City of Manitou Springs
Community Wildfire Protection Plan

City of Manitou Springs Community Wildfire Protection Plan
Recommendation and Approval

Recommended by:

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Approved by:

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Introduction

Community Wildfire Protection Plans (CWPP) are authorized and defined in Title I of the Healthy Forests Restoration Act of 2003 (HFRA) which was passed by Congress following the devastating wildfires of 2002. The act emphasizes community planning and prescribes a framework for a community to assess its wildfire risks and develop plans to mitigate its wildland fire hazards.

In the spring of 2016, the City of Manitou Springs (The City) collaborated with Clarion Associates to help assess the hazards present in the community. The Hazard Mitigation Planning Team (HMPT) was formed to bring together representatives from The City, El Paso County and the State of Colorado to discuss the potential for several different types of disasters that could occur in Manitou Springs. Wildfire was determined to be one of the hazards with the highest potential for negative impact upon The City. Recent wildfires near Manitou Springs (Incline Fire of 2007 and Waldo Canyon Fire of 2012) proved that The City is vulnerable to adverse effects by such events. The Incline Fire forced the cancellation of local events and the temporary closing of a major tourist attraction. The Waldo Canyon Fire resulted in The City being evacuated. Though neither fire burned any structures in Manitou Springs, the subsequent and devastating flash floods and loss of tourism, The City's major industry, made for long-term recovery efforts. The HMPT ultimately recommended that The City create and adopt a CWPP.

The purpose of this CWPP is to address wildfire prevention, create a process for parcel level assessments, set goals to make properties and structures more fire resistive and eventually help Manitou Springs move toward becoming a fire adaptive community. In addition, this CWPP describes the importance of collaboration between professionals and community volunteers. Actual implementation of a CWPP relies on this collaboration.

Fire Adapted vs. Mitigation

The United States Forest Service defines a fire adapted community as "a knowledgeable and engaged community in which the awareness and actions of residents regarding infrastructure, buildings, landscaping and the surrounding ecosystem lessens the need for extensive protection actions and enables the community to safely accept fire as a part of the surrounding landscape." The National Wildland Coordinating Group definition, which was developed and approved by the Wildland Urban Interface Mitigation Committee, is "A human community consisting of informed and prepared citizens collaboratively planning and taking actions to safely co-exist with wildland fire."

According to a United States Forest Service briefing paper (USDA Forest Service, Fire and Aviation Management. 2014. Briefing Paper. Topic: Fire Adapted Communities) the following are some of the elements of a fire adapted community:

The public understands:

- The role of fire on the surrounding landscape
- Fire authorities may not save all homes
- Community mitigation actions reduce the impacts of wildfire

The community takes action to:

- Create a collaborative group to develop a CWPP
- Develop and maintain a mitigation education program including prevention
- Support and enhance local fire protection capacity
- Prepare structures for wildfire via Firewise®, Living With Fire® or similar principles
- Build with fire resistant materials and site structures in low risk landscapes
- Develop evacuation plans
- Create safety zones in the community and fuel buffers or breaks at its edge
- Use codes and ordinances if applicable
- Work with public and private landowners to treat hazardous fuels
- Maintain cooperative agreements with partners
- Increase and maintain risk reduction efforts over time

Achieving a fire-adaptive community is an approach that concentrates on plans and activities that reduce risk before a wildfire occurs. It does not rely on government agencies, through fire suppression efforts, to protect communities after a wildfire starts. In a fire-adapted community, the citizenry and its government have a combination or mixture of similar characteristics:

- The community exists within or adjacent to a fire-prone ecosystem and has a defined geographic boundary.
- Residents have the knowledge, skills and desire to properly prepare their homes before a wildfire threatens, prepare to evacuate and safely evacuate when necessary.
- Local fire suppression forces have the adequate skills, equipment and capacity to manage wildfire.
- Residents and local fire agencies have met and understand the local fire suppression capability and related fire response expectations.
- Landowners are aware of hazardous fuels on their property and have taken action to mitigate the danger.
- Structures and landscaping are designed, constructed, retrofitted and maintained to an ignition-resistant standard.
- A CWPP is developed and implemented.
- The community has embraced the need for defensible space by reducing fuels and creating safety zones and maintaining both over the long term.
- Local government has effective land use planning and regulation, including building codes and local ordinances if applicable.
- Property owners understand their responsibilities before, during and after a wildfire.
- Public expectations are realistic and not based on reliance of government to provide all answers. Individuals accept personal responsibility for their property. The public understands firefighters cannot provide protection for everyone affected during a wildfire; and understands it is dangerous for firefighters to attempt to protect a structure where owners have not taken appropriate measures to make it defensible.

A community with a desire to build a wildfire protection plan must recognize a significant difference between the terms “mitigation” and “fire-adapted.” Mitigation efforts are smaller parts of the much wider mind set of being fire-adaptive. Actions such as fuels treatments, structural retro-fitting, creating safety zones, establishing evacuation routes, cleaning gutters and trimming trees that directly contact houses are examples of mitigation actions. Becoming fire-adaptive involves creating a culture that maintains mitigation efforts and moves toward safe and effective response and resilient landscapes. Mitigation work can be viewed as a “check-list” of things to do. Being fire-adaptive is a commitment to a long-term, on-going effort moving toward a community that can live with fire. Wildland firefighters use an action called LCES (Lookouts, Communications, Escape Routes and Safety Zones) in order to maintain as safe a working environment as possible. LCES is not simply a checklist but an action that requires constant updating and reassessing. A fire-adaptive community must also continually assess its risk, mitigate the hazards, maintain the mitigation and reassess again.

Area Description

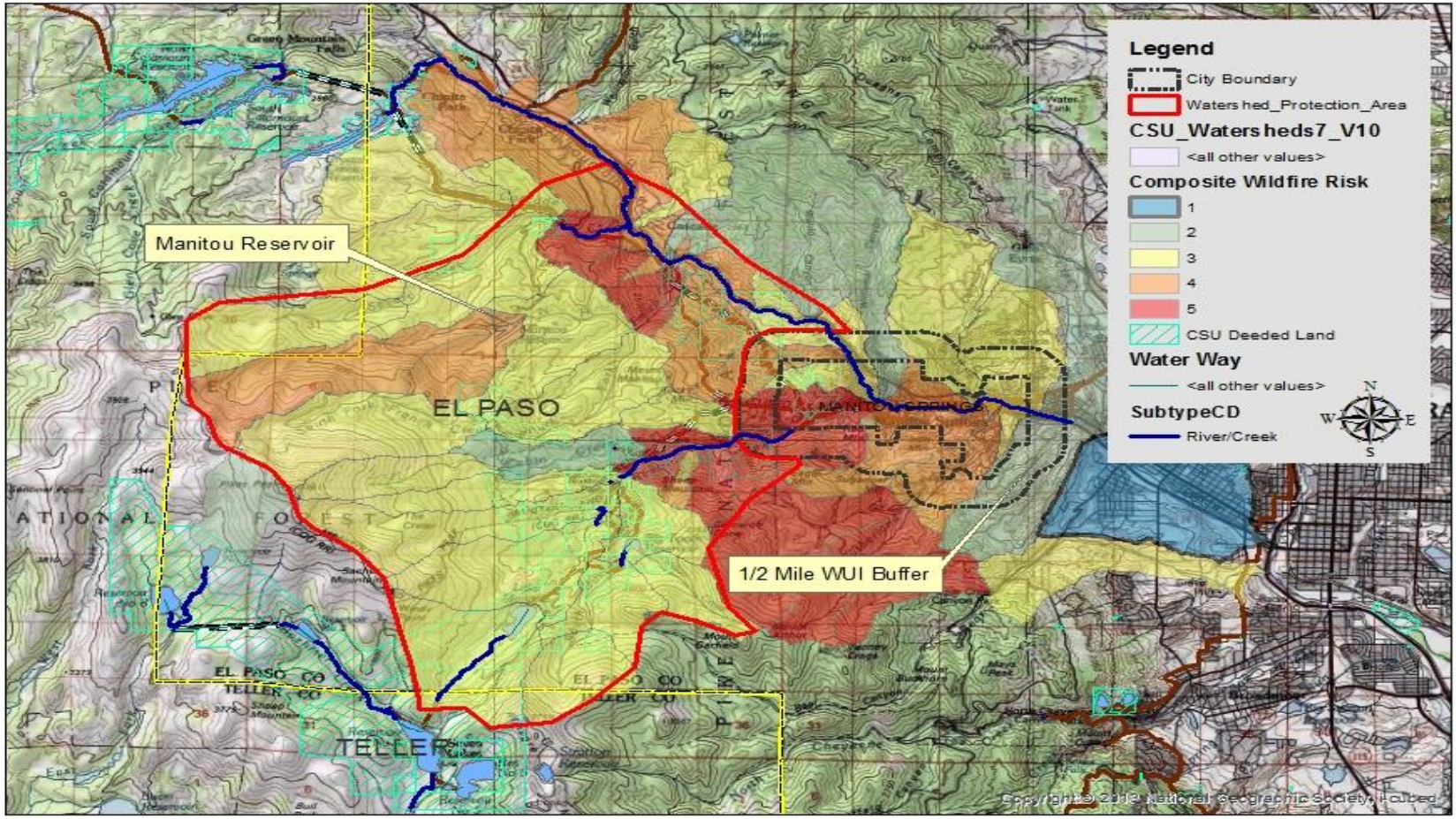
Manitou Springs is a home rule municipality of 5,334 (2015) residents spread over approximately 3.17 square miles (2,028 acres). The City is situated in the foothills east of Pikes Peak, in the western part of El Paso County, CO at latitude 38°51'28.2"N, longitude 104°54'47.6"W (at Manitou Springs Fire Department) or Range 67W, Township 14S in portions of sections 4, 5, 6, 8 and 9. Landmarks include U.S. Hwy 24 and Garden of the Gods to the north, Mt. Manitou and Englemann Canyon to the west with Red Mountain, Iron Mountain and Crystal Park bordering the south and Red Rock Open Space and Colorado Springs on the East.

Topography

The elevation in Manitou Springs ranges from approximately 6,300 ft. to 7,200 ft. The entire city is located in typical foothills type topography with steep, narrow drainages (i.e. Manitou Ave., Engelmann Canyon, Williams Canyon, and Wildcat Gulch) and ridge tops (i.e. Crystal Hills Blvd., Mesa Rd.). The majority of the business district begins at the mouth of Ute Pass and runs parallel to Fountain Creek. Most residential neighborhoods are located either in narrow canyons, on ridge tops or mid-slope on steep terrain.

The location of neighborhoods in this steep terrain leads to potential hazards regarding ingress and egress. Many streets and roads are steep and narrow, allowing minimal room for passenger vehicles. In the event of a wildfire burning near a Manitou neighborhood, responding fire agencies and evacuating public could quickly overcome the capacity of these roadways. Though pre-planned evacuation routes could be beneficial, actual evacuation routes would be situational depending on fire location or direction. Responder and public safety could be enhanced by participating in evacuation drills. Evacuation drills should be conducted at a neighborhood level and should be in concert with residents, law enforcement and fire agencies. Drills should include a call to evacuate, travelling on a pre-determined route and arriving at a pre-determined safety zone.

Manitou Springs CWPP WUI Buffer and Watershed Protection Area



Map produced by Colorado Springs Utilities, to be utilized for planning purposes only.
September 18, 2018

Fuels

Vegetative fuels within The City range from native grasses, shrubs and trees to ornamental, non-indigenous species. On the edges of The City and in much of its open spaces mountain mahogany, Gambel oak, Douglas fir, Ponderosa pine and scattered pinion and junipers are among the most common species of trees and shrubs. Several of these species are drought resistive and can thrive or survive with little precipitation. When healthy and with a moderate to high fuel moisture content, these plants can also be fire resistive. However, when allowed to grow unchecked, Gambel oak for example, can grow very fast and in stand densities that do not support a healthy micro-ecosystem. A mature stand of Gambel oak can often have between 30% to 60% dead material that could either be standing or down fuel. Without naturally occurring, low complexity fire or mechanical thinning this dead material will continue to pile up and create dangerously high levels of fuel available to ignite. Conversely, a well-maintained stand of Gambel oak can be fire resistive as the trunks of larger specimen do not support lower limbs and greatly reduce ladder fuels that can allow fire to climb into the canopy. Ponderosa pine can also be resistant to fire as they also do not typically have low hanging limbs and have a very thick bark. Ponderosas can also hold up to 130% of their body weight in water. In the summer of 2013, Ponderosa pine fuel moistures in Black Forest were approximately 87% and existed in stands with over 1,000 stems per acre. With healthy fuel moisture content and a reduced number of trees per acre, the Black Forest Fire would likely not have been as devastating. With timely and appropriate maintenance of fuels, by either natural or mechanical means, the native species around Manitou Springs can once again be classified as fire-adaptive.

Within The City's neighborhoods, subdivisions and parks, indigenous trees, shrubs, and grasses intermix with ornamental plants. Trees include cottonwoods, willows, various elms, Engelmann spruce, blue spruce, Ponderosa pine, several varieties of fruit trees and aspens. These trees can be fire resistive if they are healthy and maintained. Adequate spacing between one tree and others is crucial maintenance that must be considered. Distance from structures is another consideration. The usual care for any plant would include adequate watering and pruning. Elms are an example of how a mature tree can pose a risk. Elms typically need a lot of water. As an elm grows, some limbs naturally die off but the main system can still be strong. These dead limbs can become receptive to airborne firebrands that can eventually ignite the entire tree. Cottonwoods are potentially dangerous species. As a cottonwood matures, its core can become hollow. Fire can enter a cottonwood trunk and burn undetected for many hours or days, further weakening the tree. Without constant trimming and pruning, cottonwoods can become a dangerous source of fuel. Most trees that are within neighborhoods, subdivisions and parks should be kept watered, pruned and limbed so that no branches touch the ground or any structure.

Weather

The mountains to the west most often influence the weather in Manitou Springs. The mountains often capture or divert most of the precipitation from storms that move east over the community. As a result, Manitou Springs has approximately 250-280 days of sunshine, 13-20 inches of rain and 30-40 inches of snow annually. Though residents and visitors alike enjoy relative moderate weather in Manitou Springs, there are occasional periods of extreme weather conditions. Periods of unseasonable heat and drought (i.e. 2002, 2012), heavy rainfall (i.e. 2013 - 2015), subzero temperatures in the winter and triple digit heat in the summer and extreme winds (Jan. 2017). These extremes are exceptions to the rule of a mild climate on the Front Range of Colorado. Recent, local, natural disasters however, were the result of some of these exceptions. The Waldo Canyon fire of 2012 and the subsequent flash flooding of 2013 are indelible examples.

Manitou Springs Fire Department

The Manitou Springs Fire Department was created in 1879 as the William A. Bell Hose, Hook and Ladder Company. Initially, the fire department was all-volunteer.

On average, Manitou Springs Fire Department has 35-40 volunteer firefighters and six full-time firefighters that operate out of one fire station located at 620 Manitou Ave. The Manitou Springs Fire Department has the following response apparatuses:

- Two, Type 1 Engines (Class A)
- One, Type 1 Tactical Tender
- One, Type 6 Wildland/Brush truck
- One, six seat UTV
- Four, Motorcycles
- One, Medical Response SUV

The Manitou Springs Fire Department is an *All Hazard* agency. Members of the Manitou Springs Fire Department are each trained and certified by the Colorado Division of Fire Safety to Firefighter I and II levels with Hazardous Material Awareness and Operations. Additionally, firefighters are offered opportunities to obtain certification as Emergency Medical Technicians, High Angle Rescue Technicians and Wildland Firefighters.

All members of the Manitou Springs Fire Department receive basic wildland firefighting training, however on average, 25 firefighters hold national wildfire credentials per the National Wildfire Coordinating Group. These individuals are monitored by the State of Colorado for competency and maintained in a database as potential national resources.

With only four firefighting apparatus and a staff based on volunteer response, it would be unreasonable to expect that the Manitou Springs Fire Department would be able to place a fire apparatus and firefighters in front of every house during a major fire event. To enhance response capabilities, The City and the Manitou Springs Fire Department have mutual aid agreements in place with local municipal, county, state and federal fire agencies. Mutual aid fire response is based on resource availability.

Wildfire History in the Region

The Front Range of Colorado, where Manitou Springs is located, has a long history of wildland fires. The Big Burn of 1854 burned forestland from present day Ft. Carson to Wilkerson Pass, approximately 43 miles. An 1894 fire burned much of the same area but stopped on the east face of Pikes Peak. More recently, the Hayman Fire of 2002 burned 138,000 acres in Pike National Forest destroying 133 homes, 600 total structures and claiming the lives of 5 firefighters and one civilian. The Hayman Fire was the most destructive fire in Colorado's history at the time, both in land and structure losses. The 4 Mile Fire of 2010 near Boulder, CO burned 135 structures to become the state's most destructive fire regarding homes burned. The 2012 fire season set several state wildfire records beginning with the High Park Fire consuming 87,000 acres, 248 homes and one human life. The Waldo Canyon Fire, also in 2012, destroyed over 18,000 acres, 346 homes and 2 lives, becoming Colorado's most destructive fire until the next year, when in 2013 the Black Forest Fire claimed the lives of 2 people, burned 511 homes and consumed 14,000 acres of Ponderosa Pine forest.

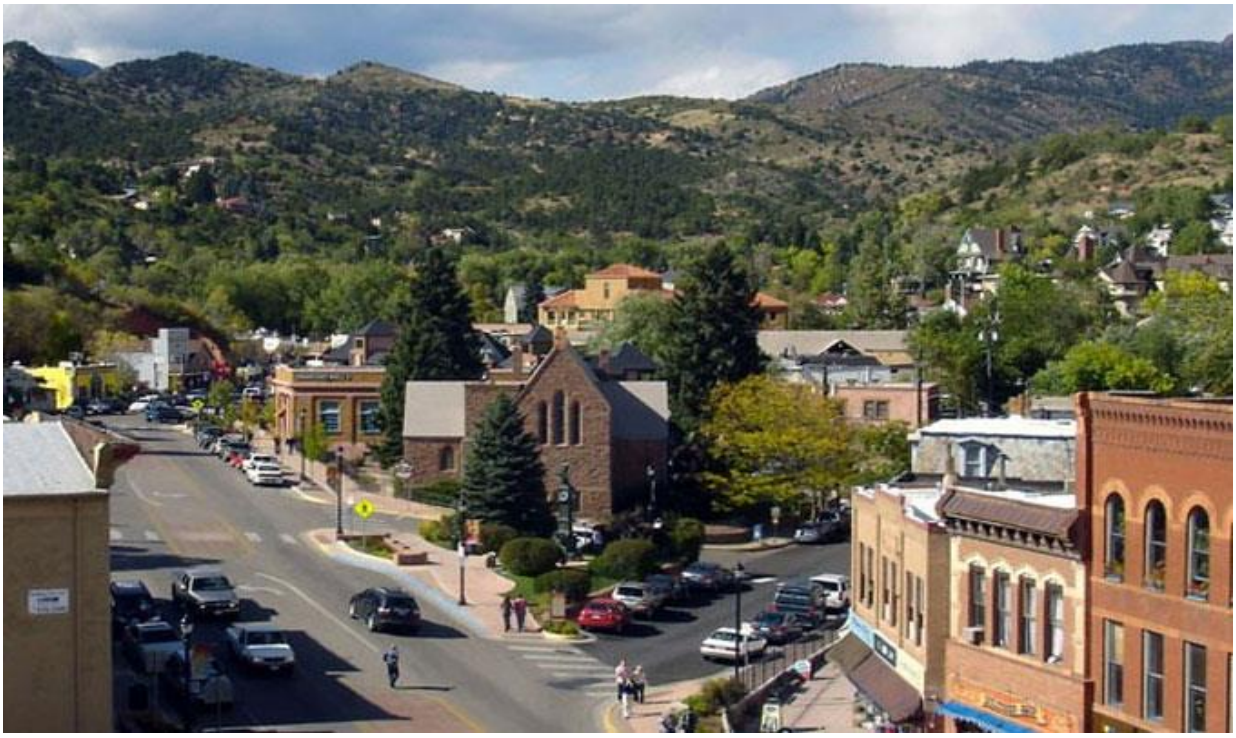
Historically, large, catastrophic wildland fires were infrequent. Low intensity fires were common and a part of nature that promoted healthy forests and grasslands. With the spread of human development into the wildland areas, the once innocuous, low intensity fires have become a potential for catastrophe. The devastating national wildfire season of 1910 prompted the United Sates Forest Service to adopt the "10:00 a.m." rule, which promoted the suppression of all reported fires by 10:00 a.m. the next day. That policy, over the next century, helped lead to forests becoming overgrown by not allowing natural wildfires to clean up leaf litter, immature trees, ladder fuels, etc. The combination of unhealthy, overgrown wildlands and the spread of urban development into the wilderness have created conditions that promote extreme fire behavior among larger and larger populations.

Values at Risk

Photo courtesy of Bing.com

Manitou Springs features many residential subdivisions. Most residential properties are on the south side of town, or south of the main artery, Manitou Ave. There are however, several residential subdivisions north of Manitou Ave., mainly those in the Williams Canyon, along El Paso Blvd. and neighborhoods adjacent to Garden of the Gods. Several of these residential areas have commercial properties mixed in. Accesses to popular tourist destinations such as Pikes Peak, The Manitou Incline and Garden of the Gods are through residential neighborhoods.

Wildland/Urban Interface (WUI) is defined as that part of a city where people and development meet wildland fuels and topography. With the location of open space and national forest around the border of Manitou Springs, the entire perimeter of the town should be considered to be in the WUI. Wildland fuels are described using various characteristics. Two of these characteristics are horizontal continuity and vertical arrangement. Horizontal continuity is defined by the proximity of one unit of fuel to the next, in a horizontal plane, in which radiant heat is readily transferred from unit to unit. Vertical arrangement is defined as the alignment of fuels that allow heat/fire to move from the surface to the canopy. Due to the challenge of steep topography and a desire to build close to the economic and social center of The City, structures exist in a horizontal continuity and vertical arrangement that is conducive to near source ember production and rapid, structure-to-structure fire spread.



The residential neighborhoods feature homes built ranging from the 1880's to new present day construction. Entire neighborhoods are comprised of wood framed homes built around the turn of the 20th century. In addition to the ages of homes and their construction types, many homes are situated in close proximity (sometimes less than five feet) to each other.

Below is an excerpt from Firewise Communities® which makes recommendations using "zones" around a structure.

Using the Zone Concept

The primary goal for Firewise® landscaping is fuel reduction — limiting the amount of flammable vegetation and materials surrounding the home and increasing the moisture content of remaining vegetation. The home itself and everything around it up to 100 – 200 feet is known as the 'home ignition zone.' In areas across the country where the risk of wildfire is high, the home ignition zone extends up to 200 feet beyond the actual home structure. Within this 200 foot area, there are three zones:

Zone 1 encircles the structure and all its attachments (wooden decks, fences, and boardwalks) for at least 30 feet on all sides. *Note:* the 30-foot number comes from the very minimum distance, on flat ground, that a wood wall can be separated from the radiant heat of large flames without igniting. In this area:

- Plants should be carefully spaced, low-growing and free of resins, oils and waxes that burn easily.
- Mow the lawn regularly. Prune trees up six to ten feet from the ground.
- Space conifer trees 30 feet between crowns. Trim back trees that overhang the house.
- Create a 'fire-free' area within five feet of the home, using non-flammable landscaping materials and/or high-moisture-content annuals and perennials.
- Remove dead vegetation from under deck and within 10 feet of house.
- Consider fire-resistant material for patio furniture, swing sets, etc.
- Remove firewood stacks and propane tanks; they should not be located in this zone.
- Water plants, trees and mulch regularly.
- Consider xeriscaping if you are affected by water-use restrictions.

Zone 2 is 30 to 100 feet from the home, and plants in this zone should be low-growing, well irrigated and less flammable. In this area:

- Leave 30 feet between clusters of two to three trees, or 20 feet between individual trees.
- Encourage a mixture of deciduous and coniferous trees.
- Create 'fuel breaks', like driveways, gravel walkways and lawns.
- Prune trees up six to ten feet from the ground.

Zone 3 is 100 to 200 feet from the home and this area should be thinned, although less space is required than in Zone 2. NOTE: Because of other factors such as topography, the recommended distances to mitigate for radiant heat exposure actually extend between 100 to 200 feet from the home – on a site-specific basis. In this area:

- Remove smaller conifers that are growing between taller trees. Remove heavy accumulation of woody debris.
- Reduce the density of tall trees so canopies are not touching.

Structures in Manitou Springs exist very near other structures. According to the FireWise® information, Zone 1 would be very difficult to achieve in The City due to the simple fact that most homes and buildings have another home or building within the defensible 30 feet. Zones 2 and 3 would likely only be considered in The City's open spaces and around its perimeter.

The main business district in The City is along Manitou Ave. Over 500 business licenses are registered with The City with 312 businesses accessible to the public. These businesses are mostly retail, lodging, dining and recreation. There are several other businesses outside the traditional business district such as the Broadmoor Pikes Peak Cog Railway, the Garden of the Gods Trading Post and the Manitou Cliff Dwellings. There are also many, in-home businesses that provide various services.

In addition to residential and business assets, Manitou Springs is home to School District #14. Manitou Springs District Building, Manitou Springs High, Middle and Elementary Schools occupy several properties near the downtown area or adjacent to the WUI. Green Mountain Falls Elementary School and the school district's bus storage are located northwest along U.S. Highway 24 near Pike National Forest boundary.

Infrastructure in Manitou Springs is diverse in its type and location. The City has a single point water source known as Manitou Reservoir on the northeast slope of Pikes Peak. The water is supplied via French Creek and is completely fed by snowmelt. Both the reservoir and French Creek are located in or run through Pike National Forest in an open-air system. The water is then delivered to the French Creek intake near Long's Ranch Road. From the intake, the water travels via pipeline to The City's water treatment plant. From the water treatment plant the water is moved to one of two storage tanks and then into the distribution system. The entirety of Manitou Springs' water collection, treatment and storage facilities lie directly within the WUI or in Pike National Forest. With the reservoir and French Creek being Manitou's single source of water for the entire water system, a catastrophic wildfire with subsequent erosion, would potentially cause damage that could take years or decades to restore to a usable condition.

Manitou Springs single watershed is located in or on properties owned or managed by multiple agencies. The City of Colorado Springs and Colorado Springs Utilities, The Colorado State Forest Service and the United States Forest Service all own or manage lands that include Manitou Springs water source. It is crucial to collaborate efforts with all land owners and managers in order to protect Manitou Springs and its interests. Manitou Springs has responsibility for actions taken within its boundary and the effects those actions would have on other property owners. Colorado Springs, The Colorado State Forest Service and The United States Forest Service have responsibilities to promote healthy forests, mitigate hazardous fuels and to help protect neighboring municipalities, subdivisions and their interests.

The Hayman Fire of 2002 burned around Cheesman Reservoir, a water supply for the City of Denver. A Denver Post article in 2006 "Hayman Fire still mucking up water" discusses the effects the fire was having on the reservoir. Storms, four years after the fire, continued to bring ash, mud and decomposed granite down slope and into the creeks and reservoir. The amount of sediment threatened to fill the reservoir. At the time, $7.8 million had been spent on debris removal, culvert replacements and building debris detention dams and ponds. $20 million was estimated needed to finish work stabilizing slopes with planted trees, hardening drainages, removing sediment and strengthening or repairing dams.

Colorado Springs Utilities (CSU) owns and operates critical infrastructure within The City of Manitou Springs. Ruxton and Fountain Creeks and their watersheds are part of Colorado Springs water supply. CSU also operates two hydroelectric plants, one in Manitou Springs, the other at the top of Engelmann Canyon and the Ruxton Creek drainage in Pike National Forest. CSU maintains a right-of-way for overhead powerlines from Ruxton Park, the location of the upper hydroelectric plant, through Engelmann Canyon and across Manitou Springs' south side parallel to the Intemann Trail. Two, underground, large diameter raw water mains belonging to CSU also run the length of Manitou Springs from upper Ruxton Ave. through the downtown area.

Manitou Springs also has many cultural values at risk. These include a thriving art industry which is closely tied to The City's businesses. Many art studios, galleries and exhibits line the streets of the town. Manitou Springs features several mainstream religions and their church buildings, several of which are historic structures. Nature seekers enjoy the extensive trail system in and around The City. The Intemann, Iron Mountain, Barr, Ute and Manitou Incline trails see hundreds of thousands of users annually. Large crowds enjoy annual events such as the Emma Crawford Coffin Races, Carnivale, Fruitcake Toss, Wine and Beer festivals and Concerts in the Park(s). The mineral springs that have attracted visitors and health seekers for centuries remain a big draw for thousands of people every year.

Setting Goals and Taking Action

Taking action and setting goals must take into account the long term and ongoing process of being fire adaptive. Several goals can be set for near term action in which mitigation efforts, education and prevention can be achieved. However, long term goals such as expansion of mitigation actions, furthering education and most importantly, maintaining work that has already been done. One, three and five years goals should be considered. These goals should be reassessed regularly for achievability, appropriateness and capacity. These goals should include the responsibilities for each involved entity such the Manitou Springs Fire Department, The City and its citizens and other partnering agencies.

One-Year Goals:

- Manitou Springs Fire Department
    - Train firefighters to conduct rapid assessments and one-on-one, parcel level assessments
    - Create a system to deliver rapid assessments to property owners
    - Continue community chipper days
    - Continue wildland firefighting training
    - Begin parcel level assessments and schedule revisits
    - Encourage neighborhood level education opportunities

- City of Manitou Springs
    - Seek and create agreements with USFS, CSFS, CSU and El Paso County to address their interests and land holdings within Manitou Springs and around The City's water shed
    - Assess evacuation routes and plan for an evacuation exercise
    - Continue fuels treatments around The City's perimeter and within its parks
    - Assess public areas for further fuels treatment and safety zones
    - Purchase industrial chipper
    - Consider creating a city mitigation position or team
- Citizens

- Schedule one-on-one visits with Manitou Springs Fire Department for property assessments
- Take action on recommendations by Manitou Springs Fire Department as physical or financial ability allows
- Encourage neighbors to take actions and create a neighborhood plan

Three-Year Goals:

- Manitou Springs Fire Department
  - Complete delivery of rapid assessments to property owners
  - Continue training personnel to perform parcel level assessments
  - Continue parcel level assessments
  - Continue wildland firefighting training
  - Participate in community chipper days
  - Participate in evacuation drills

- City of Manitou Springs
  - Maintain mitigation work that has been completed
  - Continue fuels treatment in open spaces and on city owned property
  - Consider ordinances for future development, rebuilds, retrofits or current built environment as appropriate
  - Participate in evacuation drills
  - Expand community chipper days to include neighborhood chipper days

- Citizens
  - Maintain mitigation that has been completed
  - Schedule parcel level assessment
  - Continue to encourage neighbors to participate
  - Participate in evacuation drills
  - Establish neighborhood champion

Five-Year Goals:

- Manitou Springs Fire Department
  - Assess and update as needed
  - Continue community education programs
  - Continue community chipper days
  - Continue revisiting at the parcel level
  - Continue wildland firefighting training

- City of Manitou Springs
    - Assess and update as needed
    - Continue participating in evacuation drills
    - Have established safety zones and evacuation routes

- Citizens
    - Assess and update as needed
    - Maintain work that has been completed

When action and goals are discussed, often the public focuses is on mitigation. The perception of mitigation is cutting down trees. Mitigation however, includes actions such as cleaning gutters, raking leaves, mowing grass and moving plants away from structures. Trimming trees away from buildings and watering plants are other forms of mitigation. The key to being adaptive is constant maintenance.

Wildfire education is another important action that must be implemented and continued for the long term. The USFS National Director of Fire and Aviation, Shawna Lagarza, stated that of the 67,743 wildfires in the United States in 2016, 90% were human caused. The human caused fires were mostly accidental. Education on all levels will help prevent some of these fires. Professionals and public figures must stay abreast of current and expected fuel and weather conditions and pass this information onto the community. Neighbors must inform neighbors of conditions and help report any signs of wildfire.

The Wildfire Research Team (WiRē) suggests infusing social science into wildfire education. Wildfire is a natural occurrence and learning to live with fire needs a social solution. Volunteer ambassadors can lead by example and help serve as catalysts within their neighborhoods, encouraging neighbors to adapt to living with fire.

Generally, WUI residents understand they live in an area at risk of wildfire. Many WUI residents report taking action to mitigate risk but these reports are not always consistent with the view of a wildfire professional. Moving people to take some or more action or maintain actions requires education and encouragement.

Wildfire and Flash Floods as One Conversation

Wildand fires and flash flooding should be considered as natural components of the Rocky Mountain environment. Though wildfires and floods have, can and will occur independently from each other, one can exacerbate the effects of the other. Flash flooding can occur in a geographic area with soil or vegetation that is unable to absorb a large amount of water. Wildfires can occur with the right combination of high temperatures, fuel and an ignition source. High winds and low fuel moistures can create an environment in which a low

complexity wildfire can become a large conflagration. Conditions that support the occurrence of wildland fires and flash flooding occur regularly in Manitou Springs.
A well maintained and healthy forest can reduce the potential for a catastrophic wildfire. A parcel of land with an unhealthy amount of grass, shrub, tree and dead and down fuel components promote intense burning such as occurred in the 2012 Waldo Canyon fire. The soil was left barren and unstable. The rainstorms of 2013 triggered massive flooding that carried water, soil, rock and large dead tree debris into Manitou Springs causing significant damage to infrastructure and private property.

Through the wildfire adaptive approach of education, prevention, fuel mitigation and maintenance, the potential for devastating flooding is also reduced. The same can be stated in reverse that flood prevention and maintenance can help reduce the amount of available debris for a wildfire. A heavy fuel load + intense burning = unstable soil. Unstable soil + heavy rain = potential for damaging flash flooding.

Glossary

Wildfire:	A wildfire or wildland fire is an uncontrolled fire in an area of combustible vegetation occurring in rural areas.[1] Depending on the type of vegetation present, a wildfire can also be classified more specifically as a brush fire, bushfire, desert fire, forest fire, grass fire, hill fire, peat fire, or vegetation fire.
Canopy:	The upper layer or habitat zone, formed by mature tree crowns and including other biological organisms
Conflagration:	An extensive fire which destroys a great deal of land or property.
Ecosystem:	A biological community of interacting organisms and their physical environment.
Firewise:	NFPA's Firewise USA® program teaches people how to adapt to living with wildfire and encourages neighbors to work together and take action now to prevent losses.
Fuel moisture content:	Is a measure of the amount of water in a fuel (vegetation) available to a fire, and is expressed as a percent of the dry weight of that specific fuel
Indigenous :	Originating or occurring naturally in a particular place
Infrastructure:	The system of public works of a country, state, or region, including the resources (such as personnel, buildings, or equipment) required for community activity.
Living With Fire:	The Living With Fire Program began in 1997 as Nevada cooperators who developed a set of consistent wildfire threat reduction recommendations for Nevadans.
National Wildland Coordinating Group:	The National Wildland Coordinating Group provides national leadership to enable interoperable wildland fire operations among federal, state, local, tribal, and territorial partners. Primary objectives include: Establish national interagency wildland fire operations standards. Recognize that the decision to adopt standards is made independently by the NWCG members and communicated through their respective directives systems. Establish wildland fire position standards, qualifications

	requirements, and performance support capabilities (e.g. training courses, job aids) that enable implementation of NWCG standards. Support the National Cohesive Wildland Fire Management Strategy goals: to restore and maintain resilient landscapes; create fire adapted communities; and respond to wildfires safely and effectively. Establish information technology (IT) capability requirements for wildland fire. Ensure that all NWCG activities contribute to safe, effective, and coordinated national interagency wildland fire operations.
Suppression:	Is a range of firefighting tactics used to suppress wildfires. Firefighting efforts in wild land areas require different techniques, equipment, and training from the more familiar structure fire fighting found in populated areas.
Topography:	The arrangement of the natural and artificial physical features of an area.
Watershed:	Is a land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs.
Wildfire Research Team:	The Wildfire Research (WiRē) Center is a nonprofit organization that works with wildfire practitioners seeking pathways to create fire adapted communities.
WIldland Urban Interface (WUI):	Is a zone of transition between wildland (unoccupied land) and human development.
Wildland Urban Interface Mitigation Committee:	The Wildland Urban Interface Mitigation Committee (WUIMC) provides national leadership in wildland urban interface fire mitigation through the promotion and development of fire adapted communities in the wildland urban interface.

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Recommendation and Approval

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Bobby White, Wildland Fire Coordinator
Manitou Springs Fire Department — Date: 9-3-19

Approved by:

Ken Jaray, Mayor
City of Manitou Springs — Date: 9/3/19

Andy Schlosberg, Supervisory Forester
Colorado State Forest Service — Date: 8/26/2019

John K. Forsett, Fire Chief
City of Manitou Springs — Date: 9/3/19

Roy C. Chaney, Interim City Administrator
City of Manitou Springs — Date: 9/3/19