

WILDFIRE HAZARD ASSESSMENT
AND MITIGATION REPORT
for the proposed
PINE VIEW ESTATES
El Paso County, Colorado.

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Pine View Estates is a proposed seven lot subdivision located in Section 13, T11S, R64W of the 6th P.M., El Paso County. Lot sizes are from 5.01 acres to 6.14 acres. More generally, the property lies in the north central part of the County, north of Highway 24 and the Town of Peyton; north, too, of Hopper Road and west of Ranch Hand Road in Peyton Pines. The property is 38.8 acres in area and is a portion of the original 640 acre Owens Ranch. The County small area plan that applies to this parcel is the Falcon/Peyton Small Area Master Plan. This parcel has long been used (and remains) as grazing for cattle. The parcel schedule number is 41000-00-428.



HAZARD ASSESSMENT

The El Paso County Wildfire Hazard Map (December 2007) has two hazard classifications: Low Hazard - Non Forested, (no vegetation, grass and brush) and High Hazard - Forested, (deciduous and conifer/evergreen). These hazards are based on the Colorado Vegetation Classification Project. The property in question is generally shown as having a Low Hazard.

The earlier Wildfire Hazard Area Map (WHAM) developed by the Colorado State Forest Service in 1974 indicates the property to have a Low Hazard for Trees and Grass.

WHAM mapping is somewhat dated (though still relevant) and has essentially been superseded by the 2012 Colorado Wildfire Risk Assessment (CO-WRAP) which can be found online at www.coloradowildfirerisk.com. This site discusses, analyzes and maps the several significant factors relative to wildfire behavior. It is user friendly and can be accessed by anyone at anytime. Using it's mapping function for Fire Occurrence we discover the likelihood of a wildfire starting based on historical ignition patterns is low to moderate; rating a 4 or 5 out of 9 (highest). Looking to the Vegetation Map we find the general vegetation types are shown as grasslands, shrublands, oak shrubland and a very small section in the northwest shown as ponderosa pine forest. One of the significant characteristics of wildfire when analyzing it's potential impact to structures is Fire Intensity. The Fire Intensity Map indicates a Moderate fire intensity for the property. Overall, the mapped wildfire hazard is low to moderate.

A field inspection of the property on October 17, 2019 reveals it's use for grazing and that it is fully grass covered with scattered Ponderosa Pines throughout. Most are younger, not yet fully mature trees. Trees are scattered and spaced such that all lots are treed but future construction won't likely risk removal of some particular specimen tree. The area along the western boundary seems most treed especially to the northwest corner. Despite the Vegetation Map listing of shrubland, almost none currently exists. Those portions of the property that are treed constitute a higher hazard than the remaining pasture because of that tree cover. New home construction on the proposed lots will afford an opportunity to clear around the home and mitigate remaining on lot trees which will significantly reduce that hazard even though a structure will have been added.

Although the hazard on this parcel is relatively low, wildfire can occur and the opportunity for ignition remains. The Black Forest Wildfire that occurred June 11, 2013 to June 20, 2013 consumed 14,280 acres (over 22 square miles), destroying 486 homes and taking two lives. It burned primarily in the more mature (and overgrown) pine forest perhaps ten miles west of here. Although tree density and age here is much lower than it was in the Black Forest, the threat remains.

WILDFIRE BEHAVIOR

There are three primary components that affect wildfire behavior. The first is fuel, the second is topography and the third is the local weather during a wildfire event.

Fuels:

Fuels on site include grasses and the scattered Ponderosa Pines as mentioned. These are young trees and those not removed during home or outbuilding construction can easily be mitigated. If lower limbs are removed so as to prevent a ground fire with potential flame lengths of 2 to 3 feet from entering the canopy, any fire should pass through with little damage to the trees.

In the more open areas trees are more scattered and little forest litter exists other than grasses. Tree spacing is such that canopies are separate from one another. Ground fire here will have flame lengths of less than 2 feet. The chance of canopy involvement is low. A severe ground fire may torch an individual (smaller) tree but the fire will then return to the ground. All but the smallest of saplings will likely survive fire passage.

Throughout the balance of the property, grasses are the only fuel available. Grasses are an easily ignited fuel and, being light, they burn readily and rapidly. If ungrazed and unmowed, these grasses can grow 18 or 20 inches in height and support flame lengths of over 4 feet. Wildfire in grasslands can move faster than most people can run and can move even more quickly when conditions are windy.

Topography:

Assuming wind is not a factor, wildfire will advance faster up a slope than it will downslope or on level ground. This occurs primarily because the fire preheats and dries the fuel in front of itself when ascending a slope. The steeper the slope the more dramatic the effect. Generally slopes of greater than 25% are considered a significant hazard depending on fuel availability.

Slopes in the proposed subdivision are generally mild, typically in the 3% to 8% range. This slope is not likely to significantly influence wildfire behavior.

WILDFIRE MITIGATION

Weather:

It is a fact that the recent really large wildfires in Colorado have all had a weather component that drives them such that efforts to contain the blaze are severely hampered or even ineffectual. Wind and moisture are the two weather phenomena that always affect wildfire behavior. Lack of moisture, either as rain or snow, allows vegetation to dry out and become much more susceptible to ignition. The lighter the fuel, the quicker the lack of moisture renders it more hazardous. Grasses become dry in just days. Brush or small trees can become hazardous in weeks and significant stands of pines can become dangerously dry in not much more than a month. The effect is cumulative; that is, a prolonged drought (not uncommon here) lowers the moisture content of all the vegetation at the same time raising the chance of uncontrollable wildfire. Conversely, rain or snow during a wildfire will suppress it and may even extinguish it.

Strong wind will drive wildfire before it. It will increase the speed at which the fire travels. Wind will also loft embers or fire brands high into the air where the directional winds will transport them, still glowing, well beyond the limits of the fire. This is called spotting and it can start new fires up to a mile or more away. Additionally, extreme fire behavior will create it's own winds. These winds sometimes appear within the fire as small tornados. Tornados made of fire.

Another word about weather that is pertinent is the fact that there is only one fire season here along the front range. It lasts 12 months a year. Wildfires start, grow and damage property in every month of the year here. While it is true that we cannot do anything about the weather, we can and must be mindful of it's effects and potential impact on fire behavior all year long.

Which brings us to the subject of Mitigation. Since we know wildfires will occur but we cannot know when or how intense they may become, we must be proactive in creating an environment through which wildfire can pass with minimal impact to our structures and the land.

WILDFIRE MITIGATION

We cannot control the weather during a wildfire and we cannot alter the basic topography of the property during one either. That leaves two approaches that we can address before a wildfire happens. The first is to alter the fuels available to a wildfire and the second is to use fire resistant construction methods when we construct homes and outbuildings within the area.

Fuel Mitigation

It stands to reason that the less fuel available, the lower the impact any fire will have. Trees, brush and grasses can be reduced in number and trimmed such that fire will have a more difficult time moving from tree to tree or from the ground into the tree canopy. Canopy fires are especially difficult to control and typically lead to spotting which advances the fire rapidly and spreads firebrands into new areas that may be behind the efforts of firefighters who are battling the existing fire front. They can also impact structures directly, piling up against foundation walls like leaves in autumn or snow in winter. They also settle into valleys on roof tops, concentrating heat and fire there.

The mitigation of fuels is simply the managing of the continuity of fuel both horizontally and vertically within the landscape. Around homes and other structures, we identify a circular area within which we mitigate more intensely close to the structure and less intensely further out. This is called Defensible Space and it serves to reduce the fire hazard and to provide firefighters room to more safely fight a fire. Typically within 30 feet of a structure fuels are heavily reduced or even eliminated (think xeriscape landscape treatments adjacent to the house). Trees within this zone are few and far between. Ground cover is kept to 6 inches in height or less and pine needles or slash and debris are removed. This is Zone 1. In the next 50 to 100 feet fuel continuity is maintained at a lower density with at least 10 feet between tree limbs. Shrubs (especially scrub oak) in this zone are removed from under trees to prevent fire from "laddering up" into the canopy. Clumps of shrubs should be isolated and kept twice their mature height from other vegetation. Grasses are kept mowed. This is Zone 2. Finally Zone 3 is the area outside that 100 foot Zone 2 line. Here the forest is managed to maintain the health of the vegetation that is present. In this area of Colorado that often means some thinning. Trees in all zones are pruned 6 feet up from the forest floor to lessen the chance of fire reaching the crown. Mowing in Zone 3 is not necessary but collection and disposal of slash is a benefit. Colorado State Forest Service Quick Guide Fire 2012-1 (Formerly CSU Extension Fact Sheet 6.302) *Protecting Your Home from Wildfire: Creating Wildfire Defensible Zones* provides further discussion on defensible space and how to create and maintain it.

It is unusual to see a mature natural evergreen forest today in much of Colorado because past fire suppression efforts have allowed vegetative growth that is several times more dense than nature would permit. A mature natural forest has a park like appearance with trees of all ages, sizes and species, each having room to grow. Sunlight reaches almost all of the forest floor for at least some time during the day.

In light of the fact that this property is mostly grasses and not heavily forested, we can expect homeowners will plant trees and shrubs. There can be a distinct advantage to this as species and type of vegetation can be placed where they will do the most good and still comply with the principals of Defensible Space. See CSFS / CSU Cooperative Extension pamphlet #6.306 *Grass Seed Mixes to Reduce Wildfire Hazard* and #6.305, *FireWise Plant Materials*, both by F.C. Dennis.

Fire Restive Structure Construction

Wildfire is capricious. It is certainly possible to lose a structure that is constructed of all fire resistant materials. It is also much less likely than the loss of one constructed of light flammable materials like wood siding or roofing. Structures are ignited by the direct impingement of flames as a fire passes the structure and they are ignited by firebrands that are blown up against the walls or onto roof valleys or eaves. As we already know, structures will be preheated and dried by the approaching fire. Soffit and foundation vents must be screened to prevent embers from entering. Fire resistive roofing is absolutely necessary because of those firebrands. Windows are particularly vulnerable. Glass will fracture in about 10 minutes in the presence of the level of heat that wildfires generate. And that heat will get to the structure before the fire does. Glass that falls out or is blown in creates a direct path for firebrands to enter the home. Decks are particularly vulnerable to wildfire as they are often constructed (and decked) with light wood framing, open to fire below. Too, they are often placed above an approaching slope to enhance the view. The area under a deck should be rock or other non combustible material and a fire resistive soffit material should cover the bottom side while a non combustible surface should be used instead of light wood decking on top.

New construction, as will occur in this subdivision, can be planned to utilize materials that are fire resistive at little or no additional cost. Materials that are dangerously combustible can simply be avoided. There are several publications available that address materials and construction in the Wildland-Urban Interface. *FireWise Construction: Site Design & Building Materials* by Tim Foley and David Bueche, December 2012, based on the 2009 International Wildland-Urban Interface Code is published by the Colorado State Forest Service. The Federal Emergency Management Agency (FEMA) published P-737, *Home Builder's Guide to Construction in Wildfire Zones* in September 2008 as part of their Technical Fact Sheet Series. It addresses both existing structures and new construction and provides guidance for methods and techniques to employ for each.

Finally, effective, reliable and no longer prohibitively expensive automatic sprinkler systems are available and easily incorporated in new construction.

Like Defensible Space, the materials used in the construction of any structure are important but it is the execution of an overall plan of Defensible Space and fire resistive construction that will provide the best chance to reduce structural vulnerability to wildfire.

Peyton Fire Protection District

The subject property lies within and is served by the Peyton Fire Protection District. The District is a mixed paid and volunteer fire department providing fire, rescue and emergency medical services along with public education and covers an area of approximately 110 square miles at an average elevation of about 6500 feet in the north-central part of the County. The District serves about 3500 buildings through one fire station. Personnel include 18 firefighters, all but 3 of whom are currently certified as EMT's or better.

Station #1 is located at 13665 Railroad (Main) Street, in Peyton. Equipment here includes a 1000 gallon Type 1 engine, a 3000 gallon Type 1 pumper, a Medical Ambulance, 3 Type 6 Brush Trucks and a Tender with a capacity of 2000 gallons. There are two buildings on this site. All personnel work from this station location.

In addition to water available on the responding engines and brush trucks, there are currently four 30,000 gallon fire cisterns located throughout the District. One is located at the High School, two are in subdivisions and one is at Station 1. In addition, the pond located in Homestead Ranch Regional Park in the northwest portion of the District is available to provide water for fire fighting. While there are some hydrants in the District, there is no District wide water provider. Consequently, current policy requires larger incoming developments provide suitable water storage.

Included with this Report is the full detailed *Colorado Wildfire Risk Assessment Report* created using the COWRAP Program.

Note: All Colorado State Forest Service publications are available on their website, www.csfs.colostate.edu

2017 COLORADO WILDFIRE RISK ASSESSMENT SUMMARY REPORT



*Pine View
Estates*



Report was generated using
www.ColoradoWildfireRisk.com

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Users 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 Professional Viewer application of the Colorado Wildfire Risk Assessment (Colorado WRA) 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 MS WORD format.

The report has been designed so that information from the report can easily 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 Wildfire Risk Assessment web portal (CO-WRAP).

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

Wildland Urban Interface

Description

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.



For the **Pine View Estates** project area, it is estimated that **0** people or **NaN percent** of the total project area population (0) live within the WUI.

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 datasets, 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.

The new WUI dataset is derived using advanced modeling techniques based on the Where People Live dataset and 2016 LandScan USA population count data available from the Department of Homeland Security, HSIP dataset. WUI is simply a subset of the Where People Live dataset. The primary difference is populated



areas surrounded by sufficient non-burnable areas (i.e. interior urban areas) are removed from the Where People Live dataset, as these areas are not expected to be directly impacted by a wildfire. This accommodates WUI areas based on encroachment into urban areas where wildland fire is likely to spread.

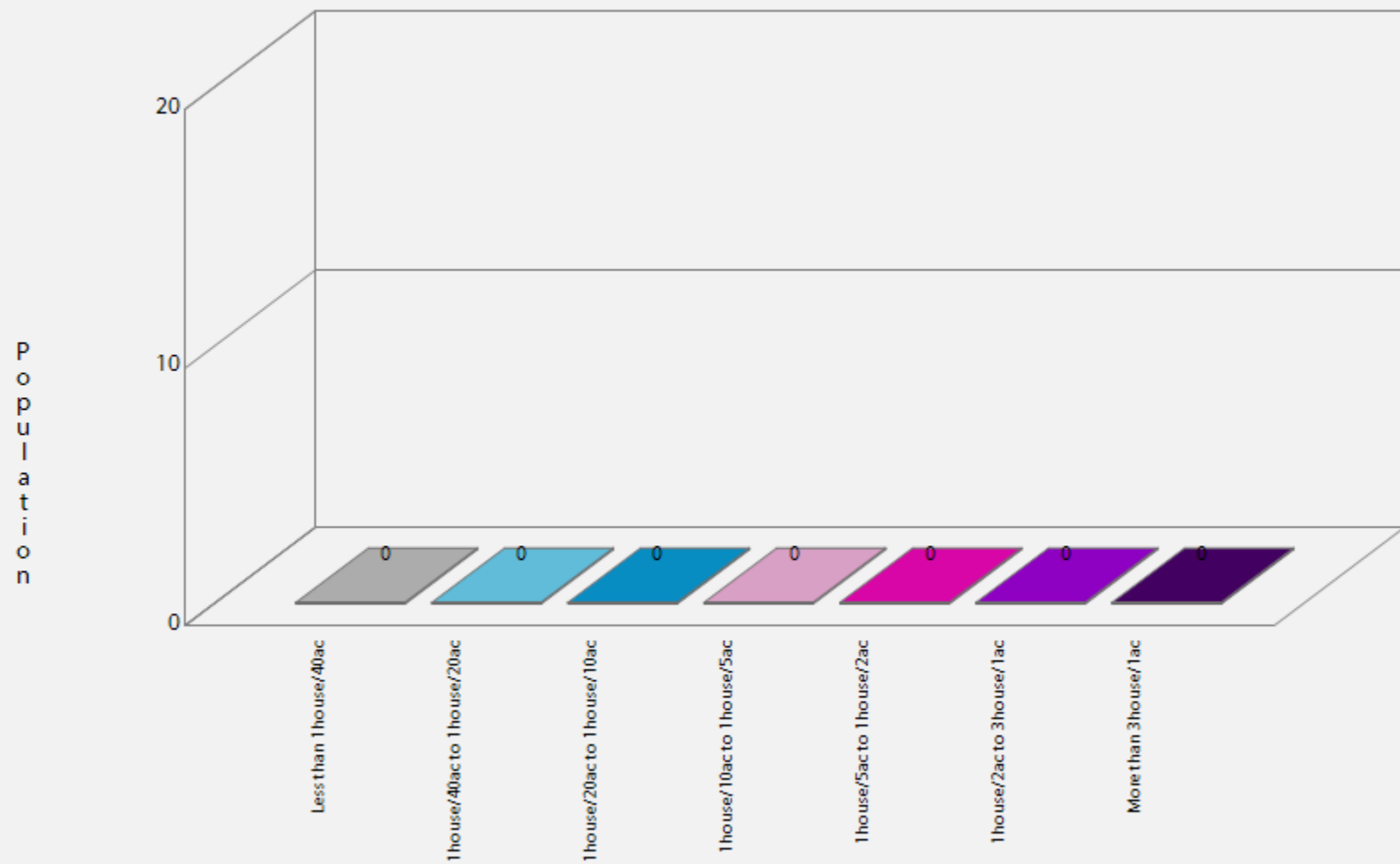
A more detailed description of the risk assessment algorithms is provided in the Colorado Wildfire Risk Assessment (Colorado WRA)

Final Report, which can be downloaded from www.ColoradoWildfireRisk.com.

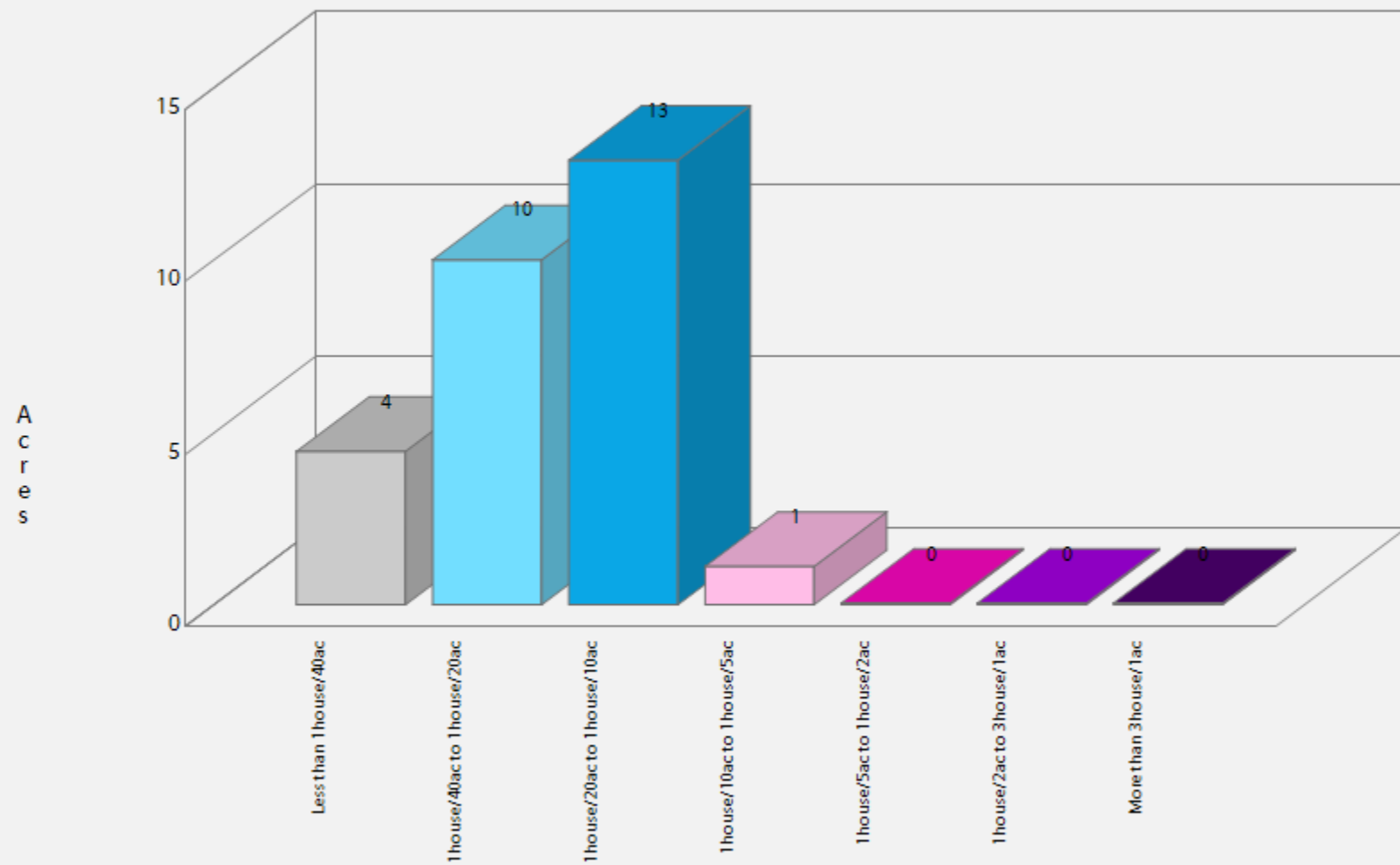
Data are modeled at a 30-meter cell resolution (30 m² or 900 m area per map cell), which is consistent with other Colorado WRA layers. The WUI classes are based on the number of houses per acre. Class breaks are based on densities understood and commonly used for fire protection planning.

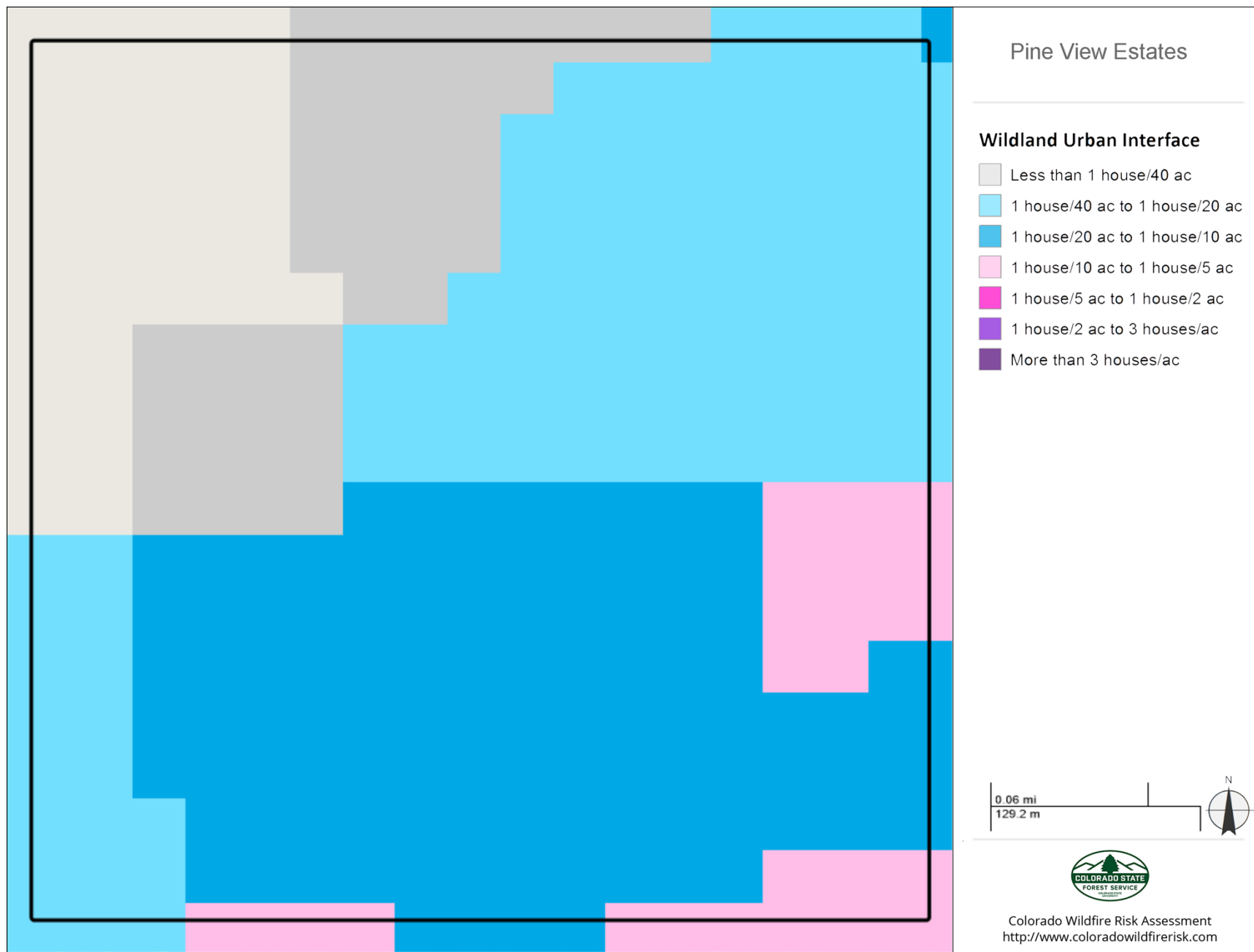
	Housing Density	WUI Population	Percent of WUI Population	WUI Acres	Percent of WUI Acres
	Less than 1 house/40 ac	0	NaN	4	15.6 %
	1 house/40 ac to 1 house/20 ac	0	NaN	10	35.2 %
	1 house/20 ac to 1 house/10 ac	0	NaN	13	45.3 %
	1 house/10 ac to 1 house/5 ac	0	NaN	1	3.9 %
	1 house/5 ac to 1 house/2 ac	0	NaN	0	0.0 %
	1 house/2 ac to 3 houses/ac	0	NaN	0	0.0 %
	More than 3 houses/ac	0	NaN	0	0.0 %
	Total	0	100.0 %	28	100.0 %

Pine View Estates Wildland Urban Interface



Pine View Estates
Wildland Urban Interface





Wildland Urban Interface (WUI) Risk Index

Description

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

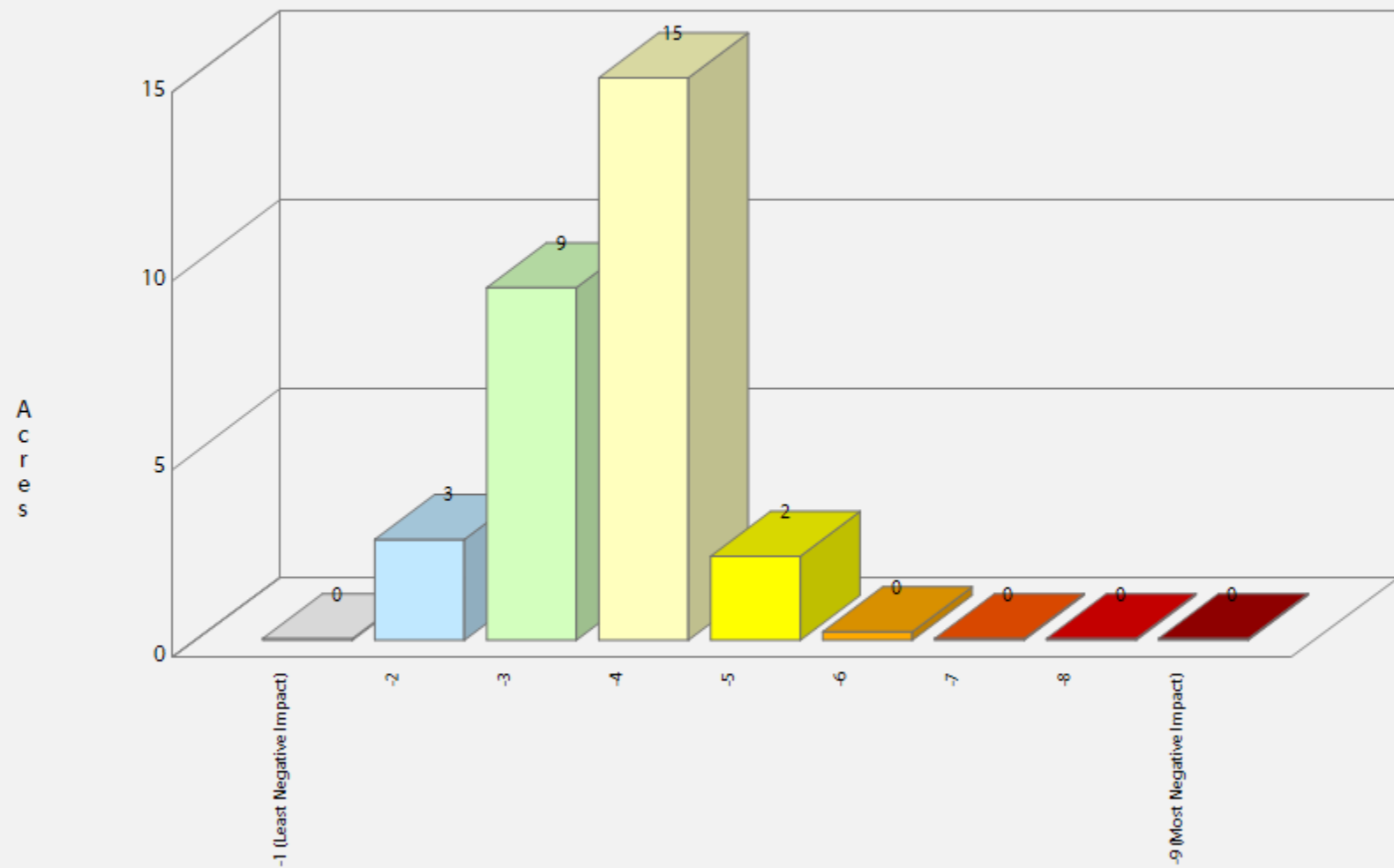
Service mitigation planning staff. By combining flame length with the WUI housing density data, it is possible to determine where the greatest potential impact to homes and people is likely to occur.

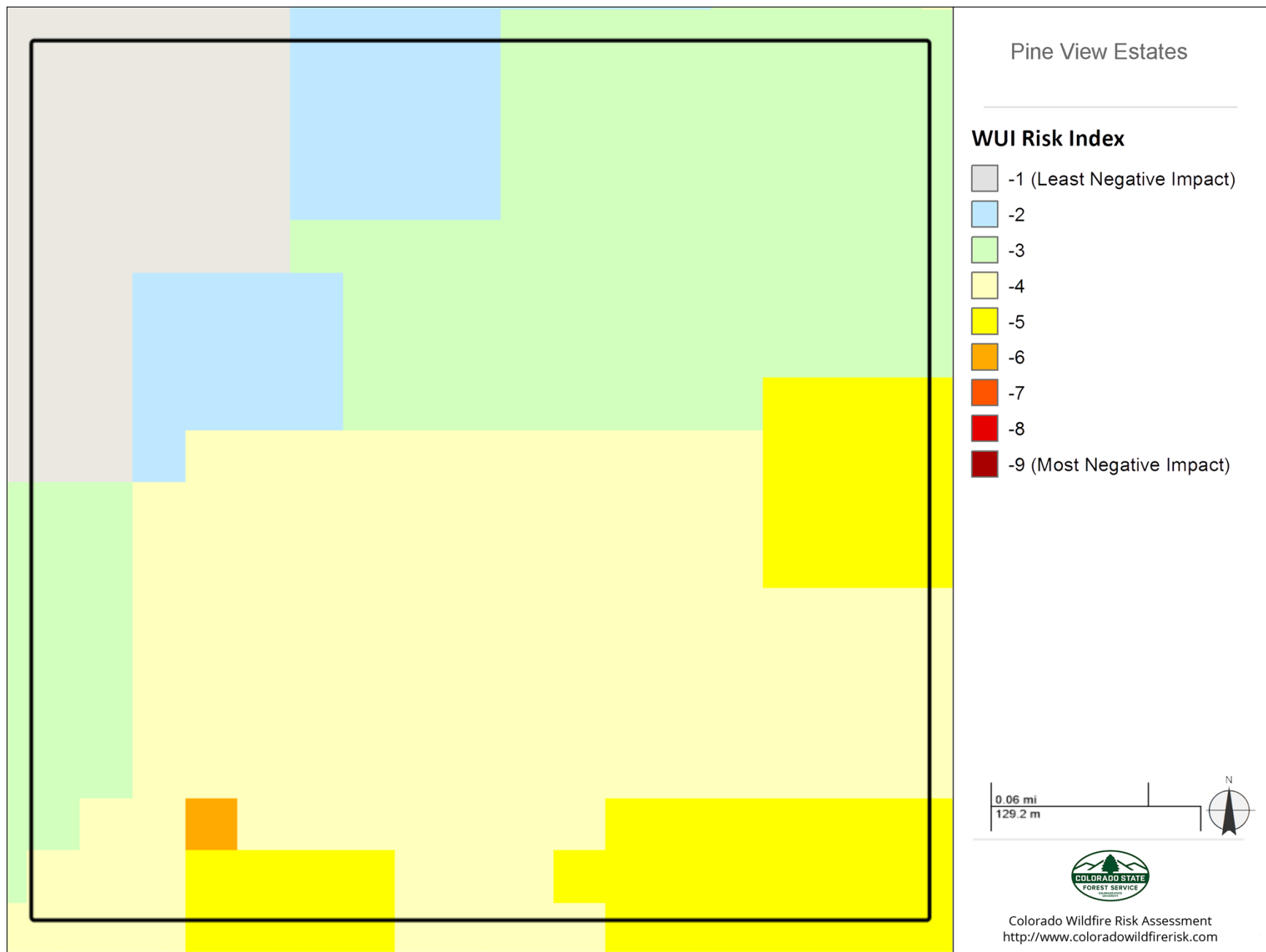
The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact. For example, areas with high housing density and high flame lengths are rated -9, while areas with low housing density and low flame lengths are rated -1.

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 are modeled at a 30-meter cell resolution, which is consistent with other Colorado WRA layers.

	WUI Risk Class	Acres	Percent
	-1 (Least Negative Impact)	0	0.0 %
	-2	3	9.1 %
	-3	9	31.8 %
	-4	15	50.8 %
	-5	2	7.6 %
	-6	0	0.8 %
	-7	0	0.0 %
	-8	0	0.0 %
	-9 (Most Negative Impact)	0	0.0 %
Total		29	100.0 %

Pine View Estates
WUI Risk Index





Firewise USA®

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.



FIREWISE USA® **Residents reducing wildfire risks**

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/>

***The designated project area does not contain
Firewise USA® data***

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



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

- 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.

future wildfires. Contact your local CSFS district to learn how to start this process and create a CWPP for your community:

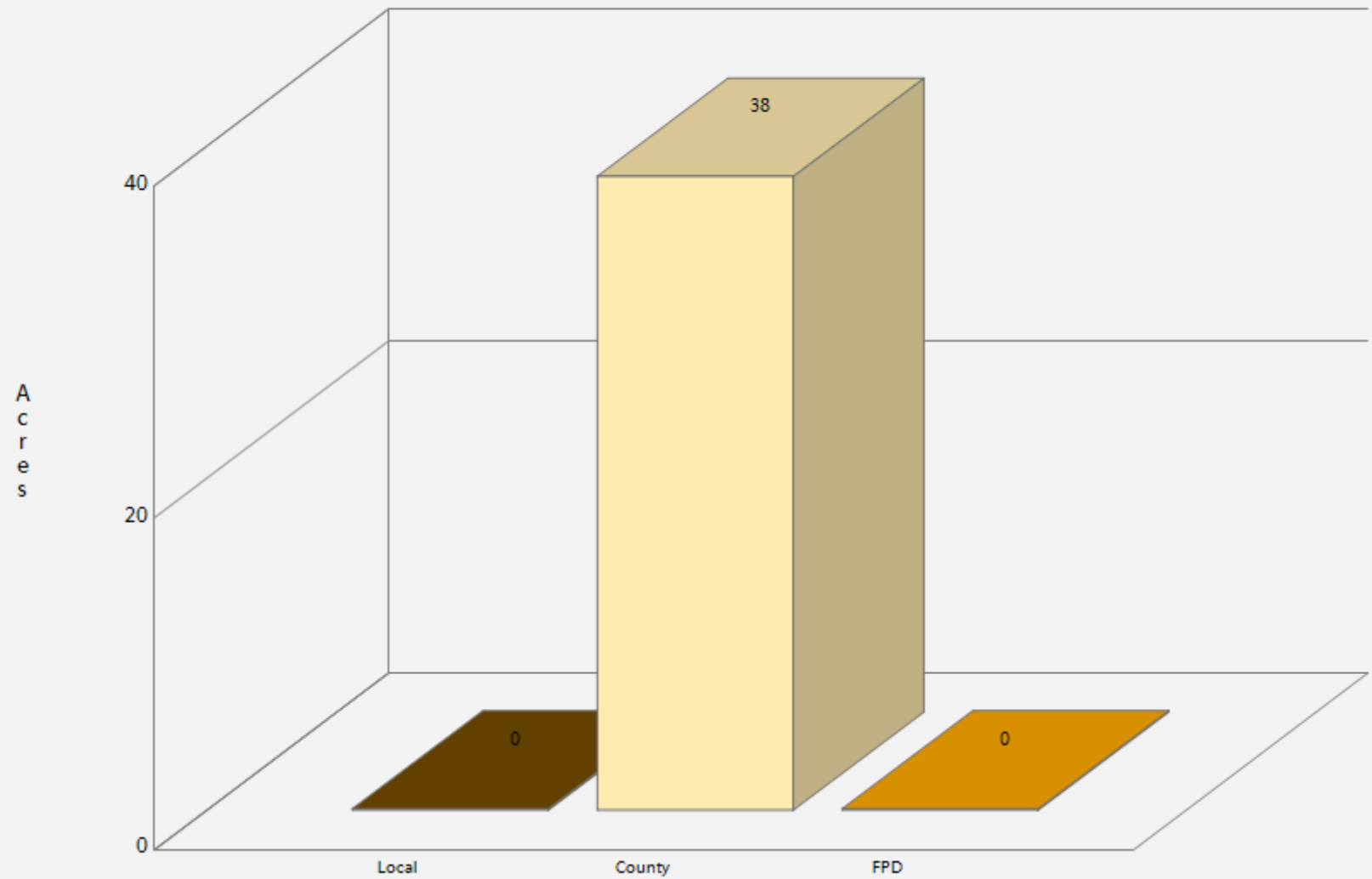
<http://csfs.colostate.edu/pages/your-local-forester.html>.

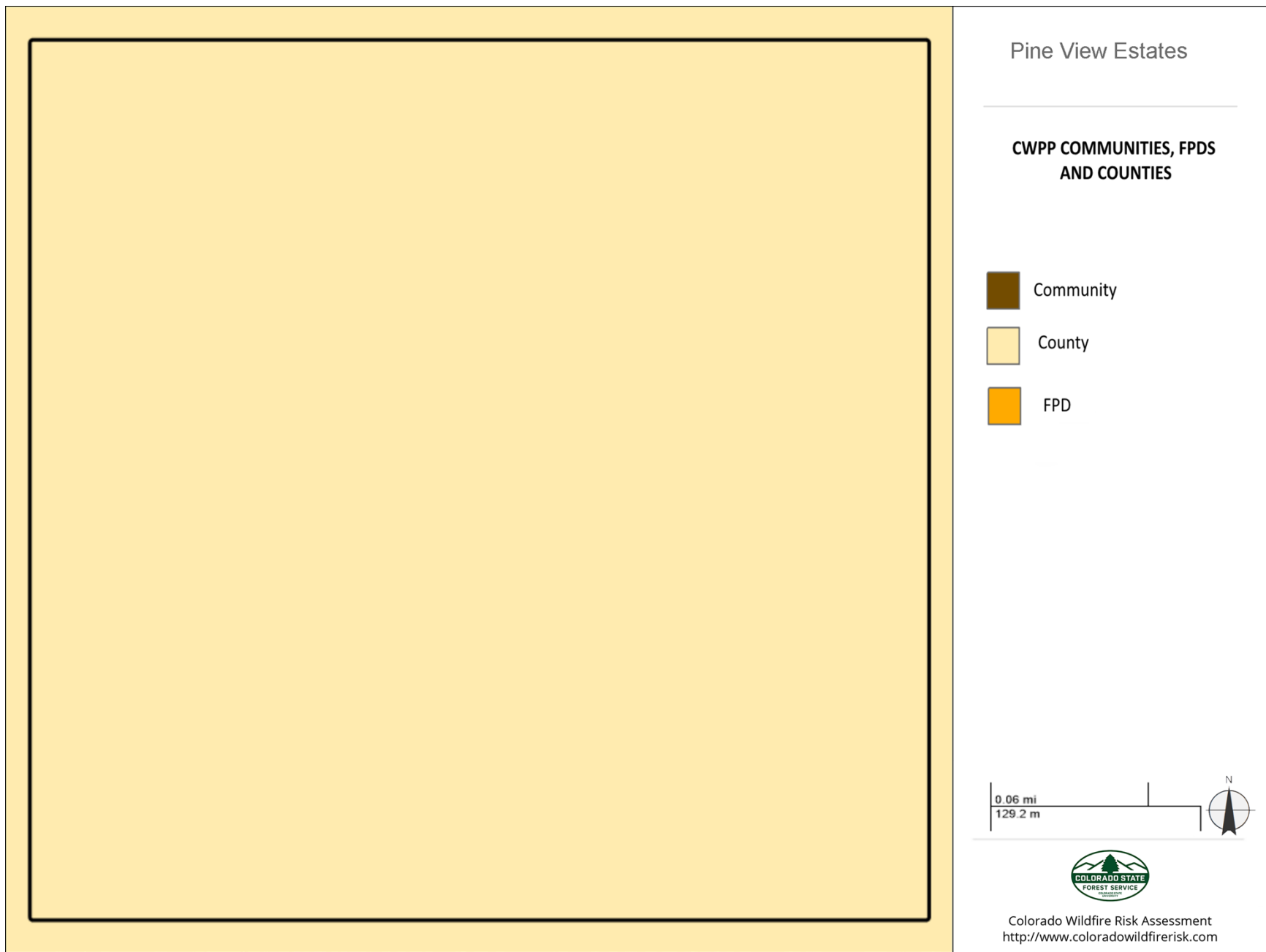
If your community is in an area at risk from wildfire, now is a good time to start working with neighbors on a CWPP and preparing for

For the **Pine View Estates** project area, there are **1** CWPPs areas that are totally or partially in the defined project area.

Community CWPP Name	CWPP Type	CSFS District	Acres Inside Project Area	Total Acres
El Paso County	County	Woodland Park	38	1,361,913
Total Acres			38	1,361,913

Pine View Estates
CWPP





Forest Management Activities

Description

Forest management activities are practices implemented on the ground to address or reach management objectives. Forest management activities are also known as treatments. They are described in Forest Management Plans, Stewardship Plans, or Community Wildfire Protection Plans and are prescribed through processes that consider current condition, future desired condition, and best science-based management practices for the type of vegetation and local environmental conditions.

The data displayed in this layer were collected by CSFS for activities that occurred during the five-year period 2008 through 2012. The forest management activities are classified by general category and year of completion. More than one activity may have occurred within any polygon. Activities in any polygon may occur in more than one year.

The legend for the activities is presented on a per year basis and identifies the type of activity that has occurred for the project report area. Note that in some cases more than one activity may occur during a year and this is identified with a separate class.

A tool is provided within CO-WRAP to select treatment activity polygons on the map and review the information about the specific activity that has occurred for the selected year. Note that individual years from 2008 to 2012 are shown as separate layers within CO-WRAP and can be queried separately.



For the **Pine View Estates** project area, there were **no** forest management activities conducted between 2008 and 2012.

Wildfire Risk

Description

Wildfire Risk is a composite risk rating obtained by combining the probability of a fire occurring with the individual values at risk layers. Risk is defined as the possibility of loss or harm occurring from a wildfire. It identifies areas with the greatest potential impacts from a wildfire – i.e. those areas most at risk - considering all values and assets combined together – WUI Risk, Drinking Water Risk, Forest Assets Risk and Riparian Areas Risk.

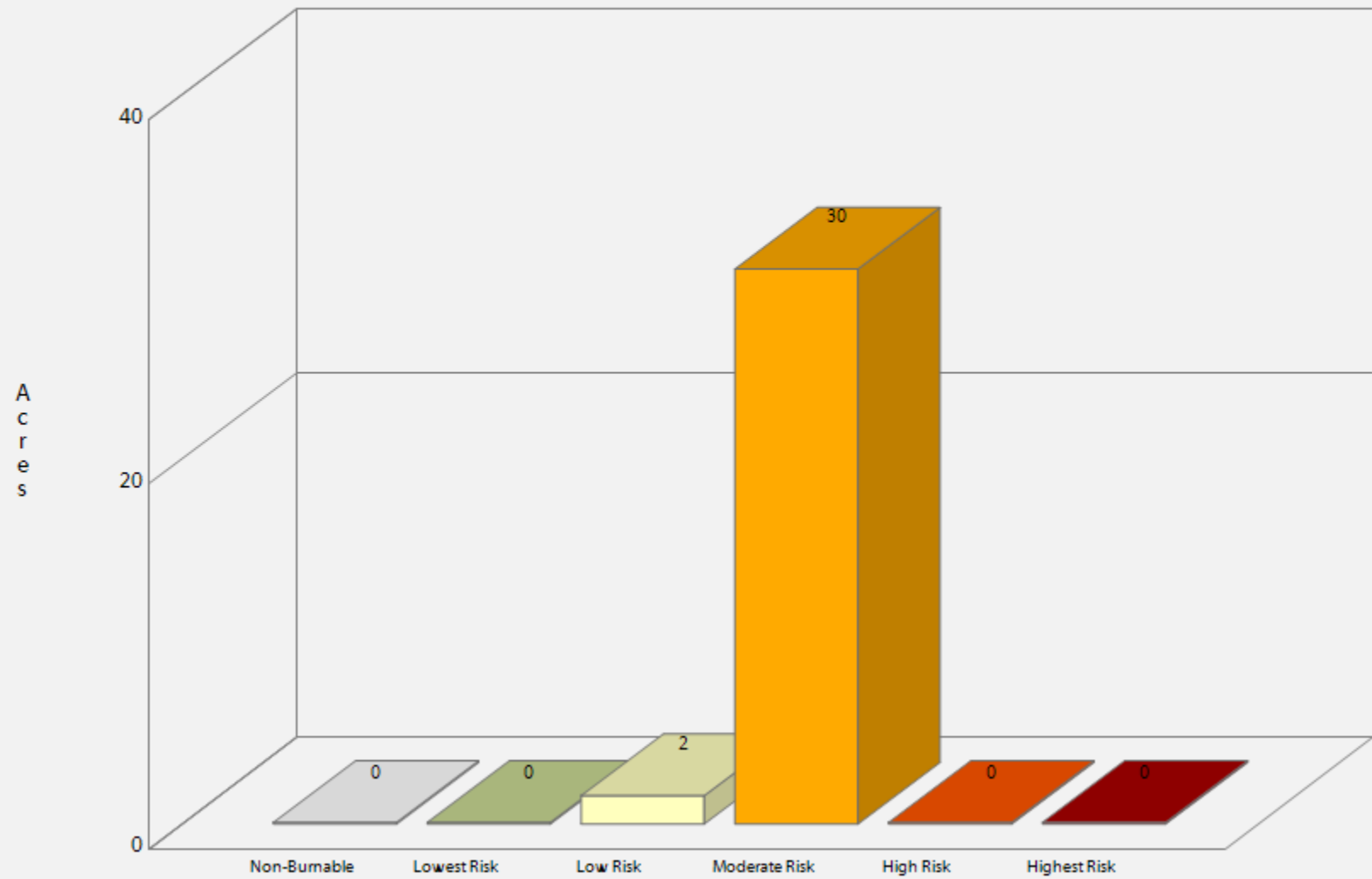
Since all areas in Colorado have risk calculated consistently, it allows for comparison and ordination of areas across the entire state. The Values at Risk Rating is a key component of Wildfire Risk. The Values at Risk Rating is comprised of several inputs focusing on values and assets at risk. This includes Wildland Urban Interface, Forest Assets, Riparian Assets and Drinking Water Importance Areas (watersheds).

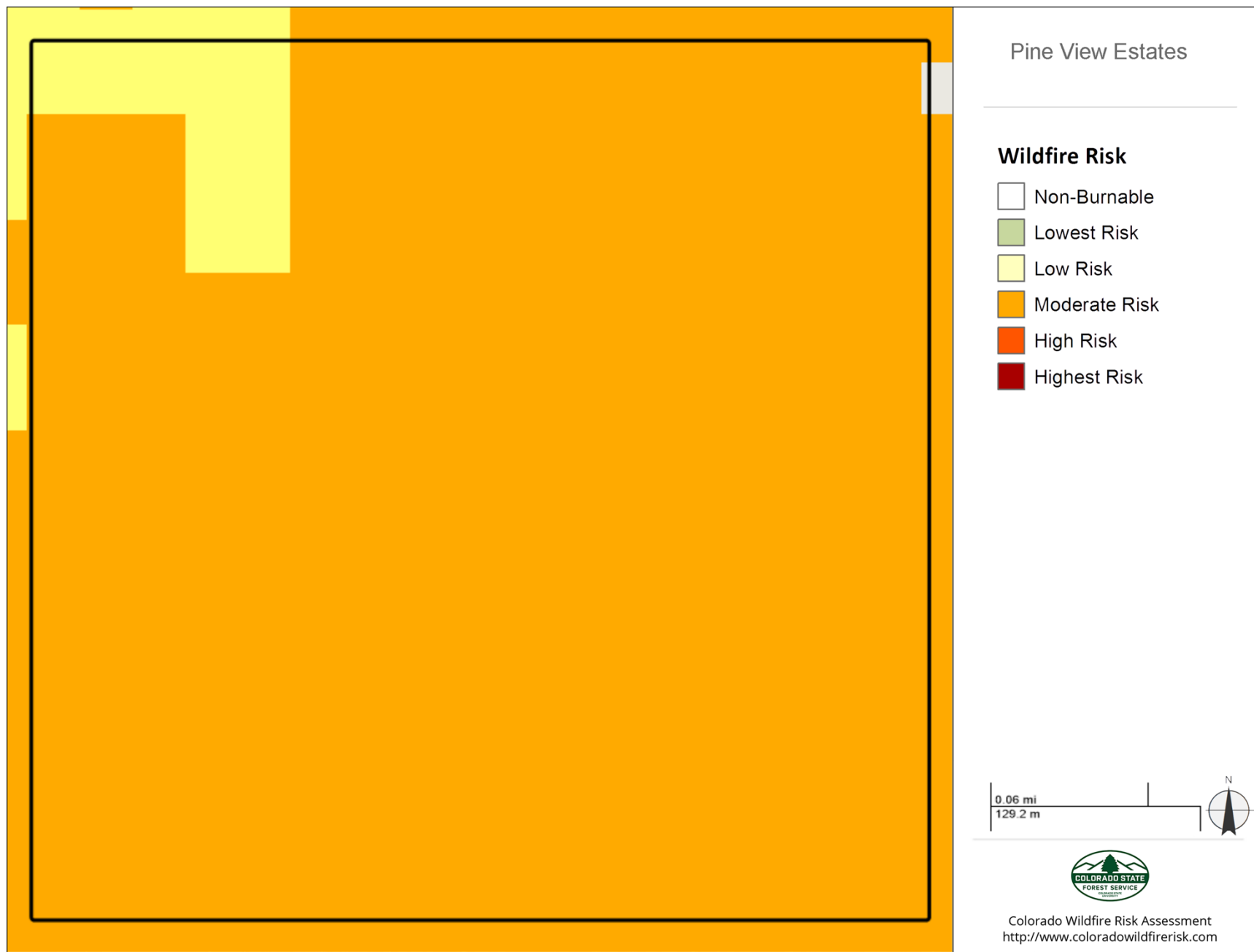
To aid in the use of Wildfire Risk for planning activities, the output values are categorized into five (5) classes. These are given general descriptions from Lowest to Highest Risk.



Wildfire Risk Class		Acres	Percent
	Non-Burnable	0	0.0 %
	Lowest Risk	0	0.0 %
	Low Risk	2	4.9 %
	Moderate Risk	30	95.2 %
	High Risk	0	0.0 %
	Highest Risk	0	0.0 %
Total		32	100.0 %

Pine View Estates
Wildfire Risk





Burn Probability

Description

Burn Probability (BP) is the annual probability of any location burning due to a wildfire. BP is calculated as the number of times that a 30-meter cell on the landscape is burned from millions of fire simulations. The annual BP was estimated by using a stochastic (Monte Carlo) wildfire simulation approach with Technosylva's Wildfire Analyst™ software (www.WildfireAnalyst.com).

A total number of 3,200,000 fires were simulated across the state, including those fires outside the Colorado border which were used in a buffer area around the state, to compute BP with a mean ignition density of 8.68 fires/km². The simulation ignition points were spatially distributed evenly every 500 meters across the state. Only high and extreme weather conditions were used to run the simulations. All fires simulations had a duration of 10 hours.

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 of those fires that burned in high and extreme weather conditions. The weighting was done by assessing the relationship between the annual historical fire ignition density in Colorado and the total number of simulated fires with varying input data in the different weather scenarios and the historical spatial distribution of the ignition points.

The probability map is derived at a 30-meter resolution. This scale of data was chosen to be consistent with the accuracy of the

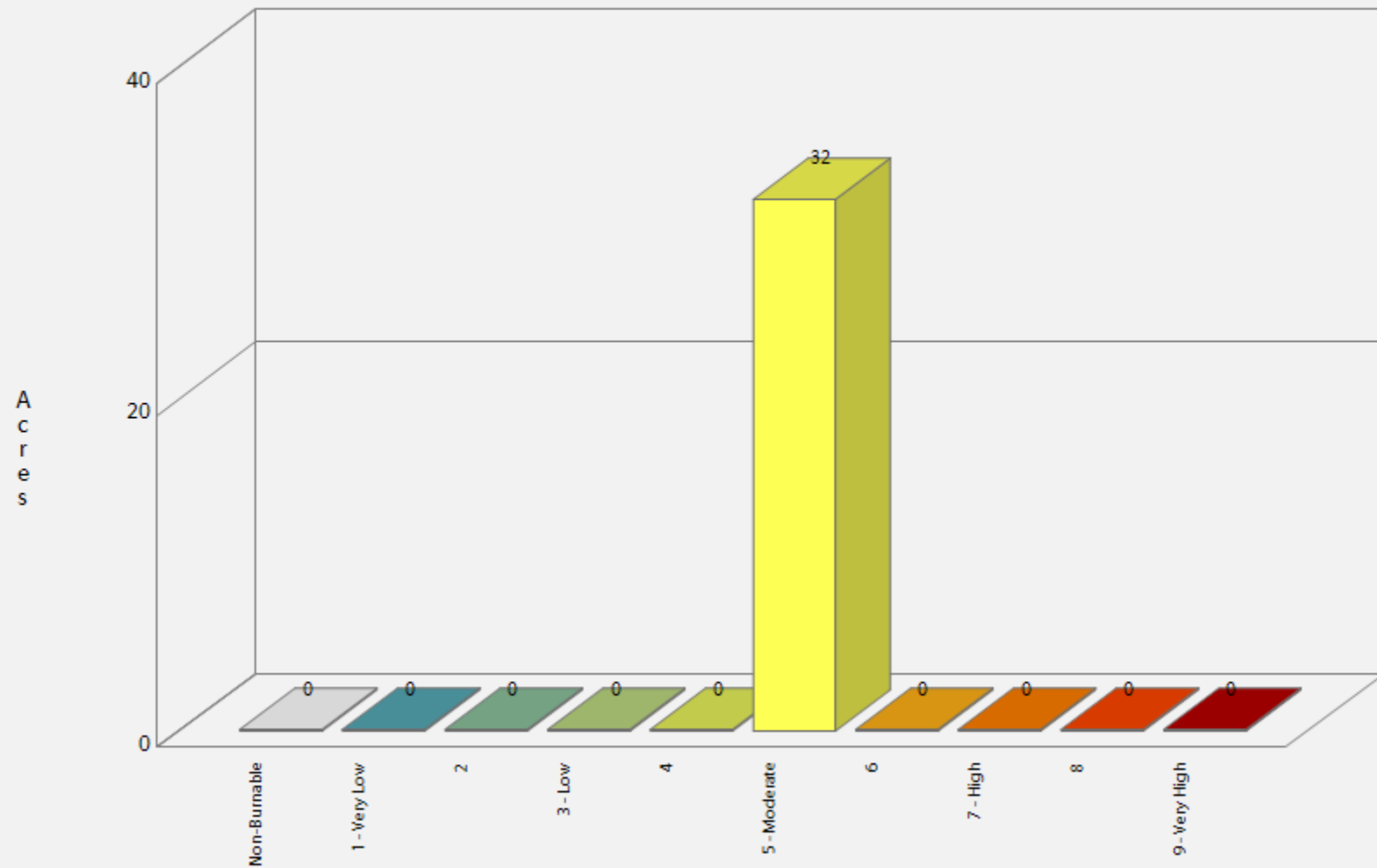
primary surface fuels dataset used in the assessment. While not appropriate for site specific analysis, it is appropriate for regional, county or local protection mitigation or prevention planning.

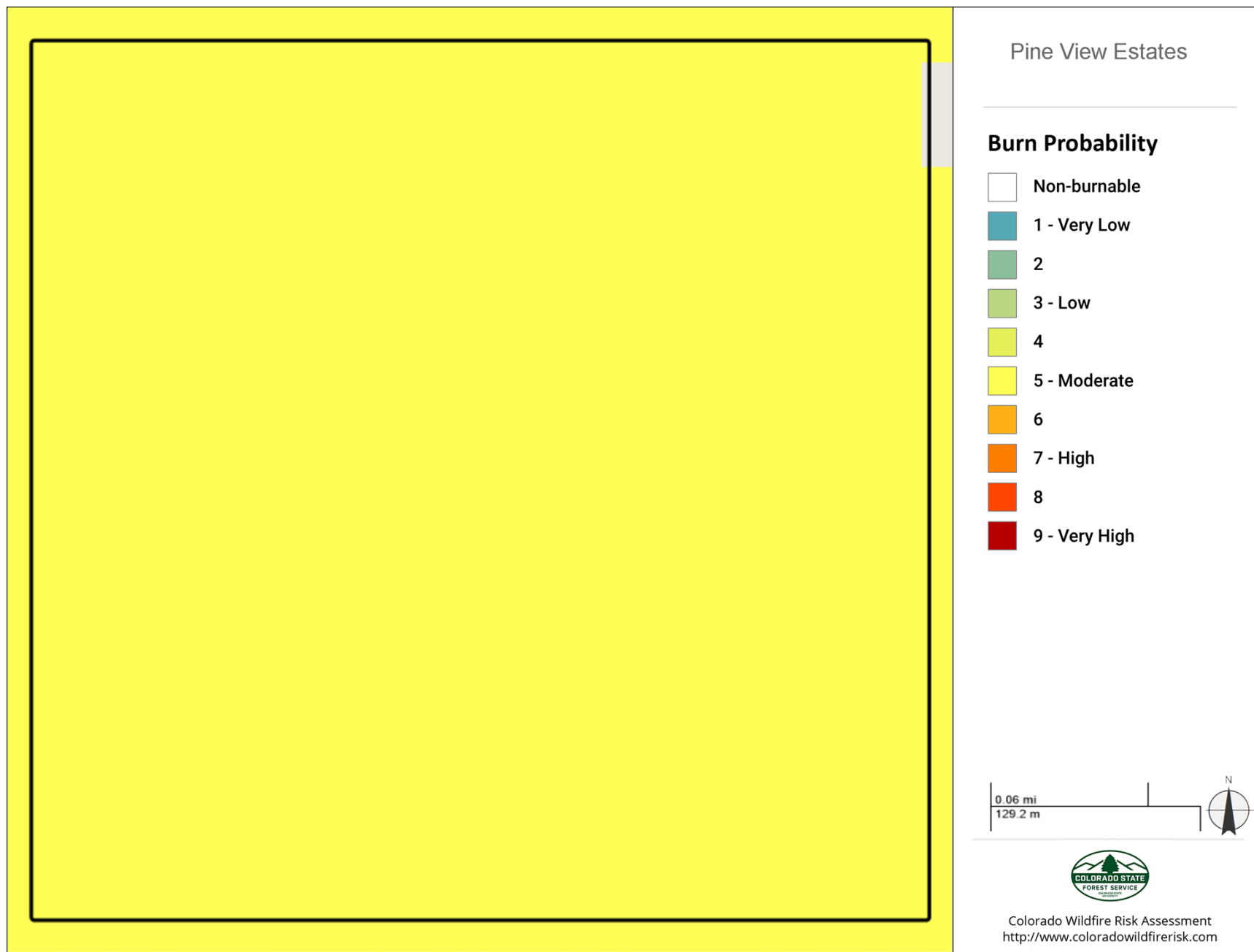
To aid in the use of Burn Probability for planning activities, the output values are categorized into 10 (ten) classes. These are given general descriptions from Lowest to Highest Probability.

A more detailed description of the risk assessment algorithms is provided in the Colorado WRA Final Report, which can be downloaded from www.ColoradoWildfireRisk.com.

Burn Probability Class		Acres	Percent
	Non-Burnable	0	0.0 %
	Very Low	0	0.0 %
	Very Low-Low	0	0.0 %
	Low	0	0.0 %
	Low-Moderate	0	0.0 %
	Moderate	32	100.0 %
	Moderate-High	0	0.0 %
	High	0	0.0 %
	High-Very High	0	0.0 %
	Very High	0	0.0 %
Total		32	100.0 %

Pine View Estates
Burn Probability





Values at Risk Rating

Description

Represents those values or assets that would be adversely impacted by a wildfire. The Values at Risk Rating is an overall rating that combines the risk ratings for Wildland Urban Interface (WUI), Forest Assets, Riparian Assets, and Drinking Water Importance Areas into a single measure of values-at-risk. The individual ratings for each value layer were derived using a Response Function 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. A resource or asset is any of the Fire Effects input layers, such as WUI, Forest Assets, etc. These net changes can be adverse (negative) or positive (beneficial).

Calculating the Values at Risk Rating at a given location requires spatially defined estimates of the intensity of fire integrated with the identified resource value. This interaction is quantified through the use of response functions that estimate expected impacts to resources or assets at the specified fire intensity levels. The measure of fire intensity level used in the Colorado assessment is flame length for a location. Response Function outputs were

derived for each input dataset and then combined to derive the Values Impacted Rating.

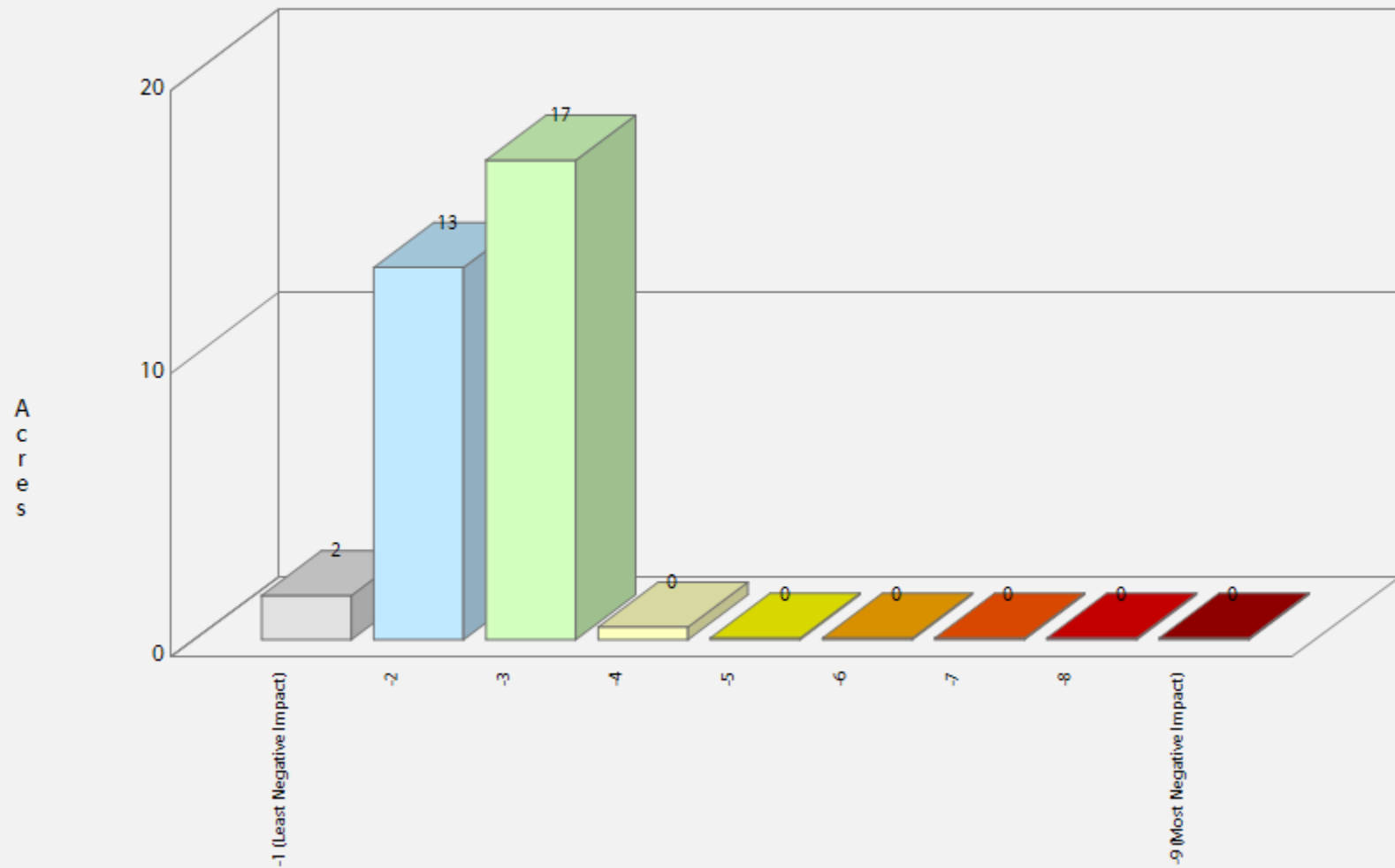
Different weightings are used for each of the input layers with the highest priority placed on protection of people and structures (i.e. WUI). The weightings represent the value associated with those assets. Weightings were developed by a team of experts during the assessment to reflect priorities for fire protection planning in Colorado. Refer to the Colorado WRA Final Report for more information about the layer weightings.

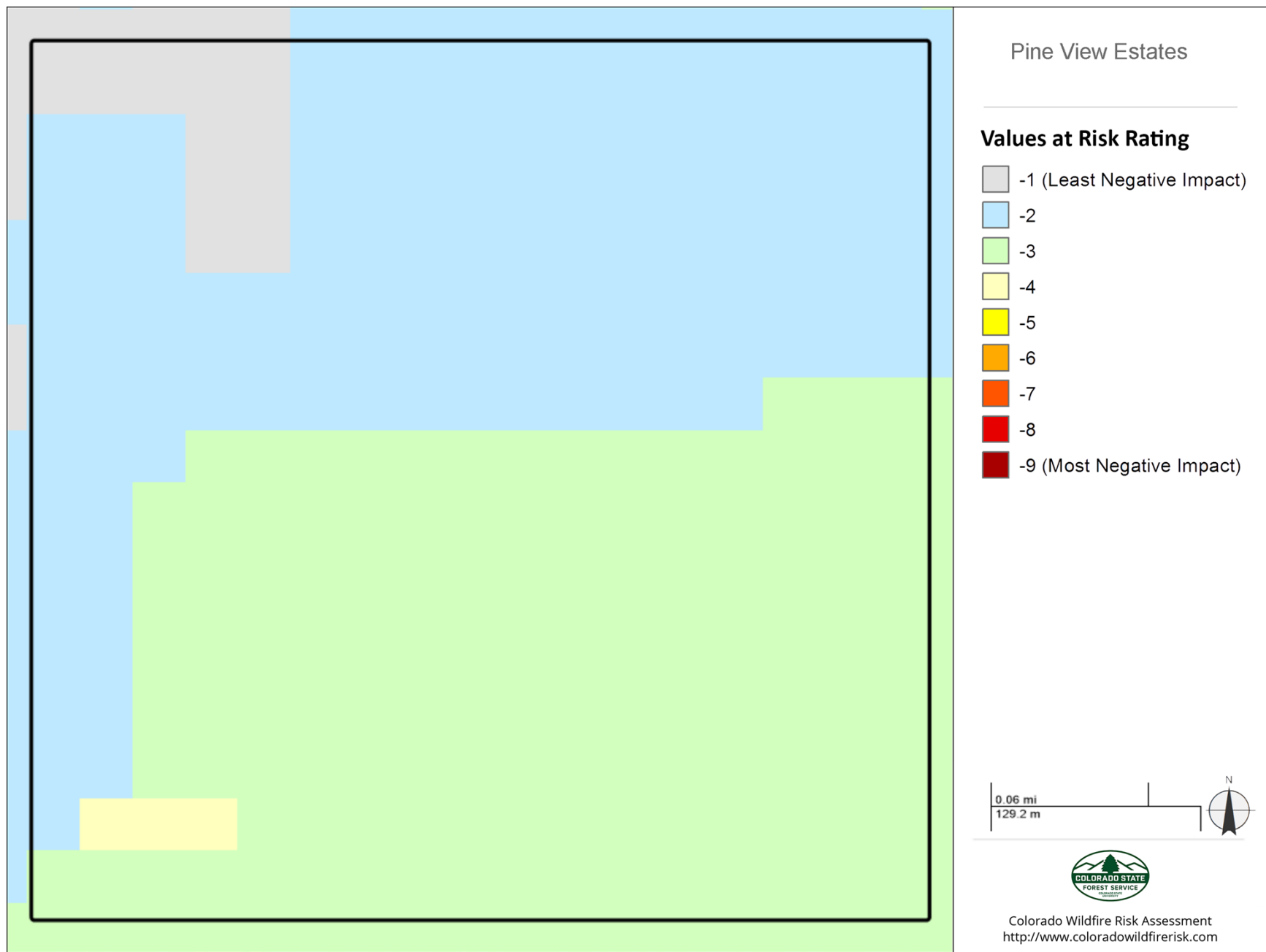
Since all areas in Colorado have the Values at Risk Rating calculated consistently, it allows for comparison and ordination of areas across the entire state.

The data were derived at a 30-meter resolution.

	Values at Risk Class	Acres	Percent
	-1 (Least Negative Impact)	2	4.9 %
	-2	13	41.0 %
	-3	17	52.8 %
	-4	0	1.4 %
	-5	0	0.0 %
	-6	0	0.0 %
	-7	0	0.0 %
	-8	0	0.0 %
	-9 (Most Negative Impact)	0	0.0 %
Total		32	100.0 %

Pine View Estates
Values at Risk Rating





Suppression Difficulty Rating

Description

Reflects the difficulty or relative cost to suppress a fire given the terrain and vegetation conditions that may impact machine operability. This layer is an overall index that combines the slope steepness and the fuel type characterization to identify areas where it would be difficult or costly to suppress a fire due to the underlying terrain and vegetation conditions that would impact machine operability (in particular Type II dozer).

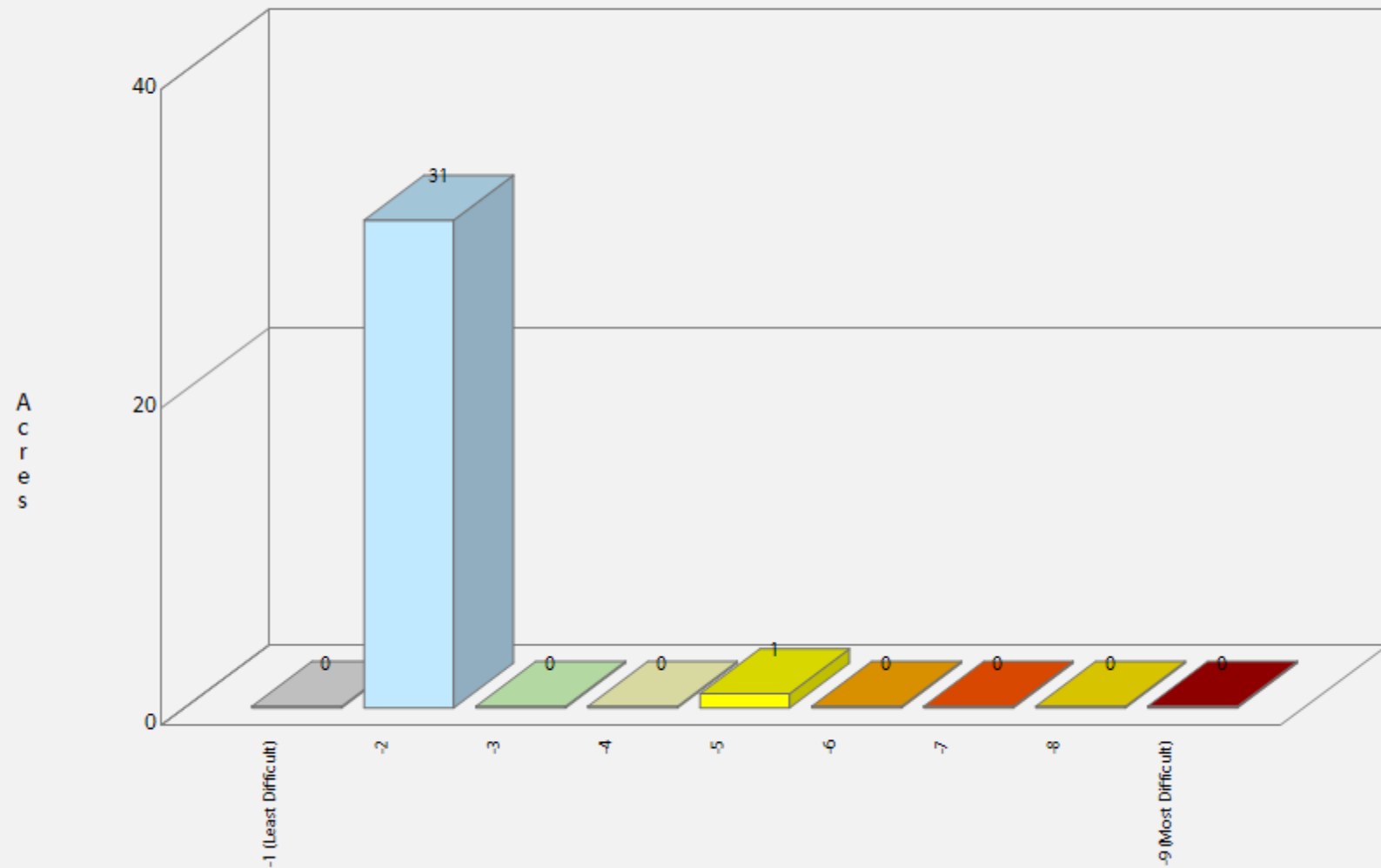
The rating was calculated based on the fireline production rates for hand crews and engines with modifications for slope, as documented in the NWCG Fireline Handbook 3, PMS 401-1.

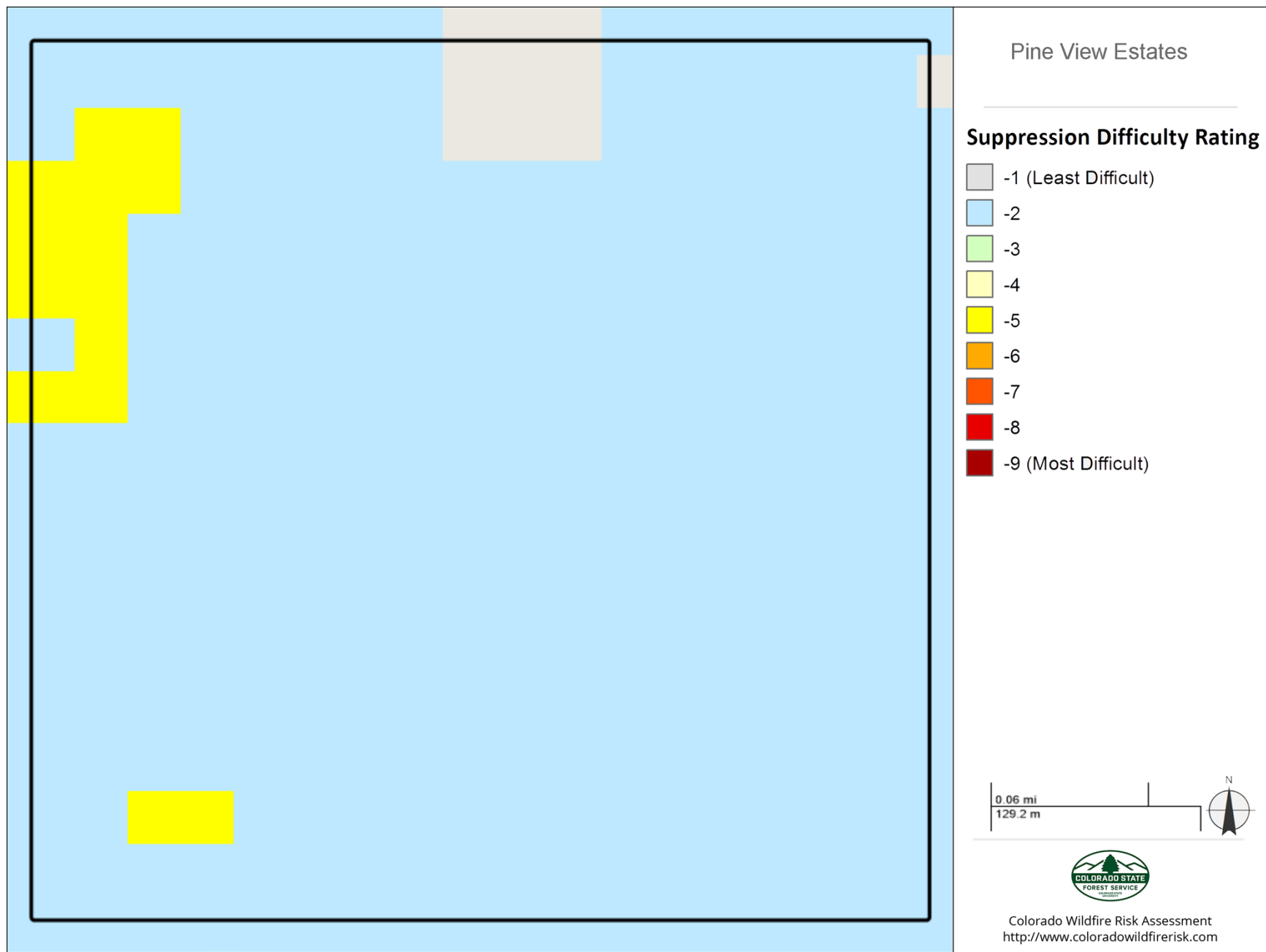
The burnable fuel models in the Colorado WRA were grouped into three categories: slow (0-66 feet), medium (67-165 feet) and fast (greater than 165 feet).

Fireline production capability on five slope classes was used as the basic reference to obtain the suppression difficulty score. To remain constant with the Value Impacted Rating output values, a response function (-1 to -9) is assigned to each combination of fuel model group (slow, medium and fast) and slope category.

SDR Class		Acres	Percent
	-1 (Least Difficult)	0	0.0 %
	-2	31	97.2 %
	-3	0	0.0 %
	-4	0	0.0 %
	-5	1	2.8 %
	-6	0	0.0 %
	-7	0	0.0 %
	-8	0	0.0 %
	-9 (Most Difficult)	0	0.0 %
Total		32	100.0 %

Pine View Estates
Suppression Difficulty Rating





Fire Occurrence

Description

Fire Occurrence is an ignition density that represents the likelihood of a wildfire starting based on historical ignition patterns. Occurrence is derived by modeling historic wildfire ignition locations to create an ignition density map.

Historic fire report data were used to create the ignition points for all Colorado fires. The compiled fire occurrence database was cleaned to remove duplicate records and to correct inaccurate locations. The database was then modeled to create a density map reflecting historical fire ignition rates.

Historic fire report data were used to create the ignition points for all Colorado fires. This included both federal and non-federal fire ignition locations.

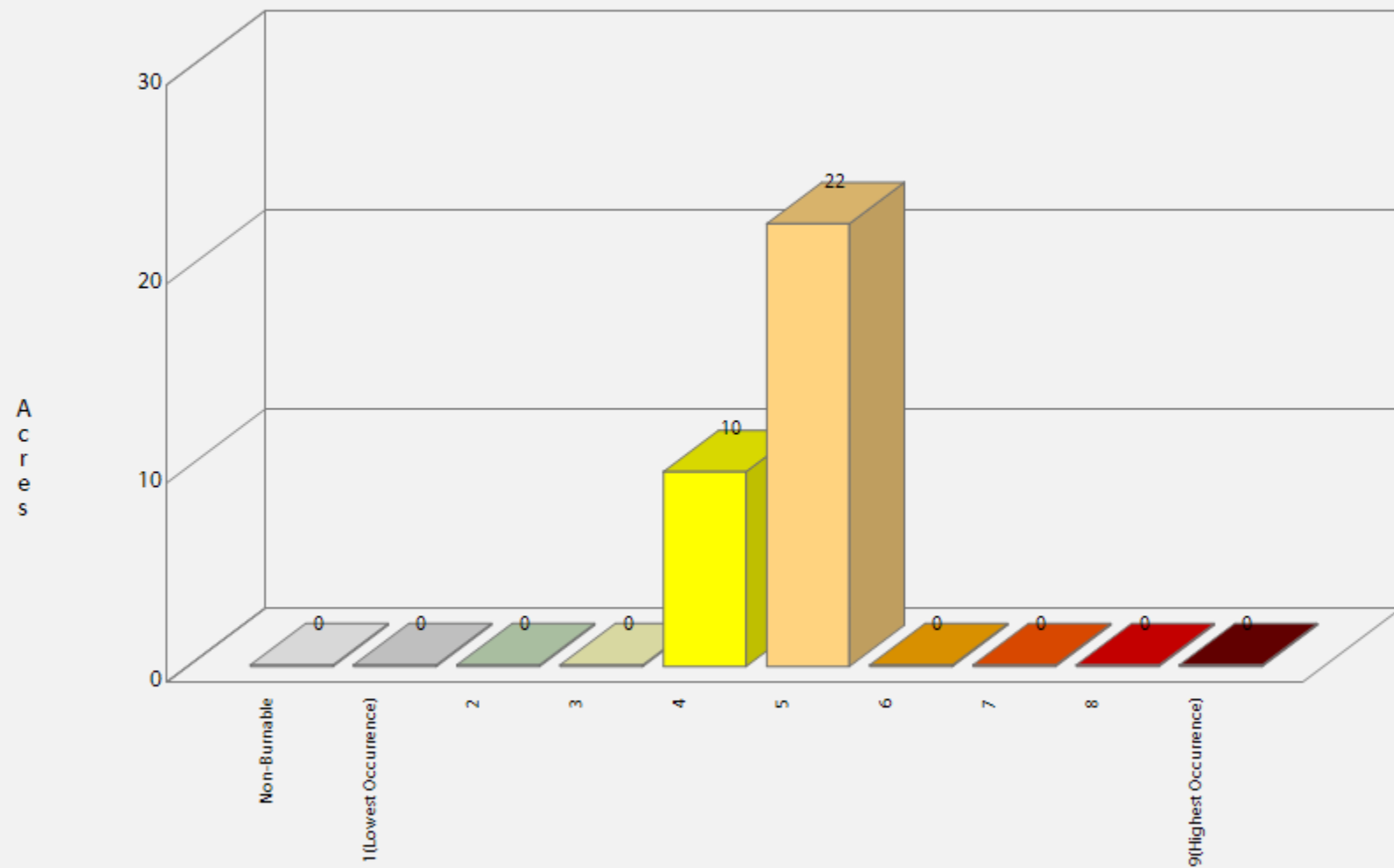
The class breaks are determined by analyzing the Fire Occurrence output values for the entire state and determining cumulative percent of acres (i.e. Class 9 has the top 1.5% of acres with the highest occurrence rate). Refer to the Colorado WRA Final Report for a more detailed description of the mapping classes and the methods used to derive these.

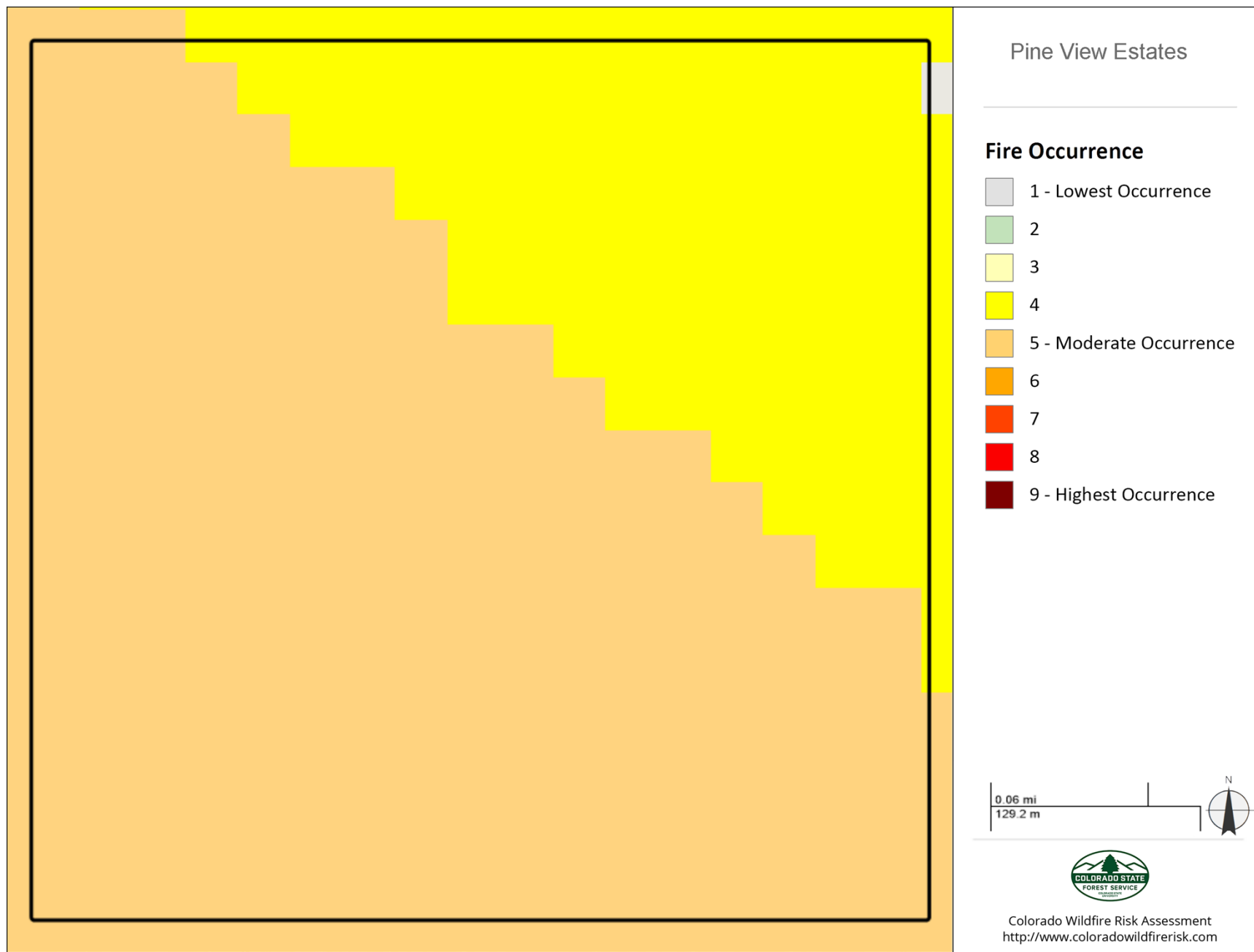
The Fire Occurrence map is derived at a 30-meter resolution. This scale of data was chosen to be consistent with the accuracy of the primary surface fuels dataset used in the assessment. While not sufficient for site specific analysis, it is appropriate for regional, county or local protection mitigation or prevention planning.

A more detailed description of the risk assessment algorithms is provided in the Colorado WRA Final Report, which can be downloaded from www.ColoradoWildfireRisk.com.

Fire Occurrence Class		Acres	Percent
	Non-Burnable	0	0.0 %
	1 (Lowest Occurrence)	0	0.0 %
	2	0	0.0 %
	3	0	0.0 %
	4	10	30.6 %
	5	22	69.5 %
	6	0	0.0 %
	7	0	0.0 %
	8	0	0.0 %
	9 (Highest Occurrence)	0	0.0 %
Total		32	100.0 %

Pine View Estates Fire Occurrence





Fire Behavior

Description

Fire behavior is the manner in which 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:

- **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 2017 assessment uses the latest 2017 calibrated fuels for Colorado.
- **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.
- **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.

- **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.
- **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

Environmental weather parameters needed to compute fire behavior characteristics include 1-hour, 10-hour and 100-hour time-lag fuel moistures, herbaceous fuel moisture, woody fuel moisture and the 20-foot, 10-minute average wind speed. To collect this information, Weather data (1988-2017) from NCEP (National Center for Environmental Prediction) was used to analyse potential weather scenarios in which assessing fire behavior and spread. In particular, the North American Regional Reanalysis (NARR) product from NCEP was selected because of it provides high resolution weather data for all of Colorado. The following percentiles (97th, 90th, 50th and 25th) were analysed for each variable in each 30km NARR point to create four weather scenarios to run the fire behavior analysis: “Extreme”, “High”, “Moderate” and “Low”. After

Characteristic Rate of Spread

computing the weather percentiles of the NARR variables, an IDW algorithm was used to derive 30m resolution data to match the surface fuels dataset.

The four percentile weather categories are intended to represent low, moderate, high and extreme fire weather days. Fire behavior outputs are computed for each percentile weather category to determine fire potential under different weather scenarios.

For a detailed description of the methodology, refer to the 2017 Colorado Wildfire Risk Assessment Final Report at www.ColoradoWildfireRisk.com.

Topography

Topography datasets required to compute fire behavior characteristics are elevation, slope and aspect.

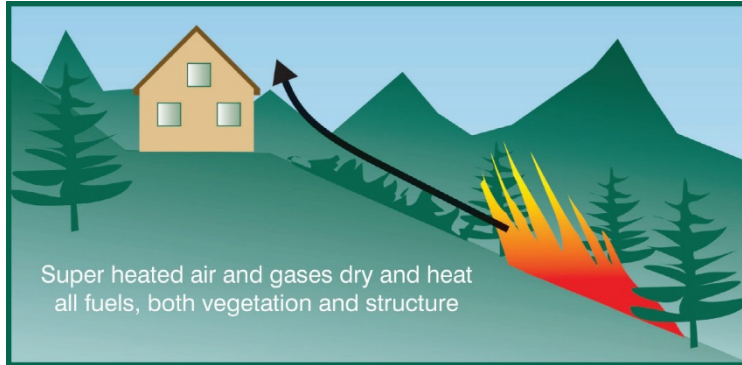
FIRE BEHAVIOR CHARACTERISTICS

Fire behavior characteristics provided in this report include:

- **Characteristic Rate of Spread**
- **Characteristic Flame Length**
- **Fire Intensity Scale**
- **Fire Type – Extreme Weather**

Characteristic Rate of Spread is 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 Colorado WRA, this measurement represents the maximum rate of spread of the fire front. Rate of Spread is used in the calculation of Wildfire Threat in the Colorado WRA.

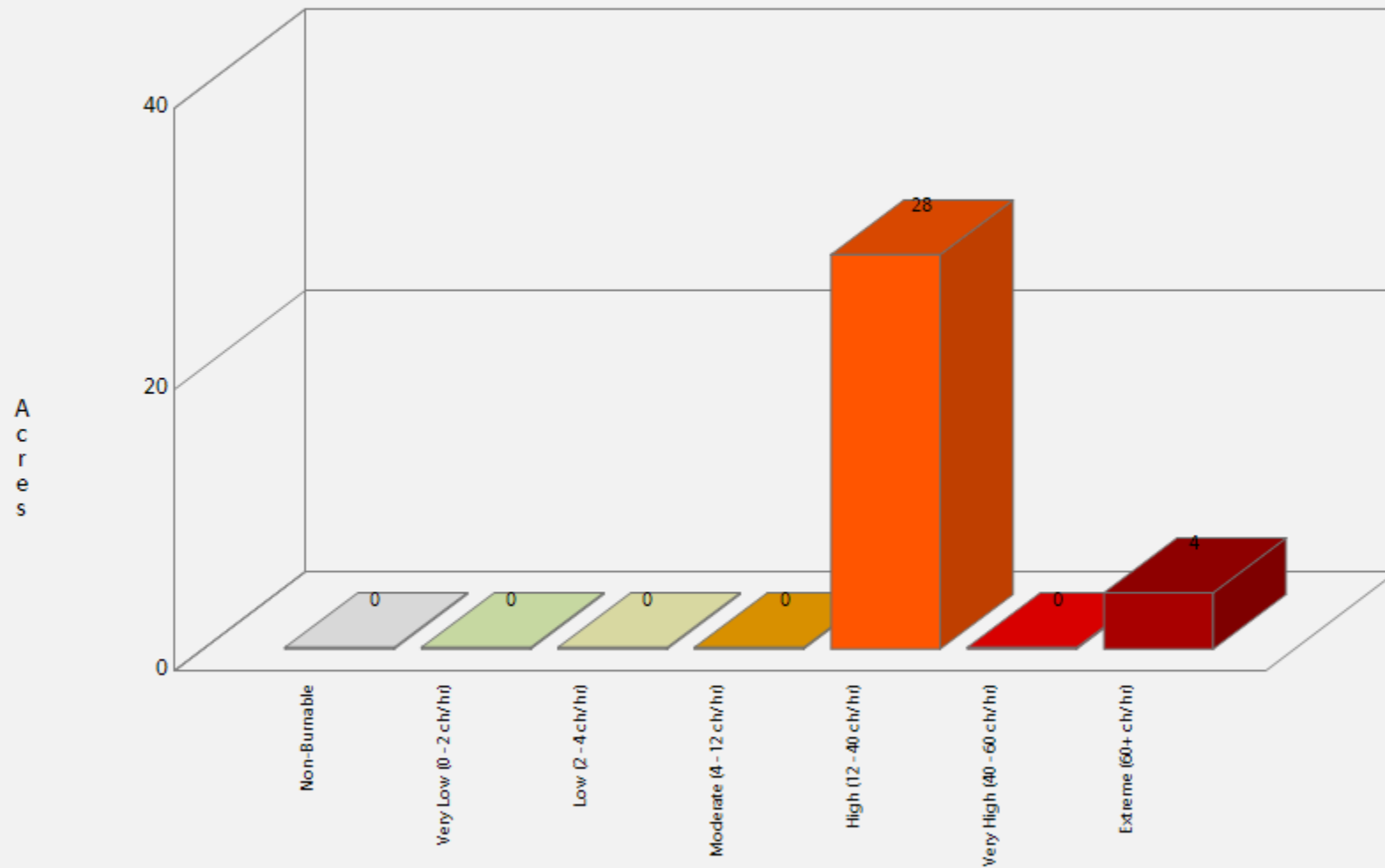


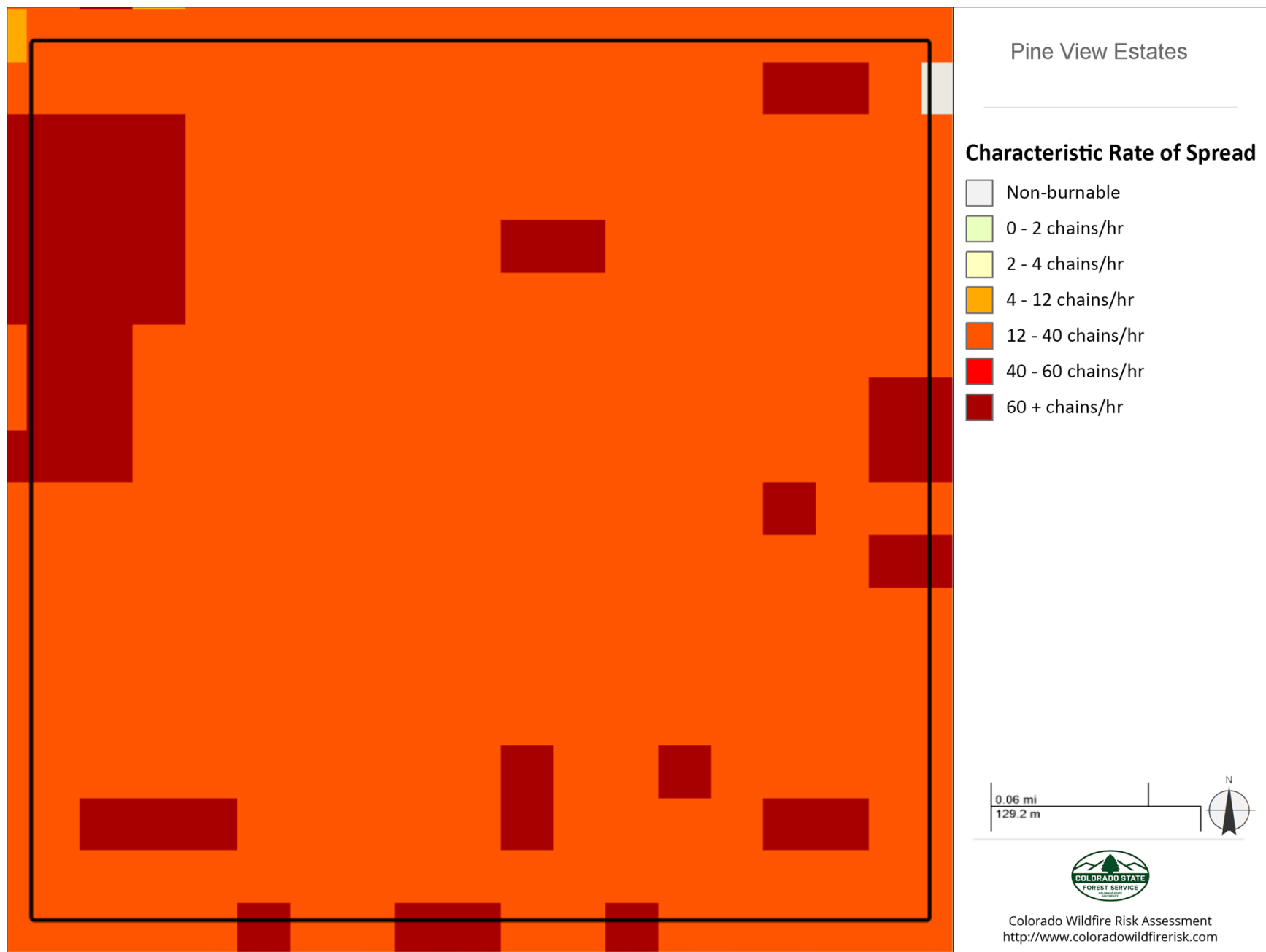
Rate of spread is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for each 30-meter cell in Colorado. Thirty (30) meter resolution is the baseline for the Colorado WRA, matching the source surface fuels dataset.

The “characteristic” output represents the weighted average for all four weather percentiles. While not shown in this report, the individual percentile weather ROS outputs are available in the Colorado WRA data.

	Rate of Spread	Acres	Percent
	Non-Burnable	0	0.0 %
	Very Low (0 - 2 ch/hr)	0	0.0 %
	Low (2 - 4 ch/hr)	0	0.0 %
	Moderate (4 - 12 ch/hr)	0	0.0 %
	High (12 - 40 ch/hr)	28	87.5 %
	Very High (40 - 60 ch/hr)	0	0.0 %
	Extreme (60+ ch/hr)	4	12.5 %
Total		32	100.0 %

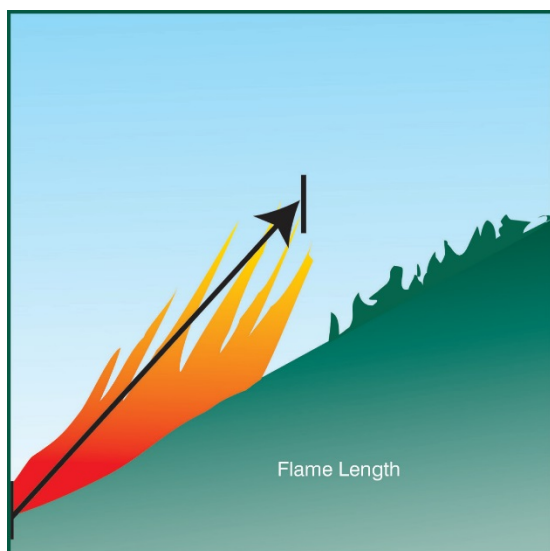
Pine View Estates
Characteristic Rate of Spread





Characteristic Flame Length

Characteristic Flame Length is 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 (ft). Flame length is the measure of fire intensity used to generate the Fire Effects outputs for the Colorado WRA.

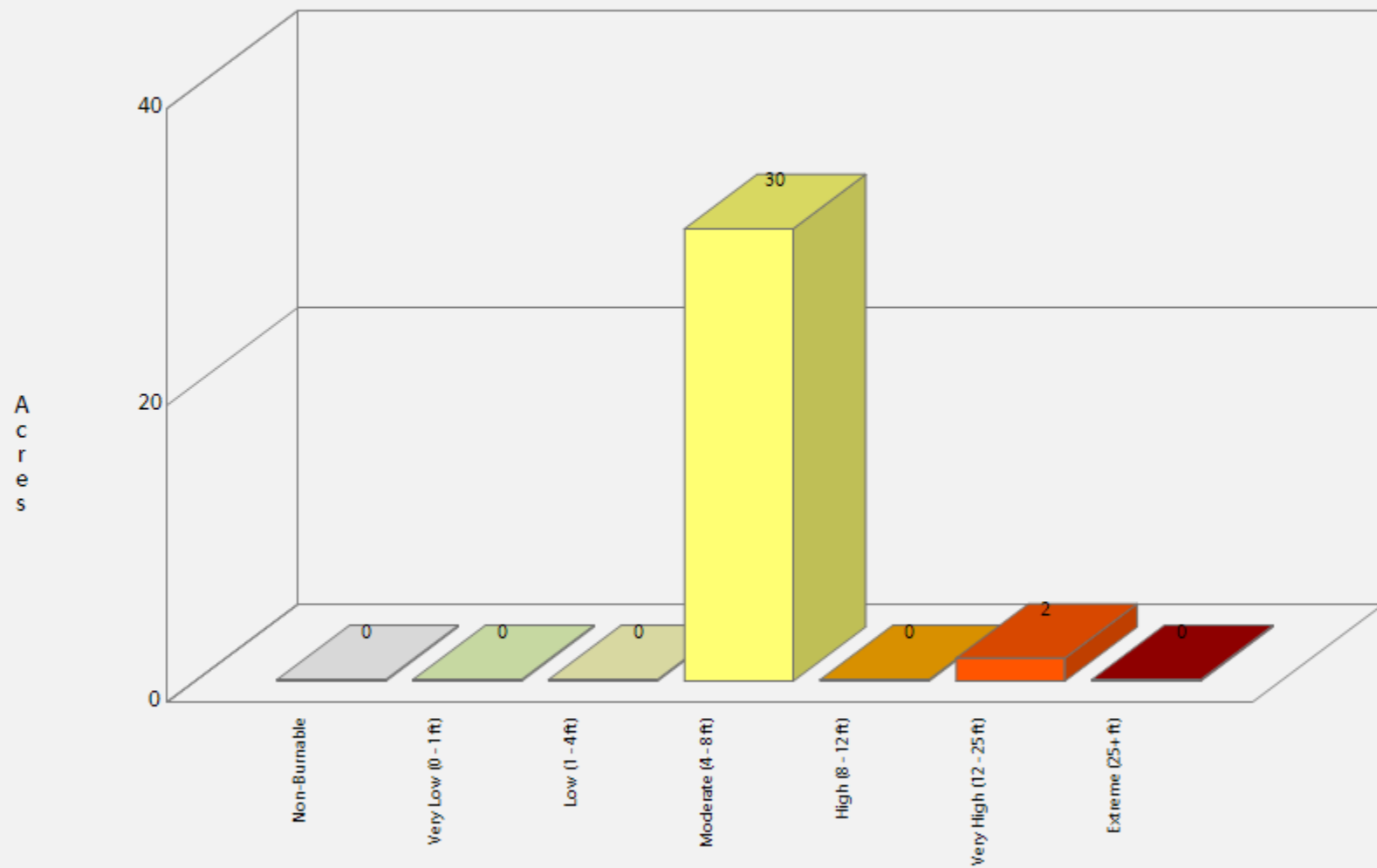


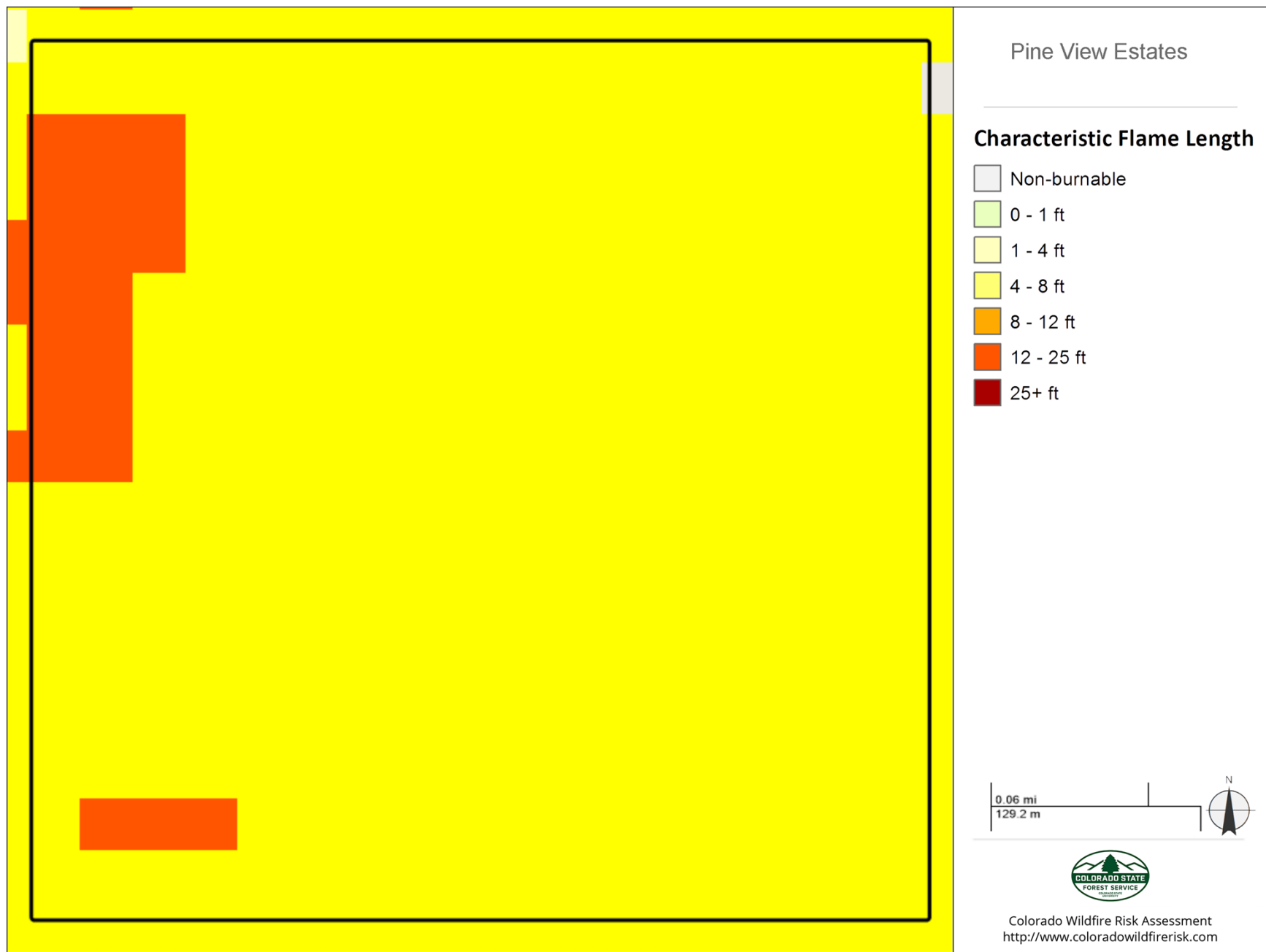
Flame length is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently. To account for this variability, four percentile weather categories were created from historical weather observations to represent low, moderate, high, and extreme weather days for each 30-meter cell in Colorado.

This output represents the weighted average for all four weather percentiles. While not shown in this report, the individual percentile weather Flame Length outputs are available in the Colorado WRA data.

Flame Length		Acres	Percent
	Non-Burnable	0	0.0 %
	Very Low (0 - 1 ft)	0	0.0 %
	Low (1 - 4 ft)	0	0.0 %
	Moderate (4 - 8 ft)	30	95.2 %
	High (8 - 12 ft)	0	0.0 %
	Very High (12 - 25 ft)	2	4.9 %
	Extreme (25+ ft)	0	0.0 %
Total		32	100.0 %

Pine View Estates
Characteristic Flame Length





Fire Intensity Scale

Description

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. **Class2, 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. 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.

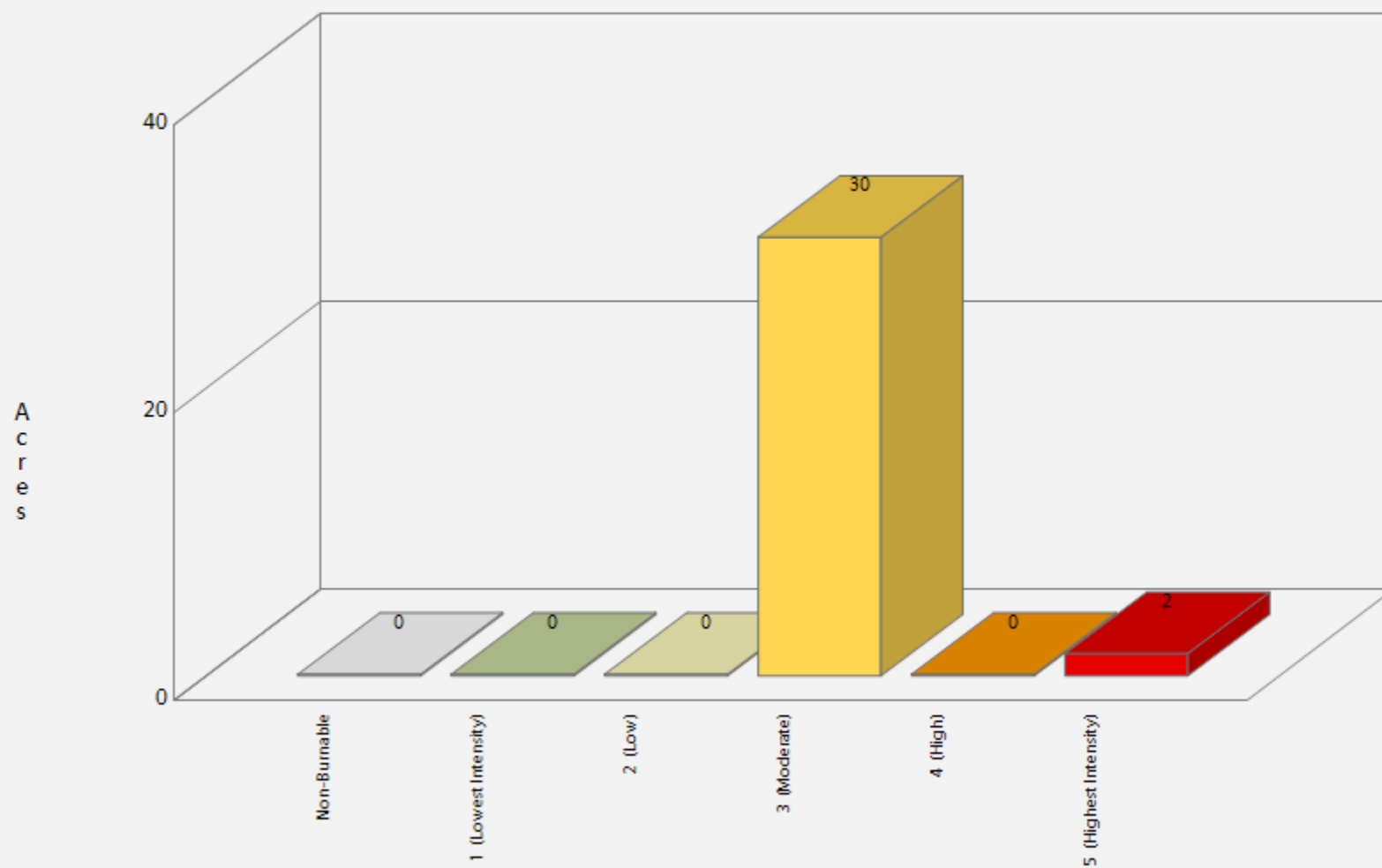
Fire intensity scale is a fire behavior output, which is influenced by three environmental factors - fuels, weather, and topography. Weather is by far the most dynamic variable as it changes frequently.

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 30-meter cell in Colorado. The FIS represents the weighted average for all four weather percentiles.

The fire intensity scale map is derived at a 30-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
	Non-Burnable	0	0.0 %
	1 (Lowest Intensity)	0	0.0 %
	2 (Low)	0	0.0 %
	3 (Moderate)	30	95.2 %
	4 (High)	0	0.0 %
	5 (Highest Intensity)	2	4.9 %
	Total	32	100.0 %

Pine View Estates
Characteristic Fire Intensity Scale





Fire Type – Extreme Weather

Fire Type – Extreme represents the potential fire type under the extreme percentile weather category. The extreme percentile weather category represents the average weather based on the top three percent fire weather days in the analysis period. It is not intended to represent a worst-case scenario weather event. Accordingly, the potential fire type is based on fuel conditions, extreme percentile weather, and topography.

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. Typically canopy fires occur in extreme weather conditions. The Fire Type – Extreme 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).



Active Canopy Fire

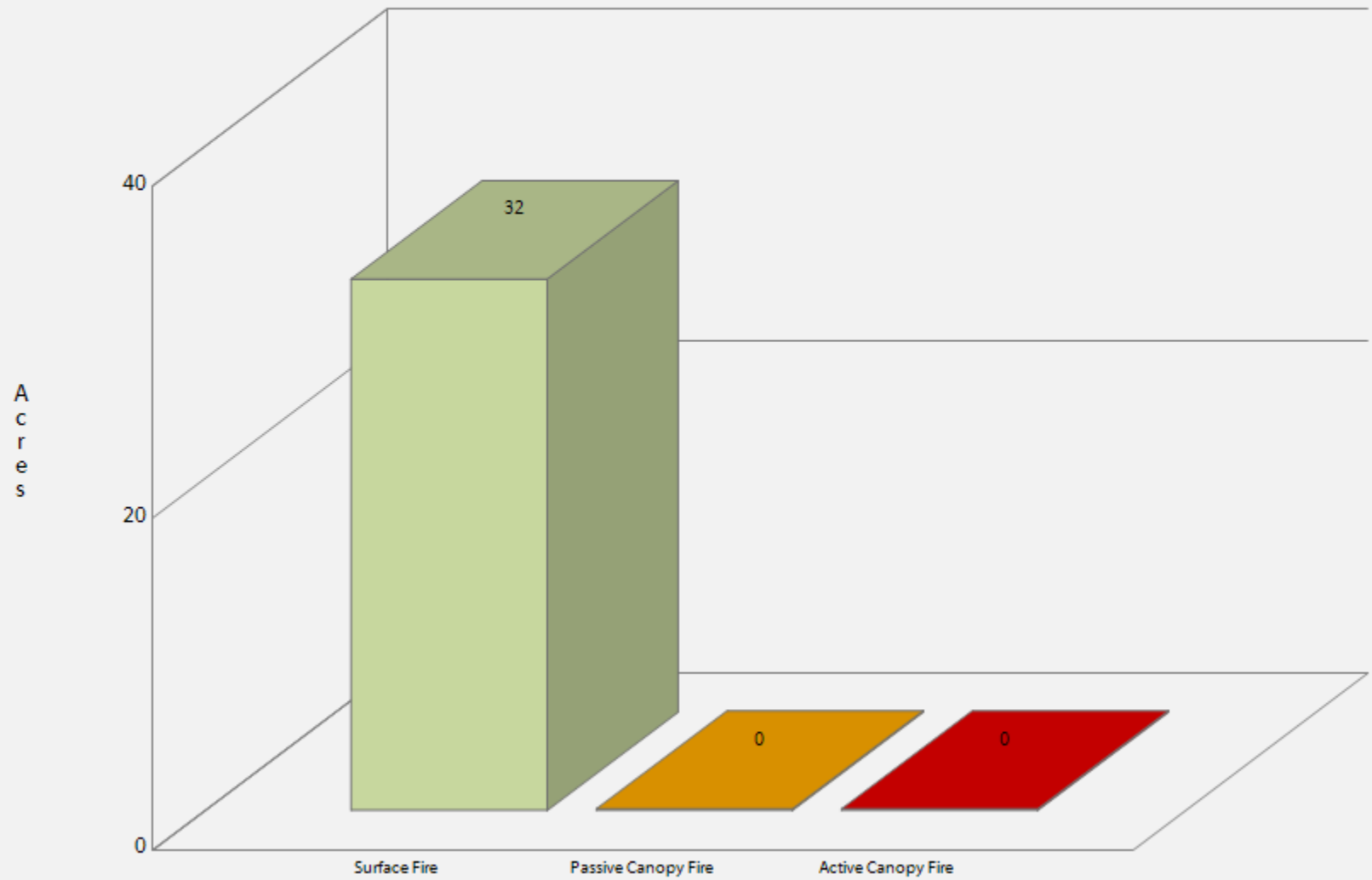
A crown fire in which the entire fuel complex (canopy) is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread (Scott & Reinhardt, 2001).



The Fire Type - Extreme Weather map is derived at a 30-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.

Fire Type – Extreme Weather		Acres	Percent
	Surface Fire	32	100.0 %
	Passive Canopy Fire	0	0.0 %
	Active Canopy Fire	0	0.0 %
Total		32	100.0 %

Pine View Estates
Fire Type - Extreme





Surface Fuels

Description

Surface fuels, or fire behavior fuel models as they are technically referred to, contain the parameters required by the Rothermel (1972) surface fire spread model to compute surface fire behavior characteristics, including 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 Colorado WRA accounts for both surface and canopy fire potential in the fire behavior outputs. However, only surface fuels are shown in this risk report.



Unmanaged forest with dead and downed trees and branches



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

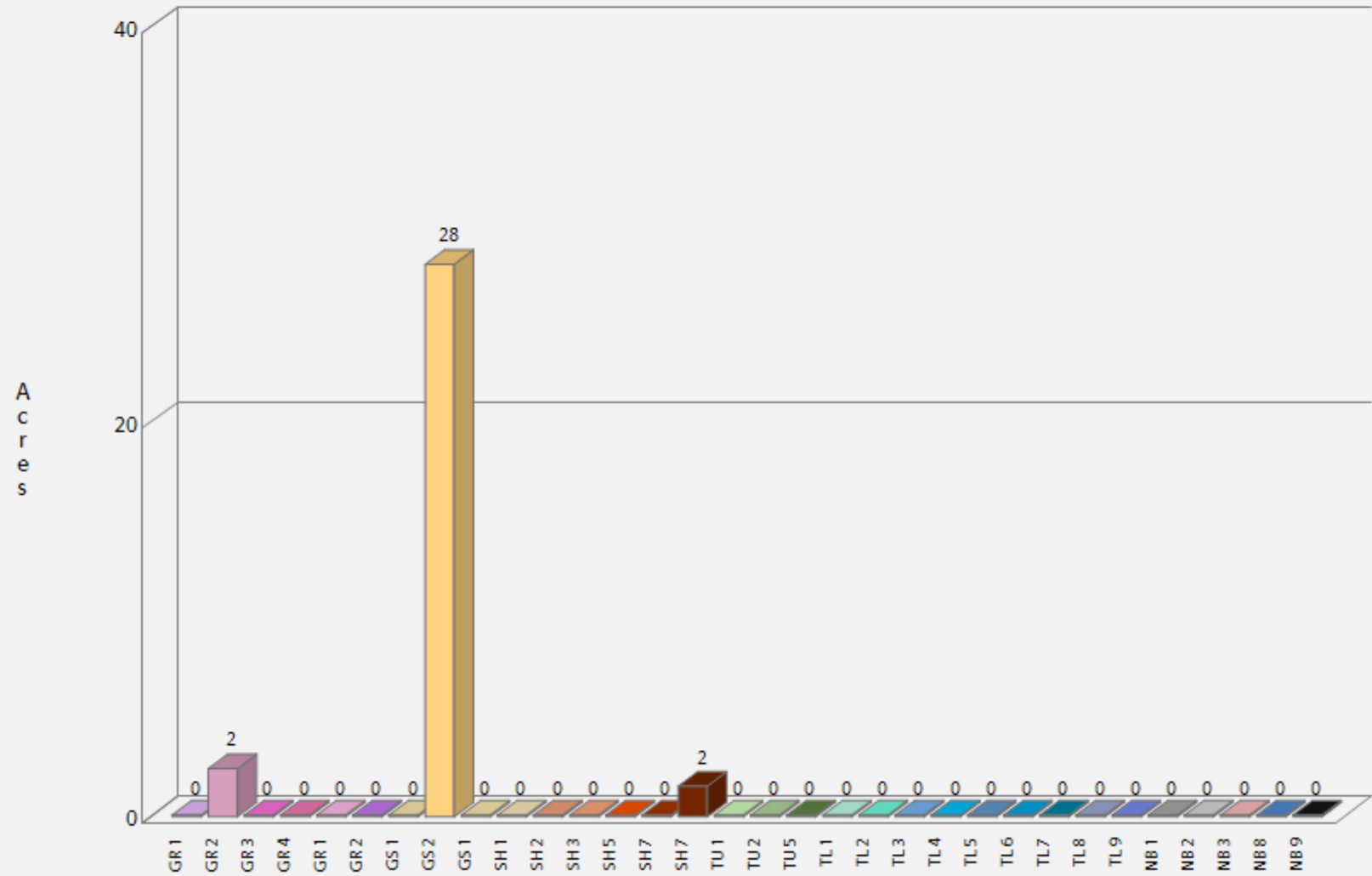
Surface fuels typically are categorized into one of four primary fuel types based on the primary carrier of the surface fire: 1) grass, 2) shrub/brush, 3) timber litter, and 4) slash. Two standard fire behavior fuel model sets have been published. The Fire Behavior Prediction System 1982 Fuel Model Set (Anderson, 1982) contains 13 fuel models, and the Fire Behavior Prediction System 2005 Fuel Model Set (Scott & Burgan, 2005) contains 40 fuel models. The Colorado WRA uses fuel models from the 2005 Fuel Model Set.

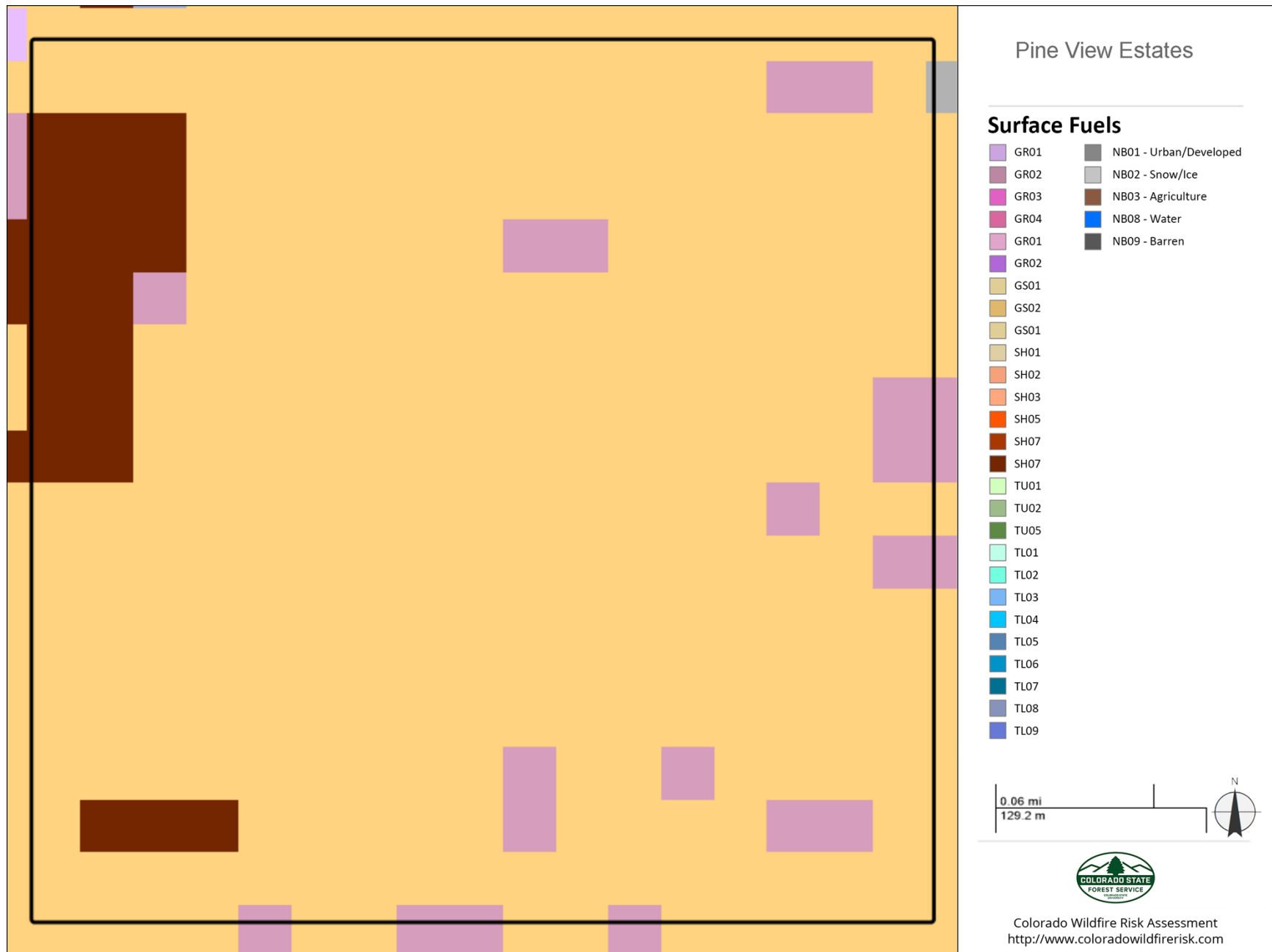
The 2017 Colorado Surface Fuels were derived by enhancing the baseline LANDFIRE 2014 products with modifications to reflect local conditions and knowledge. A team of fuels and fire behavior experts, led by the CSFS, conducted a detailed calibration of the LANDFIRE 2014 fuels datasets. This calibration involved correcting LANDFIRE mapping zone seamlines errors; adding recent disturbances from 2013 to 2017 for fires, insect and disease, and treatments; correcting fuels for high elevations; adjusting fuels for oak-shrublands and pinyon-juniper areas; and modifying SH7 fuel designations. This calibration effort resulted in an accurate and up-to-date surface fuels dataset that is the basis for the fire behavior and risk calculations in the 2017 Colorado Wildfire Risk Assessment Update.

A detailed description of the fuels calibration methods and results is provided in the CSFS 2017 Fuels Calibration Final Report (July 2018).

Surface Fuels	Description	Acres	Percent
GR 1	Short, Sparse Dry Climate Grass (Dynamic)	0	0.0 %
GR 2	Low Load, Dry Climate Grass (Dynamic)	2	7.6 %
GR 3	Low Load, Very Coarse, Humid Climate Grass (Dynamic)	0	0.0 %
GR 4	Moderate Load, Dry Climate Grass (Dynamic)	0	0.0 %
GR 1	GT 10,000 ft elevation	0	0.0 %
GR 2	GT 10,000 ft elevation	0	0.0 %
GS 1	Low Load, Dry Climate Grass-Shrub (Dynamic)	0	0.0 %
GS 2	Moderate Load, Dry Climate Grass-Shrub (Dynamic)	28	87.5 %
GS 1	GT 10,000 ft elevation	0	0.0 %
SH 1	Moderate Load, Humid Climate Grass-Shrub (Dynamic)	0	0.0 %
SH 2	Moderate Load, Dry Climate Shrub	0	0.0 %
SH 3	Moderate Load, Humid Climate Timber-Shrub	0	0.0 %
SH 5	High Load, Humid Climate Grass-Shrub	0	0.0 %
SH 7	Very High Load, Dry Climate Shrub	0	0.0 %
SH 7	Oak Shrubland without changes	2	4.9 %
TU 1	Light Load, Dry Climate Timber-Grass-Shrub	0	0.0 %
TU 2	Moderate Load, Humid Climate Timber-Shrub	0	0.0 %
TU 5	High Load, Conifer Litter	0	0.0 %
TL 1	Low Load, Compact Conifer Litter	0	0.0 %
TL 2	Low Load, Broadleaf Litter	0	0.0 %
TL 3	Moderate Load, Conifer Litter	0	0.0 %
TL 4	Small Downed Logs	0	0.0 %
TL 5	High Load, Conifer Litter	0	0.0 %
TL 6	Moderate Load, Broadleaf Litter	0	0.0 %
TL 7	Large Downed Logs, Heavy Load Forest Litter	0	0.0 %
TL 8	Long-needle Litter	0	0.0 %
TL 9	Very High Load, Broadleaf Litter	0	0.0 %
NB 1	Urban/Developed	0	0.0 %
NB 2	Snow/Ice	0	0.0 %
NB 3	Agricultural	0	0.0 %
NB 8	Open Water	0	0.0 %
NB 9	Bare Ground	0	0.0 %
Total		32	100.0 %

Pine View Estates
Surface Fuels





Vegetation

Description

The **Vegetation** map describes the general vegetation and landcover types across the state of Colorado. In the Colorado 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 LANDFIRE 2014 version of data products (Existing Vegetation Type) was used to compile the Vegetation data for the Colorado WRA. This reflects data current to 2014. The LANDFIRE EVT data were classified to reflect general vegetation cover types for representation with CO-WRAP.



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.



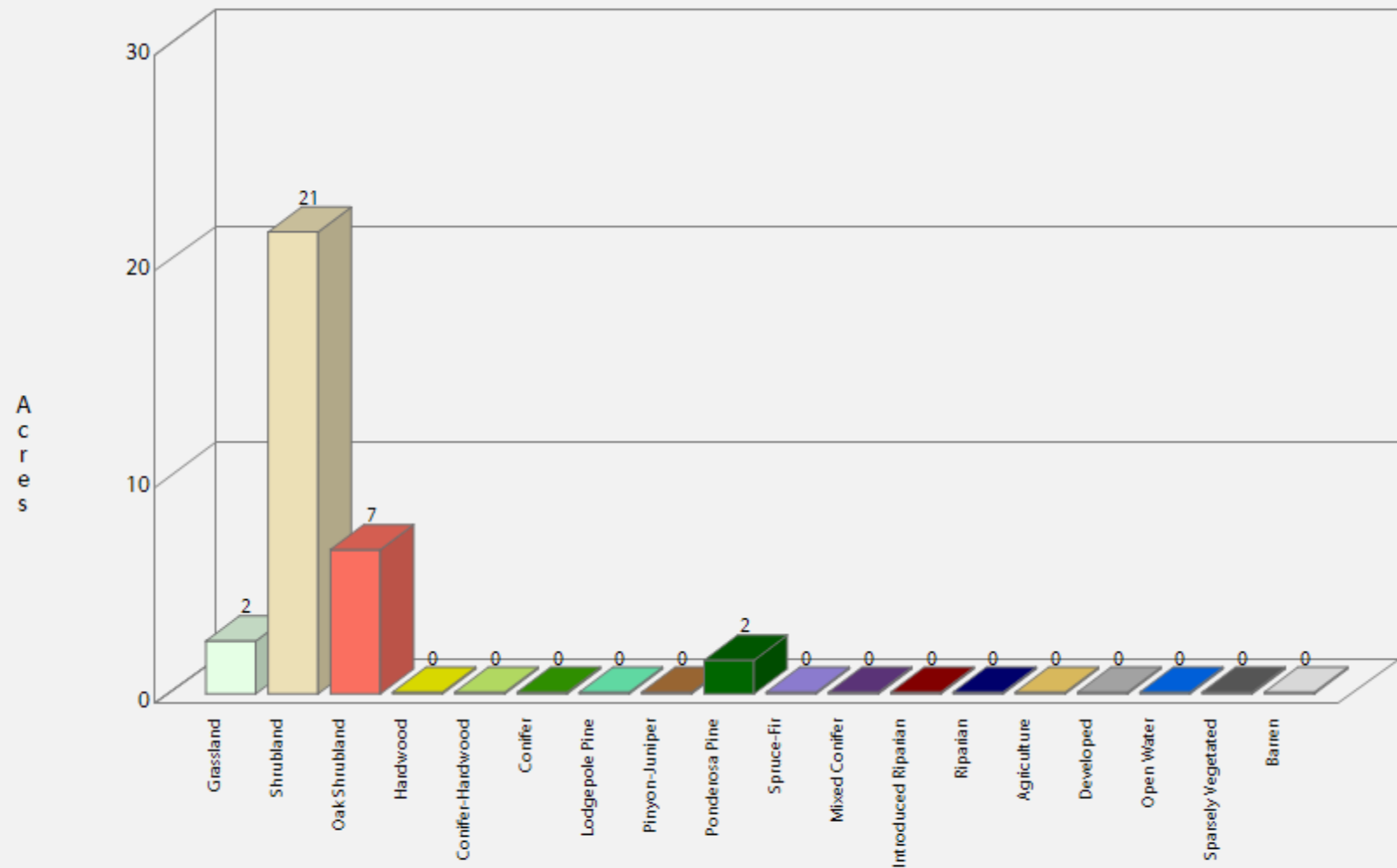
Wildland fire threat increases in lodgepole pine as the dense forests grow old.

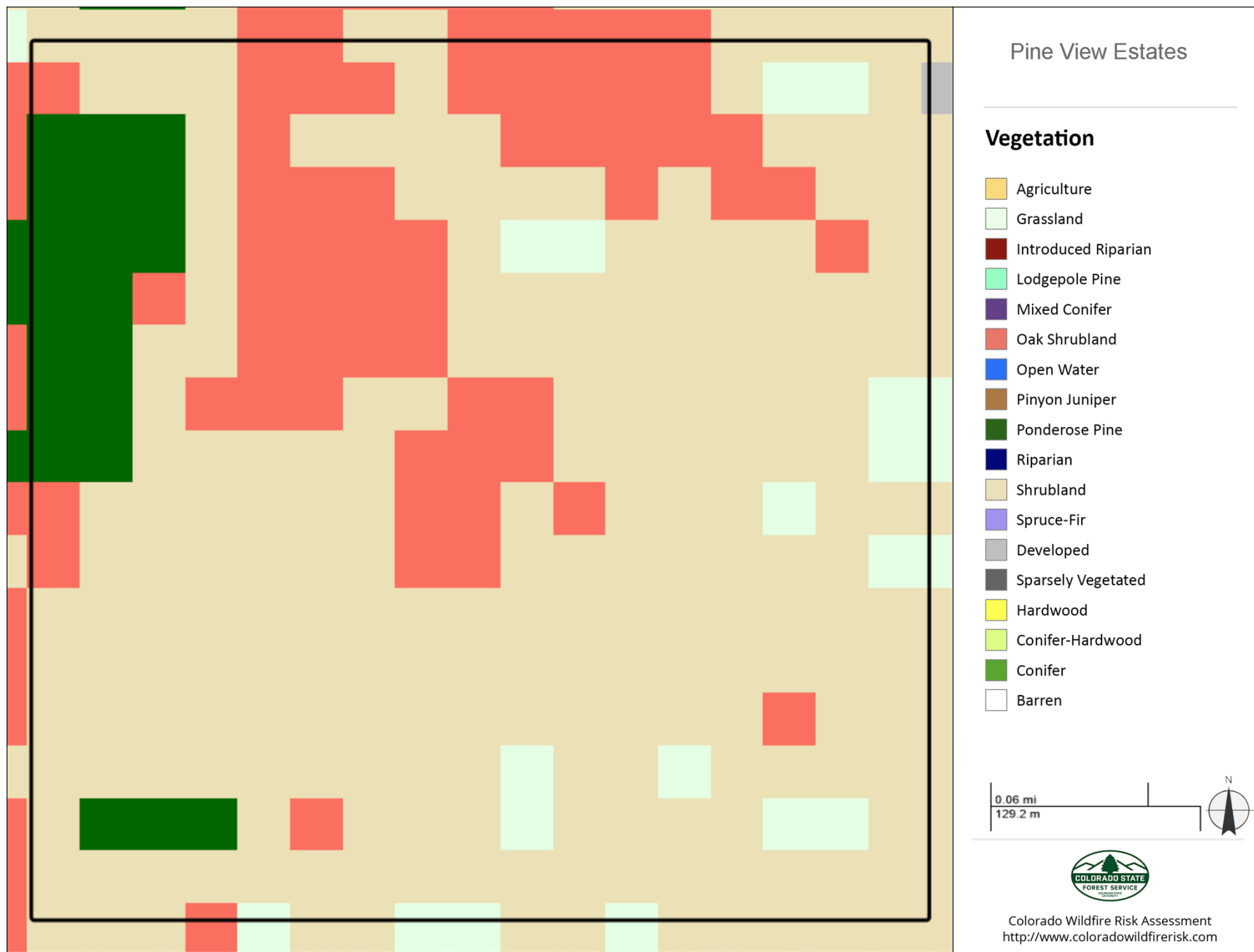


Overly dense ponderosa pine, a dominant species of the montane zone.

	Vegetation Class	Acres	Percent
	Grassland	2	7.6 %
	Shrubland	21	66.7 %
	Oak Shrubland	7	20.8 %
	Hardwood	0	0.0 %
	Conifer-Hardwood	0	0.0 %
	Conifer	0	0.0 %
	Lodgepole Pine	0	0.0 %
	Pinyon-Juniper	0	0.0 %
	Ponderosa Pine	2	4.9 %
	Spruce-Fir	0	0.0 %
	Mixed Conifer	0	0.0 %
	Introduced Riparian	0	0.0 %
	Riparian	0	0.0 %
	Agriculture	0	0.0 %
	Developed	0	0.0 %
	Open Water	0	0.0 %
	Sparsely Vegetated	0	0.0 %
	Barren	0	0.0 %
	Total	32	100.0 %

Pine View Estates Vegetation





Drinking Water Importance Areas

Description

Drinking Water Importance Areas is the measure of quality and quantity of public surface drinking water categorized by watershed. This layer identifies an index of surface drinking water importance, reflecting a measure of water quality and quantity, characterized by Hydrologic Unit Code 12 (HUC 12) watersheds. The Hydrologic Unit system is a standardized watershed classification system developed by the USGS. Areas that are a source of drinking water are of critical importance and adverse effects from fire are a key concern.

The U.S. Forest Service Forests to Faucets (F2F) project is the primary source of the drinking water data set. This project used GIS modeling to develop an index of importance for supplying drinking water using HUC 12 watersheds as the spatial resolution. Watersheds are ranked from 1 to 100 reflecting relative level of importance, with 100 being the most important and 1 the least important.

Several criteria were used in the F2F project to derive the importance rating including water supply, flow analysis, and downstream drinking water demand. The final model of surface drinking water importance used in the F2F project combines the drinking water protection model, capturing the flow of water and water demand, with a model of mean annual water supply.



Virtually all of Colorado's drinking water comes from snowmelt carried at some point by a river.



The headwaters of the Animas River begin near Silverton, CO at elevations greater than 12,000 feet.

The values generated by the drinking water protection model are simply multiplied by the results of the model of mean annual water supply to create the final surface drinking water importance index.

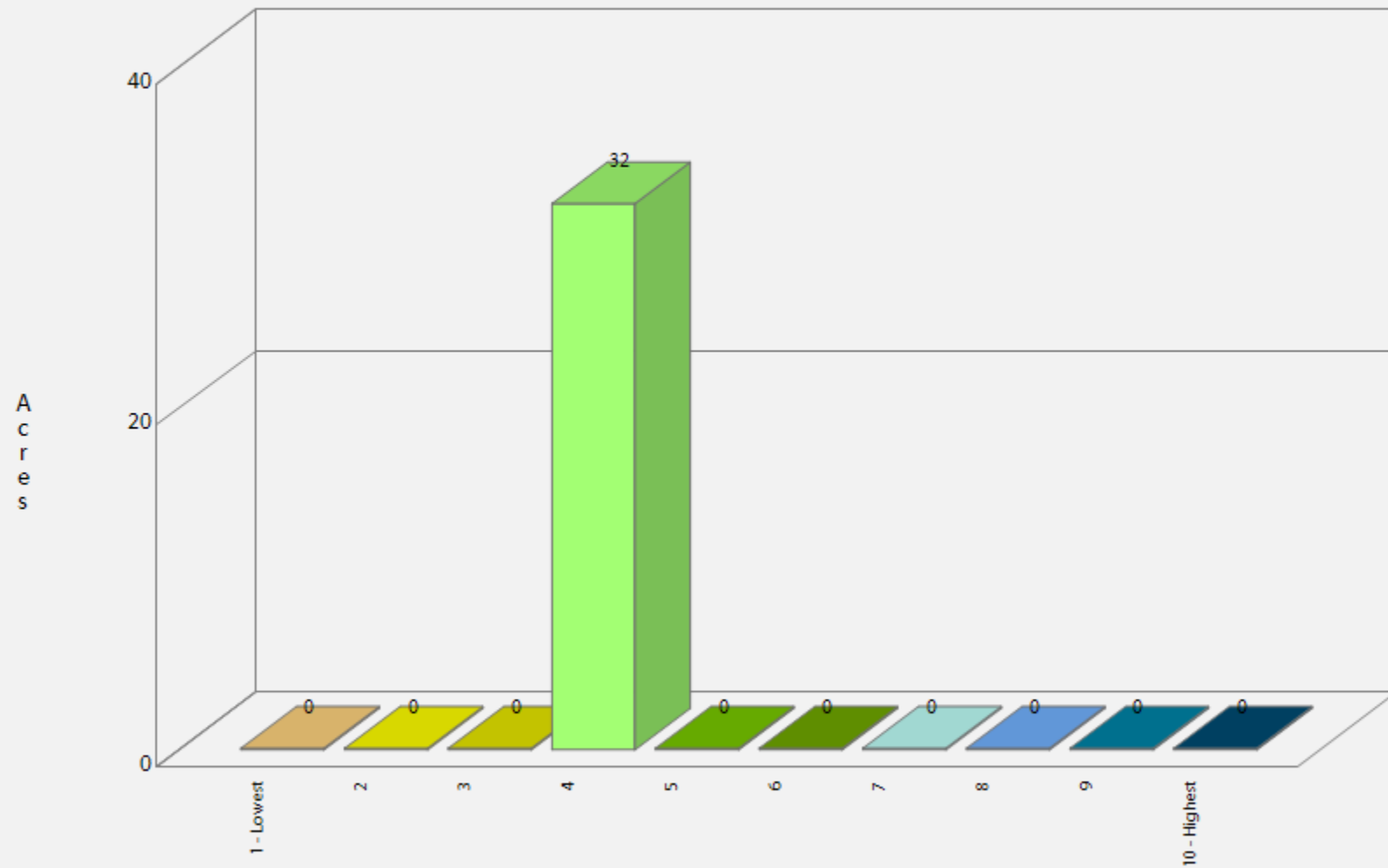
Water is critical to sustain life. Human water usage has further complicated nature's already complex aquatic system. Plants, including trees, are essential to the proper functioning of water movement within the environment. Forests receive precipitation, utilize it for their sustenance and growth, and influence its storage and/or passage to other parts of the environment.

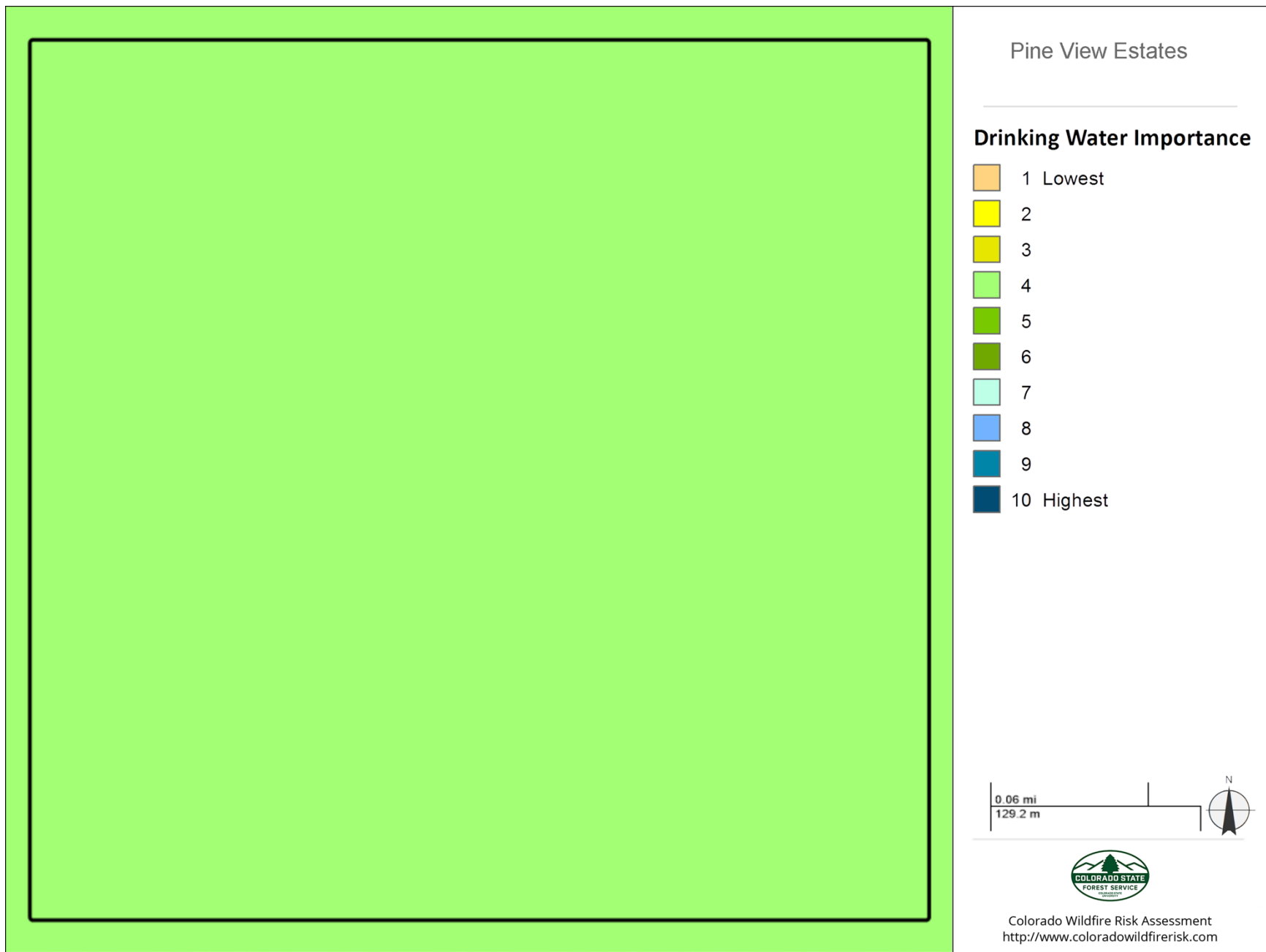
Four major river systems – the Platte, Colorado, Arkansas and Rio Grande – originate in the Colorado mountains and fully drain into one-third of the landmass of the lower 48 states. Mountain snows supply 75 percent of the water to these river systems.

Approximately 40 percent of the water comes from the highest 20 percent of the land, most of which lies in national forests. National forests yield large portions of the total water in these river systems. The potential is great for forests to positively and negatively influence the transport of water over such immense distances.

	Drinking Water Class	Acres	Percent
	1 - Lowest	0	0.0 %
	2	0	0.0 %
	3	0	0.0 %
	4	32	100.0 %
	5	0	0.0 %
	6	0	0.0 %
	7	0	0.0 %
	8	0	0.0 %
	9	0	0.0 %
	10 - Highest	0	0.0 %
Total		32	100.0 %

Pine View Estates
Drinking Water Importance Areas





Drinking Water Risk Index

Description

Drinking Water Risk Index is a measure of the risk to DWIAs 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.

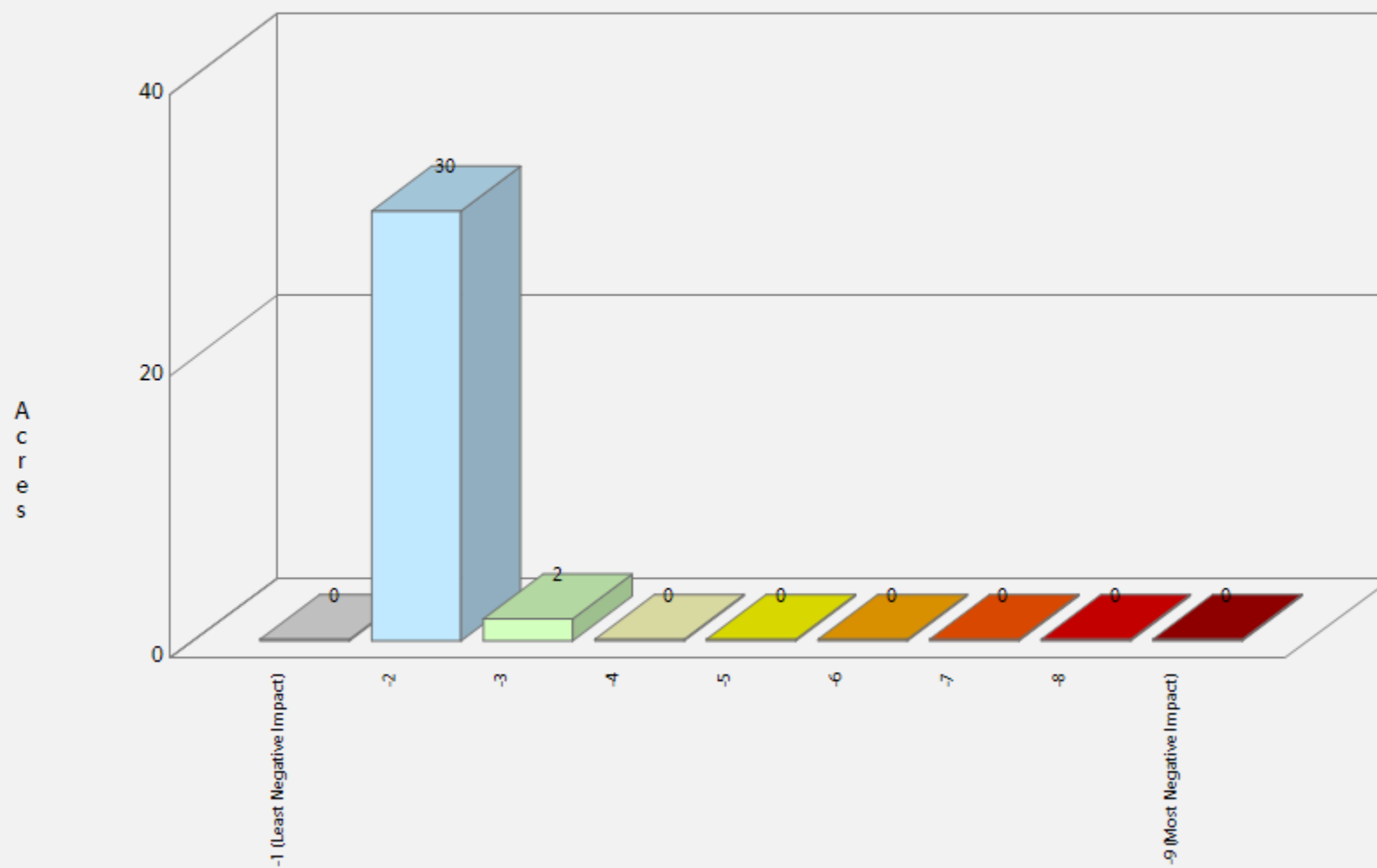
In the aftermath of the 2002 fire season, the Colorado Department of Health estimated that 26 municipal water storage facilities were shut down due to fire and post-fire impacts.

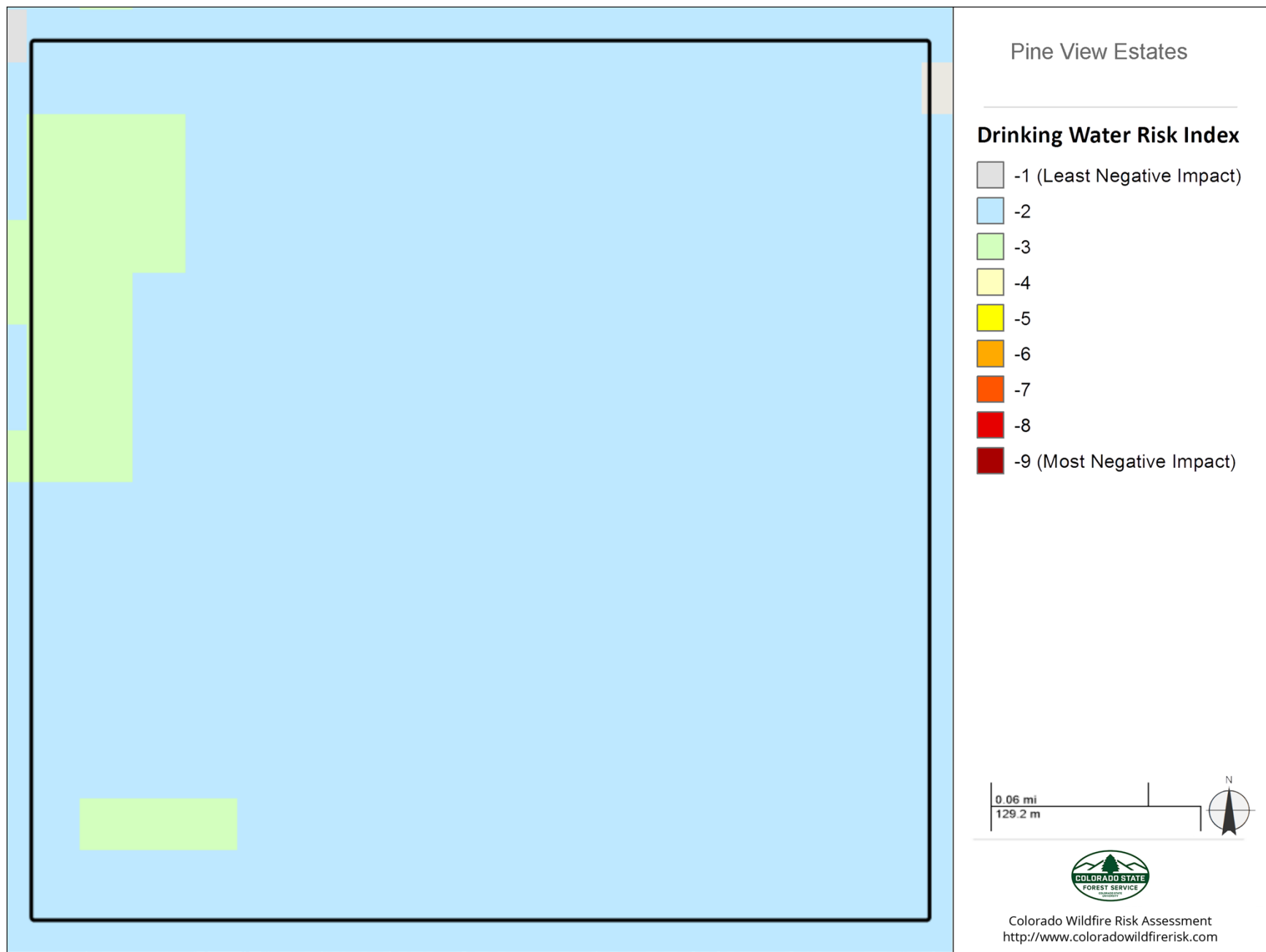
The potential for severe soil erosion is a consequence of wildfire because as a fire burns, it destroys plant material and the litter layer. Shrubs, forbs, grasses, trees and the litter layer disperse water during severe rainstorms. Plant roots stabilize the soil, and stems and leaves slow the water to give it time to percolate into the soil profile. Fire can destroy this soil protection.

The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact.

Class		Acres	Percent
	-1 (Least Negative Impact)	0	0.0 %
	-2	30	95.2 %
	-3	2	4.9 %
	-4	0	0.0 %
	-5	0	0.0 %
	-6	0	0.0 %
	-7	0	0.0 %
	-8	0	0.0 %
	-9 (Most Negative Impact)	0	0.0 %
Total		32	100.0 %

Pine View Estates
Drinking Water Risk Index





Riparian Assets

Description

Riparian Assets are forested riparian areas characterized by functions of water quantity and quality, and ecology. This layer identifies riparian areas that are important as a suite of ecosystem services, including both terrestrial and aquatic habitat, water quality, water quantity, and other ecological functions. Riparian areas are considered an especially important element of the landscape in the west. Accordingly, riparian assets are distinguished from other forest assets, so they can be evaluated separately.

The process for defining these riparian areas involved identifying the riparian footprint and then assigning a rating based upon two important riparian functions – water quantity and quality, and ecological significance. A scientific model was developed by the West Wide Risk Assessment technical team with in-kind support



from CAL FIRE state representatives. Several input datasets were used in the model including the National Hydrography Dataset and the National Wetland Inventory.

The National Hydrography Data Set (NHD) was used to represent hydrology. A subset of streams and water bodies, which represents perennial, intermittent, and wetlands, was created. The NHD water bodies dataset was used to determine the location of lakes, ponds, swamps, and marshes (wetlands).

To model water quality and quantity, erosion potential (K-factor) and annual average precipitation was used as key variables. The Riparian Assets data are an index of class values that range from 1 to 3 representing increasing importance of the riparian area as well as sensitivity to fire-related impacts on the suite of ecosystem services.

***The designated project area does not contain
Riparian Assets data***

Riparian Assets Risk Index

Description

Riparian Assets Risk Index is a measure of the risk to riparian areas based on the potential negative impacts from wildfire. This layer identifies those riparian areas with the greatest potential for adverse effects from wildfire.

The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact.

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.

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

***The designated project area does not contain
Riparian Assets Risk Index data***

Forest Assets

Description

Forest Assets are forested areas categorized by height, cover, and susceptibility/response to fire. This layer identifies forested land categorized by height, cover and susceptibility or response to fire. Using these characteristics allows for the prioritization of landscapes reflecting forest assets that would be most adversely affected by fire. The rating of importance or value of the forest assets is relative to each state’s interpretation of those characteristics considered most important for their landscapes.




Canopy cover from LANDFIRE 2014 was re-classified into two categories, open or sparse and closed. Areas classified as open or sparse have a canopy cover less than 60%. Areas classified as closed have a canopy cover greater than 60%.

Canopy height from LANDFIRE 2014 was re-classified into two categories, 0-10 meters and greater than 10 meters.

Response to fire was developed from the LANDFIRE 2014 existing vegetation type (EVT) dataset. There are over 1,000 existing vegetation types in the project area. Using a crosswalk defined by project ecologists, a classification of susceptibility and response to fire was defined and documented by fire ecologists into the three fire response classes.

These three classes are sensitive, resilient and adaptive.

- **Sensitive** = These are tree species that are intolerant or sensitive to damage from fire with low intensity.
- **Resilient** = These are tree species that have characteristics that help the tree resist damage from fire and whose adult stages can survive low intensity fires.
- **Adaptive** = These are tree species adapted with the ability to regenerate following fire by sprouting or serotinous cones

Forest Assets Class		Acres	Percent
	Adaptive	0	0.0 %
	Resilient	1	100.0 %
	Sensitive	0	0.0 %
Total		1	100.0 %

Forest Assets Risk Index

Description

Forest Assets Risk Index is 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.

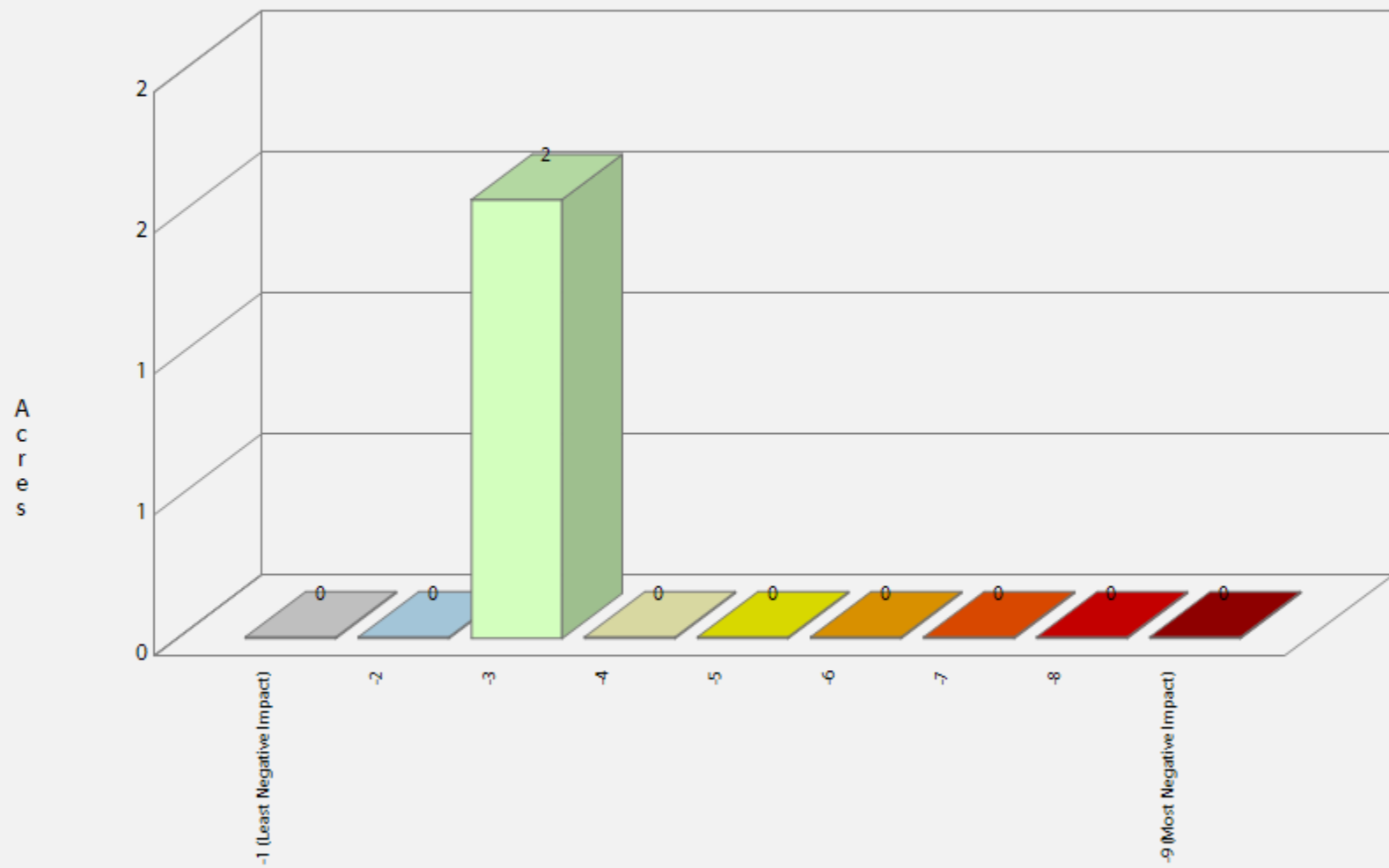
The range of values is from -1 to -9, with -1 representing the least negative impact and -9 representing the most negative impact.

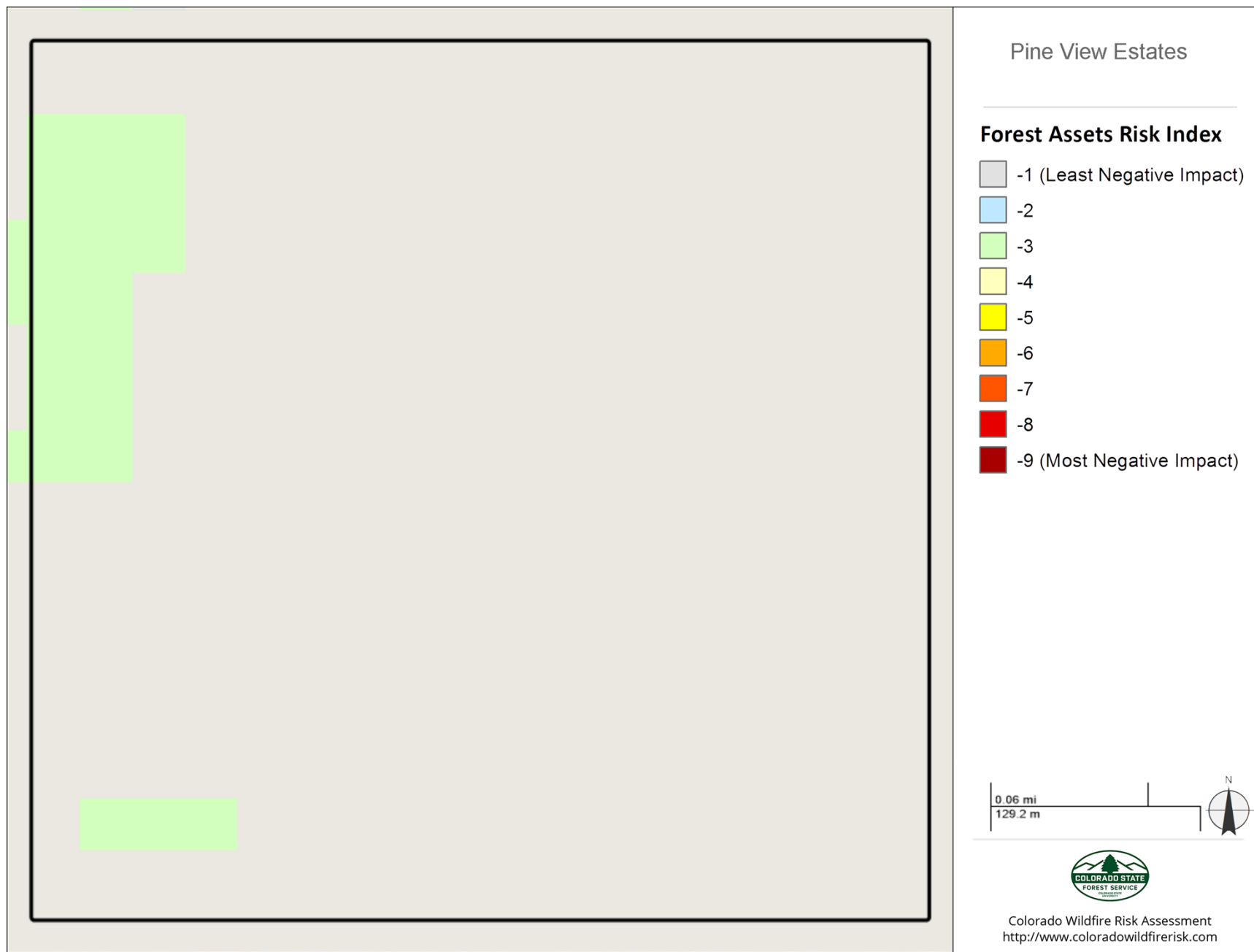
The risk index has been calculated by combining the Forest Assets data with a measure of fire intensity using a Response Function approach. Those areas with the highest negative impact (-9) represent areas with high potential fire intensity and low resilience or adaptability to fire. Those areas with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

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 Class	Acres	Percent
	-1 (Least Negative Impact)	0	0.0 %
	-2	0	0.0 %
	-3	2	99.8 %
	-4	0	0.0 %
	-5	0	0.0 %
	-6	0	0.0 %
	-7	0	0.0 %
	-8	0	0.0 %
	-9 (Most Negative Impact)	0	0.0 %
	Total	2	100.0 %

Pine View Estates Forest Asset Risk Index





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