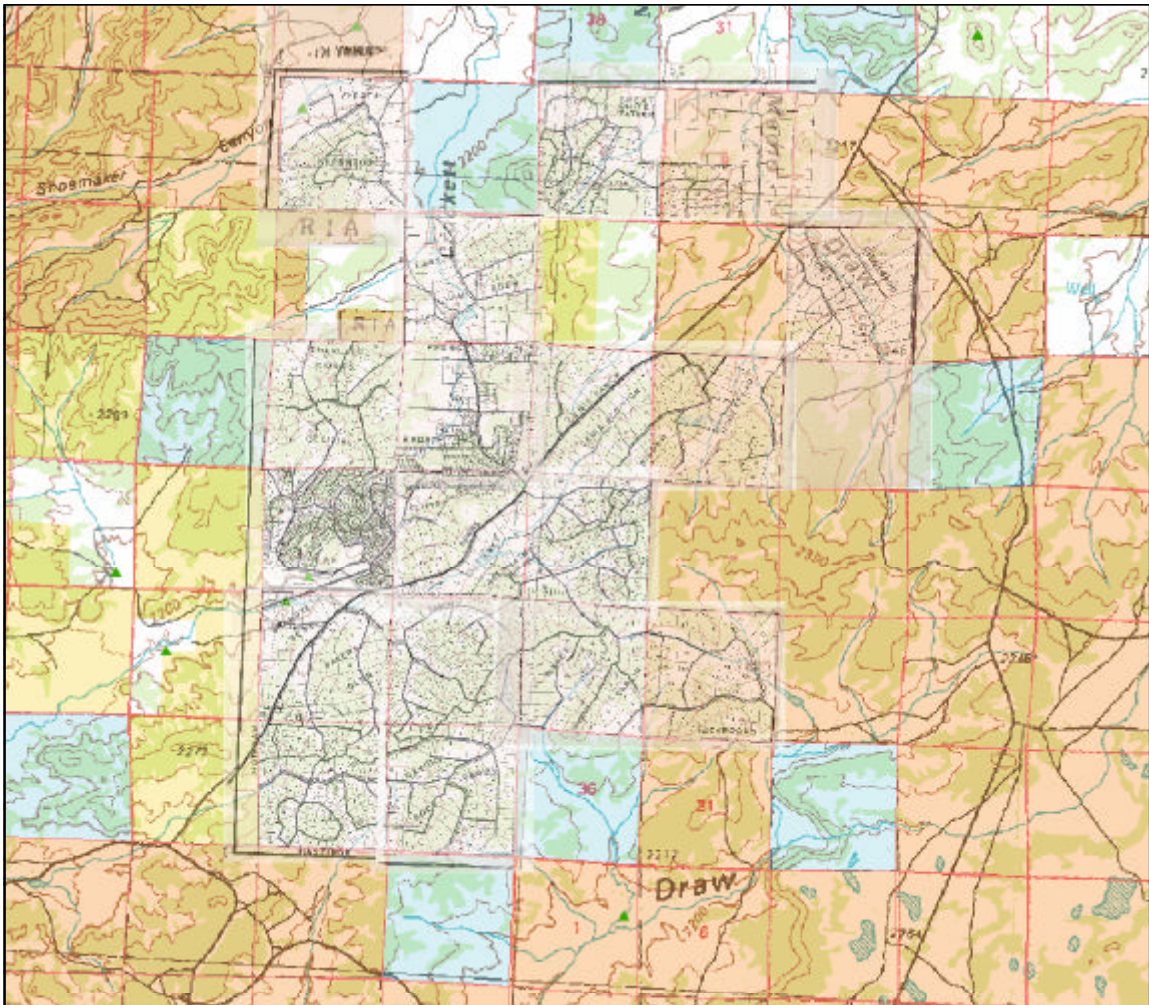


Candy Kitchen Community Wildfire Protection Plan



Map of the Candy Kitchen Area showing the Planning Area Boundaries

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Table of Contents

Elements:

1. Summation of Assessments within the Candy Kitchen Area
 2. Goals and Objectives
 3. Background Information
 - ? Planning Area Boundaries
 - ? The History of Fire in the Candy Kitchen Area
 - ? Current Factors Affecting Fire Regime
 - ? Local Organizations Roles in Fire Protection
 4. Analysis Criteria
 - ? Risks
 - ? Risk Criteria Ratings
 - ? Hazards
 - ? Hazard Criteria Ratings
 - ? Values
 - ? Value Criteria Ratings
 5. Assessments for the Subdivisions of Candy Kitchen
 - ?Great White Father
 - ?Rock House/Homestead
 - ?Rockwood/Bear Valley
 - ?Five Gate
 - ?Well
 - ?Jubilee Trail
 - ?God's acre
 6. Current Management Actions and Future Proposals of the BLM in the Candy Kitchen Area
 7. Strategic Plan
 - ?Education and Outreach
 - ?VFD Support
 - ?Infrastructure
- Bibliography
Glossary of Terms

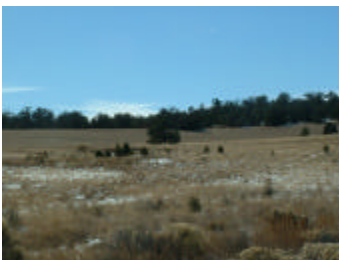
Elements

1. Summation of Assessments within the Candy Kitchen Area

The assessments for the Candy Kitchen area were derived from “Zig-Zag” vegetative transects and visual observations. The information gathered was within the defined Candy Kitchen Area during the summer and fall of 2005. Information gathered by the transects included: the spacing of the trees or the average distance from tree trunk to tree trunk, the average tree diameter within that area, the approximate trees per acre of an area, the percent crown cover and average stem height. Visual observations were written in field notes taken by the author. Observations included looking at fire history, vegetative health, species diversity, habitat orientation and human’s position in this environment. The following summation will look at these ecological factors and their relationship to existing fire regime. This relationship will be used to reduce ignitability by managing the wildland fuels in the Candy Kitchen Area and around local homes and structures.

The primary factor to be looked at will be FRCC and its relationship to the fire danger it puts your home and structures in. Fire Regime is the relationship of the system to normal fire occurrences that keep the system in balance. FRCC I would indicate a good balance between the vegetation and natural fire occurrence while FRCC III would indicate a system structure far removed from this balance. This is important as this regime and departure from this balance has much to do with predicted fire behavior under a specific range of conditions. These regimes will be looked at in terms of the main vegetative systems that exist in the Candy Kitchen area. These are grasslands, pinyon/juniper woodlands, which are the primary systems, and ponderosa savannahs.

The first system to be looked at is grasslands. The photo sequence below shows the current dynamic state of the local grasslands. Fire regimes exist within all classes with the most common being FRCC II. FRCC I for grasslands exist mainly in the southern ¼ of the area. These areas are characterized by open grassy areas with little



FRCC I (high)



FRCC II



FRCC III (low)

presence of larger species in it. These grassland areas tend to have an association with ponderosa savannah systems that are generally adjacent to them. These sites have had the most recent wildfires within the subdivision probably within the last 50-75 years. From a wildfire stance these facts give some clues to reducing ignition in areas within or adjacent to them.

FRCC II grassland is the most common regime found within the subdivision. This is the first stage of the grassland converting into woodland and the eventual loss of the grassland. It is characterized by varying degrees of pinyon/juniper encroachment. The middle photo shows the transition going on in this system locally. Soon the grasses will lose their ability to carry fire and the change in regime will move forward. The picture on the right shows the grassland moving to more of a woodland type creating a FRCC rating of III. The fire occurrence will be much less in this picture compared to the first. This illustrates the change in fire regime from frequent low intensity fire to that of infrequent high intensity fires. Remember grasslands always want to be grasslands and when a fire occurs in the picture on the right it will want to achieve that balance and return to grassland. This will produce a much more intense fire than in the first picture were there is more predictable fire behavior.

Many homes and structures exist adjacent to these grassland systems. These sites need to be protected first as this is where fire occurs at more regular intervals. An important fact for many of these sites is the removal of grazing from the majority of the subdivision in the last 4-8 years. The pictures below illustrate the changes occurring because of this removal. This was taken on the southern edge of God's acre and shows much heavier



grass within the subdivision. Many of these once beaten down grasslands (picture on right) that could not support active ground fire are now capable. Fire occurrence within and adjacent to these grassland areas will increase as the impacts of grazing are further removed from the system.

Reducing ignition in this situation would primarily be accomplished by removing any continuity between what is to be protected and the grassland fuels. This continuity can be broken up by animal paths, green belts, mowing grass to reduce flame height and spread, maintained driveways or bladed tracks, fire resistant plants or good amounts of human activity. Fire will not be the only threat as there will be wind and plenty of small embers blowing to ignite other fires. Remove fuel jackpots and other flammable items adjacent to these areas that could start due to either direct contact with the embers or the radiant heat from the flame. Remember grass fire can be extremely fast moving (up to twice the speed of the wind) and because of the high spread rates in grass, these ignition reducing tactics cannot be done last minute.

The next of the local systems that will be summarized is the pinyon/juniper woodland type. This and the grassland type are about evenly distributed throughout the area. This system can be found mainly within the upper ½ of hills and ridges within the area. The historic woodland types generally have trees commonly greater than 20". Many of the sites that have no large diameter representatives are young woodlands that have replaced

grassland systems. Without management through fire use or thinning woodlands will trend toward the photo at far right or FRCC III. Here the larger tree species have out competed the smaller fuels and have produced a fire regime that will be extremely infrequent because of this.



FRCC II (low)



FRCC II (high)



FRCC III

Conditions would have to be extreme meaning high winds, dry fuels and an ignition source or a droughty spring in New Mexico. These FRCC III conditions mainly exist on and near ridge tops. As mentioned in the grassland system, those woodlands next to ponderosa areas have additional threats due to greater chances of ignition and spread in this system moving into the woodland type. This is to say the savannah area may provide the wick necessary to ignite this infrequent fire regime. Those woodland systems rated as FRCC III have seen the greatest changes in the last 100 years. The total removal of fire from these areas has produced woodlands that are in extremely poor health. Disease, insect infestation, stress and death are common here.

The photo on the left and the one in the middle are quite different from one another when comparing fire regime. The photo on the left suggests a fire that will mainly stay on the ground and burn with a lower intensity than that picture in the middle. The condition in the FRCC II (low) picture is fairly common within the area and does suggest much more frequent fire occurrence in the Candy Kitchen area approximately 35 -70 years ago. Differences within the low and high FRCC II pictures that are related to an increase in fire behavior include ladder fuels, greater loadings of dead and down and higher percentages of crown cover. This means more torching, spotting and potential for crown runs within this system and its FRCC rating.

Those residents that live or have structures within these areas or adjacent to them can perform many management related techniques to reduce ignitability within this system. These include reducing crown cover near your home or making sure there is enough space between trees so fire cannot move from one tree top to another. A general rule of thumb is about 30 -40' between trees. Because grass is a component of the spread equation in this fuel model many of the suggestions for the grassland system are also relevant. Another item in this system is removal of ladder fuels. Removal of ladder fuels should be completed on those trees near the protected structure, those trees within the entire property that are considered special or important and a special focus on ladder fuel removal from the west and southwest of the structure.

The last of the ecological systems in the Candy Kitchen area that will be written of is the ponderosa savannah. This system makes up only a small percentage of the lands within

Candy Kitchen. It exists on some of the higher ridge tops in the northern part of the area while it is the dominant system in the southern ¼ of the area. This system has many



Both pictures show FRCC II

similar characteristics to the last two. These include potential for spread through both tree tops and the fine fuels below and an abundance of ladder fuels. The major differences between this and other systems are the soils, which have higher erosivity, and the ponderosa which have higher rates of ignition from lightning and provide a more suitable fine fuel for fire spread or needles. This system, because of this higher threat of ignition, could provide the necessary wick to start some of these more difficult to burn systems. Sound ecological objectives within this system would be to protect the historic species within this system type. This would include protecting ponderosa pines, large gamble oak and in some places alligator juniper.

For those who live or have interests in this system many of the same tactics used in the others will work well to reduce ignitability in this one. Removal of ladder fuels, managing fine fuel continuity near structures, reducing crown cover and fuel loading, removing needles from underneath trees close to the home and with special status, limbing trees high enough up the trunk to prevent the ground fuel from igniting them and generally keeping yards clean of flammable debris.

Although the risks, values and hazards are numerous within the Candy Kitchen Area the residents of Candy Kitchen are concerned about their environment. From conversations with residents, the majority realize their battle in making their community safe from wildfire lies in how they deal with the current vegetative state of the subdivision. The community has a strong foundation from which to build on. Organizations that define this foundation are the Volunteer Fire Department, The Wolf Ranch, the Candy Kitchen Ranches and all of the property and home owners of the area. The process to make the community wildfire safe is going to take many years, but with the current community attitude, coordination with other agencies and entities and on-going hard work the end goals of a fire safe and ecologically sound environment are possible.

2. Goals and Objectives

? Define the values, risks and hazards within the community

? Provide an action plan that will lay the framework for current and future projects and activities within the Candy Kitchen Area irregardless of ownership.

? Collaborate with community residents and organizations on the planning and execution of projects within the Candy Kitchen Area.

? Increase the understanding of fire and fuels management within the Candy Kitchen Area to help reduce ignitability of homes and improve fuel conditions in the Community of Candy Kitchen.

3. Background

Planning Area Boundaries

The Candy Kitchen Area is located in Cibola and McKinley Counties, New Mexico. The legal locations of the Candy Kitchen Area are as follows: Township 9 North, Range 16 West, sections 33, 34, 35, 36; Township 9 North, Range 15 West, sections 31, 32, 33; Township 8 North, Range 16 West, sections 1, 2, 3, 4, 9, 10, 11, 12, 13, 14, 15, 16, 21, 22, 23, 24, 25, 26, 27, 28, 33, 34, 35, 36; Township 8 North, Range 15 West, sections 4, 5, 6, 7, 8, 9, 16, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32, 33 and; Township 7 North, Range 16 West, sections 1, 2, 3, 4. These sections include all land that is private, federal or state.

These legal descriptions of land will be defined as the Candy Kitchen Area. This is important to note as the area will be assessed in its entirety. Vegetation, fuels, fuel loading, history, topography and climate will all be assessed without confines to land ownership or legal description.

The History of Fire in the Candy Kitchen Area

Historically fire has been the dominant force shaping the vegetation of the area. This historic fire regime was characterized by fires that were high in frequency and low in intensity. Studies completed by The University of Arizona and The University of Tennessee, Knoxville for the nearby El Malpais National Monument have indicated that wildfires frequented the ponderosa stands in the area once about every 7 – 12 years with wide spread fires (>100,000 acres) occurring about every 12 - 15 years (Lewis, 2003; Grassino-Mayer, 1995). Fire frequency in the Candy Kitchen Area probably mimicked this frequency with little difference. Within the scientific community it is generally agreed upon that grasslands and shrub lands burned at more frequent intervals than pine

stands (approximately every 2-5 years) while Pinyon and Juniper Woodlands burned less frequently than pine stands (approximately every 15-30 years) (Covington, WW. 1997).

These frequent fires were the cleansers, maintainers and the invigorators of the ecosystems within the Candy Kitchen Area. In ponderosa forests and savannas as well as pinyon and juniper woodlands, these frequent fires reduced needle litter, removed disease and decay and reduced sapling and seedling numbers. Fires maintained a relatively open forest or woodland floor that provided needed habitat requirements for grasses, herbs, shrubs and a multitude of wildlife. The frequent fires in grasslands and brush lands removed encroachment from larger vegetative species and released nutrients necessary for the plants and animals associated with these systems.

Currently, the fire regime within the area is one characterized by a low frequency of wildfires that have a higher probability of being intense. Historically, the fire regime would be characterized by a high frequency of fires that had lower intensities associated with them. Wildfire frequency is now approximately a half dozen fires started each year within the area with nearly half being human caused. These fires have been relatively small in size and inconsequential. Given some of the current fuel loadings in the subdivision, it is a matter of time before one of these fires starts in the wrong place at the wrong time.

Current Factors Affecting Fire Regime

The communities' recent climatic history puts the Candy Kitchen Area in an extended drought with deficits in annual precipitation occurring in many of the last ten years. This is even evident even this previous winter of 2004-2005 and the Monsoon season of 2005 in which Candy Kitchen received below normal amounts of precipitation. This extended drought has put stress on the existing vegetation and is related to higher than normal occurrences of vegetative death, plant disease, plant deformity and insect infestations. This ongoing drought event intensifies wildfire vulnerability throughout Candy Kitchen especially when coupled with the spring windy season (March, April, May, and June) and a mild winter snowfall. The tail end of this spring windy season is when the Candy Kitchen Area would likely experience its largest fires.

As stated earlier, the Candy Kitchen Area was once a ranch that has been converted into a subdivision. Many of these once heavily grazed pastures are now fallow fields with grasses growing unchecked from local sheep or cow herds. This increase of grasses within the Candy Kitchen Area will have the affect of increasing the spread potential and intensity of wildfire ignitions within in the area. This increase in fine fuel loading will be especially prevalent after wetter periods like the first $\frac{3}{4}$ year of 2005. These wetter periods if followed by extreme fire danger indices may hold the greatest opportunities to produce a catastrophic wildfire in the area. This increase in fine fuels complemented with the removal of fire and lack of fuels management in the area are opposite characteristics of the low frequency, high intensity fire regime that currently exists within the Area. These traits are linked to the high frequency/low intensity regime that once

existed here. These changes could awaken the sleeping giant (the large fire potential) that exists within the area.

In addition to the increase in grasses occurring within the subdivision, there is an increase of three to fifteen times the amount of aerial fuel or trees compared to historical fuel loadings. Historically, there was on average 62 trees per acre (Covington, 1997) and now through the woodland transects completed within the area the average fuel loading for the Candy Kitchen Area is >226 trees per acre within forested sites. Historic ranges were 8 – 232(Covington, 1997) and, in comparison, the Candy Kitchen area ranges are 67 -- 509 trees an acre. From a fire behavior standpoint, this means higher rates of spread, greater flame lengths, higher spotting potentials and greater chances for a catastrophic wildfire.

In conclusion, the vulnerability of areas within Candy Kitchen to a catastrophic wildfire is highly probable. Each year the woodlands and pastures go unmanaged, competition for available nutrients and water increase. Biology dictates that plant species with larger root systems will have competitive success against those with less. The caveat is that this only occurs in a fire regime with infrequent fires. This mechanism is the primary reason for the loss of the local meadows and grasslands through encroachment. This will over the long term directly affect local vegetation by causing live fuel moistures to decline, higher susceptibility to fire and fire mortality, increased rates and types of insect and disease problems, ground water levels to gradually drop and the decline in ecological health of the area.

Local Organizations Roles in Wildfire Protection

The Candy Kitchen Area is composed of a diverse group of people, organizations and agencies. These include the Bureau of Land Management, the State of New Mexico, the Pueblo of Zuni, the Ramah Navajo Chapter, local ranching enterprises, environmental groups, the Wild Spirit Wolf Sanctuary, a small volunteer fire department and the private landowners within the area. Each entity needs to play a part in the overall success of vegetative and fuels management activities, in actively suppressing any wildfire starts in the area and ultimately in reducing the threat of a catastrophic wildfire in the area.

The Bureau of Land Managements (BLM) has taken several roles in the long term assistance and management of the area. One being created by the local fuels specialist is this document or the Candy Kitchen CWPP. As previously stated in the objectives there are several goals for this plan. These include assessment of the current hazards, values and risks to wildfire, prioritization of future projects on BLM lands to reduce wildland fire behavior in the area, cooperation with the subdivision and the homeowners within the Candy Kitchen Area to perform their own land treatments, education of the local residents explaining the how, when and why land and fuels management should occur, and executing projects on BLM managed lands to help achieve the short and long term objectives of the area.

Although the Pueblo of Zuni has land to the northwest of Candy Kitchen, the tribe will play a minor role in the management of the area. Most of the functions they fill will be

associated with contracts managed by the BLM. They will fill roles of labor by providing chainsaw operators and equipment to meet objectives defined by the BLM and the National Fire Plan. They are also responsible for correctly managing land under their jurisdiction to the northwest of the planning area.

The Ramah Navajo Organizations will have a greater role than the Zuni Organizations in the management of the area as they also own land within the Candy Kitchen Area defined within this plan. They to, like Zuni, will run chainsaws and equipment to accomplish objectives set forth by the BLM that will include thinning operations and gathering of wood products from the selected project areas. The management of their land is at their discretion and as with Zuni are responsible for the correct management of it.

Adjacent landowners and ranching enterprises can also play a part. Options at their disposal that would aid in reducing fire behavior on the subdivision boundaries include reducing tree numbers (hazardous fuels) by selling fuel wood to local businesses or private individuals, managing for wildlife through grants from entities such as the Rocky Mountain Elk Foundation, and continued grazing of the adjacent lands to limit herbaceous growth.

Of all these parties the greatest task will be on the largest landowner of the area, or the landowners within the subdivision. This group will also have the greatest losses if a wildfire should occur. Their role can be as little or as all encompassing as they desire. Active participation will protect their land within Candy Kitchen. Managing their land will help to make it safe from the inevitable event of a wildfire.

4. Wildfire Analysis Criteria

Risks (Likelihood of ignition)

The existence of the subdivision in New Mexico at elevations between 7400 and 8000' is a risk to the Candy Kitchen Area. Reason being is that New Mexico has some of the highest frequencies for electrical storms in all of the United States. The state is also rated either one or two per population when it comes to lightning fatalities, casualties or injuries per year in the United States (<http://sciencepolicy.colorado.edu/sourcebook>). This along with the fact that 80%+ of New Mexico's wildfires each year are started by lightning creates an abundance of opportunities for wildfires to start.

With additional homes and infrastructure improvement come additional threats to wildfire ignition. Additional power lines, vehicle traffic, camp fires, wood stoves and construction equipment are but a few of the items that come with new residents and infrastructure. Each of these community additions add to the chances of a human ignition. All of these improvements will also add to the complexity of suppression operations within the community.

Risk Assessment Criteria

Risks are defined as the likelihood of ignition. Risk assessment will involve Fire Regime Condition Class (FRCC), crown cover and structure density. These three risks and the assessment criteria are listed below.

Fire Regime Condition Class (FRCC)

Fire Regime Condition Class (FRCC) is an interagency, standardized tool for determining the degree that fire occurrence has departed from local reference conditions. Reference conditions that determine FRCC include historical (pre-1870) vegetational composition, fuel loadings and fire regimes. Assessing FRCC can help guide management objectives and set priorities for treatments. To help determine this condition within the Candy Kitchen Area, FRCC was determined by accumulating field data using standardized national methods. This methodology will determine which condition class is specific to an area within Candy Kitchen. The results of the field data will determine a FRCC score which can be a 1, 2, or 3. A score of one would indicate natural or near natural conditions or health of the vegetation, fuel loadings and disturbance regimes. A score of three would indicate the extreme opposite or a site where natural conditions do not represent historical (pre-1870) norms. A score of 2 is obviously somewhere in the middle. The majority of the Candy Kitchen Area has been determined to be a FRCC of 2 or 3.

FRCC Risk Ratings

High Risk: FRCC Class III
Medium Risk: FRCC Class II
Low Risk FRCC Class I

Crown Cover and Risk

Candy Kitchen has two main and one minor vegetative systems. These are grasslands, pinyon/juniper woodlands and the minor system or ponderosa savannah. Each system will have similar fire behavior characteristics and probabilities given a specific scenario. Within the probabilities are thresholds that when exceeded will result in a specific response. For example, in the pinyon/juniper type where crown cover exceeds 75 % there is a high likelihood that a crown fire would occur and that the post fire environment would have long term negative effects on soils, vegetation and wildlife. Each of these vegetative systems has these thresholds that when achieved take the fire behavior climate to the next level. Crown cover is one of the specific inputs in the scenario that dictates a specific response under a specific set of conditions.

Crown Cover Risk Ratings

High Risks

- ?Pinyon/Juniper BPS where crown cover exceeds 75%
- ?Grasslands with a continuous fuel bed

Medium Risk

- ?Pinyon/Juniper BPS where crown cover is between 50 and 74%
- ?Southwest Shrub Steppe with a continuous fuel bed

Low Risk

- ?Pinyon/Juniper BPS with < 49% crown cover
- ?Mountain Grassland without a continuous fuel bed

Structure Density

Structure density is the number of structures within the area of assessment. The number of structures chosen for assessment criteria was chosen based on response capabilities of the surrounding area, i.e., local resources could handle structure protection in an area with less than five structures; however as more and more homes are threatened that ability is pushed and the demand for more resources and a larger suppression organization would exist.

The adding of additional structures to the area will greatly add to the workload and hazards of any wildland fire. Structural protection needs will increase, hazards surrounding these structures will increase and coordination needs between wildfire and structural personnel will increase. If structures are built of fire resistant material and have defensible space this eases the work load of protection and suppression personnel.

Structure Density Risk Ratings

- ?High Risk: More than 25 structures within an assessed area
- ?Medium Risk: between 5 and 24 structures within an assessed area
- ?Low Risk: < 5 structures within an assessed area

Hazards (Fuels and topography)

The location of the Candy Kitchen area places it on the southeastern edge of the Colorado Plateau. This large topographical feature dominates the areas climate. On a broad scale, the general seasonal weather patterns that dominate the area are cool moist winters, warm and dry conditions in the springtime and early summers, monsoonal rains in late summer

and mild, delightful conditions in fall and early winter. Other large scale events that effect climatic patterns over the area include El Nino and La Nina, which respectively contribute to wetter and drier climatic cycles. On a smaller scale climate is dictated by topography and the elevation of the area. An example of this is Oso Ridge to the north of the area. It receives more moisture and maintains cooler temperatures than the Candy Kitchen Area. It is also dominated by ponderosa pine and oak where the mostly drier environs of Candy Kitchen are more conducive to Pinyon and Juniper Woodlands and wide reaching grasslands. The Candy Kitchen Areas climate is highly variable in both temperature and precipitation. Temperatures can range from below -10 in the winter months to over 90 degrees in the summer months. The majority of the precipitation falls as rain during the monsoonal season and as snow/rain in the winter months. The Candy Kitchen Area has yearly precipitation totals that range from a low of about 2 inches to higher totals above 20 inches (Grissino-Mayer 1995).

The topography in the area is dominated by rolling hills and high mesas with variably sized valleys in-between. The elevations of the valleys are between 2150 and 2200 meters while the mesas can rise to elevations between 2250 and 2300meters. These hills and mesas are mostly composed of aging Zuni and Dakota sandstone with the valleys in between composed of sandy silty dirt from these mesas which has highly erosive characteristics. The area is dominated by three main drainages or draws. These are the White Horse Draw to the north, the Terrero Draw to the east and the Pinitos Draw that lays to the west. These drainages tend to be well defined and have similar characteristics in soils and, therefore, the vegetation within them.

These two diverse components of the area, climate and topography, determine the vegetative composition and arrangement in the area. The xeric nature of the mesas tops and runoff filled valleys dictate the biophysical units associated with them. Although much has changed since approximately 1870 or when European mans influence became evident, the vegetative communities have changed little. These communities within the valley bottoms are defined as mountain grasslands while the majority of mesa tops and adjacent slopes are dominated by pinyon/juniper woodlands. Another community within the area is the southwest shrub steppe which tends to be associated with the mountain grasslands. Another vegetational zone that exists in the area is the ecotone that exists between the pinyon/juniper and the grasslands. This ecotone is where the greatest changes have occurred in the last 130 years. This zone has expanded in size and influence. Its expansion has reduced the amount of grass/shrubland in the area, has reduced the amount and extent of ponderosa habitat and has allowed the pinyon/juniper to expand in both numbers and acreage.

The Candy Kitchen area is home to many common southwestern tree species including ponderosa pine, piñon pine, one-seed juniper, alligator juniper, rocky mountain juniper, scrub oak, fragrant ash and mountain mahogany. Several brush species are also common. These include horse brush, current, snake weed and rabbit brush. The dominant grasses are blue gramma, fescue and western wheat. The historical vegetative diversity composition, condition and location are quite different from the current ecological state of the land. This change in composition is evident when comparing historical vegetative data, historical photographs and aerial photos of the area.

These changes in vegetation have created many of the current problems that will need to be addressed to reduce the ignitability around outbuildings, infrastructure and homes. These hazards include tree densities, ladder fuels, and fuel loadings.

Tree densities can be explained as the both the amount of trees you have and how close they are together. If the trees on your property nearly touch one another, you have high densities. This affects the ability of the fire to move from point to point. High densities allow a fire to move quickly and effectively from a – b, low density vice versa. Tree density can be used to predict the likelihood of a crown fire in a specific area. To reduce ignitability around structures the area adjacent to the home would desirably be moved to and maintained at a low density. Other areas to address tree densities would be power lines and poles, well houses, propane tanks, animal habitat and view sheds.

Ladder fuels can be explained as a shorter fuel or fuse that allows a path for fire to get to a larger fuel. A common natural progression of ladder fuels is grass to brush to small tree to large tree (blue gramma, grass– rabbit brush – juniper – ponderosa). Be aware steps can be skipped if conditions are right. Common ladder fuels to homes are landscaped hedges, wood fences, wood chips or needles used adjacent to home for mulch, trees close to the home providing a fuel bed on the roof and adjacent trees left unmaintained. To reduce ignitability around a home each one of these issues would need to be addressed.

The last of the vegetational changes that has occurred and poses the greatest risk to your property is fuel loading. This problem is the one that has changed the most dramatically since our human influence. It is directly related to the last two issues written about. High tree densities and ladder fuels did not exist in the numbers they do now and contribute to an increase in fuel loading. Fuel loadings are now 2 – 15 times what they were when fire was the shaper of the landscape and not human activity (Covington, WW. 1997). What this means when combined with ladder fuels and high tree densities is that the fire will burn hotter and have burning characteristics that exceed the historical norm. This affects ignitability of homes directly as the extreme fire behavior that is produced in these areas where these problems exist reduce the ability of firefighters to defend a home or fight the fire. To reduce ignitability these areas identified as high fuel loading should be addressed so as to reduce fire potential if a fire were to occur in that area. This can be accomplished by placing a fuel break around the area or thinning to a prescriptive objective.

The hazards that were used for the assessment criteria are trees per acre of an area, the use of fire wise construction materials and creation of defensible space and the effects of slope.

Hazard Assessment Criteria

Trees per Acre

The ratings on fuel loadings are just looking at the live trees and standing snags within an area. This is the fuel that will support a crown fire and produce catastrophic post fire results. At 200 trees an acre, which is equivalent to >50% crown cover (trees nearly

touching each other) the likelihood of a crown fire is high. Between 60 and 200 trees an acre the area could expect limited crown runs, while at numbers below 60 trees an acre crown runs would be unlikely to happen.

Trees per Acre Ratings

- ?High Hazard Rating:** >200 trees an acre
- ?Medium Hazard Rating:** between 60 and 200 trees an acre
- ?Low Hazard Rating:** < 60 trees an acre

Home Construction Materials & Defendable Space

Homes and their assessment will be done by each phase or phases, i.e. all homes within a phase will be assessed and lumped together as a structure assessment for each assessment area. Assessments will be done by this method as opposed to individual assessments on each house. This methodology will help to delineate the greatest risks within each phase or phases as structure densities vary widely throughout the subdivision.

Home construction and fire resistant building material will also be assessed in this manner throughout the area. The assessment criteria used is listed below and will be judged on current condition vs. the safest practice.

Home Construction Criteria and the Safest Practice

Criteria	The safest practice
Defensible Space	Appropriate area considering slope and fuel loading
Roofing material fire resistance	well kept asphalt shingles or a metal/aluminum roof
fire resistant siding material	aluminum/metal, concrete or stucco
Yard clear of ignitable debris	no scrap wood or other burnable material lying around
Driveway access and egress	cleared for safe access/egress of wildland engines or larger structural engines
Decks clear of debris	vegetation underneath cleared and managed, no woodpiles on it
Location of wood piles	should be on the northeast side of the house and/or uphill from structures
Infrastructure items safe (Power poles, well head, phone box...)	Clear of debris and vegetation that would promote ignition

Home Construction Materials & Defendable Space

?High Hazard Rating:

Homes or structures that lack defensible space and have not implemented the safest practice criteria to help reduce ignitability.

?Medium Hazard Rating:

There are homes or structures that lack defensible space but have implemented at least two of the safest practice criteria to reduce ignitability.

?Low Hazard Rating:

The majority of homes/structures have defensible space.

Slope (Topographical Hazards)

Hazards ratings for slope are directly related to fire behavior modeling from the Fireline handbook (NWCG Handbook 3).

Slope Ratings

?High Hazard Rating: >45% slope on property

?Medium Hazard Rating: from 30 – 44% slope

?Low Value Rating: < 29% slope

Values (Loss potentials should a wildfire occur)

Values are defined as loss potential if a wildfire should occur. These include anything the community values as important to the long term existence of the subdivision. The following criteria will be used to assess the value level for these three different value categories including ecological, economic and social.

Ecological values

The ecological values of the area are tied to the most prominent vegetation of the area or pinyon/juniper woodlands. 90% of the homes are tied to the woodlands in that they find their solace within them. This habitat compromises about 65 % of the area and is expanding into the other habitats each year. The other primary habitat of the area is the grass and shrub lands. These are valued for the range they provide for the local horse and cattle owners. The birds, animals and plants associated with these habitats are admired and provide a link to the social values that draw the residents here. Although many of the woodland areas have little threat from catastrophic wildfire many do. The threat of ignition and damaging fire are then a threat to some of the reasons that residents live here.

Economic Values

The economic values of the area are limited. The economic values within the community are secondary to the values placed on the local woodland setting and the social framework existing in the community. These economic values include roadways, utilities, homes, businesses and agriculture. Residents may feel that without the ecological values the social setting and the economic infrastructure within which they live means little. Roadways, homes and electric poles can be replaced, but the environment in which they live cannot.

Social values

The social value that best defines the Candy Kitchen Area is the rural setting from which it was carved out. This rural life and the environment that defines it is the main draw for the many of the older and/or retired people that live here. This rural setting has provided a social setting that has allowed for the establishment of several animal shelters of which the most recognized is the Sacred Spirit Wolf Sanctuary. It has also provided a place for the Candy Kitchen Ranch itself which provides the setting for this diverse group of people to share the wonders of the local area. Being the draw to the area is the rural qualities that come with the ranches; this fact may be the most difficult item to tackle in getting residents to reduce the ignitability of their homes and properties. Trees provide shielding to neighbors eyes and provide the illusion of isolation or remoteness from the outside world.

Value Ratings

It is hard to separate these three values as they are interrelated. Values are also a tough item to quantify as each of us would have their own ratings. This rating will look at the physical things that would be lost if a catastrophic wildfire were to occur. Things such as homes, structures, trees, habitat, jobs, electric, soil cohesion, fuel wood, privacy and seclusion. The following criteria will be used to assess each phase or area within The Candy Kitchen Area.

?High Risk: > 50% of Values will be lost if a wildfire should occur

?Medium Risk: Between 25 and 49% of the values will be lost if a wildfire should occur

?Low Risk: < 24% of the values will be lost if a wildfire should occur

5. Assessments

Assessments of the area were broken down into areas that had common access and egress roads or routes. These roadways tie the group of homeowners together with common hazards and risks. These common routes also provide the best avenue to have larger

impacts on reducing ignitability. This would be the synergistic affect of neighbors within an area all managing their land with similar goals. Ideally these goals are reducing ignitability of their property and homes.

The following assessments give data that is a combination of objective observations and forestry and fire science. The matrixes will give an averaged rating for the area being assessed. The photos provide examples of fuel loadings that are common in the area and suggest possible management prescriptions that would provide the homeowner ideas on how to reduce ignitability around their homes.

The subdivisions that will be assessed as a unit will be Great White Father, Rock House/Homestead, Rockwood/Bear Valley, Five Gate, Well, Jubilee Trail and God's acre. These areas are defined on the map below. Risks, Hazards and Values will be assessed for each area using the criteria listed above. There will also be a summary of why the area received the specific ratings.

Great White Father



Photo of Area

Risks, Hazards and Value Assessment Great White Father

Risks		Hazards		Values		Overall
Great White Father	FRCC	moderate	Fuel Loading	moderate	Social, economic & ecological	low
	Crown Cover	moderate	Home Construction	moderate		
	Structure Density	moderate	Topography	moderate		
Overall Rating Great White Father						moderate

Summary of Risks, Hazards and Values Great White Father

Risks

The risks of this are broken down into FRCC, crown cover and structure density. FRCC was given a rating of moderate as many of the places within this area have lost a good amount of ground cover or grasses, have increased trees per acre and crown cover and most importantly lost the ability to carry fire. The majority of Great White Father is of this description or grasslands that are losing a battle to Pinyon and Juniper encroachment. This is different from many of the areas in the subdivision as this area has lost the ability to carry fire while other areas have had vegetative change that has increased the probability of a catastrophic fire occurring.

The areas within Great White Father that have fuel characteristics that would promote fire control problems are those areas on ridge tops or hilltops. These areas have the greatest fuel loadings and crown cover. These locations in Great White Father will be the most susceptible to wildfire and adverse post fire results. These hilltops are the only reason the area did not get a low rating in crown cover, fuel loading and slope. This is also tied to the fact the approximately half the residences in the area are next to or on top of these topographical features.

The last of the risks is structure density. There are several homes in the Great White Father area of the subdivision. The majorities of these homes has adequate defensible space and many have used fire resistant building materials such as a metal roof (the most common). The problem here and the reason for the moderate rating is the abundance of mobile trailers and camping type trailers spread throughout the area. Many of these are placed in areas with little thought to protecting them from wildfire. For owners of these structures it is even more important to reduce ignitability by creating defensible space around these than compared to a house. The reason for this is that air and embers and fire can flow around the entirety of the trailer. This makes trailers more susceptible to fire especially from underneath where a house with a foundation is not.

Hazards


The hazard ratings in the area are also listed as moderate. As stated earlier fuel loading around the hilltops is the highest in this area. What complicates this is when the slope of the hills is combined with this fuel loading. Once again these hilltops and their characteristics bump up the ratings for this area. This clearly states that someone who lives on these hilltops or ridge tops will need to spend more time designing and creating defensible space around their home. Reducing ignitability will involve clearing a further distance from the home to compensate for the fire behavior the slope and fuel loading will create when a fire starts below.

Values


The value assessment and rating is low for this area. There is little infrastructure in the area that could be damaged through fire. The greatest value is the homes were people currently live.

Transects and Descriptions Phase #1

Transect #1 Great White Father

<p>Transect #1, Great White Father September 8, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 16.9', Avg. Tree Diameter: 9.3", Trees an acre = 153, Crown Cover % = 59, and stem height = 17.4'</p>
	<p>This transect was completed on Eagle Hill Road in Great White Father. Although vegetative conditions on this site are good the reason for being FRCC II is that there is a definite lack of fire and its rejuvenative effects. One of these effects would be more flowers (forbes) growing. Management of this site to reduce ignitability around a home or structure would be to eliminate ladder fuels. Another activity would include both the cleaning of needles around nearby trees and the removal of some grass to eliminate a continuous bed of fine burnable fuel. This could include dirt or gravel walkways or a green belt of live grass, shrubs or flowers or next to the structure.</p>

Transect #2 Great White Father

<p>Transect #2, Great White Father October 4, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 25.5', Avg. Tree Diameter: 4.5", Trees an acre = 67, Crown Cover % = 6, and stem height = 8</p>
	<p>This picture was taken at the cull de sac at the end of Sierra de Manana Drive. This is a perfect example of the mass amount of pinyon and juniper encroachment going on in this area. All trees in this picture are less than 70 years old. They have moved into this range area and are slowly reducing the grasses competitive edge. Throughout the subdivision these areas are seeing a loss in diversity and a dropping of the water table. Ecological treatment in these areas would involve removal of all but the largest of trees. Homes in grasslands need to remove fuel continuity near their homes by creating a green belt or bare dirt trails that encompass their homes.</p>

Rock House/Homestead



Photo of area

Risks, Hazards and Value Assessment Rock House/Homestead Road




Risks			Hazards		Values		Overall
Rock House/ Homestead	FRCC	moderate	Fuel Loading	moderate	Social, economic & ecological	moderate	moderate
	Crown Cover	moderate	Home Construction	low			
	Structure Density	low	Topography	low			
Overall Rating for Rock House/ Homestead						Moderate	

Summary of Risks, Hazards and Values Rock House/Homestead

Risks

The risks are broken down into three measured ratings which include the Fire Regime Condition Class (FRCC), soils and vegetation and structure density. This area received a moderate rating, or a 2, for FRCC. Reason for this rating is that fire frequency has changed moderately from the historic fire regime and vegetational composition that supported fire more frequently in the past. These changes are more dramatic as one travels south down the main road in this part of the subdivision. The northern part or Rock House is made up of open meadows and stands of historic pinyon juniper woodlands, mostly located on the hilltops and rises. The area in between Rock House and Home Stead is a transitional point as there is an increase in encroachment from pinyon and juniper into the meadow areas, while the stands of P/J woodlands are more dense and expansive. The southern part of Homestead achieves the opposite of the entrance to Rock House as meadows are small to nonexistent and the P/J woodlands are dense and thick. This high variance in vegetation and FRCC rating gives it a moderate rating with lower ratings being in the Rock House area and higher ratings in the Homestead area.

Progression of Pictures in Rock House Homestead

		
<p>Typical view in the Rock House area. The abundance of snake weed indicates overgrazing and the loss in ability for these meadows to carry fire. This can be good and bad!</p>	<p>The good is grasslands no longer support fire spread to endanger homes. The bad is that there is no longer a check and balance system to maintain meadow sizes and to keep tree numbers in check. Here is an excellent example of the middle stages of pinyon and juniper encroachment and the loss of this meadow.</p>	<p>Here is more of the bad. This is an area where fire used to keep the woodland healthy and tree numbers in check. This is at the end of Homestead road. This is the result of total loss of fire in the system. This woodlands area has become decadent and shows increased numbers of disease, decay, deformity and insect infestation.</p>

This vegetational sequence also shows an increase in susceptibility to fire as one goes north to south. These changes in the local plant communities also are directly related to a loss in diversity in species and numbers as one goes north to south in this area. The soil also has related properties to these vegetational changes or differences. Soils are bound together by a mixture of weeds trees and grasses at the northern end while at the south end there are few grasses in the woodlands and soil erosion is high. If fire were to occur in these woodlands soil erosion would be high and of concern to nearby home owners. This would be especially true if one lived at the bottom of a hill were a crown fire had occurred. Because of these characteristics the soil and vegetative rating is a moderate due to the changes in vegetational composition and continuity.

The last of the Risks is the structural density rating. This is rated as low as there are few houses in both Rock House and Homestead. They also have considerable spacing between them. One factor that nearly changed this was that the access and egress within the area is basically one way in and out.

Hazards

The hazard rating for crown fire potential/fuel loading, home construction materials and defensible space and slope are as follows. Crown fire potential does exist in the area at the southern extremes of Homestead. Here fuel loading is in excess of 500 trees an acre and all the density needed to allow for a crown fire is 200 trees an acre. The majority of the area has considerably less densities thus a rating of moderate.

Home construction materials and defensible space is adequate for the majority of homes in this area. This has either been accomplished by reducing vegetation near the home or by choosing a good site to build on. This gives the area a rating of low.

Slope is gentle to rolling through most of the subdivision and this area is little different. Meaning slope will do little to contribute to fire spread or intensity, therefore a rating of low.


Values

The values in the Rock House Homestead areas are similar to the entire subdivision. This area provides a rural setting that creates a quiet beauty and the feeling of remoteness to those that live there. The trees and the woodlands they create allow for this feeling and this setting bringing the social and ecological values together. Any management activity will need to address this issue when designing projects.


An economic value is the continued grazing of the lands in this area. Many of the meadows are being lost to encroachment and woodland areas lack any grazeable acreage at all. This indicates a decline in the ability to add weight to animals and inability of the range to support grazing animals without supplemental feed. This can only be improved through actively managing these woodlands and meadows. This gets a rating of moderate as the prized values in the area are in declining health and some susceptible to wildfire.

Transects and Descriptions Rock House/ Homestead

Transect #1 Homestead

<p>Transect #1, Rock House/Homestead September 8, 2004 FRCC class III</p>	<p>Transect Information: Avg. Spacing of trees: 9.25', Avg. Tree Diameter: 8.75", Trees an acre = 509, Crown Cover % = 87, and stem height = 9.8'</p>
	<p>This transect was read at the end of Homestead road. Notice that absence of ground vegetation. This is directly related to the crown cover for the site which is 87%. This site shows high instances of disease, decay and deformity. Competition for available nutrients and water is high. This creates a stressed environment for the vegetation on site. Thinning or management would include removing disease from the stand and protecting the healthy well shaped trees on site. Crown fire is possible in densities such as this. 80 to 90% of the trees could be removed from these high density sites. If a home is in this dense a stand defensible space would have to be adjusted to a greater distance from the home to accommodate for the increase in fire behavior.</p>

Transect #2 Homestead

<p>Transect #2, Rock House/ Homestead September 8, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 13.7', Avg. Tree Diameter: 8.25", Trees an acre = 234, Crown Cover % = 59, and stem height = 15.6'</p>
	<p>The biggest visual difference here is in the shape of the trees compared to the 1st transect. The majority of the older trees have the classic shape of a spade and have good needle coverage on all of there branches. Management here would be less invasive than in the last transect. Ladder fuels adjacent to the larger trees would be a good place to start. Some light thinning would be appropriate throughout this tree density. If your home was in this woodland, larger trees and some thickets could be left near the home, but maintenance around those trees would be necessary to keep ignitability reduced near the home. This would include pruning the lower branches and cleaning up the needles in the spring and/or fall.</p>

Rock Wood/Bear Valley



Photo of area

Risks, Hazards and Value Assessment Rock Wood/ Bear Valley

Risks			Hazards		Values		Overall
Rock Wood/ Bear Valley	FRCC	high	Fuel Loading	moderate	Social, economic & ecological	moderate	moderate
	Crown Cover	moderate	Home Construction	moderate			
	Structure Density	moderate	Topography	low			
Overall Rating for Rock Wood/Bear Valley						Moderate	

Summary of Risks, Hazards and Rock Wood/ Bear Valley

Risks

Risks for this area are broken down into FRCC rating, crown cover and structure density. FRCC has been given a rating of high. This rating is due to the amount of ridge tops within this part of the subdivision. The rating is related to the fact that most of the ridge tops have lost their ability to carry a non-catastrophic fire. This means that under the right conditions a damaging crown fire could occur along or within these ridge top areas.

This threat is related to crown cover of the specific area or the fuel loading. The two transects read in this area state a crown cover that exceeds 50% on these ridge tops. This would translate in a better than average chance of a destructive fire occurring under the right conditions. This coupled with a structure density that exists at a moderate level produces a situation that would be stressful if a wildfire were to occur.

Hazards

Directly related to crown cover is trees an acre which within Bear Valley and Rockwood is different from those areas to the north and east as there are now a limited number of ponderosa trees along area ridge tops. These ponderosa trees provide a lightning rod and fine fuel to allow for the start of a wildfire. This hazard and the ignitability of the needles can be reduced by protecting the individual trees through thinning any trees close to them (crown height away ideally) and raking around the base of the ponderosa (helps to prevent torching) or removing the needles from the area (limiting continuity).

Home construction material and defensible space in this area was given a moderate rating. The level of defensible space created and the use of fire wise construction material was directly related to the investment in the home or structure. Stating that the nicer the home the greater level of defensible space created and the greater the use of fire wise building material. The moderate rating was mainly due to the number of pull trailers or mobile homes that had little or no defensible space. This fact alone makes the majority of these structures susceptible to even a low intensity ground fire as grass and wooden debris exist underneath many of these structures.

The last hazard to be rated is slope. Most of this area is low because of the mostly gently rolling terrain throughout. One area of special mention is the hill that exists to the north of Eagle Hill Road. This is due to the heavy fuel loading at the base of the hill that continues all the way to the top. The trailers at the top of this hill lack adequate defensible space or use of fire wise building material. This area would prove to be an unsafe environment for firefighters trying to protect them if a fire would come from below. This is one area where slope could contribute to fire spread and intensity.

Values

Values are once again can be economic, social or ecological and this part of the subdivision received a moderate. There are several of these within this part of the subdivision that are worth mentioning. The first of these is the Rockwood Fire Station. This facility is important both socially and economically. Socially the fire station has been used as a public meeting location and for community events. Economically it houses the community's fire engine and firefighting supplies. It is built of good fire wise construction. It does however need a little work to improve the defensible space to the back side or the east of the building.




The set of pictures below show some of the important ecological values that exist within the Rockwood /Bear Valley area. The first two pictures show a meadowland and an earthen tank that exist on the northern edge of Bear Valley. The first two pictures show the remnant of a valley/meadowland. These areas within the subdivision hold the greatest diversity in species. Within this valley bottom nearly twenty species of grass were found. The importance of this is that these areas are also the areas that are disappearing the fastest due to encroachment from the pinyon and juniper trees. These areas need to be protected by removing the encroaching species and burning if possible. Otherwise, without management, this diversity within Candy Kitchen may be lost.




The last picture shows a private thinning project at the entrance to Rockwood Rd. It is worth mentioning that all management at any level and size does its part at reducing ignitability within the subdivision. Firefighters compliment any resident who takes the initiative of performing any type of work that reduces local fuel loadings, improves structure defensibility and promotes a healthier ecological setting.

Transects and Descriptions Rock Wood/ Bear Valley

Transect #1 Bear Valley

<p>Transect #1, Bear Valley/Rockwood October 4, 2005 FRCC class III</p>	<p>Transect Information: Avg. Spacing of trees: 15.4', Avg. Tree Diameter: 10.2", Trees an acre = 185, Crown Cover % = 53, and stem height = 14.8'</p>
	<p>This is a good example of the most common vegetative type in the area or Pinyon/Juniper woodlands. These areas have similar characteristics: little plant and animal diversity, high percentages of disease, decay and deformity, high fire ratings and high rates of erosion. The most common disease is mistletoe and the amount of this disease is generally directly related to the trees per acre in the woodland area. Although fires are infrequent in this fuel type, under the right conditions fire in these woodlands can be quite destructive.</p>

Transect #2 south end Rockwood Rd.

<p>Transect #2, Bear Valley/Rockwood October 12, 2005 FRCC class III</p>	<p>Transect Information: Avg. Spacing of trees: 14.15', Avg. Tree Diameter: 8.5", Trees an acre = 218, Crown Cover % = 51, and stem height = 16.3'</p>
	<p>Notice the similarities of this transect and #1 taken over on the Bear Valley side. Both are near ridge tops where a threshold has been achieved. A threshold that limits ground moisture to those species with deeper roots and greater ability to gather water. Notice the total lack of ground vegetation. There is also an abundance of disease decay and deformity within this stand with small pockets of bark beetle still affecting the woodlands in this area. Thinning or management involves retaining the healthiest of the trees and removing the mistletoe (disease within the stand). Mistletoe is readily spread from natural processes and bird vectors if left in the stand. Mistletoe is one of the most difficult diseases to deal with in management of a woodland stands.</p>

Five Gate



Photo of area

Risks, Hazards and Value Assessment Five Gate

Risks		Hazards			Values		Overall
Pinyon Juniper Woodlands	FRCC	moderate	Fuel Loading	moderate	Social, economic & ecological	low	moderate
	Crown Cover	moderate	Home Construction	moderate			
	Structure Density	low	Topography	low			
Overall Rating for Five Gate						Moderate	

Summary of Risks, Hazards and Values Five Gate

Risks

Risks within the Five Gate area are rated according to the FRCC rating, Crown Cover and Structure Density. The rating for FRCC or fire regime condition class is II or moderate. Remember that this is an average rating for the area in its entirety. The majority of Five Gate was previously open grassland and park like pinyon and juniper savannah. The grasslands now have exploding amount of pinyon/juniper encroachment while the savannah areas are converting to more of a woodland type. The area that has gone through the greatest changes in the last 125 years within this area is the ridge tops in Fernwood. Here pinyon/juniper have become the dominant species by out competing grasses, forbes and brush species. True throughout the majority of the subdivision these ridge top areas are the most stressed areas within the subdivision. Disease, especially mistletoe, runs rampant in these areas. These areas, even without ground fuel, offer some of the greatest dangers related to fire because of the tree density.

The next Risk criterion is crown cover. This also received a moderate rating. Opposed too many of the other subdivisions in the area the moderate rating is related to the grass cover as well as tree cover. This area has one of the greatest abundances of grasses in the area. These grasses provide suitable continuity which would allow for fire spread in many areas under the right conditions.

The last criterion would be the structure density within Five Gate. There are many structures within the area, but they are widely dispersed and separated, thus the low rating.

Hazards

The criteria for hazards include fuel loading, home construction material/defensible space, and slope. The rating for fuel loading is moderate. This is due to heavy dead and down concentrations in areas and as mentioned above grass continuity in much of the area.

Home construction defensible space received a rating of moderate as well. The reason for moderate exists with the multiple out buildings, small homes and trailers that lack good use of fire wise building materials and have no attempt made at creating defensible space around them. Many are along the edges of woodland/grassland areas and have continuity within the fine fuels adjacent to them providing the wick for any local wildfire.

The last of the hazard criteria is slope which received a rating of low. The Five Gate area is composed mainly of a gently sloped valley with good grass cover and an abundance of encroachment. The only slight exception to this is once again Fernwood which does have enough slope to effect fire behavior under the right conditions.

Values

Values that are assessed include economic, social and ecological of which a rating of low was given. The rating pertains to the loss that would occur if a catastrophic wildfire occurred in the area. The first of these is economic. These are mainly power lines, solar panels and other worldly amenities in this part of the subdivision. Many of these are not



threatened to any great extent as many of the power lines are newer and recently were cleared of vegetation beneath them. The next of these values is the social setting of the area. I do not believe the life of seclusion and remoteness is threatened to a great degree here because of the broken topography and vegetation that exists locally. The last of the values rated is the ecological condition that exists within Five Gate. This picture shows that a mass germination of mostly pinyon trees

occurred within the last 20 – 25 years. This is due to lack of fire maintaining this grassland. The threat to the ecology is the loss of these grassland habitats due to encroachment. How many more of these mass germinations before the loss of the habitat or fire tries to reclaim it?

Transects and Descriptions Five Gate

<p>Transect #1, Five Gate November 28, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 17.6', Avg. Tree Diameter: 8.85", Trees an acre = 141, Crown Cover % = 45, and stem height = 20'</p>
	<p>This is common woodland fuel loading within the subdivision. It is historic pinyon/juniper woodland savannah. These areas represent areas that have had fire within them approximately 35 - 80 years ago. Fire behavior would be represented by ground fire with sporadic torching events. Notice the FRCC rating of II. Management to reduce ignitability/fire behavior would include removing the younger unhealthy trees and ladder fuels and protecting any ponderosas that may be in the area. Clear ladder fuels at least to the drip line of the ponderosas. These areas are some of the ecologically healthier locations within the subdivision. These sites generally show greater diversity in plant species, healthier disease free trees, and greater activity from local animal species.</p>

Well Road



Photo of area

Risks			Hazards		Values		Overall
Rock Wood/ Bear Valley	FRCC	high	Fuel Loading	moderate	Social, economic & ecological	high	moderate
	Crown Cover	moderate	Home Construction	moderate			
	Structure Density	moderate	Topography	moderate			
Overall Rating for Well						Moderate	

Summary of Risks, Hazards and Values Well Road

Risks

Risks are broken down into FRCC rating, crown cover and structure density. The FRCC rating for most of the Well Road are high or a rating of III. This is due to the lack of fire mainly within the grasslands and ponderosa stands within this part of the subdivision. Ponderosa stands alone suggest a fire regime that has a frequent fire return interval.

The crown cover within the area is highly variable as are the majority of the areas within the subdivision. Once again the cover is more or less dictated by the position on the ridge or hill. This dictates that within valley bottoms there is a low percentage of crown cover (0 – 20%) while on ridge tops there is high percentages (>50%) with the mid slopes being somewhere in the middle. The moderate rating for this risk is due to the number of ridges in the area that could support intense fire behavior, increased crown cover in grassland areas, and the amount of fuel in ponderosa stand at the north end of Well Road.

The structure density rating is also at a moderate level for the area but there is a difference from north to south along Well Road. The southern end near the community well has houses fairly well distributed throughout the area while at the north end residences are nearly nonexistent. The proximity of many of these houses to the large well vegetated grassland where the air strips are located is the main reason for the moderate rating. This is because many homes would be simultaneously threatened if a fast moving fire occurred there. This would overextend the capabilities of local firefighting resources.

Hazards

The hazard ratings for the Well Road are based on fuel loading, home construction material/defendable space and terrain or slope. The rating given to all of these criteria for the area are moderate. Fuel loading from the most part fall into the middle stocking levels while slope is enough that it would have some effect on spread and fire intensity. The use of good fire wise building material and the development of defensible space within this area is an area that will need to be improved to reduce ignitability of many of the homes in this area.

Values

The values within this area are linked to the community well being located here. The *Candy Kitchen Area Water Cooperative Association* is one of the common links that exist between residents from all the local subdivisions. The well also creates a social setting for neighbors to discuss local politics or happenings. The loss of access to the well or loss of the facility could have dramatic effects on subdivision dynamics thus the high rating for the Well Road area. Other important values within the Well Road area include the small fire station and the water tender being located here and the airfields situated on the southern portion of this area.

One ecological value is the large area dominated by Ponderosa Pines at the northern end of the area that is at an important stage or threshold of development.




If left untreated or unmanaged the area will become more susceptible to ignition and therefore damaging fires. Fire that could possibly have negative long term effects to a unique environ within the subdivision. Another ecological value within the area that is affecting a large number of pinyon and juniper trees is the widespread occurrence of mistletoe in the woodlands. This is the first area studied in the area where this


disease is drastically affecting the health of the woodlands. This disease needs to be adequately addressed in any management action or continued decline in area woodlands is inevitable.

Transects and Descriptions Well

Transect #1 Well Rd near Dusty Lane

<p>Transect #2 Well Rd. near Dusty Lane May 6, 2004 FRCC class III</p>	<p>Transect Information: Avg. Spacing of trees: 18.2, Avg. Tree Diameter: 10.4", Trees an acre = 131, Crown Cover % = 58, and stem height = 17.4'</p>
	<p>This photo was taken off of Dusty Lane within the thinning project that the BLM is working on currently. This shows the dominant type of open space in the area or blue gramma grassland. The fact that grassland diversity has been reducing to a single species is a good sign of overgrazing and loss of fire. The moderate level of encroachment is also an indicator of the loss of fire. Grassland area management involves removing a high percentage of trees from these areas. This helps to remove species that are highly competitive for water resources once fire is removed from the system. Eventually as tree growth continues the grasses will be out competed for those water resources and will be lost from the system.</p>

Transect #2 Well Rd. near Nuthatch Lane

<p>Transect #2 Well Rd. north Cecelia October 20, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 15.675', Avg. Tree Diameter: 8.1", Trees an acre = 177, Crown Cover % = 66, and stem height = 20'</p>
	<p>This transect was completed in an area that so far has some unique characteristics when compared to the rest of the subdivision. This is the first area that could be classified as historical ponderosa savannah. It has large gamble oak and saw heavy logging activities in the past both evidence of this statement. It is also probably the healthiest stand of ponderosa current in the subdivision. Reducing ignitability and improving ecological health in this area involves removing unnatural ladder fuels near the ponderosas and large oaks, reducing numbers of ponderosas in thickets of the species, removing encroachment from the meadows and grasslands and reducing numbers of pinyon and juniper to historical numbers. An open park like environ would be the end goal.</p>

Jubilee Trail



Photo of area

Risks			Hazards		Values		Overall
Rock Wood/ Bear Valley	FRCC	moderate	Fuel Loading	moderate	Social, economic & ecological	high	moderate
	Crown Cover	high	Home Construction	moderate			
	Structure Density	moderate	Topography	low			
Overall Rating for Jubilee Trail						Moderate	

Summary of Risks, Hazards and Values Rock Wood/Bear Valley

Risks

Risk criteria are rated on FRCC, crown cover and structure density. The ratings are the average for the area that is analyzed in this case Jubilee Trail. Fire Regime rated as a moderate or an II. Here as in most areas within Candy Kitchen FRCC is a product of the type of ecosystem that is looked at. Pinyon and Juniper woodlands are generally further removed from their natural fire regime than other systems and this is no different in this area. These woodland areas are considered an FRCC Class III. The grassland systems in this part of the subdivision are healthier than many of the other areas within Candy Kitchen. This is based on species numbers, species types and the diversity of species within the area. Grasslands in the southeast part of Jubilee Trails, because of the health and little difference in historic fire regimes it is rated as a low. This makes for an average of moderate for fire regime. Here like parts of Five Gate where grasses are several years removed from heavy or moderate grazing are getting to densities and continuities that will support fire spread. Homes or structure should consider these ground fuels in structure protection and the reduction in ignitability of these homes. Green belts, dirt or rock walkways adjacent to the structure, screening or blocking vents near ground level, and mowing of weed eating grasses near the structure will all help to reduce ignitability. Crown cover in this area is rated as high. This rating is due to not only the continuity of woodland areas but of grassland areas also. This means that wildfires will spread and react differently in areas of good grass cover and will add to the potential of moving to a crown fire within the woodlands. These areas where the grasslands meet the woodlands are where management needs to be done to reduce ignitability of larger vegetation and structures. Actions performed that will reduce ignitability include limbing trees, raking the needles away from all the pines and junipers, removing ladder fuels and thinning trees to reduce crown cover and continuity.

Structure density within Jubilee Trails is rated as a moderate. The main reason for this rating is the cluster of homes and historic structures near the wolf ranch. This area alone would require several resources for adequate protection.

Hazards

Hazard criteria rated includes the fuel loading/trees an acre of the area, the construction materials used and defensible space, in general, for the structures in the area and the last hazard criteria which is topography or slope in the area. The fuel loading in the area is rated as moderate to low. This rating opposes the statement that grasses are denser here than in most areas suggesting greater loadings or species numbers per area of ground. The reality is that the fire regime and the more recent fires that have occurred there have reduced the fuel loadings not allowing them to remain or increase as would be the case in a fire deprived area. These more recent fires also entered some areas within the woodlands and reduced loadings there as well.

Home construction material usage and defensible space creation received a moderate for the area as well. This rating as other ratings within the subdivision is directly related to the amount of activity that occurs around the dwelling or structure. The activity around these structures has the byproduct of creating grass or fine fuel free zones and reducing tree numbers to accommodate for the movement of vehicles and people around them. This fact alone or human activity helps to reduce ignitability of the structures. Therefore, as many of the areas within Candy Kitchen the moderate rating is due to the equal distribution of homes that are lived in and those that are not.

The last hazard rated is that of topography or slope. As in most areas there is little slope beyond the skinny ridge tops and rocky bluffs that exist throughout Candy Kitchen. Here more than most areas the topography is gentle to rolling and thus receives a rating of low.

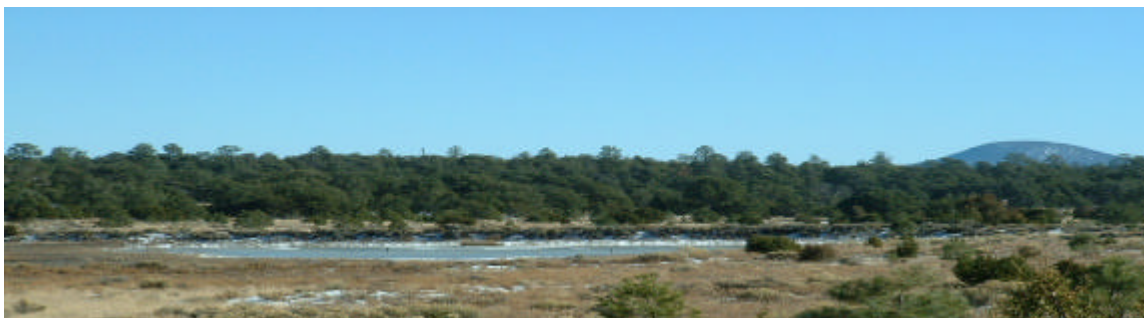
Values

The values within Jubilee Trail are rated in terms of the economic, social or ecological importance to the subdivision. Within Jubilee trail there are some of the most significant of these values. These values are focused around the Wild Spirit Wolf Sanctuary.



The sanctuary is one of the few places in the area that employs several people to meet the management needs associated with the sanctuary. It also has several historic structures associated with the property and its history. In some ways the Wolf Sanctuary is equal to the name Candy Kitchen in reference to the area. This sanctuary and its parts provide much of the reasoning for the high rating. To add to the rating was the ecological fact that soils in the area associated with ponderosa have the highest

rates of erosion associated with them. The picture to the right shows one of the deepest cuts witnessed in the Candy Kitchen area. These soils are generally at the higher elevations of the area or in the upper 1/3rd of draws and canyons. The southeast corner of the area appeared to be one of the wettest in terms of the earthen dams and species diversity. The photo below shows one of the largest and best designed of the dams in the area.



God's acre



Photo of area

Risks			Hazards		Values		Overall
Rock Wood/ Bear Valley	FRCC	moderate	Fuel Loading	moderate	Social, economic & ecological	low	moderate
	Crown Cover	moderate	Home Construction	low			
	Structure Density	moderate	Topography	moderate			
Overall Rating for God's Acre						Moderate	

Summary of Risks, Hazards and Values God's acre

Risks

The criteria rated for the risks related to this area of Candy Kitchen include FRCC, crown cover and structure density. All these criteria were rated within the moderate risk class. This part of Candy Kitchen has many similarities with the Jubilee Trails area in relationship to its vegetative condition and its ability to support a wildfire. Each of these subdivisions has the presence of a historic Southwestern mixed pine savannah to the south and east. These savannah areas are the least removed from historic fire regimes or FRCC than much of the subdivision. This creates a double edge sword. One blade speaks of the most frequent fires occurring here and of the current fuel situation being the most favorable for wildfires starts. The other blade speaks of the balance fire creates in a mixed fuel environment of grass and trees. Here the FRCC is rated as II because although the area has missed cycles of fires the ability to support a moderately intense fire exists now. The exception to these areas is the pinyon/juniper woodlands that exist in the lower elevation ridge tops to the north within the remaining part of the entire Candy Kitchen area. These ridge tops have high fuel loadings and will no longer support a fire of low or moderate intensity. These sites will only burn under extreme conditions and will burn at intense levels because of the infrequency of the fires occurring here. These pinyon juniper ridge tops are rated as FRCC III. The size of the savannah area moderates the fuel loading in God's acre and it received a moderate rating because of this.

The last of the risk criteria rated for this area was structure density. Within God's acre the relative spacing of the homes and the shear numbers is reason for giving the rating of moderate. In relationship to the rest of the Candy Kitchen area this area supports the greatest number of inhabited homes and does offer greater risk than most areas because of this.

Hazards

Hazard criteria rated for this area received a moderate for all rated criteria. Trees per acre were similar to many areas within Candy Kitchen. These tree numbers are generally dictated by elevation with higher tree numbers on ride tops while grasslands have few. It can be stated through transect information that tree numbers are still elevated throughout all elevations. These tree numbers will add to fire behavior at all elevations as well.

Home construction materials and creation and management of defensible were all well used and established throughout the area. God's acre is therefore given a low rating for the hazard criteria. As stated earlier in the plan, the quality of the defensible space is related to the amount of human activity surrounding the homes. This would suggest more full time residents and greater issues to confront fire managers if an intense wildfire were to occur. A compliment is due to most residents in the area on the management of the space around their homes.

The last criteria rated concerning the hazards in the God's acre area is slope. The rating for this area was moderate, while all other areas were given a low. This does make this


area unique from the rest of the Candy Kitchen area in the sense that fire behavior throughout the majority of God's acre will be affected by the slope of the area.

Values


Values looked at in the rating of this area include economic, social and ecological values. The rating for these criteria within God's acre was given a low. This takes into consideration mainly the low FRCC class rating for the majority of the area and the active management of defensible space around the areas structures. Of concern is the erosive nature of the soils in the area, but because of the relative health of the savannah types and grasslands it would take the most damaging of fires to make the post fire environment a damaging one.

Transects and Descriptions God's Acre

Transect #1, God's acre, High Horse Loop

<p>Transect #1 God's Acre December 8, 2005 FRCC class III</p>	<p>Transect Information: Avg. Spacing of trees: 9.55, Avg. Tree Diameter: 7.33", Trees an acre = 478, Crown Cover % = 174, and stem height = 13.1'</p>
	<p>This picture shows the typical ridge top area that exists within the area defined as Candy Kitchen. Fuel Loadings are nearly always the highest in these areas, all tree species tend to have high infection rates from mistletoe, pinyon have higher rates of infestation from the "Ips" beetle, all species tend to be dwarfed and experiencing slower rates of growth and both fine fuels (grass and forbes) and brush species have been out competed by pinyon and juniper and nearly eliminated from the sites. The dormant seed beds and fire scars tell of a recent past that suggests a much different vegetative state and fire environment. This fact alone explains the reason for the FRCC rating of high or III. The low intensity fires that once burned here are no longer occurring and have not helped to shape the site for 100 or more years.</p>

Transect #2, God's acre, Garfield area

<p>Transect #2 God's Acre December 8, 2005 FRCC class II</p>	<p>Transect Information: Avg. Spacing of trees: 21.15, Avg. Tree Diameter: 11.2", Trees an acre =97, Crown Cover % = 33, and stem height = 22.9'</p>
	<p>The pine areas within the subdivision have many of the same characteristics that others have. These include having the most recent fire scars, individuals of a species having larger size, fuller branchlets, and healthier diagnosis, grasses and forbes showing greater diversity and continuity and greater activity with all sizes of wildlife. These are the sites within the subdivision that offer the best fuel situations for larger fire growth. These fuel and vegetative conditions also exist on the southern portions of the subdivision. This asks the question, "Will these Ponderosa habitats provide the necessary wick to ignite the Pinyon/Juniper woodlands?"</p>

6. Current Management Actions and Future Proposals of the BLM in the Candy Kitchen Area

All of the BLM lands within the subdivision and adjacent to the subdivision fall into one of the systems discussed within this document. The majority of these lands tend to fall into the discussion of pinyon/juniper woodlands and will be managed accordingly.

Currently the BLM has 6 ongoing projects within the Candy Kitchen area. These projects are in some phase of the management process, but none have been considered complete. The closest to completion is the first of the projects which is surrounding Ojo Pueblo. The last phase here will be to remove the remaining fuel wood through a public wood sale next wood season in 2006.

Upcoming projects will be located on the southern boundary of the subdivision below God's acre and another between Bear Valley road and Great White Father. These projects will involve comprehensive pinyon/juniper woodland management. This involves thinning, piling, burning and fuel wood removal. Fuel wood will be made available to local residents through the second of these.

Future projects are also being planned for the remaining BLM lands within the Community Wildfire Protection Plan and the Hazardous Fuel Reduction Plan prepared by the BLM. The majority of these project proposals will exist to the southwest of the subdivision where many of the BLM lands are located.

7. Strategic Plan/Desired Condition (Tactical Plan)

The short and long term plans for treatments on BLM lands in the Candy Kitchen Area are stated in the last section, but to achieve the desired ecological, fire wise and reduced hazard conditions for the subdivision several on-going activities need to take place. These include continuing education of the residents, providing opportunities that help to support the VFD, improving and protecting the infrastructure of the community, increasing the number of homes with defensible space and continued coordination between the BLM and the entities that make up the Candy Kitchen Area.

Education and Community Outreach

Education and community outreach is an action item that needs to be explored more to examine the feasibility of holding events within and for the area. One item that could be improved is the ability of the residents to communicate more effectively with one another and with outside entities. One action that would improve this is the construction of simple information boards at each of the mailbox clusters.

Another item that would need to be accomplished is the development of an evacuation plan.

Support of the Local VFD

Support of the local VFD can be accomplished in many ways over the coming years. These include yearly training exercises that should be coordinated with the VFD and done prior to fire season each year, another would be to ensure that the BLM maintains good coordination and communication with the VFD Fire Chief, providing information necessary to access federal funding and also incorporating the VFD resources in local prescribed fires and wildfires.

Infrastructure Management and Improvements

Candy Kitchen has several action items that if addressed would improve the safety of residents as well as improving firefighters ability to handle an active large fire. Of these items several have to do with the road system of the subdivision, some with fuels management and others to do with other infrastructure improvements.

Road infrastructure could be improved in several ways. One is maintaining the connecting roads between subdivision areas to help in giving resident more than one evacuation route. Specific connections that could be better maintained include roadways between Homestead and Jubilee Trail and between Great White Father and Five Gate. Another way to improve evacuation and firefighting effectiveness would be to standardize road signs and ensure that at least the main roads are signed effectively. Another roadway improvement could be accomplished by removing the majority of trees from the right of ways throughout the subdivision. This would improve the road system by allowing the roads to dry quicker after rain and snow fall (this would lesson maintenance costs as well). During fire suppression or management activities these limited vegetation corridors would also provide fuel breaks throughout the subdivision.

Water is always of concern in the desert southwest and this is no exception here. Surface water is inconsistent and ground water access limited and the nearest high flow hydrants are located a considerable distance away from the community. Improvement of this situation could be accomplished by adding another community well located at the northern end of the subdivision through the water CO-OP and improving earthen tanks by fixing broken dams and dredging the silted in bottoms.

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?Glossary of Terms

Catastrophic Wildfire (severe wildland fire): Fire that burns more intensely than the natural or historical range of variability, thereby fundamentally changing the ecosystem, destroying communities and/or rare or threatened species habitat, or causing unacceptable erosion.

Colorado Plateau: a large plateau south and west of the Rocky Mountains; abuts mountains on the north and east and ends in an escarpment overlooking lowlands to the south and west; the Grand Canyon of the Colorado River is carved out of the southwestern corner.

Clearcut Logging: The removal of all the desired tree species from an area.

Canopy: The stratum containing the crowns of the tallest vegetation present, living or dead, usually above 20'.

Crown Cover: The ground area covered by the crowns of trees or woody vegetation as delimited by the vertical projection of crown perimeters and commonly expressed as a percent of total ground area (syn. Canopy Cover). When over 100% the trees crown cover represents trees that are interlocked together, when less than 100% there is space between the trees.

Crown Fire: A crown fire is a forest fire that advances with great speed jumping from crown to crown ahead of the ground fire.

Defensible Space: An area of modified vegetation between wildland fuels and homes that allows firefighters to protect the home or, in absence of firefighters, allows the home to better survive on its own.

Ecological Relationship: The interrelatedness between living and non-living entities that exist together, either harmoniously or in conflict, when operating under natural circumstances.

Ecosystem: An interacting system of organisms considered together with their environment.

Edge Effect: An edge effect occurs where two communities, such as land and sea, overlap, that zone becoming more diversified than each of them.

Even Aged Tree Stands: A stand of trees containing a single age class in which the range of tree ages is usually less than 20 percent of rotation.

Fire Brands: Embers produced from fire activity.

Fire Management: Activities required for the protection of burnable wildland values from fire and the use of prescribed fire to meet land management objectives.

Forbs: An herbaceous plant other than grass.

FRCC: is an interagency, standardized tool for determining the degree of departure from reference condition vegetation, fuels and disturbance regimes. Assessing FRCC can help guide management objectives and set priorities for treatments.

FRCC class I: Fire regimes in this condition class are generally within historical ranges.

FRCC class II: Fire regimes on these lands have been moderately altered from their historical range by either increased or decreased fire frequency.

FRCC class III: Fire regimes on these lands have been significantly altered from their historical return interval.

Fuel Loading: The amount of burnable material present on a site or within an area. This includes minerals, gasses, grasses and trees (live and dead), and human made objects.

Gabions: A hollow metal basket filled with earth and stones built to fortify a structure.

Group Torching: When several trees in close proximity catch on fire in a short amount of time.

Herbaceous: Refers to a plant that has a non-woody stem and which dies back at the end of the growing season.

High Grading: In relationship to Albuquerque, BLM woodland and forest management, it is the selective cutting of all species of trees leaving the healthiest, highest vigor and unique trees of that species within a thinning project.

Ladder Fuels: fuels that provide vertical continuity between the surface fuels and crown fuels in a forest stand, thus contributing to the ease of torching and crowning.

Seral Stages: Successional (or seral) stages often are described in terms of “early,” “mid,” or “late” to reflect the species and/or condition of plant communities generally characteristic at different times during succession. Early seral communities, which occur early in the successional path, generally have less complex structural development than later successional communities. Late seral communities generally have mature, larger individuals.

Sheet Erosion: Initial surface erosion by water running off as sheets, as distinct from channelized erosion in rills and gullies.

Species Composition: The relative abundance of one plant species to another using a common measurement; the proportion (percentage) in relation to the total of a given area.

Spur Road: A road that turns off the main travel routes within the subdivision, usually ending in a dead end.

Transects: A transect is a narrow strip along which information is gathered by researchers. Information is collected about organisms that exist within a specific community and is used to determine species' populations and variability.

Wildland Fuel: All the dead and living material that will burn. This includes grasses, dead branches and pine needles on the ground, as well as standing live and dead trees. Also included are minerals near the surface, such as coal, that will burn during a fire and human built structures.