

# San Juan Ranch Estates Subdivision

## Community Wildfire Protection Plan



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## I. Definition of SJRE Subdivision's Wildland Urban Interface

The Wildland Urban Interface is defined as an area where human development and structures are built in close proximity to naturally flammable vegetation. The San Juan Ranch Estates (SJRE) subdivision is a classic example of this situation. SJRE is located in the central Rocky Mountains. Many of the forested stands both within and outside of the subdivision are dense and over crowded. This creates a situation where if a wildfire emergency were to occur, the potential for loss of property and life would be high. This document represents a collaborative effort between subdivision residents and forest managers and attempts to identify and mitigate the risks associated with wildfire.

For over fifteen years SJRE has been working with the Colorado State Forest Service on forest management techniques that reduce the risk of wildfire. In 2000 the subdivision took a proactive step by having a forest management plan written. This plan divided the property into management units, prioritized forest management treatments and developed prescriptions for different forest types (see map on pg 31).

The SJRE subdivision is at about 8,000 feet in elevation and covers about 160 acres. Currently there are 47 structures within the subdivision with lot sizes ranging from .5 to 5 acres. The subdivision sits on a steep hillside overlooking the Lake Fork of the Gunnison River. Vegetation types surrounding SJRE subdivision are diverse and include dense conifer stands, aspen, high desert grass/shrub communities and riparian areas. The majority of the timber is found on the North and South sides of the subdivision. The central part of the subdivision is essentially grass and sage. The timber is a mixture of Ponderosa pine, Douglas fir and Aspen. Slopes of 30% or greater are common. Forest types at lower elevations along the river bottom include ponderosa pine, blue spruce, cottonwood and willow. Vegetative types transition to a mix of ponderosa pine/ Douglas fir and sage as elevation increases. Many of the conifer stands become dense at higher elevations and sagebrush becomes less and less prevalent.

Due to the continuous dense fuels, steep slopes, and close proximity to structures, this area has a high to extreme destructive wildfire potential. Initial efforts should be focused on the timbered areas in management units 6, 7, and 8. They have the most potential for life and property loss due to wildfire.

For this exercise, a Wildland Urban Interface boundary was created that extends well beyond the SJRE subdivision (see map on pg 5). This buffer zone was designed to capture lands that pose the greatest threat to the subdivision in the event of a wildfire. This WUI boundary encompasses 655 acres and captures both public and private land.

A. Location:

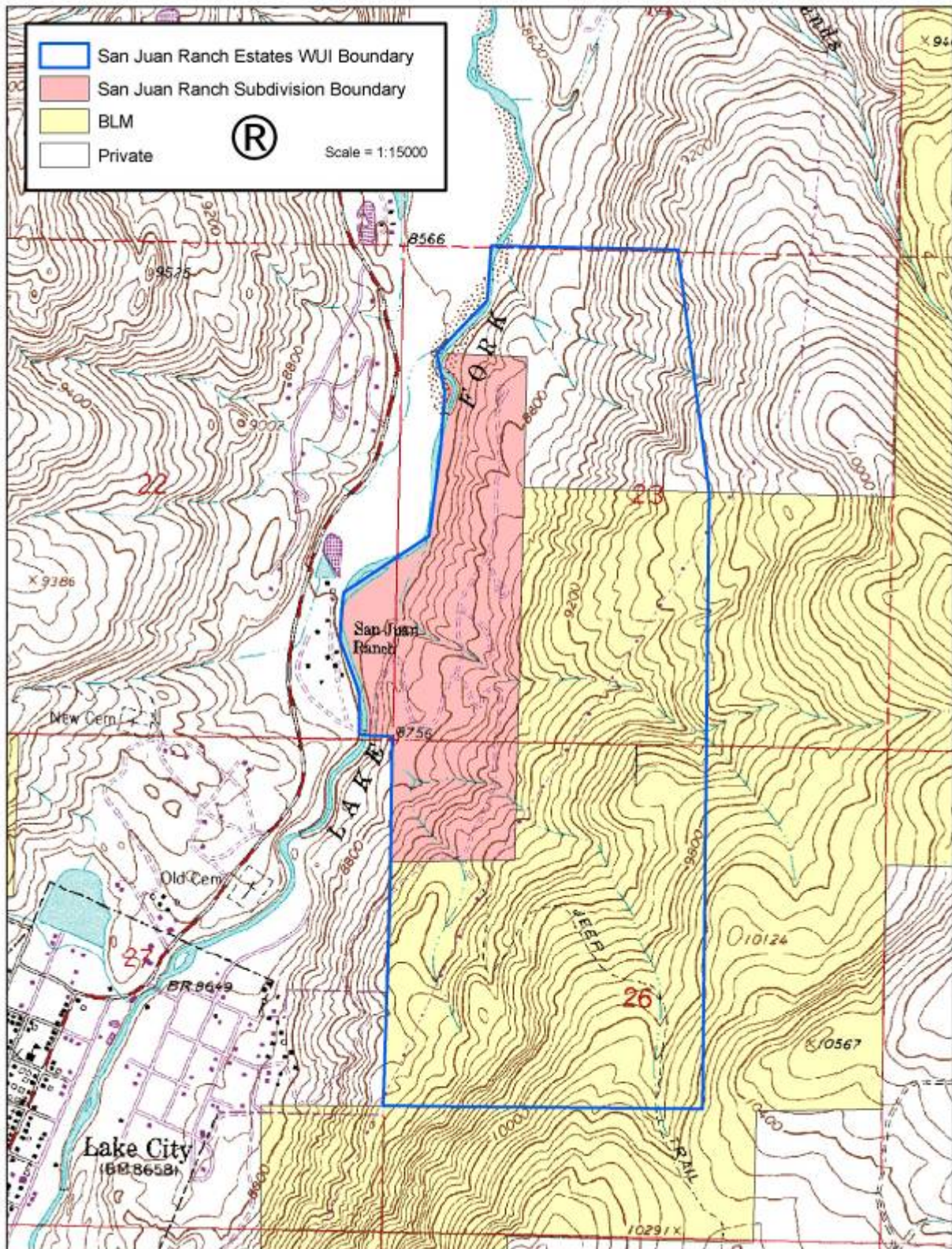
1. County: Hinsdale, Colorado
2. Geographic Area: 3/4 mile north of Lake City on HWY 149
3. Legal Description: R. 4W, T. 44N, Sections 22, 23, 26 New Mexico Prime Meridian.
4. USGS Map Quadrangles: Lake City
5. VOR:                      RAD:                      Distance: =

B. Ingress/Egress

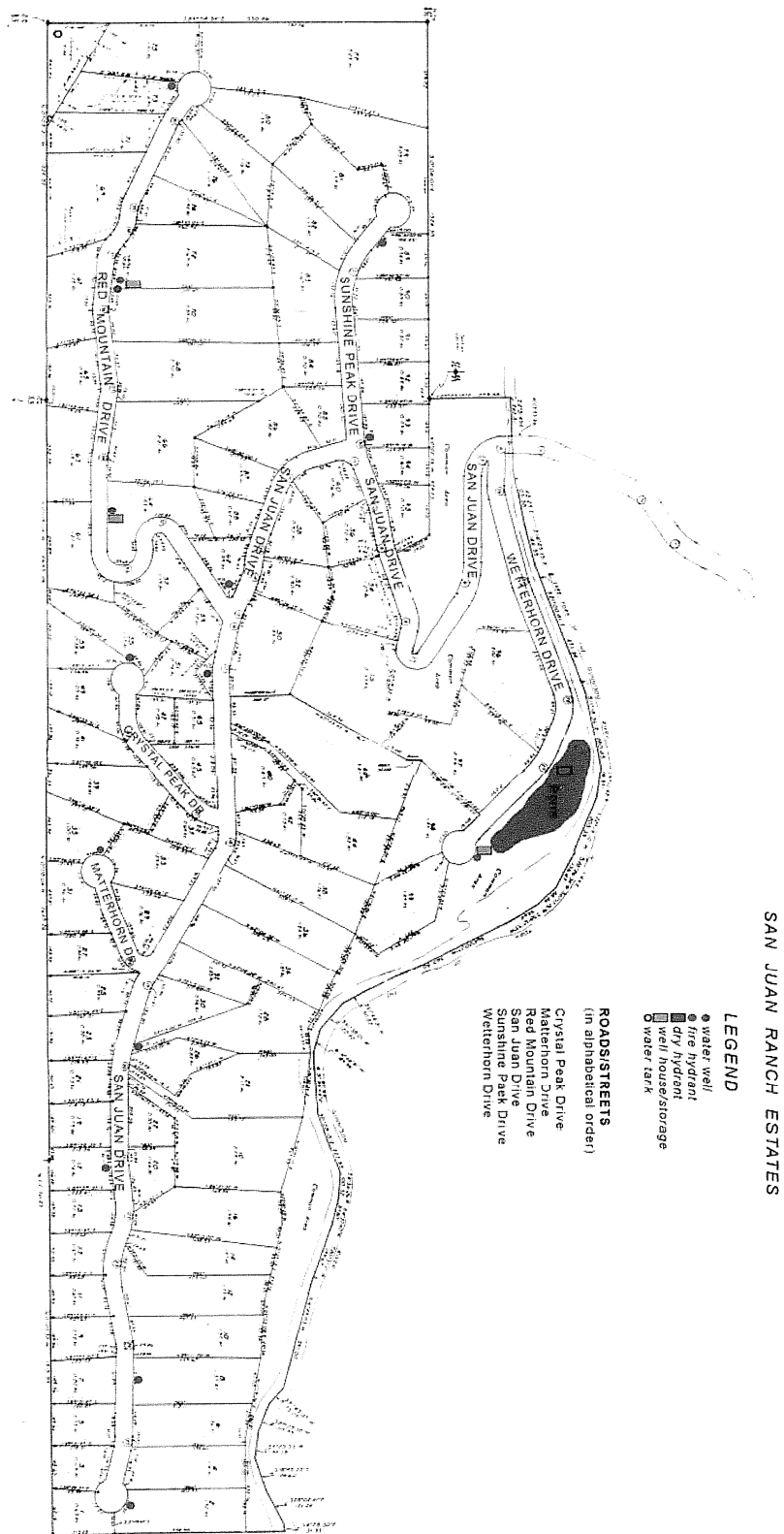
1. Routes: Hwy 149
  - a. All weather access - Colorado Highway 149
2. Directions: 1 miles north of Lake City on Hwy 149



### C. SJRE Subdivision Wildland Urban Interface



## D. SJRE Subdivision Road Map



## II. Structure/Lot Wildfire Hazard Evaluation/Fire Behavior

### A. Structure/Lot Wildfire Hazard Evaluation

1. Subdivision - The subdivision has been rated utilizing the CSFS "Wildfire Hazard Rating Form".

The results are:

Description High ( *Moderate, High, Extreme*)

Results are:

2. Structures - All structures have been rated utilizing the CSFS "Wildland Home Fire Risk Evaluation System". A description is found in Appendix 5.

Results are:

Number of Structures			
Rating	High	Moderate	Low
# lots	9	22	16

### B. Expected Fire Behavior (head fire only):

#### Aspen Stands

Fires are low to moderate in intensity except when they consume pockets of dry grass, sage -brush or conifer. Typically fires are of short duration. Rate of spread is moderate to high but fairly easy to stop.

#### Conifer Stands

Crowning out, spotting, and torching of individual trees are more frequent in this fuel situation, leading to potential fire control difficulties. Fire is of high intensity and can be of short or long duration, Rate of Spread is moderate to fast.

#### Sage and Grass

These fuels respond quickly to changes in weather. They will dry or absorb moisture rapidly. Increases in wind speed or slope will cause fire to increase in flame height and intensity. Fire behavior can range from low when burning conditions are marginal to extreme during hot, dry weather.

1. Specific - Determined utilizing BEHAVE (The Fire Behavior Prediction System) and NFFL fuel models.
  - a. Input data. 30 percent slope was used to show the fire behavior that could be expected on the more steep slopes in the Subdivision. The



Extreme rated lots at the south end of the subdivision (see Appendix 6) are located on steep slopes of 20 percent. Extreme rated lots on the East side of the subdivision are located above slopes exceeding 50 percent.

	Average Day	Red Flag Day
Date	7-31	7-31
Time (hrs)	1500	1500
Temperature (F)	65	75
Min. Relative Humidity (%)	18	10
Average Wind Speed (MPH)	6	15
Live Fuel Moisture (%)	150	100
1 Hr. Fuel Moisture (%)	5	2
10 Hr. Fuel Moisture (%)	8	5
100 Hr. Fuel Moisture (%)	14	10
Average slope (%)	30	30
Fuel Model	9	9

b. Outputs

1) Average Day

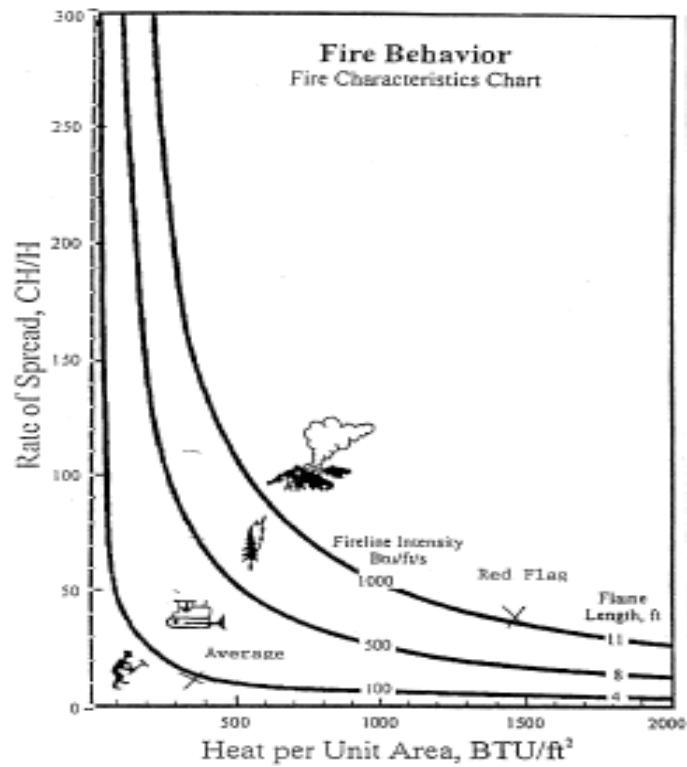
	AVERAGE DAY	
Rate of spread (chains/hr)	14	
Fireline intensity (Btu/ft/s)	100	
Average flame length (ft)	3.8	
	Response Time	
	.3 HOUR	1 HOUR
Area (acres)	.6	6.5
Perimeter (ft)	660	2310
Estimated spotting distance (mi)	.2	

2) Red Flag Day

	RED FLAG DAY	
Rate of spread (chains/hr)	84	
Fireline intensity (Btu/ft/s)	746	
Average flame length (ft)	9.4	
	Response Time	
	.3 HOUR	1 HOUR
Area (acres)	10	117
Perimeter (ft)	3498	11748
Estimated spotting distance (mi)	.4	

## 2. Fire Characteristics Chart (Projected)

This chart shows the BTU per square foot at increasing rates of spread. Rates of spread are graphed in chains per hour. One chain equals 66 feet. The Average Day and Red Flag Day Fire Behavior are plotted on the chart.



### III. Community Values to be Protected (Road Map – pg # 6)

This section addresses the essential community values that can be destroyed due to a wildfire. The highest priority for protection is human life. The community preparedness section (CPS) on pg 15 has a wealth of information to help residents become safer both before and during a wildfire emergency. Part 2 of the CPS on pg 19 has a response plan. The response plan, under section E on pg 20, designates locations of command post, staging areas, safety zones and helispots. These locations are also mapped on the logistics map in appendix 3 on pg 47. Under section 6 a. of the CPS response plan on pg 21 is the evacuation procedure. Section 6 b. on pg 21 has the specific evacuation travel routes. Please refer to the road map on pg 6.

The highest value is the residential structures. The first step in protecting structures is to refer to the Defensible Space section of the CWPP on pg 12. This topic is further illustrated in appendix 2 on pgs 45-46. Subtitle a. of section A of part 1 under the CPS (pg 16) covers actions homeowners should take prior to a wildfire emergency. These steps will help ensure the protection of their structures.

The second values of concern are the two association owned buildings. They are both well houses and are located on Red Mountain Drive. The well houses are both located in high to extreme wildfire areas. The structures are identified with a color coded dot on the logistics map. These structures can be protected with a defensible space. Please refer to the defensible space section on pg 12 and appendix 2 on pgs 45-46.

Defensible Space Prescription---

Zone 1: 15 feet measured out from the eaves should be void of any flammable vegetation

Zone 2: Keep vegetation mowed to 6 inches or less 70 feet out from structure

The third highest value is the pavilion/storage shed. It is located in moderate wildfire danger area. The vegetation in the area is (grass, willow, and cottonwood). This structure is indicated on the logistics map by a orange dot. This structure can be protected with a defensible space. Please refer to the defensible space section on pg 12 and appendix 2 on pgs 45-46.

Defensible Space Prescription---Clubhouse

Zone 1: 15 feet measured out from the eaves should be void of any flammable vegetation

Zone 2: Keep vegetation mowed to 6 inches or less 70 feet out from structure

#### IV. Reducing Structural Ignitability

A wildfire is capricious and will always find the weakest link in your defense. The goal of this section is to help residents make decisions in building materials and home maintenance, making their structures more fire resistant.

##### A. House Site Location

The first step in structure protection, for someone building a new home, is choosing a building site. When determining where a structure will be built, the developer and owner should consider how the native vegetation and topography variations affect wildfire behavior.

##### B. Roof

The second building standard that should be considered is the roofing material. One of a structures most vulnerable area is the roof, which is due to the amount of surface area. The roof can be continually inundated with flying firebrands.

##### C. Siding/Walls

The third consideration to look at while building or remodeling is the siding and walls. Use construction materials that are fire resistant or non-combustible whenever possible. Use a minimum of a class 3 flame spreading siding material. The best materials are brick or stucco type products. The walls should be constructed of fire resistive materials from the ground to the roof overhang.

##### D. Foundation

The fourth consideration is the foundation. The area is often the first area to come in contact with a spreading wildfire. Construct a closed foundation with concrete block, cement wall, or use other fire resistive materials.

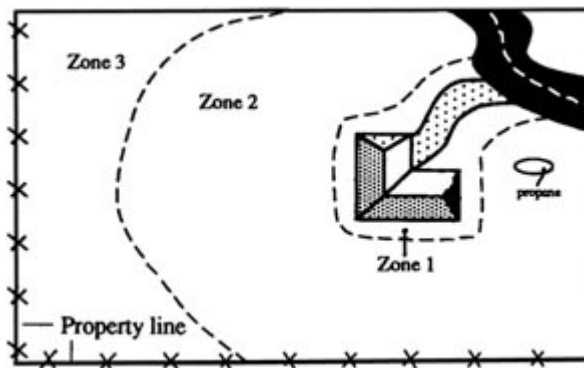
##### E. Windows

The fifth consideration is the window area and is often overlooked as a hazard. Radiant heat can pass through them and set fire to curtains or furniture. Minimize the size and number of windows on the side of the house that is likely to be exposed to wildfire. Consider size and materials for windows, choose double pane glass for reducing the amount of radiant heat; plastic skylights can melt rapidly.

## V. Defensible Space

Two factors have emerged as the primary determinates of a structure's ability to survive wildfire. These are the structure's roofing material and the quality of the defensible space surrounding it. Defensible space is an area around a structure where fuels have been mitigated to slow the spread of a wildfire. It also reduces the chances of a structure fire becoming a wildfire. Creating a defensible space involves developing a series of management zones in which different treatment methods are used depending upon the fuel type present. An example is found in the diagram below.

### A. Defensible Space Zones



Zone 1: This area receives the most modification and treatment. It consists of an area 15 feet around structure in which flammable vegetation is removed. These 15 feet are measured from the outside edge of the home's eaves.

Zone 2: This area receives a fuel reduction treatment. The size of the area is determined by the average slope of the property. Within this zone continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. In the event of a crown fire reaching this zone, fuel will be broken up in such a way that the fire returns to the ground.

Zone 3: This area receives a traditional forest management treatment. The area starts from the end of zone 2 and ends at the landowner's property boundary. Please refer to the Vegetation Management section (PG 25) for prescriptions. Determine what unit your lot is located in by referring to the Management Unit Map on page 31. Then determine what species types are present on your property. Refer to the species section (a) of the Forest Overview Section (VIII)(PG32) for descriptions of the woody type species found in the subdivision. Next follow the management recommendations found in the management unit section.(PG28)Landowners are encouraged to contact the Colorado State Forest Service (970-641-6852) for assistance in managing this zone.

## B. Steps to Determine Recommended Size of Defensible Space

The size of your defensible space is determined by the average slope of your property. A proper defensible space size can be determined using the three step process below.

### 1. 3 steps

Step 1. Determine average % slope of property ([appendix 2, pg 44](#))

Step 2. Determine size of zone 2 using provided graph in [sec. 2, pg 13](#)

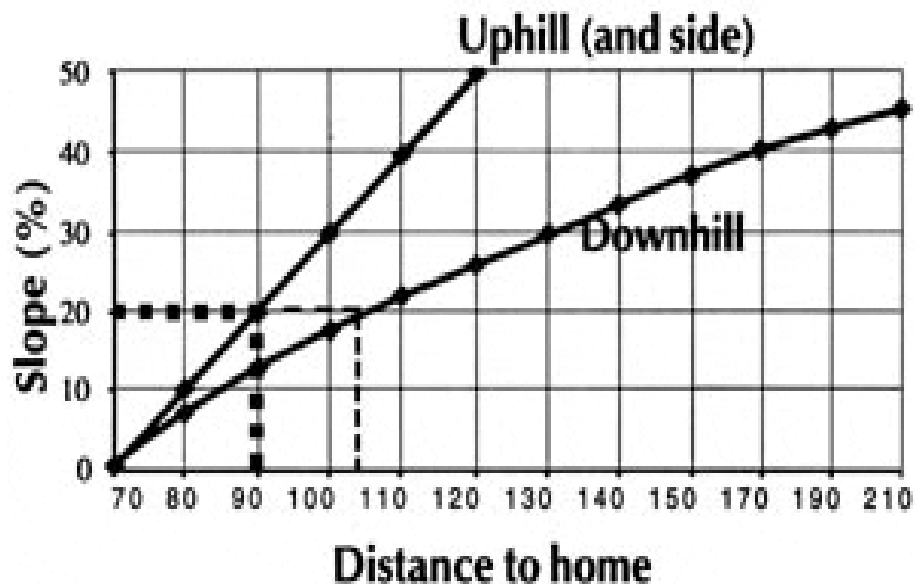
Step 3. Determine fuel type and appropriate mitigation recommendation in [sec. 3, pg 13](#)

Remember: Zone 1 is always 15 feet wide measured from the outside eaves and zone 3 extends from the end of zone 2 to the property boundary.

### 2. Zone 2 graph

This graph illustrates the recommended size of zone 2.

Directions: Find the property's average slope on left side of graph. Then follow that line over until it intersects with either the uphill or downhill line. Follow the point of intersection down to the bottom series of numbers. This number is the measurement from the eaves of the structure to the far edge of zone 2.





### 3. Fuel Types and Mitigation Recommendations for Defensible Space

#### a. Aspen with Vegetative Understory

- 1) Zone 1: Remove all **flammable** vegetation 15 feet out from the eaves.
- 2) Zone 2: The vegetation in the understory should be mowed to a minimum height of 4 inches. This should be maintained throughout the year with periodic mowing.
- 3) Zone 3: This area receives a traditional forest management treatment. The area starts from the end of zone 2 and ends at the landowner's property boundary. Please refer to the Vegetation Management section (PG 25) for prescriptions. Determine what unit your lot is located in by referring to the Management Unit Map on page 31. Then determine what species types are present on your property. Refer to the species section (a) of the Forest Overview section (VIII)(PG32) for descriptions of the woody type species found in the subdivision. Next follow the management recommendations found in the management unit section.(PG28)

#### b. Mixed Conifer (fir, spruce, pine)

- 1) Zone 1: Remove all **flammable** vegetation 15 feet out from the eaves.
- 2) Zone 2: The mixed conifer fuel type has a higher wildfire danger than Aspen due to its volatile needles. It requires significant fuel modification in order to reduce the wildfire danger. The goal for this fuel type in this zone is to break up the fuel continuity, thus reducing the chances of a crown fire. Trees should be thinned to diameter + 8 foot spacing between stems. All residual trees should be pruned up 10 feet from ground level. Remove or evenly distribute all slash.

If trees are naturally in groups an effort should be made to promote this natural un-continuity. Form islands of trees with bigger spacing between than if they were single trees.

- 3) Zone 3: This area receives a traditional forest management treatment. The area starts from the end of zone 2 and ends at the landowner's property boundary. Please refer to the Vegetation Management section (PG 25) for prescriptions. Determine what unit your lot is located in by referring to the Management Unit Map on page 31. Then determine what species types are present on your property. Refer to the species section (a) of the Forest Overview section (VIII)(PG32) for descriptions of the woody type species found in the subdivision. Next follow the management recommendations found in the management unit section.(PG25)

c. Sage/Grass

- 1) Zone 1: Remove all **flammable** vegetation 15 feet out from the eaves.
- 2) Zone 2: This fuel is considered “flashy” due to its rapid response to changes in weather. It dries and absorbs moisture swiftly. The sage in zone 2 should be mowed to a height of 6-8 inches. Follow d-space size guidelines for conifer type fuels.
- 3) Zone 3: Break up the continuity of the fuel by creating large islands of sage with treated vegetation strips in between

These are just general guidelines. Landowners are encouraged to contact their local Colorado State Forest Service office (970)641-6852 for guidance with a handout called “Creating Wildfire Defensible Zones” (603.2) The Colorado State Forest Service can also assist landowners in finding a contractor that does fuels mitigation work.

C. Other Areas of Consideration

1. To prevent sparks from entering your home through vents; cover attics, soffit and floor vents with wire mesh no larger than 1/8 of an inch.
2. Prevent combustible materials and debris from accumulating beneath patio deck or elevated porches: screen under or box in areas below ground level.
3. Landscape with fire resistive plants
4. Incorporate walkways and retaining walls as man made fuel breaks
5. Clean gutters, eaves and roofs regularly.
6. Stack firewood and place propane tank at least 30 feet from structure and on uphill side on the contour of the structure.

VI. Community Preparedness

This section of the CWPP addresses what the subdivision residents and emergency response crews can do before and during a wildfire emergency situation. It will be broken up into two sections, **before** and **during**. The “**before**” section will explain what residents, HOA, local fire and sheriffs

departments can do to lessen the danger of a wildfire emergency. The “**during**” section addresses what these same people can do in the event of a wildfire emergency. A response plan is found in this section that lays out the predetermined logistical planning.

#### A. Before a Wildfire Emergency

Wildfire awareness has been increasing over the years in SJRE subdivision. SJRE has also added a dry hydrant to the Subdivision pond. The hydrant allows fire fighters to easily draft out of the lake. The HOA has hosted several fire wise meetings in the gazebo. It also facilitates the distribution of fire wise pamphlets with in the subdivision. These types of collaborative efforts and the ones listed below are essential to a wildfire safe community.

The items below are things individual landowners, the entire HOA, the volunteer fire department, and the sheriff’s office can do to help prevent and prepare for wildfire situations. People involved should use this section as a check off list for their own residences and agencies.

##### 1. Individual Homeowner Actions

- a. **Create** a defensible space around your home and other outbuildings. Dimensions vary depending upon the degree of slope of your property. Defensible space means providing room for firefighters to protect a building (See defensible space sec. pg 12.)
- b. **Remove** trash and other combustible material (ie. hay, lawn furniture, etc,) from the defensible space.
- c. **Mow** grass and weeds to less than 4 inches in height within 10 feet of structures, propane tanks, and utility service boxes.
- d. **Stack** firewood a minimum of 30 feet uphill from structure or on an even contour with structure.
- e. **Remove** trees growing through roof or porch.
- f. **Use** non-combustible roofing material.
- g. **Clean** roof and rain gutters of all debris.
- h. **Remove** any branches within 15 feet of the chimney.
- i. **Utilize** a spark arrester on the chimney.
- j. **Place** screens on foundation and vent eaves.

- k. **Post** name/address signs which are clearly visible from the road.
- l. **Widen** driveway and provide a turn-around space for emergency vehicles.
- m. **Develop** outdoor water supply.
- n. **Practice** a family fire drill and evacuation plan.
- o. **Make** a list of items to take should evacuation be required.

## 2. Subdivision/Homeowner Actions

- a. In conjunction with the Hinsdale Sheriff Department **place** and maintain Fire Danger Sign(s) at all Subdivision entrances.
- b. **Develop** and maintain Defensible Space around the following:
  - 1) All community-held facilities
  - 2) Propane and gasoline tanks
  - 3) Electrical Transformer boxes
  - 4) Telephone Service boxes
  - 5) All utility poles
- c. **Encourage** homeowners to develop Defensible Space around individual homes.
- d. **Maintain** a well thinned forest on all Open Space lands.
- e. **Sign** all roads. (Letters should be reflective and a minimum of four inches high.)
- f. **Encourage** homeowners to sign their driveway with their name/address.
- g. **Widen** roads and improve height clearance to facilitate easy access of emergency vehicles.
- h. **Maintain** dry-hydrant in main lake.
- i. **Notify** all new residents of wildfire hazard and supply each with appropriate hazard mitigation material available through the Gunnison Basin Wildfire Council.

## 3. Fire Department Actions

- a. **Obtain** enough copies of the Wildfire Hazard Evaluation Map to place one in each piece of equipment and in each station.

- b. **Conduct** "familiarization" drills within the subdivision once per year.
- c. **Ensure** that wildland fire tools are maintained on each piece of equipment.
- d. **Develop** and maintain a 10-person wildland fire cache, in addition to the tools on each piece of equipment.
- e. **Formalize** agreements for water use with the appropriate owner.
- f. **Ensure** on a regular basis that each firefighter has wildland Personal Protective Equipment and has received proper and appropriate training.
- g. **Familiarize** yourself with the County Wildfire Annual Operating Plan.
- h. **Host** periodic "Wildfire Awareness/Hazard Mitigation" meetings within the subdivision.
- i. **Encourage** development of alternative water sources and Defensible Space.

4. Sheriff's Department Actions

- a. **Obtain** enough copies of the Wildfire Hazard Evaluation Map to place one in each vehicle and in each station.
- b. **Conduct** "familiarization" drills within the subdivision once per year.
- c. **Formalize** agreements for water use from the appropriate owner.
- d. **Facilitate** acceptance/use of the County Wildfire Annual Operating Plan.
- e. With CSFS, **host** periodic "Wildfire Awareness/Hazard Mitigation" meetings within the subdivision in cooperation with the local Fire Department.
- f. **Develop/practice** evacuation techniques.

B. During a Wildfire Emergency

This section addresses what residents and emergency response crews should do in the event of a wildfire emergency. The intent is to make an emergency situation operate efficiently and with minimal surprises. By having specific areas and responsibilities delegated an offensive plan can be put into action rapidly. A response plan has been developed to facilitate this rapid and efficient response.

## RESPONSE PLAN

### 1. Fire Protection Responsibility

#### a. Agency

- 1) Structural: Lake City Fire Protection District
- 2) Wildland
  - a) Private land: Hinsdale County.  
By and through the County Sheriff.
  - b) Federal land: Bureau of Land Management.

- #### b. Command - The first initial attack Incident Commander (IC) on the scene shall serve as IC until properly relieve

- ### 2. Alarm Response: These are equipment that are likely to respond. Actual response will depend on nature of situation and current commitments.

Response Agency	Station	Description Of Equipment	Response Time
GCFPD	Gunnison	2000 Gal. Tanker	80 minutes
GCFPD	Gunnison	Class one pumper	80minutes
GCFPD	Gunnison	Brush fire unit	80 minutes
GCFPD	Gunnison	Brush fire unit	80 minutes
USFS	Gunnison	Type 6 Engine	80minutes
Lake City Fire	Lake City	Type 1 reserve pumper 500gal	20 minutes
Lake City Fire	Lake City	Type 1 1,000 gal	20 minutes
Lake City Fire	Lake City	Type 6x 400gal	20 minutes

### 3. Access

- #### a. Road System - Of the approximately 16 miles of roads within the subdivision:

- 1) Most are constructed of gravel.
- 2) Some will support two lanes of traffic.
- 3) Some are loop roads.
- 4) Some are dead-end roads. Of these, most have adequate turn-around space available at the end of the road.
- 5) Road signs are present.



- b. Driveways:
- 1) Individual home driveway width and height clearance is inadequate for emergency equipment.
  - 2) Some individual homeowners have posted their name and address.

4. Water Supply

- a. Ponds/Creeks/Lakes/River

Type P/C	#/Name	Status P/I	Helicopter Accessible Y/N	Pump Required Y/N	Water Capacity When Full (1,000 GALS.)
C	Lake Fork of the Gunnison	P	Y	Y	Continual flow
P	SJRE Pond	P	Y	Y	
P	Fire Hydrants	P	Y	Y	Continual Flow 12 located in SJRE

Key: Type: P = Pond, C = Creek  
 Status: P = Permanent, I = Intermittent  
 Helicopter/Pump: Y = Yes, N = No  
 # (Ponds) = measure in 1000's of gal.

.

5. Locations: (logistics map appendix # 3 pg 47)

- a. Command Post - The following location(s) are recommended Incident Command Post (ICP) location(s):
- 1) SJRE Pavilion
  - 2) Structures not in fire path
- b. Staging Area(s) - The recommended staging area for operations within the subdivision is/are designated as:

- 1) Location - SJRE Pavilion
- 2) Designation - SJRE Staging
- 3) Ownership - SJRE Homeowners

c. Safety Zone(s) - The recommended safety zone(s) for operations within the subdivision is/are designated as:

- 1) County Road Maintenance Building across the road from SJRE
- 2) SJRE Pavilion

d. Helispot(s) - The recommended helispot(s) for operations within the subdivision is/are designated as:

- 1) County Road Maintenance Building across the road from SJRE

## 6. Evacuation (SJRE road Map pg 6)

a. Procedure

- 1) The Incident Commander or Incident Command Team in coordination with local authorities is responsible for initiating evacuation planning.
- 2) Local government is responsible for assisting in the dissemination of information to local residents.
- 3) All public information including that given door to door will be approved by the Incident Commander.
- 4) Reoccupation of homes will occur only after the Incident Commander determines it to be reasonable
- 5) The decision to initiate actual evacuation will come at the order of the Incident Commander in coordination with the appropriate jurisdiction/authority required by law to participate/order the evacuation process.

b. Escape Route during Emergency

Evacuations will use Hi-way 149 south to Lake City (SJRE Road Map on Pg 6)

## 7. Radio Frequencies

a. Tactical Frequency - Each agency's normal operational frequency. It shall be used for communications on scene within the response agency.

b. Operational Frequency - 154.280 (FERN); to be used in passing tactical orders from the Operations Chief or Incident Commander. A second channel may be operated on 154.145 (GCFPD).

- c. Command Frequency - 155.475 (NLEC); to be used to coordinate activities; pass data to ICP, as a back-up for the operational frequency, and for entry communications between ICP and responding agencies.
- d. Interagency radio cache may be requested through the local Interagency Dispatch Center.

## 8. Utilities

- a. Telephone service is below ground. There are approximately 12 service boxes present.  
 Provided by Century-tel  
 Telephone 1800 831-1733
- b. Electrical service is below ground. There are approximately 47 transformers, 12 primary junction boxes, three secondary, and 55 utility pedestals present.  
 Provided by Gunnison County Electric  
 Telephone # (970) 641-3520
- c. Approximately 9 homes utilize propane while 0 homes utilize central natural gas.  
 Propane provided by: AmeriGas (970) 641-1571
- d. Individual homes utilize wells.  
 Provided by Individual Homeowners.

## 9. Adjacent Property:

Ownership	Phone
BLM	(970) 641-0471
USFS	(970) 641-0471

## 10. General Goals/Objectives:

- a. Strategic
  - 1) Ensure the safety of all firefighters, residents and bystanders.

- 2) Conservation of property by minimizing damage and protecting all structures and improvements within the fire perimeter.
  - 3) Stabilize incident and contain fire to specific geographic areas.
  - 4) Protect exposures threatened by the fire but outside current fire perimeter.
  - 5) Extinguish fire.
  - 6) Perform necessary rehabilitation work.
- b. Tactical
- 1) Evacuation or in-place shelter of residents.
  - 2) Establish traffic control within affected area.
  - 3) Briefing of personnel on safety and hazards.
- 
- 4) Determine Operational Mode --
    - a) Offensive Mode
    - b) Defensive Mode
    - c) Combination
  - 5) Determine resource needs and assignments
    - a) Type and #
      - (1) Aircraft
        - (a) Rotor wing
        - (b) Fixed wing
      - (2) Mechanized
        - (a) Dozer
        - (b) Road Grader
        - (c) Other
      - (3) Hand Crews
      - (4) Water/Chemical Delivery Systems
        - (a) Engines
        - (b) Tenders
        - (c) Portable pumps
        - (d) Other
    - b) Assignment
      - (1) Reconnaissance
      - (2) Medical
      - (3) Suppression
        - (a) Line construction
        - (b) Prepare structures (See Section H)
        - (c) Burn out
        - (d) Other
      - (4) Rehabilitation
  - 6) Manage utilities
    - a) Water Supplies
    - b) Electrical

- c) Natural Gas & Propane
- d) Telephone

11. Anticipated Problems:

a Firefighter Safety -

- 1) Inexperience of crews with Extreme wildfire behavior.
- 2) Narrow roads and private drives.
- 3) Confusion and panic associated with evacuation.
- 4) Limited availability of personnel and resources.
- 5) Overhead power lines and utility service boxes.
- 6) Septic systems.
- 7) Frightened and confused pets.
- 8) Hazardous materials, including propane and gasoline tanks.

b. Wildland Fire WATCH OUT Situations

- 1) Failure to adequately scout and size up fire.
- 2) Personnel are not familiar enough with terrain to work after dark.
- 3) Safety zones and escape routes not identified.
- 4) Individuals are unfamiliar with weather and local factors that affect fire behavior.
- 5) Personnel are uninformed on strategy, tactics, and hazards of the fire.
- 6) Personnel are unclear on instructions or assignments.
- 7) Personnel are out of communication with crew members or supervisor.
- 8) Line construction is occurring without a safe anchor point.
- 9) Line construction is occurring downhill towards the fire.
- 10) Resources are attempting a frontal assault on the fire.
- 11) There is unburned fuel between firefighters and the fire.
- 12) Personnel cannot see the main fire and are not in contact with someone who can.
- 13) Personnel are on a hillside where rolling material can ignite fuel below.
- 14) The weather is getting hotter and drier.
- 15) The wind is increasing and/or changing direction.
- 16) Personnel are reporting frequent spot fires across line.
- 17) Terrain and fuels make escape to safety zones difficult.
- 18) Personnel feel like taking naps near the fire-line.

c. Structural Fire WATCH OUT situations

- 1) Poor access to the fire.
- 2) Inadequate bridge load limits.
- 3) Garages with closed, locked doors.
- 4) Inadequate water supply.

- 5) Windows are black or smoked over.
- 6) There are septic tanks and leech lines present.
- 7) Structure is burning with puffing rather than steady smoke.
- 8) Construction is wood with shake shingle roof.
- 9) Natural fuels within 30 feet of the structure.
- 10) Known or suspected panicked residents or visitors are in the vicinity.
- 11) Windows are bulging and the roof hasn't been vented.
- 12) Additional fuels can be found in open crawl spaces beneath the structure.
- 13) Structure is in or near a chimney or canyon.
- 14) Elevated fuel or propane tanks are present.

d. LCES

- 1) Place lookouts around the fire area to observe fire behavior and warn resources of potential hazards.
- 2) Make sure suppression resources have adequate communication.
- 3) Identify escape routes and assure all resources can identify these routes at all times.
- 4) Identify safety zones and assure resources know where they are located.

## VII. Vegetation Management

### A. Objectives

This section utilizes the data from the 2000 forest management plan. This area referenced is considered zone 3 of the defensible space zones or the area of traditional forest management. (d-space section pg12)  
Landowners doing work in zone 3 should use this section for management prescriptions.

The Landowner's objectives, listed in order of priority are:

1. Insect and disease control.
2. Healthy forest.
3. Aesthetics.
4. Fire prevention and fuel reduction.
5. Soil and water protection or improvement.
6. Wildlife habitat improvement for: birds, small animals, mule deer, and elk.

A Forest Management Plan was written for the subdivision in 2000. A detailed forest inventory was completed to within a +/- 20% degree of accuracy for each forest management unit. Results of this inventory can be found in **Appendix 4 PG 48**. Tree age, density, volume, diameter, height, regeneration, and slope were evaluated. This section will address management recommendations based on the landowner's objectives, forest inventory and wildfire threat for each unit of the property.



The forests in SJRE subdivision are in declining health. This is due to lack of fire and forest management, which has created overstocking, over mature timber and insect and disease susceptible stands. In pre-settlement times, low intensity ground fires would periodically burn through the area, thinning the forest by scorching and killing seedlings and saplings. These forests had significantly lower stocking levels with larger more fire tolerant trees. When too many trees compete for the same limited amount of nutrients and sunlight, an unnatural weak forest grows. Overstocked forests are highly susceptible to crown fires due to the accumulation of ground and “ladder fuels”. Ladder fuels consist of the small understory trees and the lower branches of larger trees that allow fire to climb into the forest canopy. Forest management is the solution to better forest health and reduced fuels.

Age is a second factor in the declining health of SJRE’s forest. Each specific species of tree has a biological maturity that plays a major role in a forest’s health. Once trees meet their biological age of maturity they begin to decline. Over mature trees are more susceptible to insects and diseases due to their low vigor. Selectively removing these trees can produce a younger and more vigorous stand.

The bark boring Ips beetle has attacked several over mature Ponderosa Pine within SJRE. Under the right conditions these beetles can amass and cause large stand die offs. Ips beetles were found in 2006 infesting a small group of ponderosa pine on Red Mountain Drive. Currently, Ips populations are endemic meaning that the populations remain small and widely dispersed. However, the ponderosa pine trees of the area are in a highly susceptible state due to overcrowding and over maturity. In addition, the Douglas fir bark beetle has also been found in the area. One of the reasons that these attacks are occurring is due to the low vigor of the over mature trees. Many species of trees use resin as one of their main defense mechanisms against beetles. Once a beetle begins to bore into a healthy tree a flush of resin flows to that area and entraps the beetle. The resin then flows out of the tree with the beetle entombed. When trees are stressed they produce less of these defensive chemicals. By allowing older trees to become infested, large populations of beetles can build up. Once large populations have infested and killed the weak and over mature trees they can begin to attack and overwhelm younger trees. By managing the forest and removing over mature trees, populations of beetles can be kept in check.

Needle eating moth larvae, known as western spruce budworm, were at high levels in the subdivision about eight years ago. This is a defoliating insect that thrives in overstocked forests like SJRE. It spreads by swinging from tree to tree on tiny webs. In an overstocked forest the canopies are close together or even touching, making it easy for the insect to spread. These insects eat new growth however trees are generally not killed by the insect. Over a period of several years the ability of impacted trees to produce new shoots and needles is decreased. This results in decreased photosynthesis and trees become stressed. The stressed trees open up the stand to more harmful insects such as bark beetles. SJRE avoided a serious infestation through aggressive spraying however his treatment is only a temporary fix. The conditions that make these trees more susceptible to these insects are still present. Landowners are encouraged to thin their trees and monitor for insects.

Aspen stands are common within SJRE. Aspen require abundant sunlight and regenerate in the openings created by disturbance (fire, harvest, and avalanche), allowing them to dominate disturbed sites and grow in pure mono-cultures. This species has safety advantages over conifers in WUI areas, as it is not susceptible to crown fire due to the the absence of volatile chemicals in leaves.

Aspen should be promoted in WUI areas due to its low wildfire risk, however promoting and preserving aspen stands requires management. Management for aspen consists of monitoring stand conditions and taking the appropriate action to ensure the survival.

Many of the aspen stands in SJRE subdivision have reached or surpassed their biological maturity. Aspen live 80-100 years and then the stand begins to show signs of decay (fungus, low crown ratios). Aspen stands exist through a network of underground stems (rhizomes) connected to an extensive root system. Once aspen stands reach their biological maturity and are not regenerated through disturbance, the central root system begins to die and the potential to loose the species from the site increases. Conifer begins to invade the understory of the maturing aspen and eventually the aspen is shaded out or dies from old age and conifer takes over the site. This site conversion causes a significantly increases the wildfire potential. Aspen need to be disturbed naturally or artificially at least every 80 to 100 years in order to fully regenerate. Natural disturbance typically involves a wind or wildfire event. Artificial disturbance requires clear cutting. These disturbances both natural and artificial promote regeneration and the longevity of stands.

The remaining vegetative cover is grass and sagebrush, which has a moderate to high wildfire risk. It is referred to as a “flashy fuel” and can combust rapidly. Grass and sage respond drastically to fluctuations in humidity, making their fuel moisture dangerously sporadic. These cover types can be managed as safe, healthy, and attractive landscapes but if not managed, they become dense and fire receptive. This is what is happening at SJRE. Like the forest cover type, the sage/grass cover type is also fire dependent. Without regular fire in the ecosystem to thin the sage, grass cannot compete with sage and is shaded out. The sage dominance is also perpetuated by the current drought trend in the SJRE area, as sage has a tap root and can better adapt to a drier and hotter environment. Natural fires especially in range land tend to burn in a mosaic pattern. Some areas were burned more often than others. The use of machinery to mow the sage can mimic this pattern. This type of treatment leaves a more natural and aesthetically pleasing look while still covering multiple objectives. The fuel continuity is broken up and the wildfire risk is reduced. The mowed areas will produce more grass to benefit the wildlife. The grass provides a needed source of food for wildlife (deer, elk, rodents, ect.). These types of treatments need to be repeated every 15-20 years, depending upon the productivity of the site.

The Bureau of Land Management (BLM), Gunnison Field Office, identified the SJRE Subdivision as a high priority for fuels reduction and forest restoration projects under the National Fire Plan. The BLM developed a short term plan to treat hazardous fuels and restore the health of conifer and aspen stands near the SJRE Subdivision. The SJRE Fuels Reduction and Timber Stand Improvement Project thinned and piled 58 acres of BLM land just to the south of the subdivision in 2003. Pile burning was completed in January of 2006. These treatments removed many of the small diameter trees and, limbs of larger trees that would have acted as ladder fuels during a

wildfire. The resulting stands of larger more fire resilient trees are much less susceptible to crown fire initiation and crown fire spread. Treatment locations are displayed on the Management Unit map (PG 31)

No other projects have been identified by the BLM within the SJRE WUI boundary. Steep slopes and rough terrain adjacent to the subdivision have made project implementation difficult however, future fuels treatments on BLM lands are not out of the question. (refer to management unit map on page ??)

## B. Management Units

The Management plan divided the subdivision into 8 management units according to species composition, location, topographic features, density, and condition. Prescriptions were established for the units and a plan of work was written for the property. Some units have a list of lot numbers that correspond to lots in extreme wildfire risk areas. These lots are located in priority treatment areas due to the wildfire hazard rating. The first series of numbers are the completed lots and the second are the incomplete.

## C. Management Unit Recommendations

1. Units 1-2 The priority treatment for unit 1 is a shaded fuel break along the far north side of the unit (lots 1-2). A shaded fuel break is a treatment in which only minimal trees are removed to slow a wildfire down as it approaches the subdivision. Thin to D+ 8 standard while allowing for isolated groups of healthy trees. This treatment will require the removal of 25-30 trees in the 8-12 inch size class and 15-20 in the 4-8 inch size class per acre. This type of treatment will be hard to notice. It will in fact improve the vigor of the residual stand. This will create a more fire and insect resilient stand of trees.

These units consist of patchy Douglas fir and Ponderosa pine. Patches of mature Douglas fir should be thinned to a diameter of tree at breast height (dbh) plus 8 feet standard between crowns (D+8). This will reduce insect and disease potential while providing wildfire protection. Regeneration of the same species should be given the same prescription. Ponderosa pine trees and regeneration should be thinned to a D+6 standard between crowns.

2. Unit 3: This is a riparian ecosystem zone along the Lake Fork of the Gunnison River. The primary tree in this area is Narrowleaf Cottonwood. It is recommended that the cottonwoods be managed so that there are always a variety of ages from saplings to mature trees. There are Engelmann spruce and Douglas fir in this unit. These trees should be thinned to a D+8 spacing.

Native grasses in this unit is a fire hazard in late spring early fall. Grass should be mowed around structures to a maximum of 8 inches tall. This is especially important during the times when the

grass is cured and highly flammable. (refer to grass d-space section on page 14 Fuel Types and Mitigation Recommendations)

3. Unit 4: This unit consists mostly of Aspen and Alder that line a drainage bisecting the subdivision. Aspen provide wildlife habitat, species diversity, fall color and a natural fire break. These aspen are aging and in fair health. Aspen should be promoted in the WUI setting as much as possible due to its low crown fire potential. This is done through clear or patch cuts. Due to the small size of this stand clear cut will be the only option for regeneration. The stand will then have to be fenced in order to keep ungulates from eating the regeneration. The aspen in SJRE are also being encroached by conifer species. The conifer reduces the integrity of the stand as a natural fuel break. It also hinders the regeneration of the aspen by shading the sunlight. Conifer in aspen stands should be removed.

This area has a lot of downed and dead wood that needs to be removed. This wood should be piled and burned or chipped on site.

4. Unit 5: Unit five consist of scattered patches of mature ponderosa pine and regeneration. Landowners should focus on managing regeneration (trees > 10"dbh) for future forests. This should be done by maintaining this forest at the D+6 standard. Landowners that reside in this unit need to have defensible space. This is one of the high to extreme wildfire hazard rated units. Refer to d-space recommendations for mixed conifer and grass on page 14. The mixed conifer recommendation should be used on Ponderosa Pine. While the grass recommendation should be applied to areas void of trees.

5. Unit 6: This unit consists of dense groups of Douglas fir with scattered Ponderosa pine and Aspen. This unit is very vulnerable to Western Spruce Budworm. It is also rated high to extreme for wildfire hazard. Landowners in this unit need to have defensible space around structures. (Refer to d-space recommendations for mixed conifer page 14).

This unit needs to be thinned to maintain a healthy and safe forest. Trees on moderate slopes should be thinned to a D+8 standard. Trees on steeper slopes should be thinned so that the crowns are not touching.

Ponderosa pine and Aspen should be retained when choosing which trees to thin. This will help diversify the forest. Such diversity will help protect the forest from insect and disease. Aspen should be promoted as much as possible in the WUI due to its low crown fire potential. This is done through management. Management in this case involves clear or patch cuts. Aspen require full sunlight in order to regenerate properly. The regeneration cuts will have to be followed by ungulate restrictive fencing.

It is recommended that landowners remove 102 trees 5 inches or larger per acre from unit

This will result in 5 cords of wood per acre. The idea is to have all sizes of trees represented in the unit, but to have them adequately spaced. Also approximately 200 saplings 1-2 inches dbh should be removed per acre. This will leave 150 regeneration saplings per acre.

Mitigation completed lots: 63, 64,67,68,70      Mitigation incomplete lots: 66,83,84,85,86,87

6. Unit 7 is very similar to unit 6. Dense groups of Douglas fir with scattered Ponderosa pine and aspen. It is very vulnerable to insect and disease and wildfire. This stand needs to be thinned also, however specification will be different. Trees on moderate slopes should be thinned to a D+8 standard. Trees on steep slopes should be thinned so that crowns are not touching.

In unit 7, 64 trees 5 inches or larger should be removed per acre. This will result in 6 cords of fire wood per acre. Approximately 80 4 inch saplings and 120 1-2 inch saplings should also be removed per acre.

This is also a high to extreme rated wildfire hazard unit. Landowners need to pay close attention to all details pertaining to defensible space around their structures. \

Mitigation complete lots: 67,69,70,71,72,73,74,76,82 Mitigation incomplete lots: 77,78,80,81

7. Unit 8: this unit is less dense than 7 and has more species diversification. Species represented are Dense Douglas fir, and scattered Aspen and Ponderosa Pine. It also has much more regeneration. This forest can be managed by maintaining adequate spacing between established trees and regeneration. The thinning will reduce this stand's susceptibility to insect and diseases. This unit will need to be thinned periodically to keep regeneration from becoming too dense. To begin their long term thinning process, landowners should remove approximately 330 1-2 inch saplings per acre.

Mitigation complete lots: 75 Mitigation incomplete lots: 77,79,80

#### D. Priority.

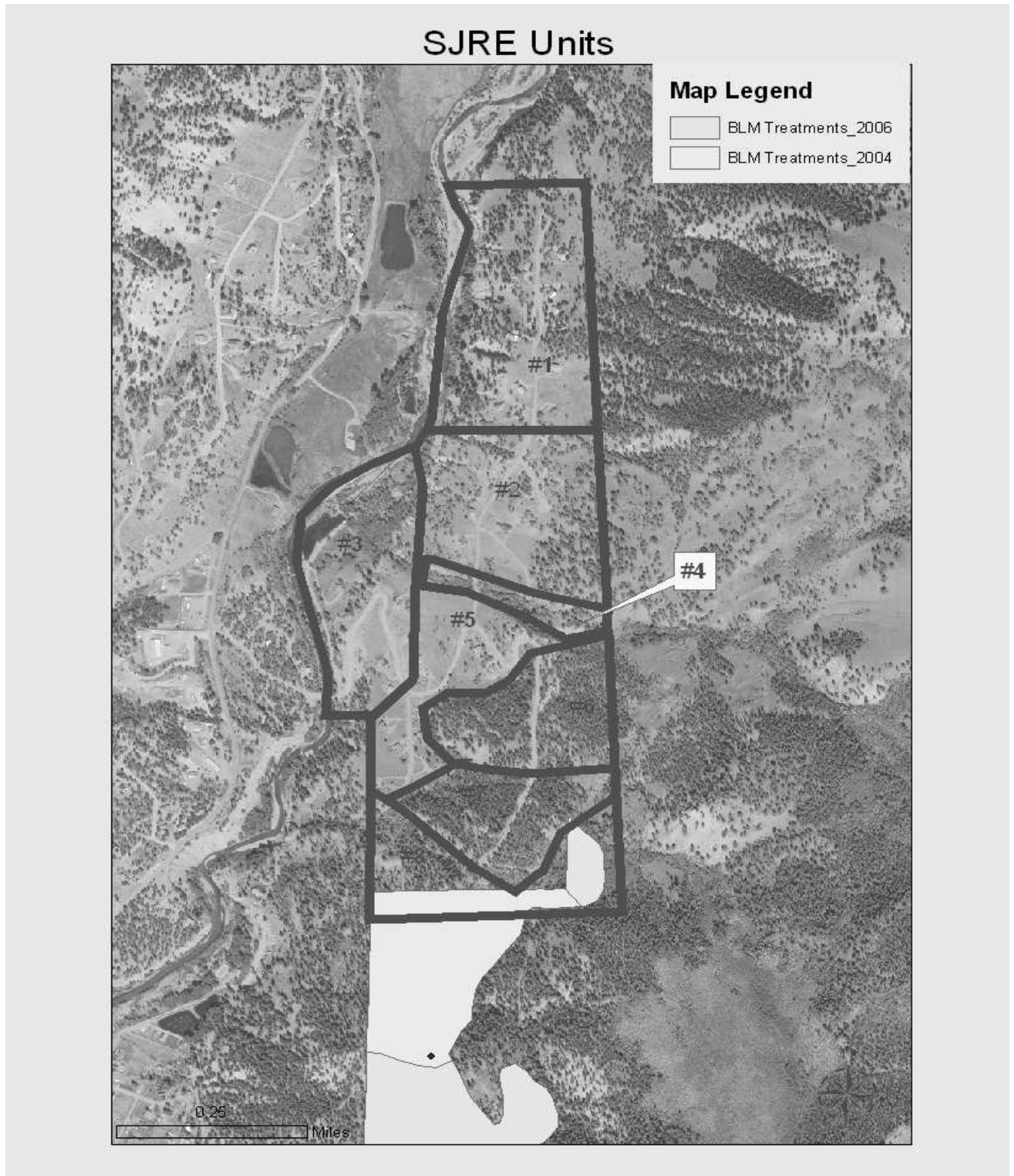
Implementation priority is based on the landowners' management goals. Listed below are the recommended management activities and their accomplishment schedule rated from highest to lowest priority.

1. Thinning of Douglas fir units 6-7
2. Thinning trees in unit 8
3. Thinning conifer in unit 4
4. Shaded fuel break in unit 1
5. Thinning regeneration in units 1-2, 5
6. Thinning Cottonwood regeneration in unit 4

#### Implementation Schedule 2008-2015

Activity	Date
Douglas fir thinning in units 6-7	2008-2012
Thin unit 8	2008-2012
Thin conifer in unit 4	2010-2014
Shaded Fuel Break	2012-2015
Thin regeneration in units 1-2, 5	2008-2012
Monitor for insect and disease	annually
Maintain defensible space around all homes	annually

E. Management Units Map



## G. Cost/Grants

Vegetation management is a costly procedure in the SJRE subdivision area. The average cost of small acreage timber fuels mitigation in the SJRE subdivision has been \$1800/acre. There are cost saving using a mechanized equipment verses a hand crew. However, steep slopes (40+% slope) can limit the use of heavy machinery. Most material removed from fuels mitigation projects is less than marketable, due to the small diameter of the wood removed. Generally during a fuels mitigation project the larger trees are not taken. The smaller diameter and suppressed understory trees are removed. Industries are not in place to utilize small diameter material. Most material is masticated on site or piled and burned.

Due to the high cost associated with fuels mitigation, funding for SJRE's large acreage mitigation projects needs to come from multiple sources. The first two sources are from within the subdivision, homeowner dues and volunteer hours. The third source of funding is grants. The main program that SJRE should try to take advantage of is the Western States Wildland Urban Interface Competitive grant (WSWUICG). The WSWUICG is a 50/50 type grant that comes from federal appropriations and is distributed through the state and private forestry branch of the USFS. These programs can be applied for through the local Colorado State Forest Service office. Competition is high and funds are not guaranteed for every applicant.

## VIII. General Forest Overview

### A. Species

#### 1. Douglas Fir

Douglas fir is a prevalent species in SJRE subdivision. This species has an elevation range of 6,000-9,000 feet. Douglas fir is a wind-firm species due to its deep root system. This species has a high wildlife food value. Small animals rely upon this species nut crop for food. Deer have been known to browse this species in harsh times.

Many of the Douglas fir stands in SJRE are over mature. Over mature trees are highly susceptible to Douglas fir bark beetles due to their low vigor. Bark beetles can build up population in weaker trees and then move onto healthier ones. Many of these stands and others are overstocked as well and contain an abundance of ladder fuels. This makes these particular stands susceptible to crown fires. In both cases, proper management is the solution. Dead, dying, diseased and over mature trees should be removed in order to promote a vigorous stand. In the case of an overstocked forest a thinning from below of the smaller trees is warranted. This will allow the residual stand of trees to be vigorous through increased sunlight, nutrients, and water.

## 2. Spruce

Spruce, both Engelmann and Blue are found in SJRE subdivision. Both are considered to have a high wildlife food value for rodent like animals. Small animal rely upon this species nut crop for food. Deer and elk have been known to browse this species in harsh times. Generally Engelmann is found higher up on a slope and Blue tends to be found in lower elevation draws and riparian areas. Both species have similar growth characteristics. Spruce prefers wetter areas than Douglas fir and north facing slopes. Its elevation range is 8,000 to 11,000. This species is generally not wind firm and is subject to blow over if thinned too heavily. Close attention to thinning prescriptions should be paid while thinning on ridge tops. The Spruce in SJRE is in overall good health. However the threat of Spruce Beetle is increasing every year. A spruce beetle infestation of a 13 acre area is occurring 20+ miles up river from the subdivision. The beetle is attracted to weak trees, especially blow down events. It can also be attracted to over stocked dense forests. Consistent monitoring and management is the best way to keep a Spruce forest healthy.

## 3. Aspen

Aspen is the final majority tree species found in the SJRE subdivision. The leaves of aspen do not contain the volatile chemicals found in conifers. The lack of volatile chemicals makes them less likely to form crown fires. This makes aspen a very desirable species in a WUI setting. Wildfire mitigation in this species requires mowing the vegetation in the understory to a height of 6-8 inches near homes. However if conifer have begun to heavily invade the stand, thinning of the understory trees might be necessary. In order to protect the integrity of the moderate wildfire risk trait of the species.

In a WUI setting, aspen becomes a valuable part of a communities overall wildfire defensiveness. This is due to its moderate wildfire risk rating. Aspen forests, like the rest of the SJRE ecosystems are constantly changing. As aspen matures it requires change or disturbance in order to survive. Many of the aspen stands in SJRE are in a stage of over maturity and decline. The best way to ensure the survival and long term health aspen in SJRE is through management. A mosaic across the landscape which incorporates regenerating patch cuts.

## 4. Sage

Sage with a grass component is the final vegetative cover found in SJRE. This vegetative type is found on sunny, semi-dry and desert like areas. It grows in dense groups. Both sage and grass respond rapidly to changes in relative humidity. Sage leaves contain volatile chemicals. Which combust very easily and increase its wildfire danger. The continuity of this fuel should be broken up. The goal is to create islands of fuel with breaks of treated fuel in between.

The SJRE area has been in a drought and no wildfire pattern for several years. This lack of moisture and disturbance has allowed the sage to dominate many sites and shade out native grasses. Wildlife depends on these grasses in order to survive. In the past wildfires would



thin out the sage in mosaic patterns of burned and unburned areas. This same pattern can be mimicked with the use of machinery and achieve the same goals.

B. Current insect threats:

1. Western Spruce Budworm (WSBW)

Douglas fir, the preferred host of WSBW, exists as multiple canopied trees of various ages and heights on the southern end of the property. The distribution of various tree heights within an overcrowded forest, creates an easy ladder for WSBW larvae dispersal. While in the larval stage, WSBW can only move from tree to tree by dropping from a silken thread. Dense trees, with interconnected branches extending the entire length of a tree, create an ideal habitat for WSBW.

A major infestation 8 years ago, that was throughout Douglas-fir stands in portions of Gunnison, Saguache and Hinsdale counties. On this property, WSBW poses the most serious threat to forest health. San Juan Ranch slowed WSBW damage with periodic spraying. However, spraying is a temporary solution because it does not change the forest structure. It is the forest structure that avails itself to WSBW infestation.

Widespread outbreaks can cause top-killing and loss in tree growth. Particularly hard-hit are the smaller, understory trees. The insect may kill a tree over several years, but the aesthetic damage done yearly is highly significant.

WSBW has a one year life cycle in Colorado. Adult emergence usually lasts from late June through early August.

Females lay their eggs (approximately 150 in all) in masses on the underside of conifer needles.

First-stage larvae hatch about 10 days after eggs are laid. These larvae do not feed but search for crevices under bark scales or lichens. Here, they spin silken shelters called "hibernaculae". The young larvae remain dormant in their hibernaculae throughout the winter and are very difficult to detect.

In late April or May, larvae leave the shelters of their hibernaculae to search for food. They migrate to the foliage of conifer trees where they mine (feed inside) older needles. In a week or two, they enter developing buds, a habit from which they derive their name. After the buds break and new needles begin to lengthen, budworm larvae do the bulk of their damage. They loosely web the foliage, and feed in high numbers until most or all of the new growth is destroyed.

Larvae mature throughout five additional stages over a 30 to 40 day period after spring feeding begins.

Mature larvae pupate in feeding webs or on foliage. Pupation takes a week to 20 days, and adult emergence from the pupal stage, in late June through early August, completes the budworm's life cycle.

When viewing infested areas from a distance, trees appear light reddish-brown, singed (current damage) or gray (old damage).

WSBW are important because they have the potential to consume all new growth produced by host trees. In addition to foliage, however, they commonly feed on coniferous flowers and cones.

## 2. Douglas-Fir Beetle (DFB)

This insect is not on the property at the present time. It may, however, develop into a problem following a WSBW epidemic.

DFB is usually not able to attack and kill healthy Douglas fir trees. Populations of these insects have been noted in other areas of Colorado to rapidly build and cause mortality of weakened Douglas fir trees which survived WSBW.

This beetle has a one-year life cycle in Colorado, beginning in late summer when eggs are laid beneath the bark by parent beetles.

Each female lays about 75 eggs in a vertical gallery. Soon these eggs hatch into larvae which feed outward from the central gallery. The larvae overwinter in the infested tree. Transformation (pupal stage) into the adult stage occurs in early summer.

Emergence of new adults begins in mid-July and may continue through September. However, the majority of beetles exit trees during the first two weeks of August.

Upon emerging, adult beetles (the size of a match-head) attack live trees, boring beneath the bark and depositing eggs. Once eggs are laid, the adults die and the cycle starts over.

A key part of this cycle is the beetle's role in transmitting blue-stain fungi. Spores of these fungi contaminate the bodies of all DFB and are introduced into trees during attack. If attacks are successful, the blue-stained fungus acts together to disrupt the tree's water transport system. Rapid tree death results.

Signs of successful attack include:

- (1) Popcorn-like masses of resin, often reddish, called pitch tubes on tree trunk.
- (2) Boring dust in bark crevices and around tree's base.
- (3) Blue-stained sapwood (check at more than one point around tree's circumference).
- (4) Characteristic DFB galleries beneath the bark.
- (5) Evidence of woodpecker feeding (patches of outer bark removed).
- (6) Fading or browning of entire tree crown (usually occurs 8-10 months after infestation).
- (7) Live DFB eggs, larvae, pupae and/or adults in galleries.

Finding live stages of the beetle actively feeding as in (7) above is by far the best indicator. Therefore, a hatchet (used to remove patches of bark) is needed to check trees correctly.

Signs of unsuccessful attack (beetles do not succeed in laying eggs) include:

- (1) Large creamy white, runny, popcorn-like masses of resin called pitch-outs on the trunk. Look for dead beetles in these globs of pitch.
- (2) Lack of items (2) - (7) above.
- (3) Checks beneath the bark reveal galleries or partial galleries as in (7) above but these are heavily flooded with resin and show little or no associated blue-stain.

### 3. Mountain Pine Beetle (MPB)

The insect is very similar to the Douglas-Fir beetle described above: life cycle, preferred host conditions, identification, and resulting damage are nearly identical. The main difference in the two insects is MPB prefers to attack Ponderosa pine.

This insect has not recently been active on the property, however there is moderate potential in stands one, two and five for future attacks. This potential is in dense patches that occur in these stands.

A significant MPB outbreak occurred in the Lake City area during the early 1980's. Several hundred trees in the immediate vicinity were killed each year. The MPB prefers trees weakened by overcrowded conditions, advanced age and damage

caused by lightning, porcupines, etcetera. The best prevention against MPB losses is to retain healthy Ponderosa pine. During outbreak periods, the removal of damaged trees is recommended. For long term forest health, thinning of the scattered pockets of overcrowded Ponderosa pine is recommended.

#### 4. Ips Beetle

This insect is in endemic (isolated) levels in the Pines of the subdivision and is a natural part of the ecosystem. When conditions are right it is an opportunist. This beetle attacks pine and spruce species during stressful times. (stress = drought, over crowding, insect/disease)

Ips beetles are not as aggressive as other bark beetles such as Douglas fir bark beetle. They generally attack trees that are already weakened due to injury or stress. However if the right conditions are present and population increase rapidly. They can attack healthy trees.

As adult beetles enter trees and tunnel, yellowish- or reddish boring dust is produced and accumulates in bark crevices or around the base of the tree. When the larval tunnel affected parts of the tree discolor or fade. Unlike many other bark beetles that cause whole trees to fade, only the effected parts of the tree fade.

Adults over winter under the bark or in surrounding litter at the tree base. Males enter the tree construct a cavity under bark (nuptial chamber). The females are then attracted to the pheromone produced by the male. The beetles then mate and the female lays her eggs. In Colorado it produces two to four generations in a year.

To prevent Ips beetle attacks, use practices that promote vigorous tree growth. Regular management including thinning, monitoring for insect/ disease, damage, and stress. Freshly cut material from pruning or thinning should be removed from the stand. Any green material should be piled and burned or shredded.

Insecticides can be used as preventive measures in heavily infested areas. Carbaryl or Permethrin should be sprayed on the tree in a drenching fashion. Timing is hard for this insect due to its multiple life cycles in a year. Adults have been observed entering trees as early as February on through November. Because of this two treatment should be applied, one in spring and a summer application

Signs of successful attack

- (1) Red boring dust found in crevices or base of tree
- (2) Fading in areas of the tree not necessarily the entire tree

Signs of unsuccessful attack (beetles do not succeed in laying eggs) include:

- (1) Large creamy white, runny, popcorn-like masses of resin called pitch-outs on the trunk. Look for dead beetles in these globs of pitch.
- (2) Checks beneath the bark to reveal no galleries or partial galleries.

C. Current Disease Threats Include:

1. Dwarf Mistletoe

This disease is not currently present in either Ponderosa pine or Douglas-fir. Although different species of mistletoe attack pine or fir, they are similar in their life history.

Mistletoe kills by slowly robbing trees of both water and food. Infected trees start declining as more and more food is taken by infected branches.

The tree slowly dies from the top. Eventually, there are not enough live branches and the entire tree dies.

Mistletoe plants are either male or female. Although both types damage ponderosa pine, only the female plants produce seeds that spread the disease.

Seeds are produced in a berry. Pressure builds up within the berries as they ripen. In August or September, the pressure becomes so great the berries are shot-out at speeds up to 60 miles per hour. They travel for distances up to 20 or 30 feet.

A gluey coating on the seeds enables them to stick wherever they land. If they land on a pine, the cycle begins anew. If they land elsewhere, they die.

The mistletoe plant is green or yellow, with slender shoots about 2 to 4 inches long.

Control involves removal of severely infested trees and pruning individual limbs of those trees slightly infested.

2. Cankers

Aspen are prone to canker development throughout their lives, but particularly if they are in excess of 60 years of age. Aspen in Unit Four are approximately this age. The term "canker" describes an area of dead cambium (living cells just beneath the

bark) and bark, usually on the tree trunk. Aspen cankers display great variety and are caused by a variety of fungus which enters the tree through a bark injury. As the canker grows the tree is slowly girdled and eventually dies. Because aspen has such a thin bark, it is very easy for cankers to become established. Canker diseases annually kill large numbers of aspen in Colorado. Three aspen cankers are present. The prominent canker present is Cytospora.

### 3. Aspen Trunk Rot

This disease is fairly common in aspen stands in excess of 80 years of age. It attacks the inner wood core of living trees. *Fomes igniarius* is the most common trunk rot present in the Lake City area. Fruiting bodies of the fungus are present on the outside of a tree's bark and are hoof shaped. Often, an entire group of trees will be affected by the fungus. Aspen trunk rot causes more volume loss in commercial aspen than any other fungus. Prevention includes avoiding wounding of tree bark and in commercial stands of aspen, harvesting trees before trunk rot becomes widespread. Such a cutting cycle, designed to avoid the onset of disease is called a pathological rotation. In aspen this generally occurs around 80 years of age.

### 4. Conifer Heart Rot

Also known as white pocket rot. It affects Douglas-fir. It is common in older, over-mature trees. It is recognized by white decayed pockets in the heartwood and the resulting honeycomb pattern of the remaining wood. It is primarily confined to the bottom ten feet of the tree.

## D. Soils

Three different soil types are located on the property. The predominate soil type, which accounts for approximately 46 percent of total acreage is Parlin-Mergel gravelly loam. These are mostly the meadows on the bench. Approximately 27 percent of the property's soil is woodhull extremely rocky loam. These areas are the traditionally forested portions. The remaining 13 percent is alluvial land, "Occasionally flooded". This is found in the riparian area along the river.

### 1. Parlin-Mergel

Parlin-Mergel consists of about 65 percent Parlin 20 percent Mergel and small areas of several other soils. Parlin soils consist of deep, well drained soils on hillsides, ridges, and benches. These soils formed in locally transported channery and gravelly sediments weathered from rhyolite and similar rocks. In a representative profile the surface layer is brown channery loam about seven inches thick. The subsoil is brown channery loam and clay loam about 24 inches thick. To a depth of 60 inches this soil is strongly calcareous (high

content of calcium carbonate), a light brownish gray very stony loam. Vegetation consists of big sagebrush, Arizona fescue, native bluegrass and wheatgrass.

Permeability is moderately slow, and available water capacity is moderate. Roots can penetrate to a depth of 60 inches or more.

## 2. Mergel

The mergel series consist of deep, well drained soils on upland hills and ridges. These soils formed in alluvial fan and glacial sediment weathered mainly from rhyolitic tuff.

In a representative profile the surface layer is grayish-brown gravelly loam about 10 inches thick. The next layer is pale brown gravelly loam about six inches thick. Below this to a depth of 60 inches is pale brown and very pale brown very gravelly loam. Vegetation is commonly big sagebrush, phlox, native bluegrass, squirrel tail, dry land sedge, wheatgrass, and pine needle grass.

Permeability is moderately rapid. Roots can penetrate to a depth of 60 inches or more, but available water capacity is low.

## 3. Woodhall

Woodhall extremely rocky loam is about 55 percent woodhall gravelly loam and 30 % Rock outcrop and Stoney rock land.

Woodhall series consists of moderately deep, well drained soils on ridge tops, mountain spurs, and mountainsides. These soils formed in locally transported stony and gravelly material from rhyolite.

In a representative profile the surface layer is dark grayish-brown gravelly loam about nine inches thick. The subsoil, about 21 inches thick, is brown very stony and extremely stony clay loam. Fractured rhyolite is at a depth of 30 inches.

The native vegetation is commonly Ponderosa pine, Douglas fir, and big sagebrush. Grasses are chiefly Indian ricegrass, Mountain muhly, Arizona fescue, and wheatgrass.

Permeability is slow. Roots can penetrate to a depth of only about 30 inches, and available water capacity is low. These soils are important for timber and wildlife.

## 4. Alluvial

Alluvial land is occasionally flooded and is along flood plains on streams and side drainage ways. It consist of material recently deposited by the streams. It varies widely in texture and commonly has very cobbly or stony areas interspersed throughout. It is subject to erosion from floods and changes in stream channels.

Alluvial land is suited to limited grazing and to wildlife and recreation. In most areas the vegetation is Narrow leaf cottonwood, willows, grasses sedges, and rushes. Small areas are flooded annually and support little or no vegetation.



## APPENDIX 1

### DEFINITIONS

**Basil Area Factor (BAF)** is a method used to take a sampling of the volume in a given area. A prism is used that bends the light displacing portions of the tree bole. Each specific prism has a factor amount (10, 20, 40 etc.) which limits the amount of light bent. By looking at trees in a given area the prism show which trees to tally for a given sampling rate.

**CRITICAL FIRE WEATHER** is a set of weather conditions (usually a combination of low relative humidity and wind) whose effects on fire behavior make control difficult and threaten fire fighter safety.

**DEFENSIBLE SPACE** is an area either natural or human-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur.

**FIRE CHIEF** is the chief officer or the chief officer=s authorized representative of the fire department serving the jurisdiction.

**FIRE HAZARD** is a fuel complex defined by kind, arrangement, volume, condition and location that determines the degree of both ease and suppression difficulty.

**FIRE RESISTIVE CONSTRUCTION** is construction to resist the spread of fire. For descriptions , see the Building Code.

**FIRE WEATHER** is weather conditions favorable to the ignition and rapid spread of fire. In wildfires, this generally includes high temperatures combined with strong winds and low humidity. See ACritical fire weather.@

**FUEL BREAK** is an area, strategically located for fighting anticipated fires, where the native vegetation has been permanently modified or replaced so that fires burning into it can be more easily controlled. Fuel beaks divide fire-prone areas into smaller areas for easier fire control and to provide access for fire fighting.

**FUEL, HEAVY**, is fuel consisting of round wood 3-to 8 inches (76 to 203mm) in diameter.

**FUEL, LIGHT**, is fuel consisting of herbaceous plants and round wood less than 1/4 inch (6.4mm) in diameter.

**FUEL-LOADING** is the oven dry weight of fuels in a given area, usually expressed in tons per acre (T/A) (tons/ha) or in pounds per acre (lb/a) (kg/ha). Fuel loading may be referenced to fuel size or timelag categories, and may include surface fuels or total fuels.

**FUEL, MEDIUM** is fuel consisting of round wood 1/4 to 3 inches(6.4 to 76mm) in diameter.

**FUEL MODIFICATION** is a method of modifying fuel load by reducing the amount of nonfire-resistive vegetation or altering the type of vegetation to reduce the fuel load.

**FUEL MOSAIC** is a fuel modification system that provides for the creation of islands and irregular boundaries to reduce the visual and ecological impact of fuel modification.

**GREENBELT** is a fuel break designated for use other than fire protection.

**SLOPE** is the variation of terrain from the horizontal; the number of feet (meters) rise or fall per 100 feet (30 480 mm) measured horizontally, expressed as a percentage.

**URBAN-WILDLAND INTERFACE AREA** is that geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels.

**WILDFIRE** is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

**WILDLAND** is an area in which development is essentially nonexistent, except for roads, railroads, power lines and similar facilities.

## APPENDIX 2

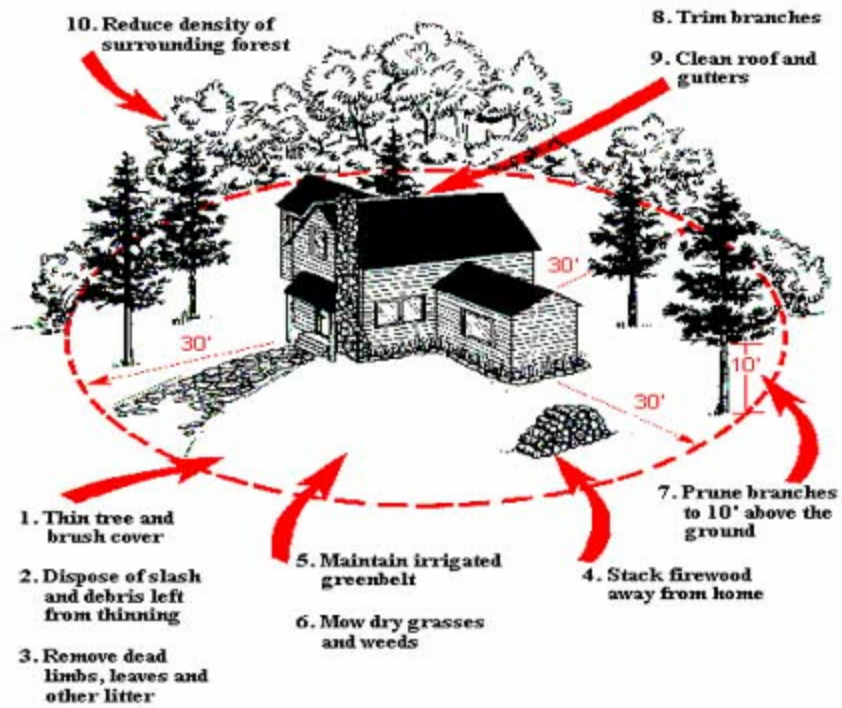
### DEFENSIBLE SPACE GUIDELINES

**Definition :** An area either natural or human-made, where material capable of allowing a fire to spread unchecked has been treated, cleared or modified to slow the rate and intensity of an advancing wildfire and to create an area for fire suppression operations to occur.

**Goal :** To provide an area from which fire suppression personnel can effectively operate during a wildfire.

- Action :**
- a. Thin conifer trees so there is a minimum distance of 10 feet between tree foliage.
  - b. Separate brush clumps from each other by a minimum of 10 feet.
  - c. Prune all tree limbs to a minimum height of 10 feet (pine, fir, spruce) or 4 feet (pinon, juniper), and remove all ground fuel below them.
  - d. Remove dead/downed wood and mow grass/weeds to a height of less than 4 inches.
  - e. Incorporate entire property, subdivision, and adjacent ownerships.

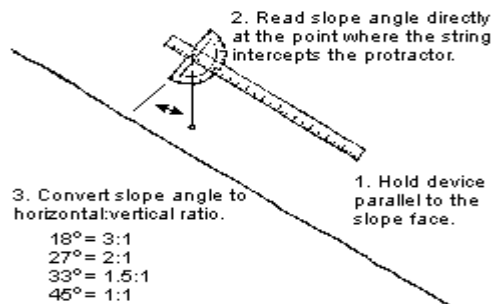
## Additional Defensible Space Information 2A



2B You can create a simple tool out of household materials to help you determine your slope.  
Materials:

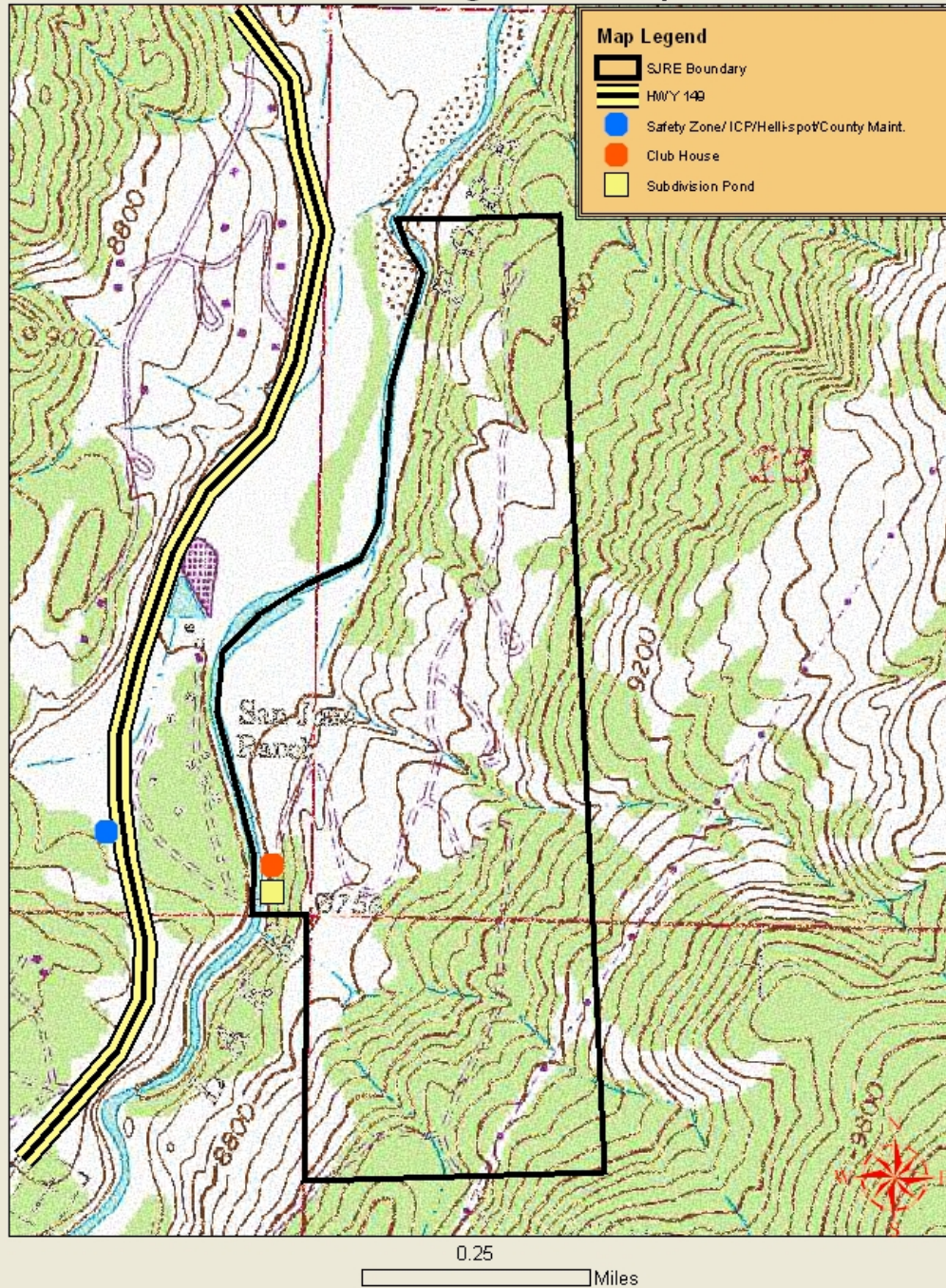
- Protractor
- String
- Weight (heavy washer or something similar)
- Yard or meter stick
- Scientific calculator

Tie the weight to one end of the string. Use the other end of the string to secure the protractor to the yardstick as the diagram indicates. Disregard step 3, instead take the slope angle in degrees and multiply it by tangent (using a scientific calculator), then multiply that number by 100 to get % slope.



## APPENDIX 3

### SJRE Logistics Map



## Appendix # 4

### Forest Inventory Tables

Unit	Acres	Type	Site	Slope	Age	Regen acres	Regen SP	TBF_AC	TCF_AC	TT_AC	BA_AC	DBH
1	26	PP	48	34	116	342	DF	2074	2125	86	50	10.3
2	12	DF	55	37	84	180	DF	2530	2251	58	46	12
3	15	CW	66	2	67	100	CW					
4	7	AS	65	10	58	780	AS	7854	2354	323	130	8.59
5	22	PP	53	22	94	180	PP	1637	3643	45	34	11.8
6	15	DF	58	27	120	350	DF	1854	1522	242	73	7.45
7	14	DF	55	31	62	450	DF	1637	1651	195	66	7.84
8	15	DF	60	33	68	1200	DF	1806	457	44	16	8

Unit	PRES	PRI	ACC	WSBW	MPB	DM	AS_CF_AC	AS_BF_AC	SF_CF_AC	SF_BF_AC
1	2	2	1	0	0	0	0	0	0	0
2	2	2	1	0	0	0	0	0	0	0
3	2	3	1	0	0	0				
4	2	2	1	0	0	0	2064	7328	63	191
5	2	2	1	0	0	0	0	0	0	0
6	2	1	1	3	0	0	68	0	26	88
7	2	1	1	3	0	0	146	178	0	0
8	2	2	1	2	0	0	83	65	0	0

Unit	DF_BF_AC	DF_CF_AC	LP_CF_AC	LP_BF_AC	PP_BF_AC	PP_CF_AC
1	1252	508	0	0	822	1617
2	1530	543	0	0	1000	1707
3				0		
4	426	226	0	0	0	0
5	95	171	0	0	1542	3472
6	1529	1308	0	0	189	120
7	1933	1257	0	0	0	248
8	299	125	0	0	157	249

Unit	IV_VIII	VIII_XII	XII_XVI	XVI_XX	XX_XXIV	XXV_PLUS
1	15	46	18	7	1	0
2	0	28	22	7	0	1
3						
4	117	157	48	2	0	0
5	0	27	9	8	1	0
6	160	63	17	0	2	0
7	118	55	20	1	0	0
8	29	11	2	2	1	0

## Appendix # 5

### DESCRIPTION OF TERMS USED TO DESCRIBE FOREST INVENTORY AND CONDITION

#### Forest Inventory:

Unit--refers to a particular management unit. Management unit locations are identified in Appendix A.

Acre--Size of the management unit.

Type--Predominant tree species within management unit. The abbreviation PP indicates Ponderosa pine.

Age--average age of trees within management unit.

T/AC--average number of trees greater than 5 inches in diameter, per acre within management unit.

CF/AC--average number of cubic feet of wood, per acre in a management unit. To convert this figure into cords, divide the total by 90.

BA/AC--Average basal area per acre. Basal area refers to the density and size (space occupied) of trees within the management unit.

DBH--Average diameter of all trees within the management unit. Diameter measurement taken 4.5 feet above ground level on the uphill side of a tree.

HT-- average height of all trees within a stand.

Slope--Referenced as a percentage of elevational rise over 100 feet distance.

R/AC--average number of viable seedlings and saplings smaller than 5 inches DBH per acre.

PRES--management prescription. As used in this plan a "1" recommends planting, "2" recommends thinning, "4" recommends aspen patch cutting.

PRI--refers to management unit priority in implementing prescriptions. A "1" are highest priority units.

SITE--refers to the site index of the land, the higher the number, the greater the potential productivity for tree growth.

R/SP--indicates species type of regeneration present within stand. The species first indicated is predominant.



ACC--refers to access of the management unit. A "1" indicates a nearby road already exists. "2" indicates a road can be easily made. "3" indicates access may be difficult.

WSBW--refers to western spruce budworm damage. A "0" rating indicates WSBW is not present. A "1" rating means damage is slight. A "2" rating means aesthetic damage has occurred. A "3" rating means tree mortality has occurred.

MPB--refers to mountain pine beetle. Not a present problem on the property.

DM--refers to the Dwarf mistletoe rating for the management unit. Not a present problem.

4-8 through 25+--indicates the number of trees within a management unit which fall into a respective diameter class. Based on the average number of trees per acre.

## Appendix # 6

### Accomplishment Record

As management activities are accomplished, records should be maintained showing treatments, dates completed, management costs, volumes, net returns, etc. An example of such a record form is as follows:

#### ACCOMPLISHMENT RECORD

<u>YEAR</u>	<u>STAND</u>	<u>ACTIVITY</u>	<u>ACRES</u>	<u>COST</u>	<u>RETURN (NET)</u>
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### Signature Page

B. A. [Signature] President Jan 12, 2009  
SJRE Subdivision Date

B. C. Aye 2-17-09  
CSFS District Forester Date

Jen Bray Jan 12, 2009  
Hinsdale County OEM Representative Date

[Signature] 2/5/09  
USDI BLM Date