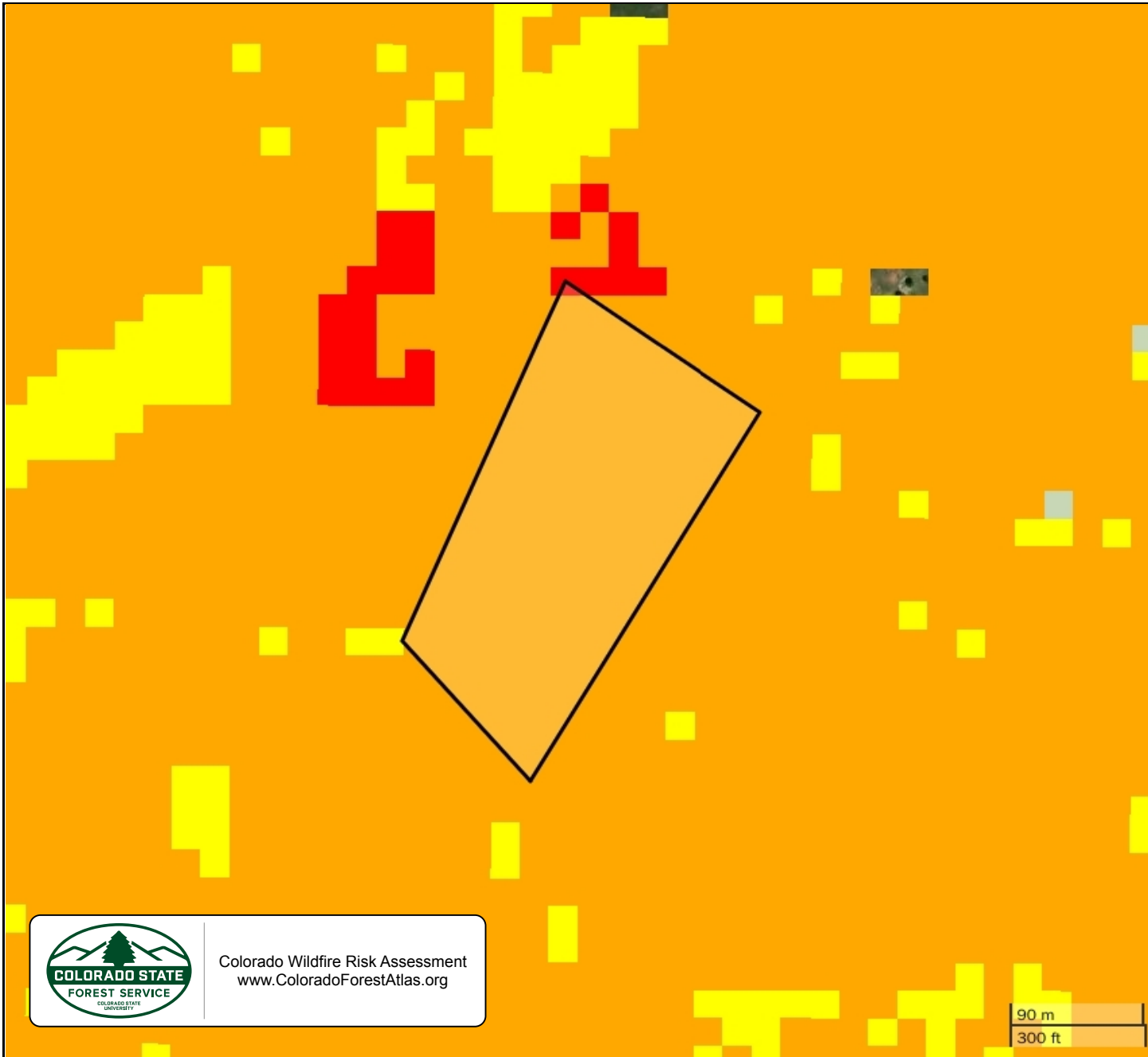
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Fire Intensity Scale

-  Lowest Intensity
-  Low Intensity
-  Moderate Intensity
-  High Intensity



90 m
300 ft



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Fire Type

Represents the potential fire type under the extreme percentile weather category.

Canopy fires are very dangerous, destructive and difficult to control due to their increased fire intensity. From a planning perspective, it is important to identify where these conditions are likely to occur on the landscape so that special preparedness measure can be taken if necessary. The Fire Type layer shows the footprint of where these areas are most likely to occur. However, it is important to note that canopy fires are not restricted to these areas. Under the right conditions, it can occur in other canopied areas.

There are two primary fire types – surface fire and canopy fire. Canopy fire can be further subdivided into passive canopy fire and active canopy fire. A short description of each of these is provided below.

- **Surface Fire** - A fire that spreads through surface fuel without consuming any overlying canopy fuel. Surface fuels include grass, timber litter, shrub/brush, slash and other dead or live vegetation within about 6 feet of the ground.
- **Passive Canopy Fire** – A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods (Scott & Reinhardt, 2001).
- **Conditional Crown Fire** – A type of crown fire in which an active crown fire is possible but one would not be predicted to initiate. Two outcomes are possible in that situation: surface fire if the fire starts in the stand as a surface fire, or active crown fire if fire enters the stand as an active crown fire.
- **Active Canopy Fire** - A crown fire in which the entire fuel complex (canopy) is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread (Scott & Reinhardt, 2001).

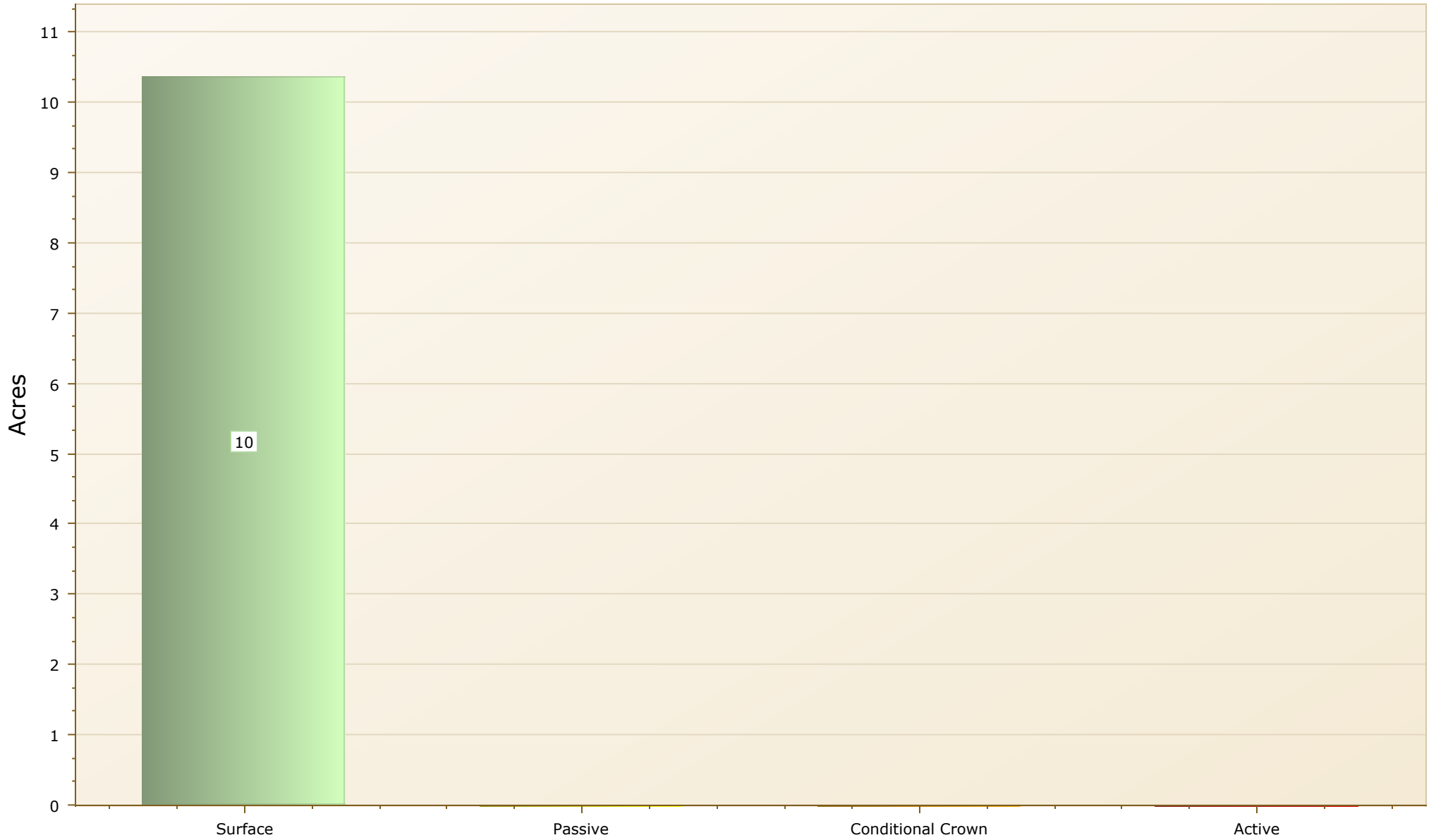
The fire type map is derived at a 20-meter resolution and was estimated based on the extreme weather scenario (percentile 97th). This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not appropriate for site specific analysis, it is appropriate for regional, county or local planning efforts.



Fire Type		Acres	Percent
Surface		10	100%
Passive			0%
Conditional Crown			0%
Active			0%
Total		10	100%

Fire Type

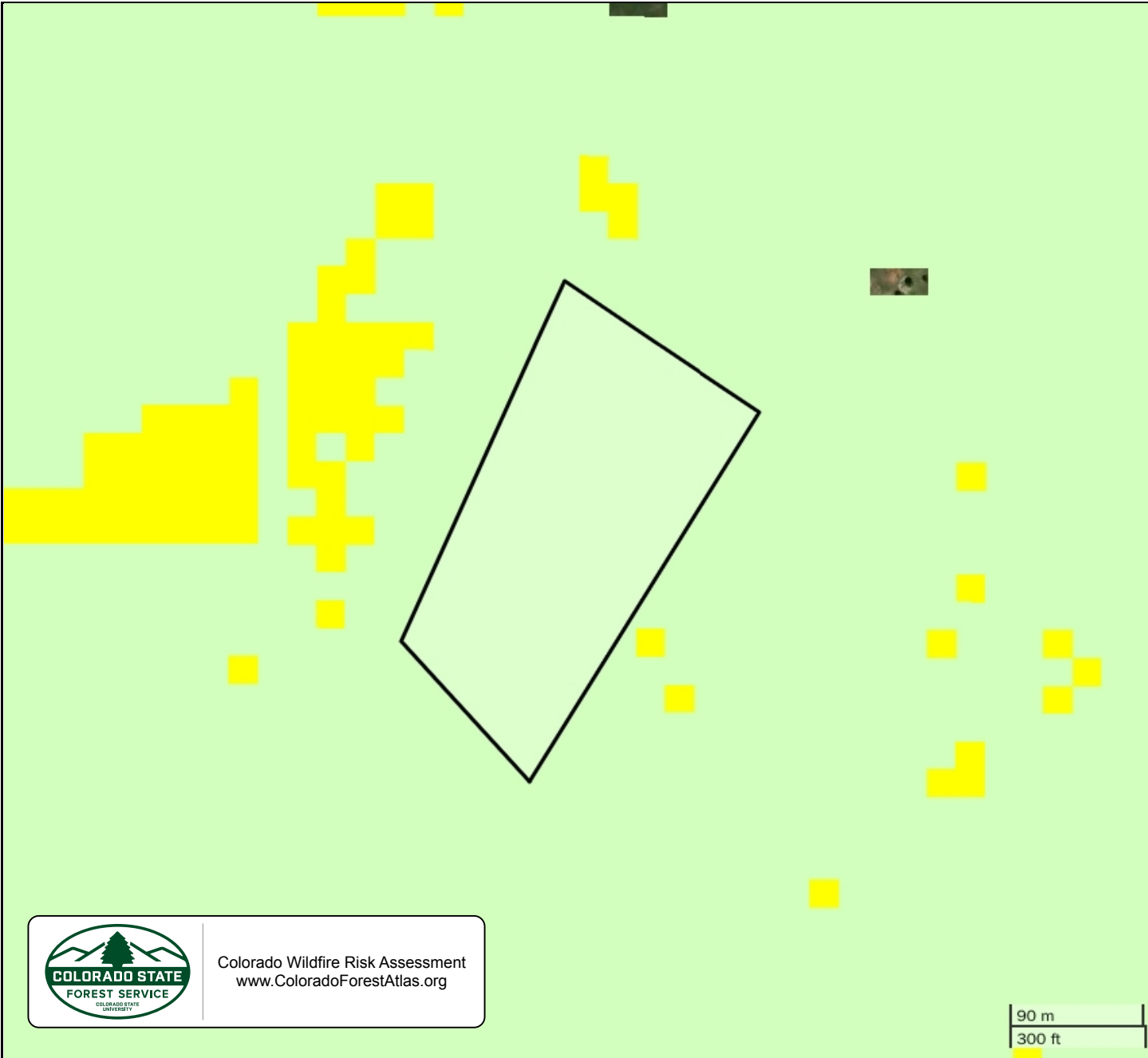
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Fire Type

- Surface
- Passive
- Conditional Crown
- Active



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Rate of Spread

The typical or representative rate of spread of a potential fire based on a weighted average of four percentile weather categories.

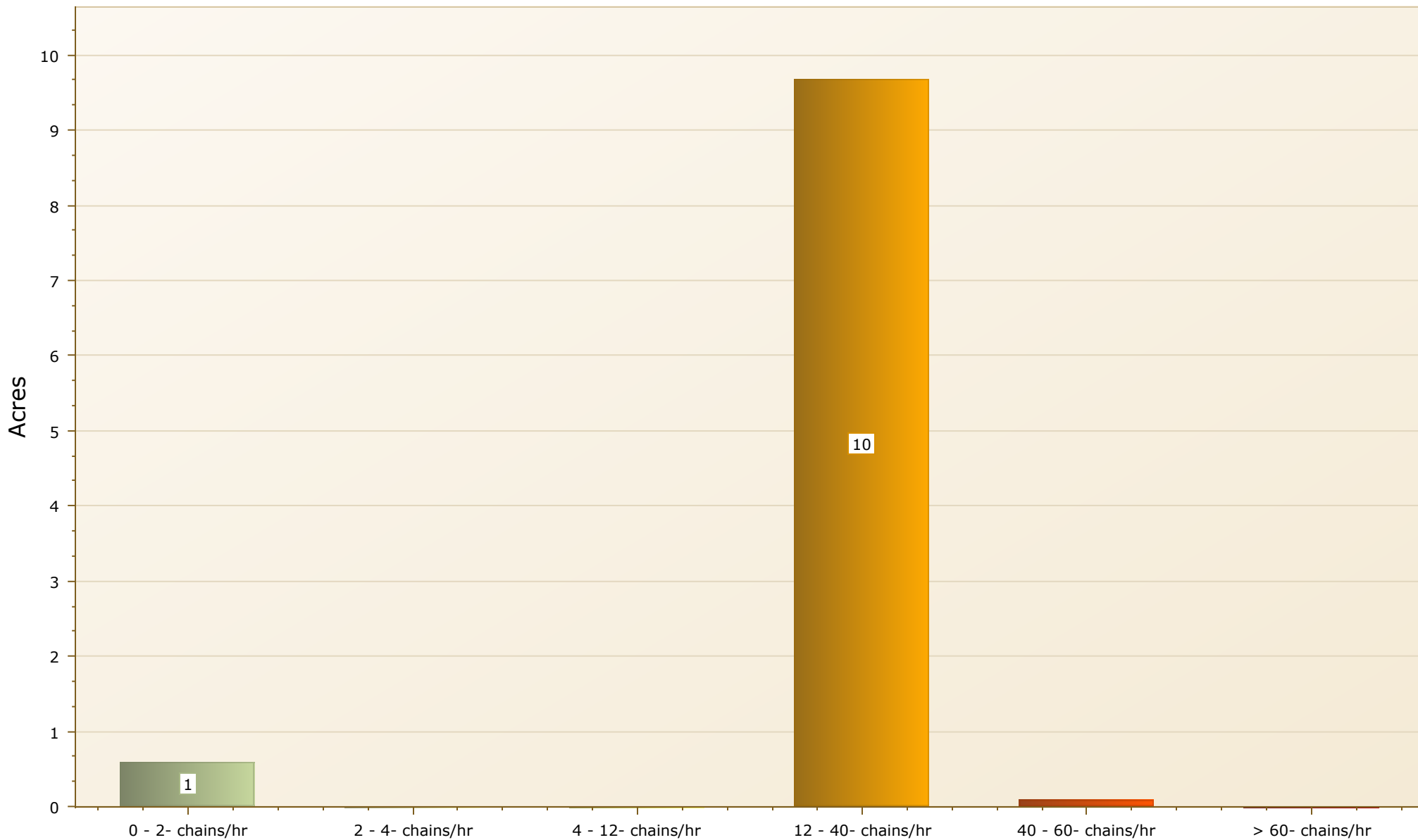
Rate of spread is the speed with which a fire moves in a horizontal direction across the landscape, usually expressed in chains per hour (ch/hr) or feet per minute (ft/min). For purposes of the CO-WRA, this measurement represents the maximum rate of spread of the fire front.

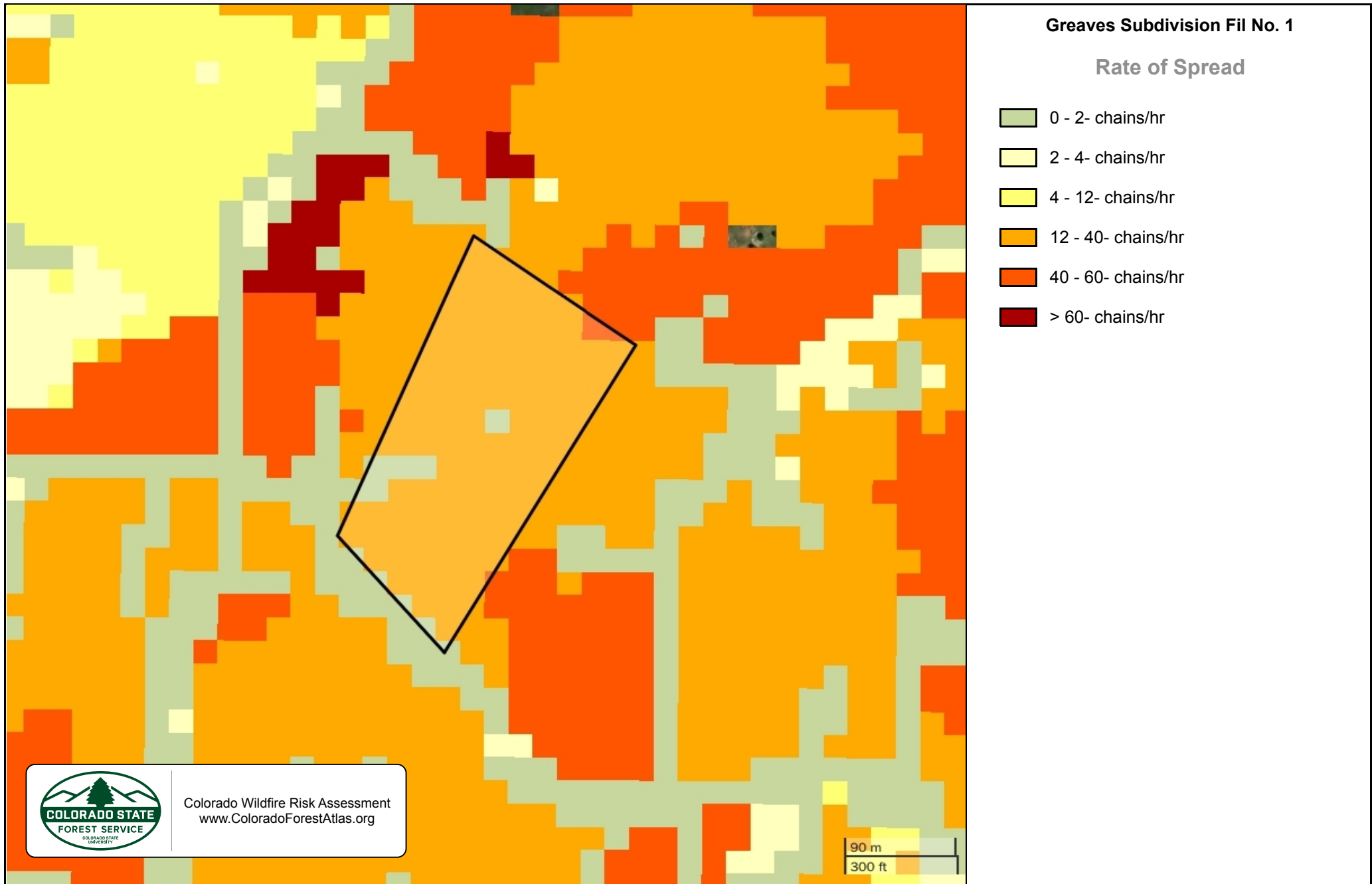
Rate of spread is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for a 20-meter grid cell in Colorado.

	Rate of Spread	Acres	Percent
	0 - 2- chains/hr	1	5.7%
	2 - 4- chains/hr		0%
	4 - 12- chains/hr		0%
	12 - 40- chains/hr	10	93.3%
	40 - 60- chains/hr		1%
	> 60- chains/hr		0%
	Total	10	100%

Rate of Spread

Greaves Subdivision Fil No. 1





Surface Fuels

Fire behavior fuel models that contain the parameters required to calculate fire behavior outputs.

Surface fuels, or fire behavior fuel models as they are technically referred to, contain the parameters needed by the Rothermel (1972) surface fire spread model to compute surface fire behavior characteristics, e.g. rate of spread, flame length, fireline intensity, and other fire behavior metrics. As the name might suggest, surface fuels account only for surface fire potential. Canopy fire potential is computed through a separate but linked process. The CO-WRA accounts for both surface and canopy fire potential in the fire behavior outputs.

An up-to-date surface fuel dataset at 20-meter (m) resolution was developed for this project, based on Scott and Burgan (2005) fuel models, enhanced with custom fuels created by Technosylva. The custom fuels distinguish this assessment from previous ones performed in Colorado as they allow a better characterization of fire behavior across the landscape. Additionally, the urban and road custom fuel models included in the assessment are key for better characterizing the exposure, vulnerability and risk of both buildings and population in the Wildland Urban Interface (WUI). This also allows for better modeling of fire encroachment in urban areas considering the building density, community structure and fuels surrounding the buildings and urban areas.

The following custom fuels were included in order to improve the fire modeling in timber, WUI and agricultural areas:

- Timber: 2 new categories (171 and 191)
- Urban: 7 new categories (911,912,913,914,915,916 and 919)
- Roads: 5 new categories (941,942,943,944 and 949)
- Agriculture: 4 new categories (931,932,938a and 939)
- Water: 3 new categories (981,982 and 989)

Additionally, we also considered canopy fuel data to better simulate crown fire behavior. This includes:

- canopy bulk density (CBD),
- canopy base height (CBH),
- canopy cover (CC) and
- canopy height (CH).



Unmanaged forest with dead and downed trees and branches



Slash on the ground indicates that forest management treatments have occurred in this area

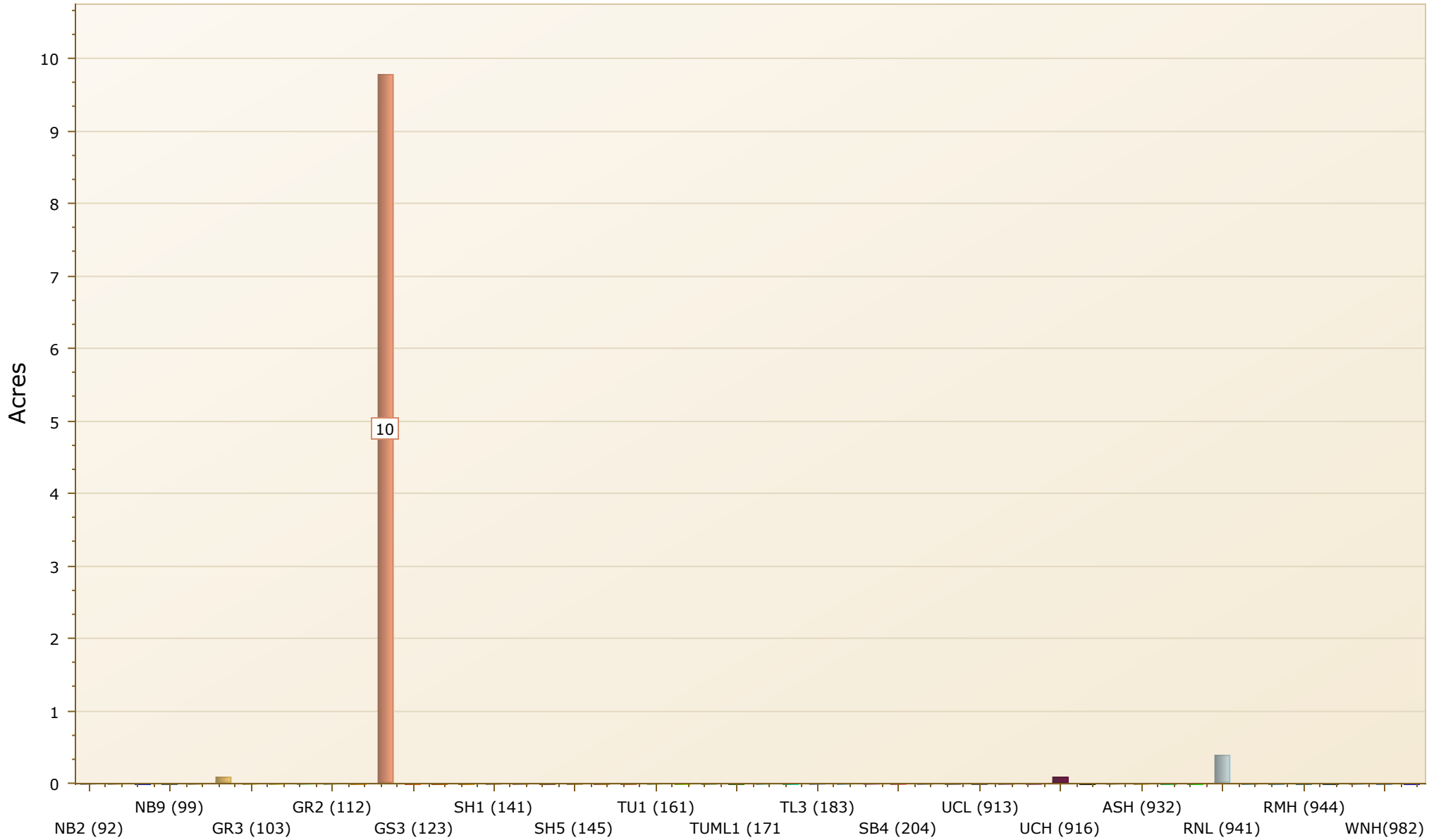
The updated fuel dataset also considered the effects of natural disturbances on vegetation (fires, insect and disease, and harvesting/fuel treatments) that occurred in Colorado from 2013 to 2022. More information about the methods used can be found in the Colorado 2022 Fuels Mapping Final Report.

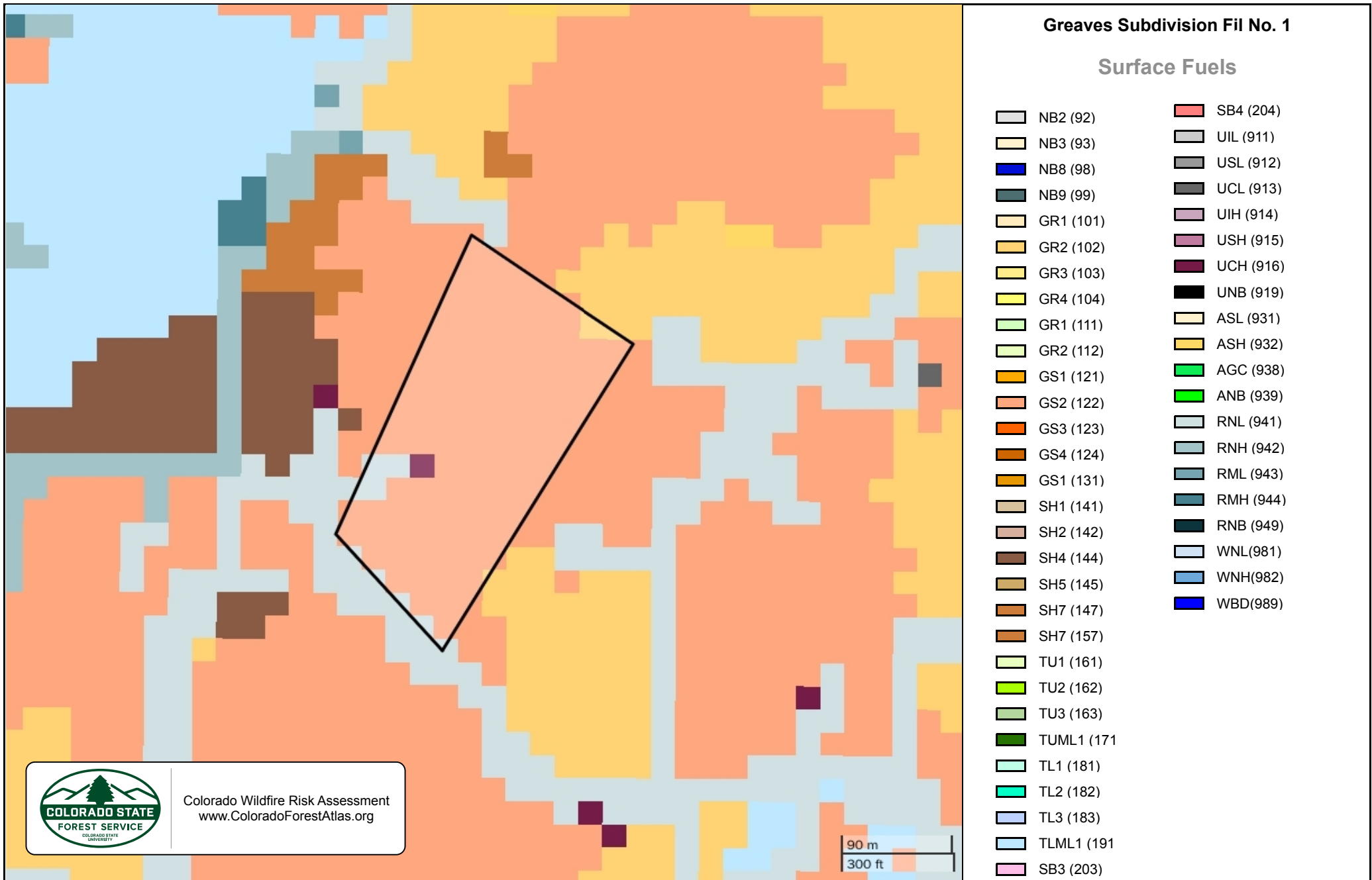
Surface Fuels	Description	Acres	Percent
NB2 (92)	Snow/Ice		0%
NB3 (93)	Agricultural		0%
NB8 (98)	Open Water		0%
NB9 (99)	Bare Ground		0%
GR1 (101)	Short, Sparse Dry Climate Grass		0%
GR2 (102)	Low Load, Dry Climate Grass		1%
GR3 (103)	Low Load, Very Coarse, Humid Climate Grass		0%
GR4 (104)	Moderate Load, Dry Climate Grass		0%
GR1 (111)	Short, Sparse Dry Climate Grass - ALPINE		0%
GR2 (112)	Low Load, Dry Climate Grass - ALPINE		0%
GS1 (121)	Low Load, Dry Climate Grass-Shrub		0%
GS2 (122)	Moderate Load, Dry Climate Grass-Shrub	10	94.3%
GS3 (123)	Moderate Load, Humid Climate Grass-Shrub		0%
GS4 (124)	High Load, Humid Climate Grass-Shrub		0%
GS1 (131)	Low Load, Dry Climate Grass-Shrub - ALPINE		0%
SH1 (141)	Low Load Dry Climate Shrub		0%
SH2 (142)	Moderate Load Dry Climate Shrub		0%
SH4 (144)	Low Load, Humid Climate Timber-Shrub		0%
SH5 (145)	High Load, Dry Climate Shrub		0%
SH7 (147)	Very High Load, Dry Climate Shrub		0%
SH7 (157)	Very High Load, Dry Climate Shrub		0%
TU1 (161)	Low Load Dry Climate Timber-Grass-Shrub		0%
TU2 (162)	Moderate Load, Humid Climate Timber-Shrub		0%
TU3 (163)	Moderate Load, Humid Climate Timber-Grass-Shrub		0%
TUML1 (171)	Timber Understory Dynamic ML (TSYL 2022)		0%
TL1 (181)	Low Load Compact Conifer Litter		0%
TL2 (182)	Low Load Broadleaf Litter		0%
TL3 (183)	Moderate Load Conifer Litter		0%
TLML1 (191)	Timber Litter ML (TSYL 2022)		0%

Surface Fuels	Description	Acres	Percent
SB3 (203)	High Load Activity Fuel or Moderate Load Blowdown		0%
SB4 (204)	High Load Blowdown		0%
UIL (911)	Isolated urban surrounded by Low FB fuel		0%
USL (912)	Scattered urban surrounded by Low FB fuel		0%
UCL (913)	Urban core surrounded by Low FB fuel		0%
UIH (914)	Isolated urban surrounded by High FB fuel		0%
USH (915)	Scattered urban surrounded by High FB fuel		0%
UCH (916)	Urban core surrounded by High FB fuel		1%
UNB (919)	Unburnable urban areas		0%
ASL (931)	Agricultural Low Load Fuels, with seasonal changes of its Burnable condition		0%
ASH (932)	Agricultural High Load Fuels, with seasonal changes of its Burnable condition		0%
AGC (938)	Golf courses - Non-Burnable (no encroachment)		0%
ANB (939)	Agricultural Fields, maintained in a Non-Burnable condition		0%
RNL (941)	Minor roads Low FB		3.8%
RNH (942)	Minor roads High FB		0%
RML (943)	Major roads Low FB		0%
RMH (944)	Major roads High FB		0%
RNB (949)	Roads surrounded by non-burnable fuels		0%
WNL(981)	Minor Water streams surrounded by Low Load Fuel (moderate encroachment)		0%
WNH(982)	Minor Water streams surrounded by High Load Fuel (high encroachment)		0%
WBD(989)	Water Bodies		0%
Total		10	100%

Surface Fuels

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Vegetation

The Vegetation map describes the general vegetation and landcover types across the state of Colorado.

In the CO-WRA, the Vegetation dataset is used to support the development of the Surface Fuels, Canopy Cover, Canopy Stand Height, Canopy Base Height, and Canopy Bulk Density datasets.

The 2020 LANDFIRE program data product (Existing Vegetation Type) was used to compile the Vegetation data for the CO-WRA. This reflects data current to 2020. The LANDFIRE EVT data were classified to reflect general vegetation cover types for representation with CFA.



Oak shrublands are commonly found along dry foothills and lower mountain slopes, and are often situated above Piñon-juniper.



Piñon-juniper woodlands are common in southern and southwestern Colorado



Douglas-fir understory in a ponderosa pine forest



















Grasslands occur both on Colorado's Eastern Plains and on the Western Slope.



Wildland fire threat increases in lodgepole pine as the dense forest grows old

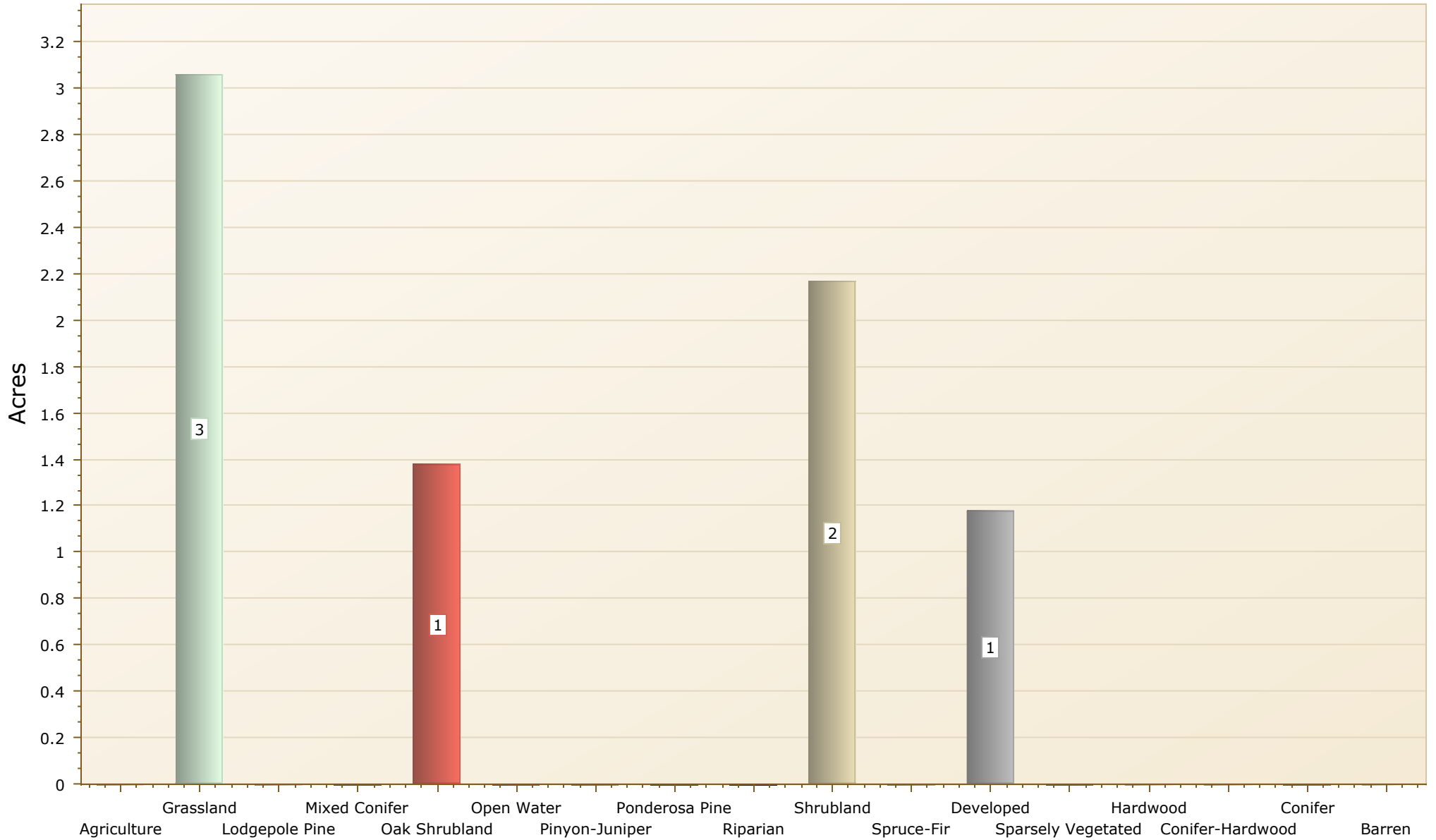


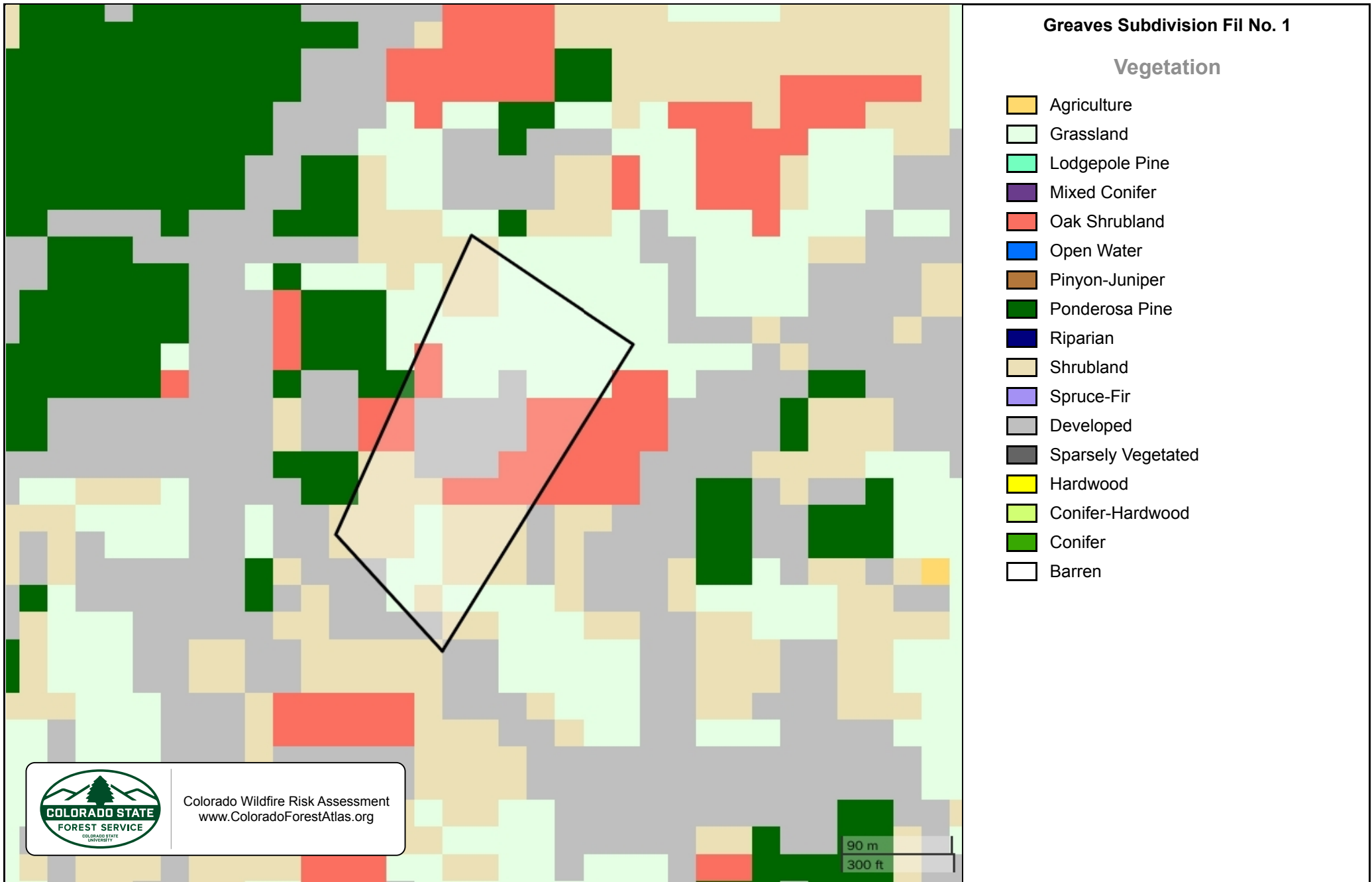
Overly dense ponderosa pine, a dominant species of the montane zone

Vegetation Class		Acres	Percent
	Agriculture		0%
	Grassland	3	39.2%
	Lodgepole Pine		0%
	Mixed Conifer		0%
	Oak Shrubland	1	17.7%
	Open Water		0%
	Pinyon-Juniper		0%
	Ponderosa Pine		0%
	Riparian		0%
	Shrubland	2	27.8%
	Spruce-Fir		0%
	Developed	1	15.2%
	Sparsely Vegetated		0%
	Hardwood		0%
	Conifer-Hardwood		0%
	Conifer		0%
	Barren		0%
Total		8	100%

Vegetation

Greaves Subdivision Fil No. 1





Watershed Protection Risk

A measure of the risk to Watershed Protection Areas based on the potential negative impacts from wildfire.

In areas that experience low-severity burns, fire events can serve to eliminate competition, rejuvenate growth and improve watershed conditions. But in landscapes subjected to high, or even moderate-burn severity, the post-fire threats to public safety and natural resources can be extreme.

High-severity wildfires remove virtually all forest vegetation – from trees, shrubs and grasses down to discarded needles, decomposed roots and other elements of ground cover or duff that protect forest soils. A severe wildfire also can cause certain types of soil to become hydrophobic by forming a waxy, water-repellent layer that keeps water from penetrating the soil, dramatically amplifying the rate of runoff.

The loss of critical surface vegetation leaves forested slopes extremely vulnerable to large-scale soil erosion and flooding during subsequent storm events. In turn, these threats can impact the health, safety and integrity of communities and natural resources downstream. The likelihood that such a post-fire event will occur in Colorado is increased by the prevalence of highly erodible soils in several parts of the state, and weather patterns that frequently bring heavy rains on the heels of fire season.

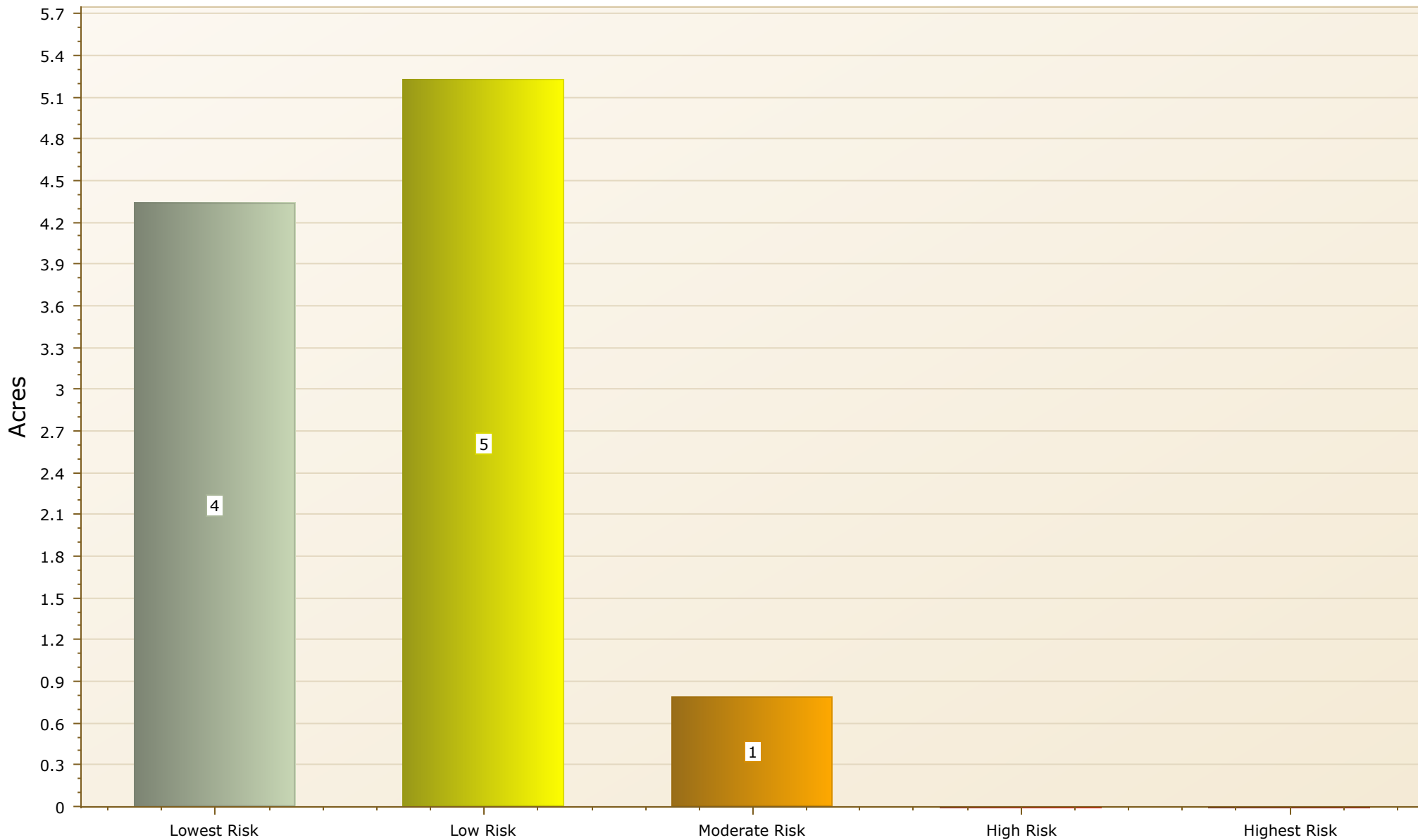
In the aftermath of the 2002 fire season, the Colorado Department of Health estimated that 26 municipal water storage facilities were shut down due to fire and post-fire impacts. The potential for severe soil erosion is a consequence of wildfire because as a fire burns, it destroys plant material and the litter layer. Shrubs, forbs, grasses, trees and the litter layer disperse water during severe rainstorms. Plant roots stabilize the soil, and stems and leaves slow the water to give it time to percolate into the soil profile. Fire can destroy this soil protection.

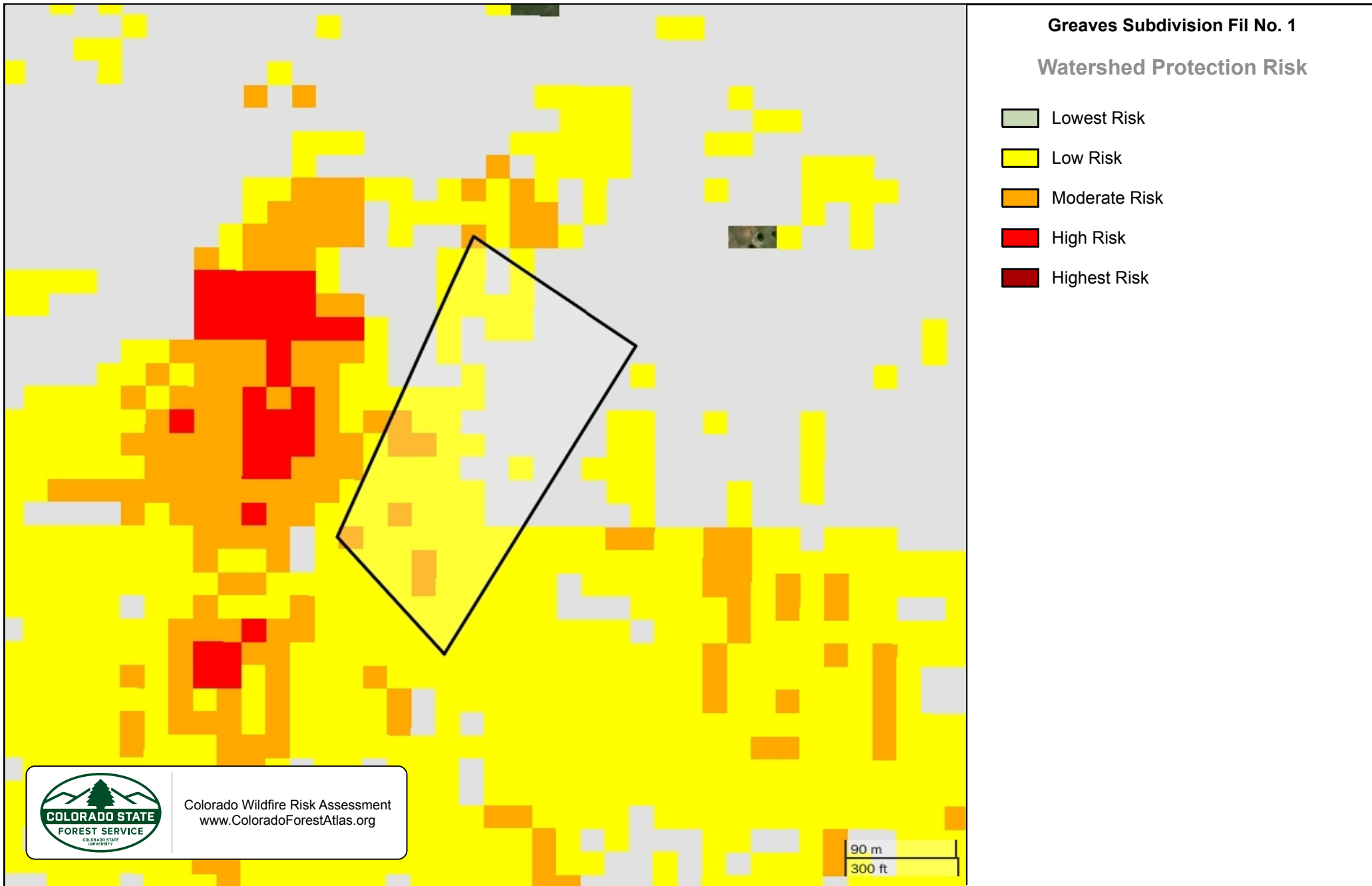
The risk index has been calculated by combining the Watershed Protection data with a measure of fire intensity using a Response Function approach. Those areas with the highest negative impact (-9) represent areas with high potential fire intensity and high importance for ecosystem services. Those areas with the lowest negative impact (-1) represent those areas with low potential fire intensity and a low importance for ecosystem services. The response function outputs were combined into 5 qualitative classes.

Watershed Protection Risk		Acres	Percent
	Lowest Risk	4	41.9%
	Low Risk	5	50.5%
	Moderate Risk	1	7.6%
	High Risk		0%
	Highest Risk		0%
Total		10	100%

Watershed Protection Risk

Greaves Subdivision Fil No. 1





Riparian Assets Risk

A measure of the risk to riparian areas based on the potential negative impacts from wildfire.



The risk index has been calculated by combining the Riparian Assets data with a measure of fire intensity using a Response Function approach. Those areas with the highest negative impact (-9) represent areas with high potential fire intensity and high importance for ecosystem services. Those areas with the lowest negative impact (-1) represent those areas with low potential fire intensity and a low importance for ecosystem services. The response function outputs were combined into 5 qualitative classes.

This risk output is intended to supplement the Watershed Protection Risk Index by identifying wildfire risk within the more detailed riparian areas.

Riparian Assets Risk	Acres	Percent
Lowest Risk		0%
Low Risk		0%
Moderate Risk		0%
High Risk		0%
Total		0%

Riparian Assets Risk

Greaves Subdivision Fil No. 1





Greaves Subdivision Fil No. 1

Riparian Assets Risk

- Lowest Risk
- Low Risk
- Moderate Risk
- High Risk



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90 m
300 ft

Forest Assets Risk

A measure of the risk to forested areas based on the potential negative impacts from wildfire.

This layer identifies those forested areas with the greatest potential for adverse effects from wildfire. This layer identifies those forested areas with the greatest potential for adverse effects from wildfire.

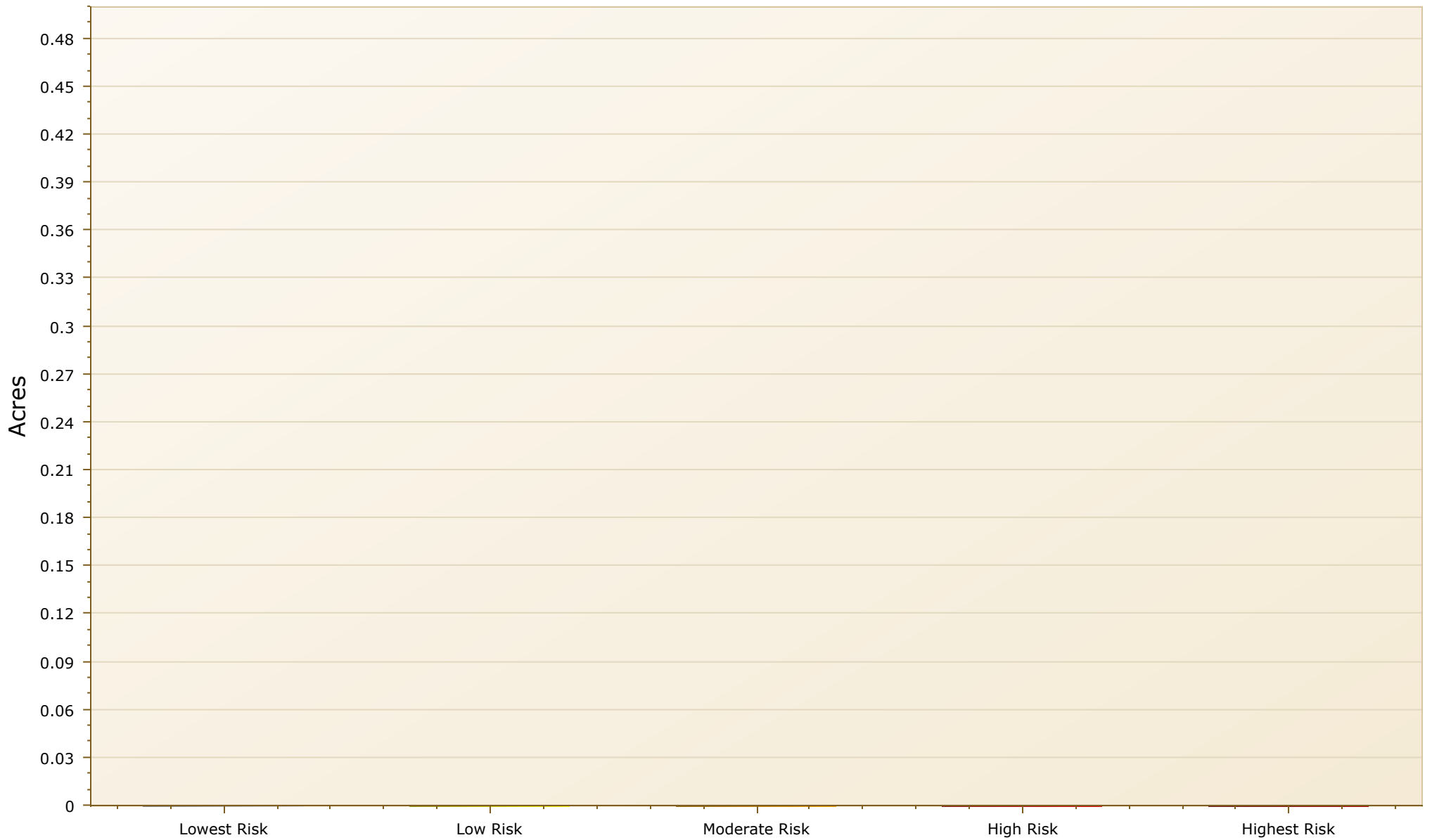
The risk index has been calculated by combining the Forest Assets data with a measure of fire intensity using a Response Function approach. Those areas with the highest negative impact (-9) represent areas with high potential fire intensity and low resilience or adaptability to fire. Those areas with the lowest negative impact (-1) represent those areas with low potential fire intensity and high resilience or adaptability to fire. The response function outputs were combined into 5 qualitative classes.

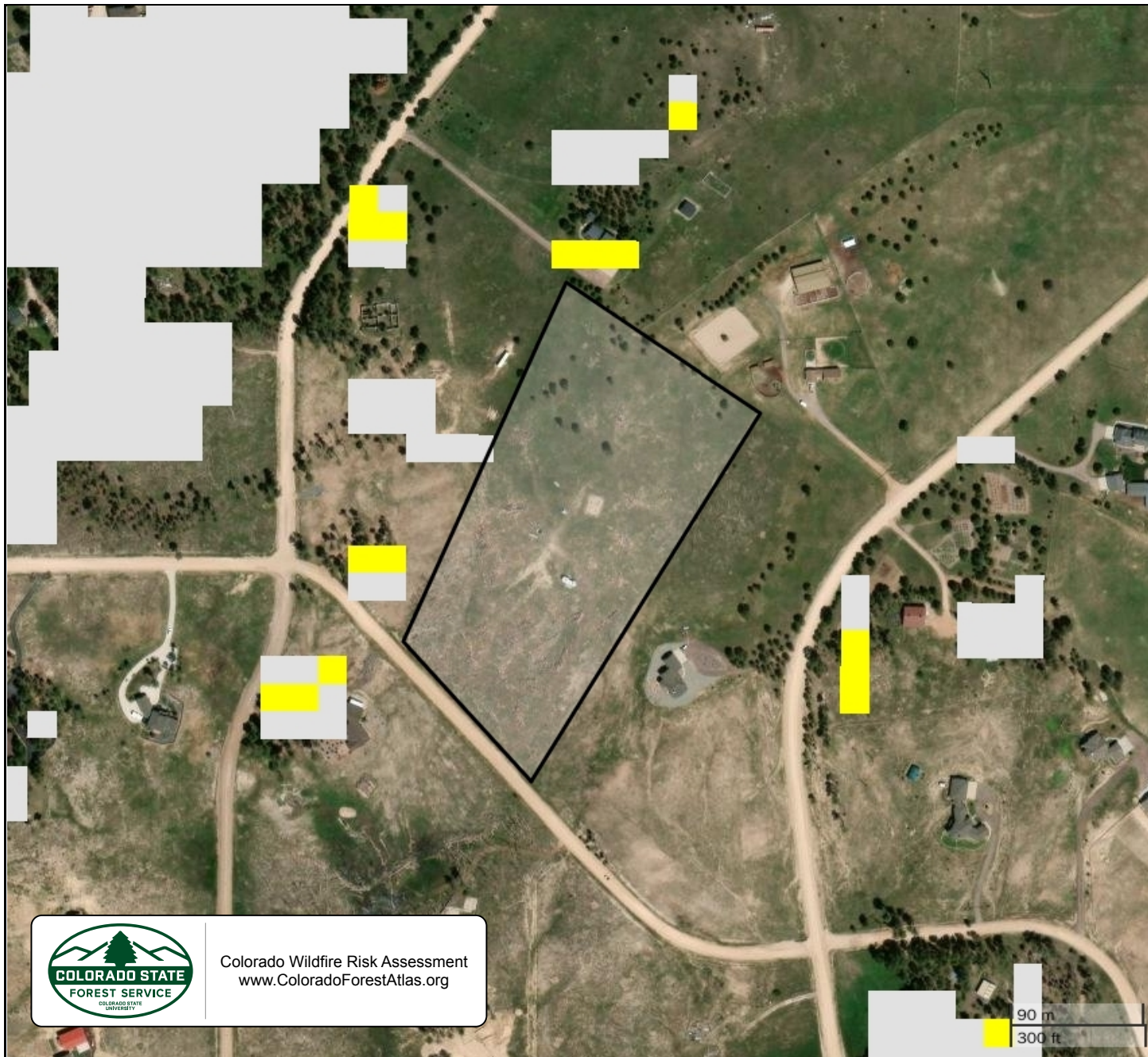
This risk output is intended to provide an overall forest index for potential impact from wildfire. This can be applied to consider aesthetic values, ecosystem services, or economic values of forested lands.

	Forest Assets Risk	Acres	Percent
	Lowest Risk		0%
	Low Risk		0%
	Moderate Risk		0%
	High Risk		0%
	Highest Risk		0%
	Total		0%

Forest Assets Risk

Greaves Subdivision Fil No. 1





Greaves Subdivision Fil No. 1

Forest Assets Risk

- Lowest Risk
- Low Risk
- Moderate Risk
- High Risk
- Highest Risk



Colorado Wildfire Risk Assessment
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90 m
 300 ft

Building Damage Potential

This metric estimates the potential for building loss and was derived using proprietary data from Technosylva Inc. on building damages that was created by analyzing 13 years of building damage data from state agency inspections after large fires.

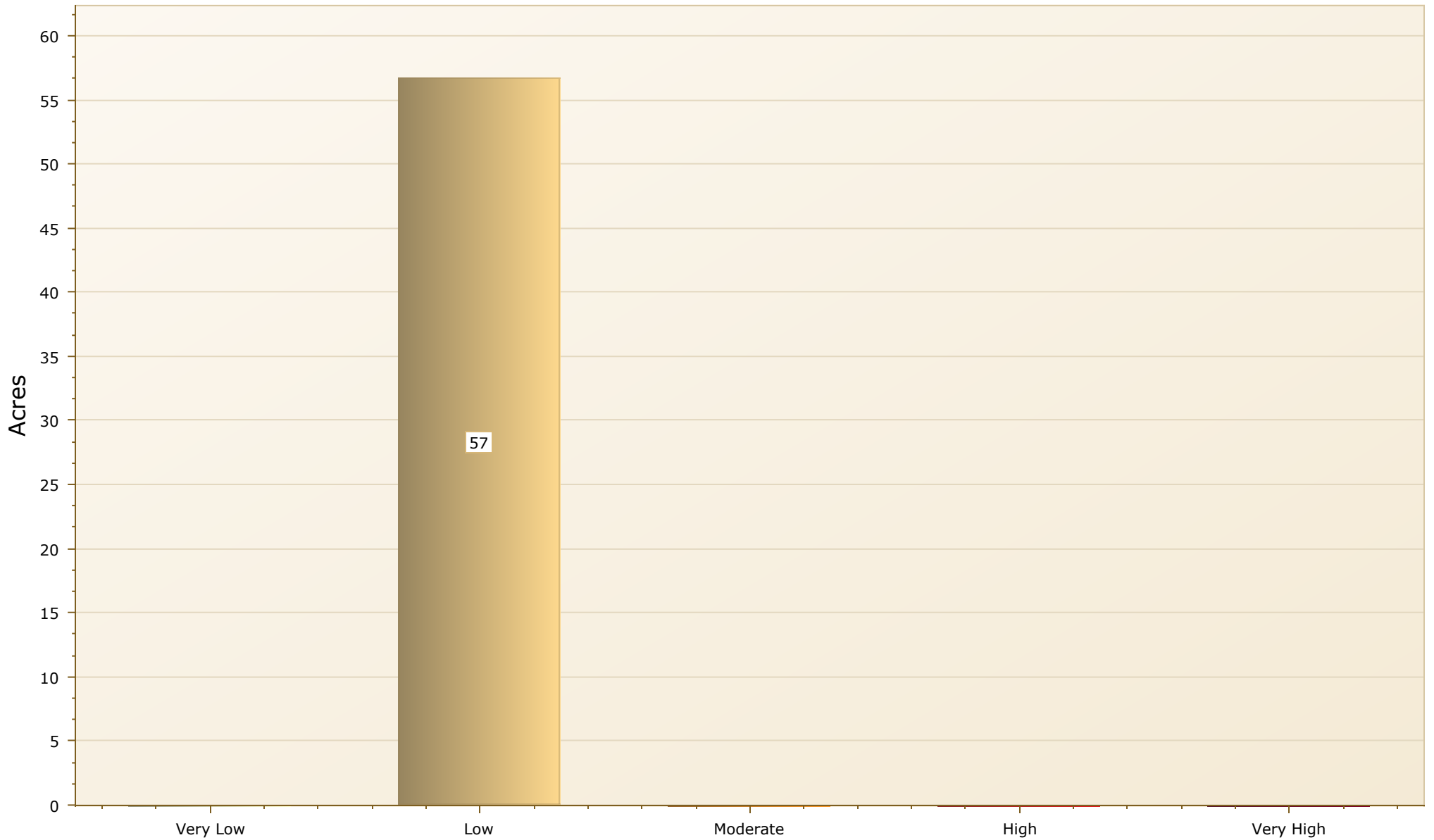
BDP is a spatially variable metric that is calculated on a building-by-building basis and aggregated to Uber H3 hexagons, providing a measure of the number of potential buildings lost based on the number of buildings threatened by fires in the specific area. BDP was calibrated using Machine Learning algorithms that identified the key factors that influenced building loss from historical damage inspection databases. The model has been calibrated using 13 years of damage inspection data and validated across multiple Western States with current wildfire data.

BDP is available as a static risk layer, although a key factor involved in the metric is conditional fire behavior. Conditional Flame Length derived in the fire behavior analysis conducted for the 2022 CO-WRA was used. However, the metric can also be used as a dynamic layer when modulated by the fire intensity of an active wildfire through conventional fire behavior analysis. Although applied as a static layer for the 2022 CO-WRA, the metric is used operationally in California by state agencies and private industry for risk forecasting

	Building Damage Potential	Acres	Percent
	Very Low		0%
	Low	57	100%
	Moderate		0%
	High		0%
	Very High		0%
	Total	57	100%

Building Damage Potential


Greaves Subdivision Fil No. 1



65/70

Greaves Subdivision Fil No. 1

Building Damage Potential

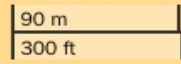
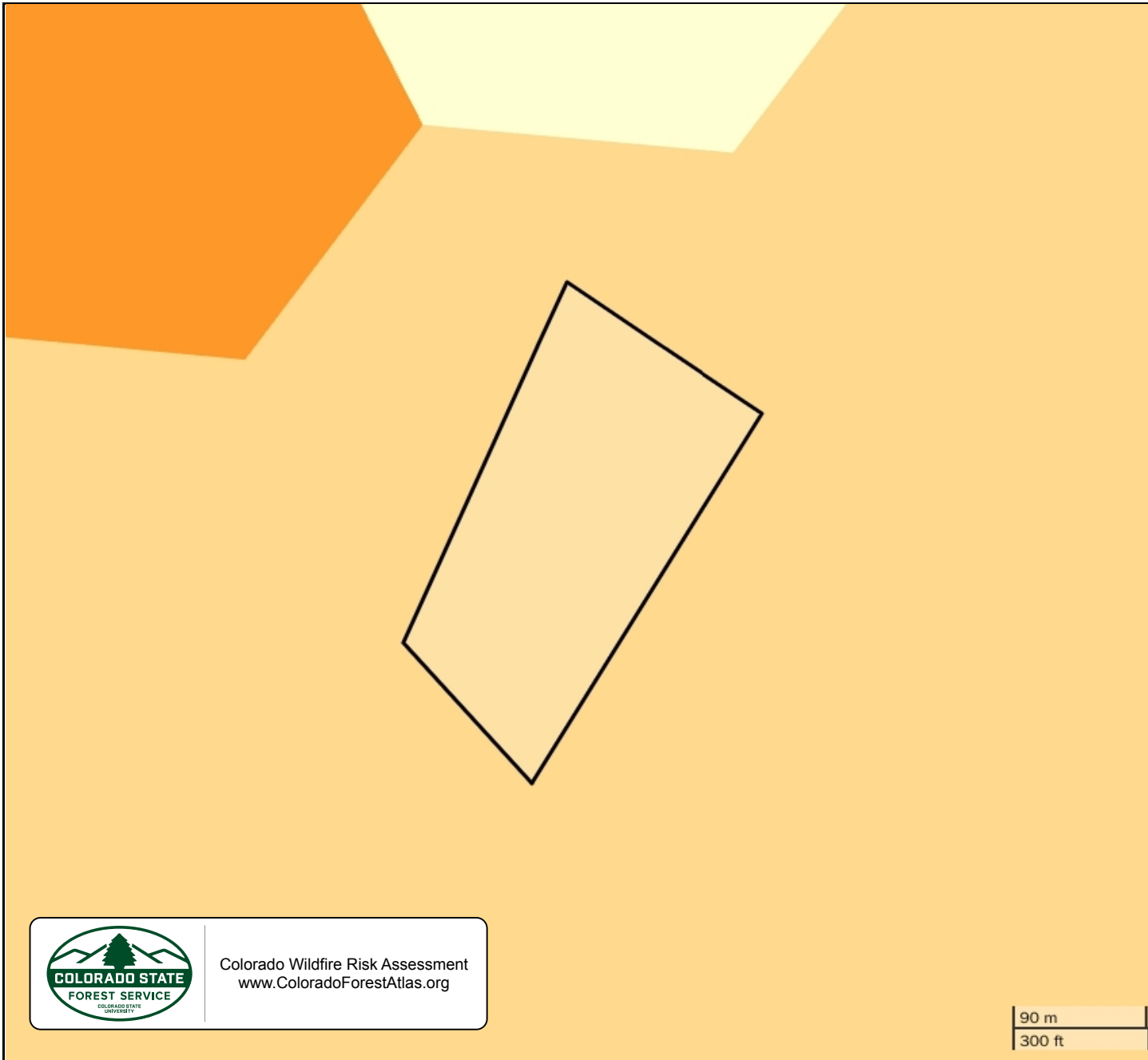
 Very Low

 Low

 Moderate

 High

 Very High



Colorado Wildfire Risk Assessment
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Defensible Space Index

The defensible space in a Wildfire Urban Interface (WUI) analysis context refers to the space that surrounds a specific building and can be used to define the hazard, or the exposure, to a wildfire occurrence. In this area, natural and manmade fuels are treated, cleared or reduced to slow the spread of wildfire near structures.

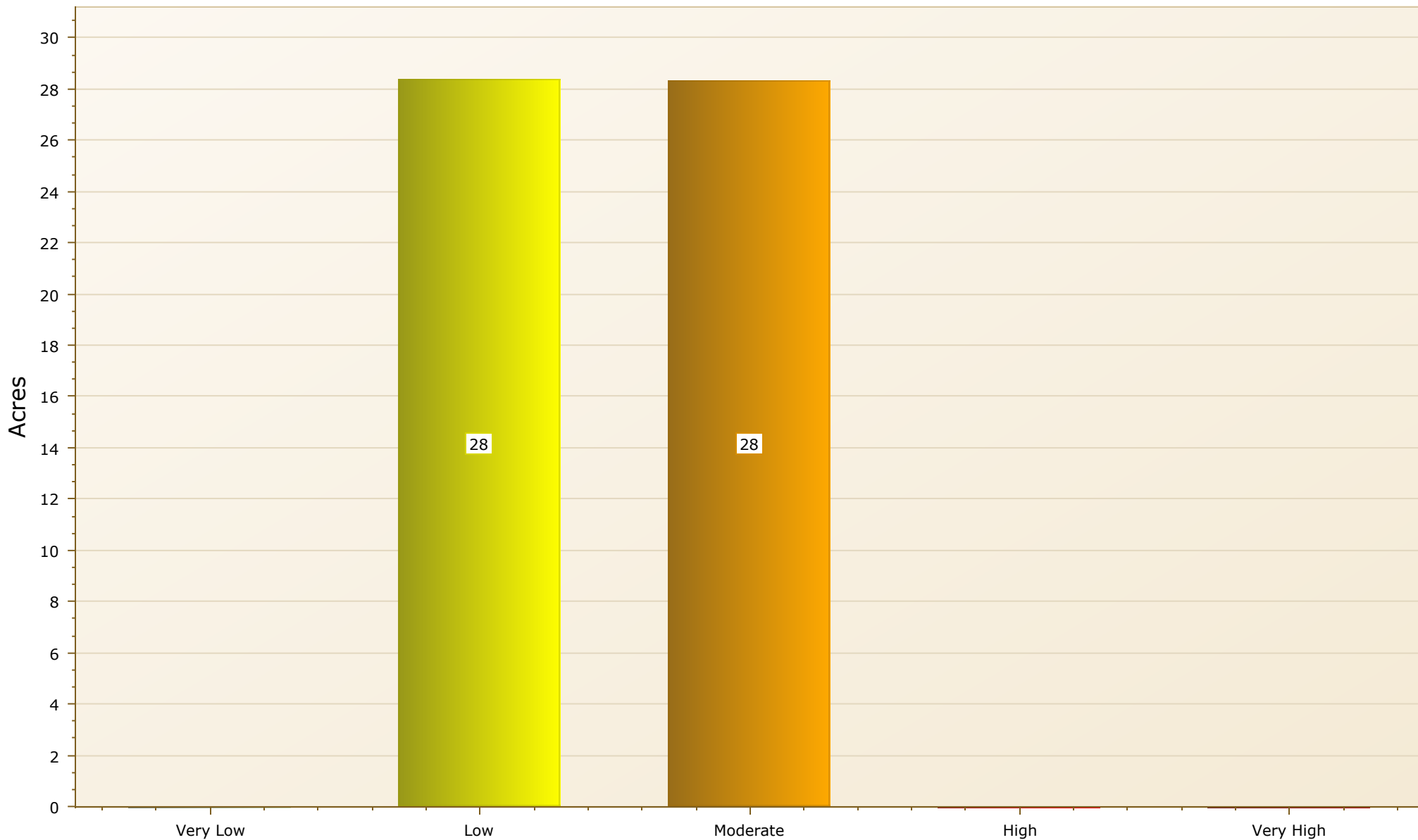
Individual building footprints were used to identify structure locations. Buildings were then grouped using Uber's hexagonal hierarchical spatial index. Within each hexagon, the building values were averaged and applied to the hexagon to remove building specific metrics. This provides a detailed measure of defensible space characteristics for small areas consistent with the accuracy of the structure locations and wildfire fuels and risk analysis data.

Each hexagon in the defensible space risk has a relative value from 0 to 1 that represents the average building hazard in that hexagon. This defensible space value is based on three spatial components/variables: 1) canopy cover, 2) slope, and 3) fuel models present within the buffer around the buildings analyzed.

Defensible Space Index		Acres	Percent
	Very Low		0%
	Low	28	50%
	Moderate	28	49.9%
	High		0%
	Very High		0%
Total		57	100%

Defensible Space Index

Greaves Subdivision Fil No. 1




68/70

Greaves Subdivision Fil No. 1

Defensible Space Index

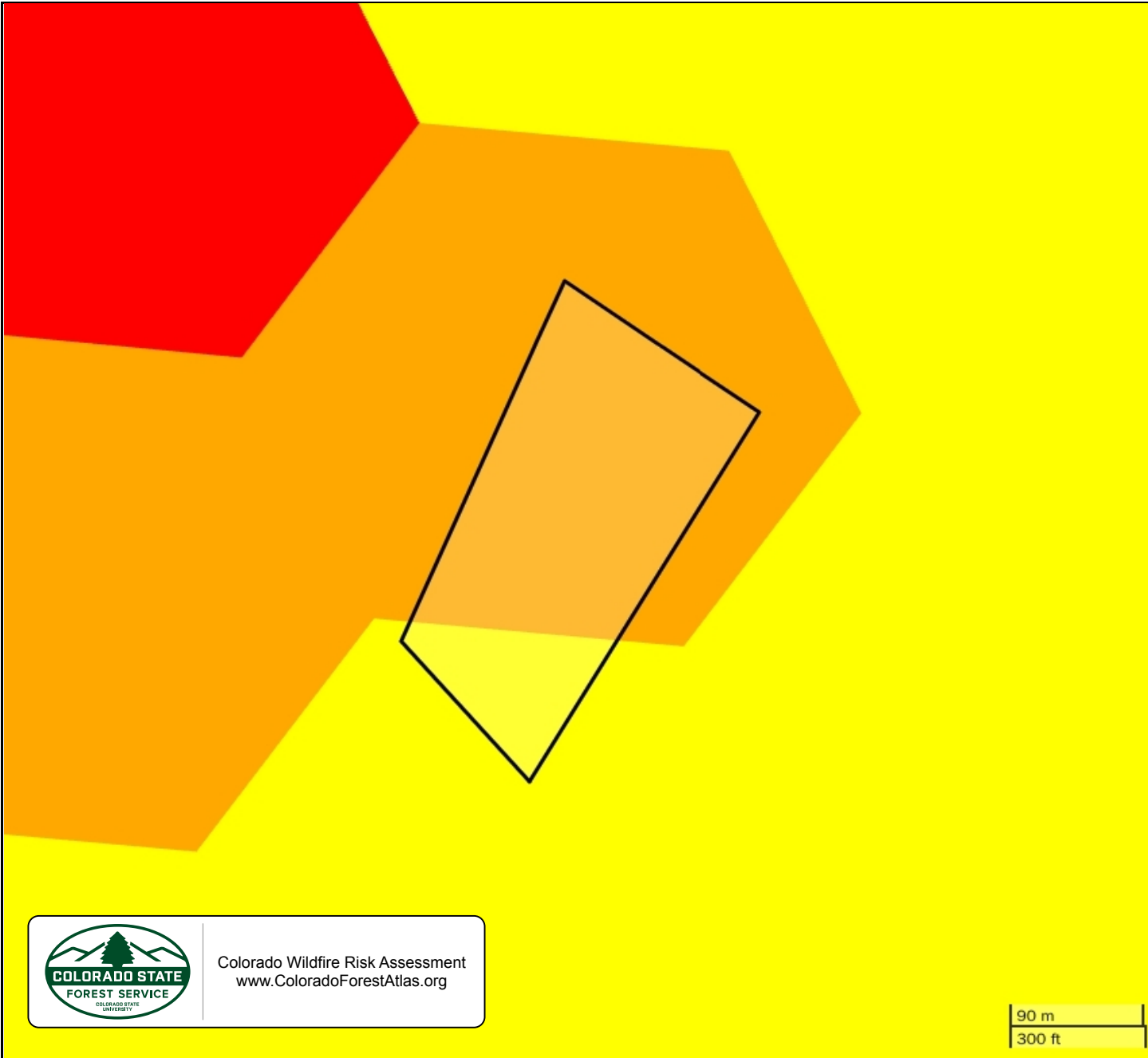
 Very Low

 Low

 Moderate

 High

 Very High



Colorado Wildfire Risk Assessment
www.ColoradoForestAtlas.org

90 m
300 ft

References

Anderson, H. E. (1982). Aids to determining fuel models for estimating fire behavior. USDA For. Serv. Gen. Tech. Rep. INT-122.

Colorado State Forest Service (August 2023). Colorado Wildfire Risk Assessment Final Report. A final report developed by CSFS and Technosylva Inc. (La Jolla, CA) documenting the technical methods and results for the Colorado wildfire risk assessment update project.

Colorado State Forest Service (June 2023). Fuels Calibration Final Report. A final report developed by CSFS and Technosylva Inc. (La Jolla, CA) documenting the technical methods and results for the Colorado fuels calibration project.

National Wildfire Coordinating Group (NWCG). (2008). Glossary of Wildland Fire Terminology. Publication Management System document PMS-205.

National Wildfire Coordinating Group (2004). Fireline Handbook. NWCG Handbook 3. PMS 410-1. NFES 0065. National Interagency Fire Center. Boise, Idaho 83705.

Scott, J. H., & Burgan, R. E. (2005). Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model. Ft. Collins, CO, Rocky Mountain Research Station: USDA Forest Service, Gen. Tech. Rpt. RMRS-GTR-153.

Scott, J. H., & Reinhardt, E. D. (2001). Assessing the Crown Fire Potential by Linking Models of Surface and Crown Fire Behavior. Ft. Collins, CO, Rocky Mountain Research Station: USDA Forest Service, Research Paper RMRS-RP-29.

