

# Arrowhead Subdivision's

## Community Wildfire Protection Plan



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

Wildland Urban Interface (WUI) is an area where structures are in close proximity of naturally flammable vegetation. Arrowhead subdivision is a classic representation of that situation. Arrowhead subdivision was designed to give its residents the feeling that they are living in an unpopulated forest. This creates the situation where a wildfire can involve more structures than any fire department can protect. A collaborative effort of forest management and organization between the community and the BLM is the solution.

Arrowhead subdivision covers 2,281 acres at an average altitude of about 9,300 feet. There are 575 one acre circular lots, 260 three-quarter acre circular lots, with the balance of the land being held in common. For the most part, the lots sit atop a ridge that slopes upward from north to south. The average slope of the subdivision is 10% with a range of 5-50%. A 40-foot interval topographic map of the subdivision can be found in the [map - appendix 7, pg 46](#). North is the predominate aspect of the subdivision. The subdivision is adjacent to both public and private land. Arrowhead subdivision is a multi faceted subdivision with not only residential use but also commercial. Within the subdivision are a bed and breakfast/restaurant and a real estate office.

Arrowhead subdivision is unique in many ways. The large amount of common ground presents challenges and opportunities, when it comes to fuels mitigation. The main challenges are the size and shape of lots and the small common ground areas between lots. All lots have a minimum of 40 feet of common ground between them. This small of an area is hard to mitigate without encroaching on private property. Since most of the lots are 1 acre and circular, mitigating on that small scale, without private participation, has its limitations. A patchwork of mitigated properties will not stop a raging wildfire. Mitigating the large acreage tracts of common ground bordering the subdivision has the greatest potential for positively impacting Arrowhead's Wildfire defense.

The biggest wildfire threat comes from common ground acreages bordering the subdivision, due to the fuel type. An estimated 65% of the common ground is located in spruce/fir type forest. This forest has a great potential for destructive crown fires than an aspen stand. This is especially true with the heavy fuel loading present at Arrowhead. The dense conifer stands are overstocked with young trees growing in the understory. This type of growth is called ladder fuel. Ladder fuels allow a ground fire to climb into the crowns of big trees.

The Wildland Urban Interface map ([pg 6](#)) shows the boundaries of the WUI. It is represented by black and yellow stripes. The WUI boundaries are based upon wildfire potential. The boundary encompasses the area that has the highest potential to spread a wildfire onto Arrowhead property. The subdivision boundary has a red stripe around it. The public land within the WUI boundary is represented with a brown stripe around it. All public land contained within the WUI is managed by the BLM. The total acreage of the WUI is 11,744. The Bureau of Land Management manages a total of 2,650 acres within the boundary. The federal land is divided up into two parcels. Adjacent to the eastern border of the subdivision is a 2,033 acre parcel known as the livestock drive. The second parcel, located adjacent to the south west corner of the subdivision, is 617 acres and is called Cox Park. The subdivision covers an area of 2,281 acres. The remaining

balance of the WUI area is privately owned and covers an area of 6,813 acres, not outlined with a colored stripe border on the map. No cross boundary mitigation work has been done on any private land bordering Arrowhead. There are areas of serious wildfire concern adjacent to the northwestern side of Arrowhead. The landowners in that area should be included in Arrowhead's wildfire meetings.

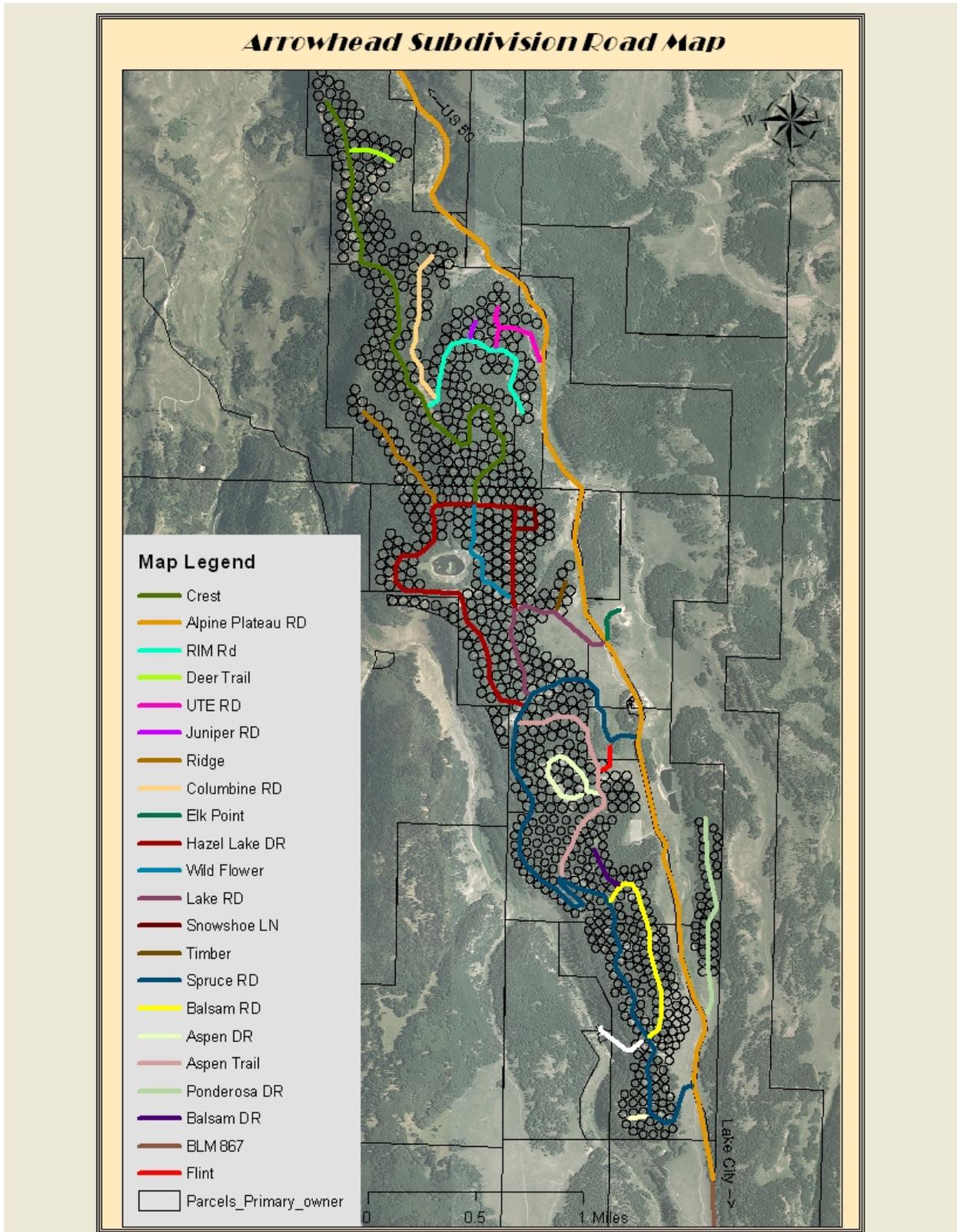
A. Location

1. County: Gunnison, Colorado
2. Geographic Area: 35 miles west of Gunnison.
3. Legal Description: R. 5W, T. 48N, S. 25 & 26; R. 4W, T. 48N, S.31; R 5W, 47N, S. 1, 12 & 13; R. 4W, T. 47N, S. 6, 7 & 18. New Mexico Principal Meridian.
4. USGS Map Quadrangles: Curecanti Needle, Lost Lake, Sapinero, Poison Draw.
5. VOR Blue Mesa                      RAD 252.0                      Distance 33.68 mile
6. Longitude: 107 degrees, 24 minutes, 46 seconds, West.  
Latitude: 38 degrees, 24 minutes, 19 seconds, North.

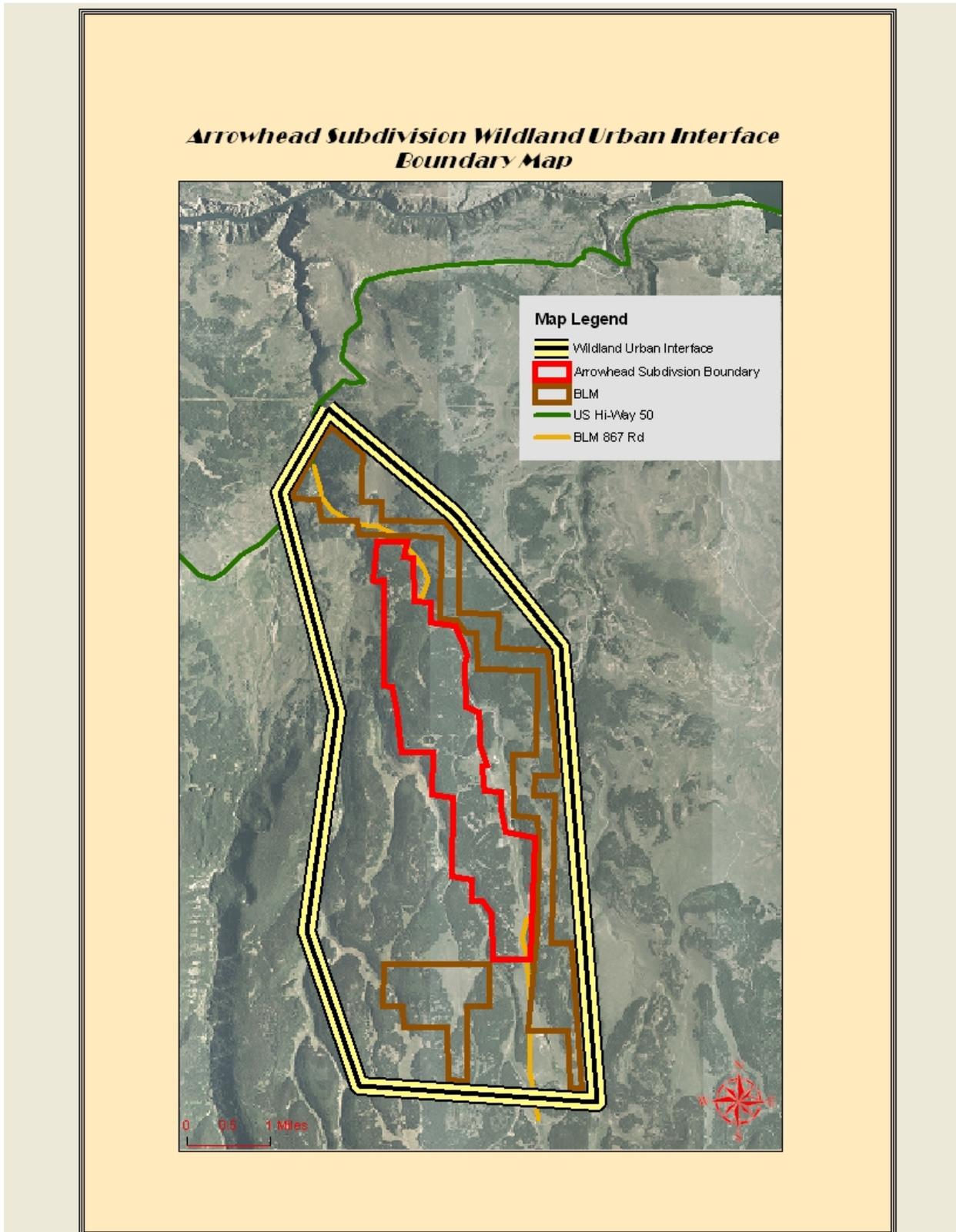
B. Ingress/Egress (AH Road Map, pg 5)

1. Routes: Hwy 50 to Alpine Plateau Road. South on Alpine Plateau Five miles to subdivision.
  - a. All weather access Alpine Plateau Road to Inn, then seasonal.
  - b. Seasonal access  
Ute Road  
Lake Road  
Spruce Road  
Ponderosa Way
2. Directions: From Gunnison, go West on U.S. Highway 50 approximately 33 miles. Turn left on Alpine Plateau road. Arrowhead is approximately five miles up that road. Alpine Plateau Road to Highway 149 is seasonal access.

C. Arrowhead Subdivision Road Map



D. Arrowhead Subdivision WUI Boundary Map



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

### A. Structure/Lot Wildfire Hazard Evaluation

1. Subdivision - The subdivision has also been rated utilizing the CSFS "Wildfire Hazard Rating Form". A description is found in Appendix 3 on [pg 40](#).

The results are:

# Points                              66        

Description                         High             (*Moderate, High, Extreme*)

2. Individual Lots - All lots have been rated based upon vegetation/slope utilizing the CSFS "Wildfire Hazard Matrix". A description is found in Appendix 4.

Results are:

Number of Lots			
Low	Moderate	High	Extreme
0	66	689	80

3. Structures - All structures have been rated utilizing the CSFS "Wildland Home Fire Risk Evaluation System". A description is found in Appendix 4.

Results are:

Number of Structures			
Extreme	High	Moderate	Low
20	184	59	0

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

#### Aspen Stands

Fires are low to moderate in intensity except when they consume pockets of 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.

1. Specific - Determined utilizing BEHAVE (The Fire Behavior Prediction System) and NFFL fuel models.
  - a. Input data. 50 percent slope was used to show the fire behavior that could be expected on the steepest slope in the Subdivision.

	Average Day	Red Flag Day
Time (hrs)	1500	1500
Temperature (F)	70	80
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	9
Average slope (%)	50	50
Fuel Model	10	10

### b. Outputs

#### 1. Average Day

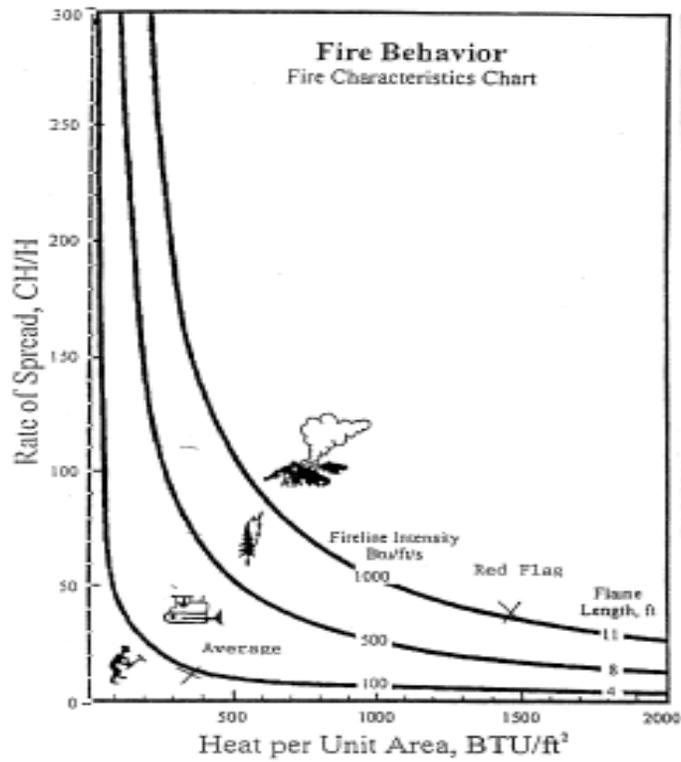
	AVERAGE DAY	
Rate of spread (chains/hr)	15	
Fireline intensity (Btu/ft/s)	357	
Average flame length (ft)	7	
	Response Time	
	3 HOUR	1 HOUR
Area (acres)	6.5	.6
Perimeter (ft)	2244	660
Estimated spotting distance (mi)	.2	

#### 2. Red Flag Day

	RED FLAG DAY	
Rate of spread (chains/hr)	52	
Fireline intensity (Btu/ft/s)	1449	
Average flame length (ft)	12.8	
	Response Time	
	3 HOUR	1 HOUR
Area (acres)	43	3.9
Perimeter (ft)	7260	2179
Estimated spotting distance (mi)	.5	

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 (Map - appendix 8, pg 47)**

This section addresses the essential community values that can be destroyed due to a wildfire. The highest priority for protection is its residents. Human life takes precedence. 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 B of the CPS on pg 18 has a response plan. The response plan, under section E on pg 21, delegates locations of command post, staging areas, safety zones and helispots. These locations are also mapped on the logistics map in map appendix 10 on pg 49. Under section 6 - a of the CPS response plan on pg 21 is the evacuation procedure. Section b on pg 21 has the specific evacuation travel routes. Please refer to the road map on pg 5.

The second highest value is the 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 5 and 6 on pgs 44-45. Subtitle a. of section A of part 1 under the CPS (pg 15) covers actions homeowners can take prior to a wildfire emergency. These steps can help ensure the protection of their structures.

The third is the water system. This encompasses not only the pump stations but also the water shed that feeds the system. The pump houses are represented on the map by dark blue squares. The watershed is indicated by a light blue shaded area with small blue dots. The water shed is very sensitive to wildfire. A crown fire poses the greatest threat because it generally leaves a moonscape landscape in its aftermath. A hillside void of most vegetation is subject to erosion. The material that erodes can clog streams and kill aquatic wildlife. The eroded material can also clog the subdivision's water purification system. A managed forest is less likely to have a crown fire. By thinning the forest that encompasses the water shed with proper tree spacing, a wildfire has a better chance of staying on the ground.

The next item is the subdivision's phone system. The main phone center is indicated by a pink square. The phone system is the main line of communication for outside emergency services. This structure can be protected with a defensible space. Please refer to the Defensible Space section on pg 12 and appendix 5-6 on pgs 44-45.

The final area of concern for the community is the subdivision's equipment storage shed, which houses several expensive pieces of large equipment. The shed is indicated on the values map with a red square. This structure can be protected with a defensible space. Please refer to the Defensible Space section on pg 12 and appendix 5-6 on pgs 44-45.

#### 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 structure's most vulnerable areas is the roof, which is due to the amount of surface area. The roof can be continually inundated with flying firebrands. Metal roofs have been required since 1996 under the subdivision's covenants.

##### 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.

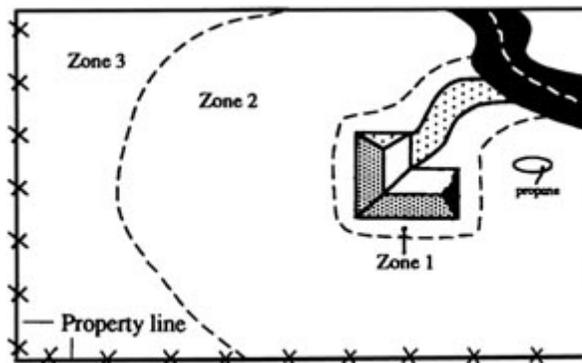
##### E. Windows

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. Since metal roofs are required in Arrowhead, defensible space should be the focus. 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. Landowners should 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 6b, pg 45](#))

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

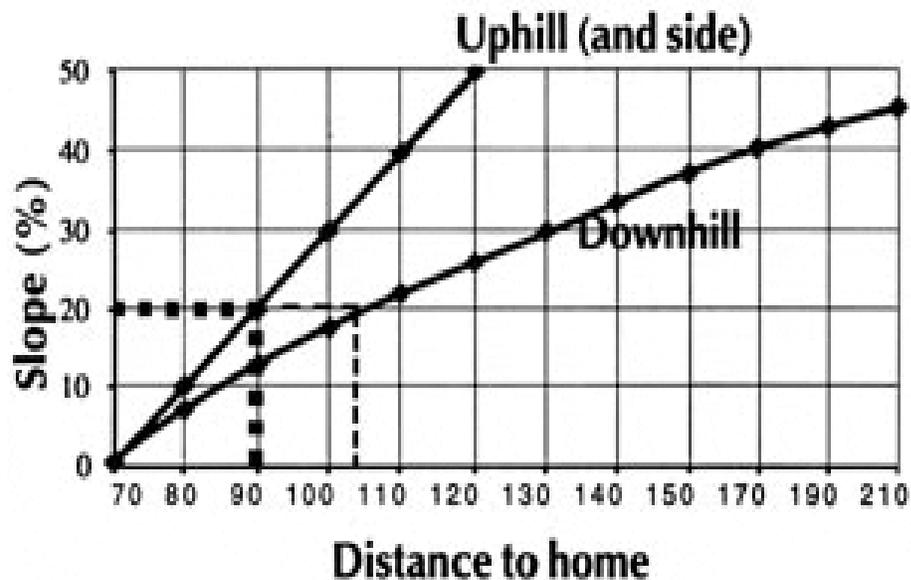
Step 3. Determine fuel type and appropriate mitigation recommendation in [sec. 3, pg 13](#)

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 Zone 2 of Defensible Space

a. Aspen with Vegetative Understory

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. Follow standard recommendations for zone 1.

b. Mixed Conifer (fir, spruce)

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 idea for this fuel type in this zone is to

break up the continuity, thus reducing the chances of a crown fire. Trees should be thinned to 10-12 foot spacing between stems. All residual trees should be pruned up 10 feet from ground level. Remove or evenly distribute all slash. Follow standard recommendations for zone 1.

Precaution: If your trees or home site are susceptible to wind throw and the trees have never been thinned, reduce the amount of trees removed in the first year. Some good indicators of wind sensitive areas: 1) blown down trees 2) large root ball holes 3) ridge tops. If you have a wind sensitive area gradually remove the trees over a 6 year period. Remove more trees every 3 years until you have reached the recommended spacing.

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.
7. The common ground between lots should also be a concern of residents. Residents are encouraged to contact the HOA regarding treatment on common ground between lots.

## VI. Community Preparedness

Concerns about the dangers associated with wildfire have been building over the years in Arrowhead. This has been due to the increased media coverage of wildfires destroying unprepared communities, as well as the Colorado State Forest Service working with Arrowhead's HOA in getting the word out regarding wildfire safety. Forest health is also a concern of the Arrowhead community. The subdivision now realizes just how closely connected forest health and wildfire prevention can be. Forest management is the solution to both problems. A managed forest is a safer and healthier environment. However the ecosystem that encompasses the Arrowhead subdivision is still a fire dependent one. This makes the occurrence of a wildfire likely. A prepared and organized community can lessen the dangers associated with a wildfire.

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

Arrowhead has done a great deal to facilitate its residents in protecting and mitigating their properties and the common ground surrounding them from a wildfire. The Arrowhead volunteer fire department offers local fire protection. However in the event of a major wildfire emergency, Arrowhead is 1 hour away from the closest backup fire department response from Gunnison. This situation has the potential to allow a medium fire to become large or a structural fire to become a wildfire. The subdivision has developed a volunteer fire department that is available for fire emergencies within in the subdivision. One of the early stages of Arrowhead's fight against wildfire involved a literature campaign and wildfire presentations. Pamphlets were distributed to homeowners showing the benefits of fuels mitigation. Local realtors were also included in the campaign to inform potential buyers of the benefits of fuels mitigation. This practice is still taking place today with the assistance of the Colorado State Forest Service and BLM. In 2000, the subdivision purchased a chipper and made it available to its residents with an operator included. This service was provided at a minimal cost to the resident. The subdivision operates a lot that is used as a stump dump. Landowners can, free of charge, drop off any slash from mitigating their lots. The slash is then burned in December. The lists of items in this section are things individual landowners, the entire subdivision, the volunteer fire department, and the sheriff's offices 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.

\* Metal roofs required since 1996 by subdivision rules.

2. Subdivision/Homeowner Actions

- a. In conjunction with the Gunnison Basin Wildfire Council, **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-hydrants in Lower Flint and Hazel Lakes.
  - 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: Arrowhead Fire Department & Gunnison Fire Protection District
    - 2) Wildland
      - a) Private land: Gunnison 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 relieved.

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
Arrowhead	Arrowhead	750 Gallon Tanker	Immediate
Arrowhead	Arrowhead	1000 Gallon Tanker	Immediate
Arrowhead	Arrowhead	(2) 4X4 Brush Trucks	Immediate
Arrowhead	Arrowhead	2500 Gallon Tender	Immediate
GCFPD	Gunnison	2000 Gallon Tanker	1 hour
GCFPD	Gunnison	Class One Pumper	1 hour
GCFPD	Gunnison	Brush Fire Unit	1 hour
GCFPD	Gunnison	Brush fire Unit	1 hour
BLM	Montrose	Type 5 or 6 Engine	45 Minutes
USFS	Gunnison	Type 6 Engine	50 Minutes
USFS	Gunnison	Type 6 Engine	50 Minutes

3. Access (General) (refer to AH road map, pg 5)
- a. Road System - Of the approximately 17 miles of roads within the subdivision:
    - 1) Most are constructed of gravel.
    - 2) Most 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 (Map - appendix 9, pg 48)

a. Ponds/Creeks/Lakes

Type P/C	#/Name	Status P/I	Helicopter Accessible Y/N	Pump Required Y/N	Water Capacity When Full (1,000 GALS.)
L	Hazel Lake	P	Y	Y	6,000
L	Evergreen Lake	P	N	N	319
L	Flint Lakes *	P	Y	Y	11,000

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

\* Best source - Flint Lakes

**(EVERGREEN AND FLINT LAKES ARE ON AN ADJACENT PROPERTY. OBTAIN PERMISSION FROM JIM SQUIRRELL AT 970-249-3034.)**

b. Hydrants

#	Type D/P	Data TP & S	GPM Output	Comments
84	Pressurized	2.5 "	100	In case of an emergency output can be doubled.
1	Dry			

Key: Type: D = Dry, P = Pressurize  
 Data: TP = Thread Pattern, S = Size  
 GPM: maximum rated output

5. Locations (Map - appendix 10, pg 49)

- a. Command Post - The following location(s) are recommended Incident Command Post (ICP) location(s):
  - 1) Arrowhead Fire Station
  - 2) Inn at Arrowhead
- b. Staging Area(s) - The recommended staging area for operations within the subdivision is/are designated as:
  - 1) Location Arrowhead Fire Station
  - 2) Designation (Name) Arrowhead Staging
  - 3) Ownership Arrowhead Improvements Association
- c. Safety Zone(s) - The recommended safety zone(s) for operations within the subdivision is/are designated as:
  - 1) Alpine Plateau Road
  - 2) Hazel Lake
  - 3) Dam at Flint Lakes
- d. Helispot(s) - The recommended helispot(s) for operations within the subdivision is/are designated as:
  - 1) Meadow at Intersection of Alpine Plateau Road and Lake Road.
  - 2) Meadow at Intersection of Alpine Plateau Road and Spruce Road.
  - 3) Dam at Flint Lakes

6. Evacuation (refer to AH Road Map, pg 5)

- a. Procedure
  - 1) The Incident Manager 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

Evacuation will use the Alpine Plateau road because it can facilitate the most traffic. There is also a primitive road that connects Alpine Plateau road to Highway 50. It intersects Alpine Plateau in Section 6, Range 4 West, Township 47 N, and intersects Highway 50 approximately 1.5

miles west of the Alpine Plateau Road. This road crosses private property and may have locked gates. It may be necessary to channel traffic to Lake City if a fire is threatening the North end of the subdivision via Alpine Plateau Road South to Highway 149 (summer only)

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.

8. Utilities

- a. Telephone service is below ground. There are approximately 159 service boxes present.  
    Provided by Nucla-Naturita Telephone Company  
    Telephone # 970-864-7335
- b. Electrical service is (below/above) ground. There are approximately 140 transformers, 13 primary junction boxes, and 149 utility pedestals present.  
    Provided by Gunnison County Electric Association  
    Telephone # 970-641-3520
- c. Some homes utilize propane while 0 homes utilize central natural gas.  
    Propane provided by: National propane (970) 249-4785,  
    AmeriGas 1-800-570-2241
- d. Individual homes utilize central water system.  
    Provided by James F. Squirrel  
    Telephone # 970-862-8294, 862-8204, 249-3024 and 249-2333

9. Adjacent Property

Ownership	Phone
BLM	(970) 641-0471
Meldrum	(970) 641-1332
Jardin	(970) 252-8445
Water Co	(970) 862-8204
Hobsan/Leban	(970) 862-8204
Prock	(970) 249-2638
Filener	(970) 249-0866
Ute Mountain Tribe Ranch	(970) 565-3751

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
    - (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) Possible loss of or reduction of water capacity due to high demand on water system.
- 5) Limited availability of personnel and resources.
- 6) Power lines are buried, utility service boxes on roadsides.
- 7) Septic systems.
- 8) Frightened and confused pets.
- 9) Hazardous materials, including propane and elevated 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 fireline.

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 publics 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.

## VIII. Vegetation Management

The forests in Arrowhead subdivision are in declining health and have heavy fuel accumulations. Years of fire suppression in the area have changed its fire regime. The ecosystem in Arrowhead is a fire dependent one. In pre-settlement times, low intensity ground fires would periodically burn through the area. The low intensity ground fires thinning the forest by scorching and killing seedlings. These forests had significantly lower stocking than the current forests. Correctly stocked forests are better able to defend itself from wildfire, insect and disease. When too many trees compete for the same limited amount of nutrients and sunlight, an unnatural weak forest grows. Over stocked weak forests are also highly susceptible to crown fires, due to the ladder fuel effect. The ladder fuel effect is created when large amounts of trees are allowed to grow in the understory of a forest. The understory trees allow a ground fire to climb up low lying branches and into the crowns of big trees. Forest management is the solution to better forest health and reduced fuels.

A second factor in the declining health of Arrowhead's forest is age. 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. By removing over mature trees a younger and more vigorous stand of trees can replace them.

This is highly evident in overly mature aspen stands which have insect and disease problems. Conifer invasion is also a problem and is evident in stands at Arrowhead subdivision. The conifer is a shade tolerant species and aspen is a shade intolerant species. What this means is that conifer can grow in the understory of aspen but aspen cannot grow in the understory of conifer. In pre-settlement times once an aspen stand achieved its biological maturity, generally, a disturbance (fire, wide spread mortality) would occur in the stand. The disturbance would open up the stand and allow the sunlight to reach the forest floor. This starts a cascading effect by sending a chemical signal to the aspen common root system. The signal tells the root system to send up a new flush of growth. However since the current stands have grown past their biological maturity, shade tolerant conifers have been able to grow in the understory and dominate. Now when the over-mature trees die, the sunlight cannot reach the new growth, allowing the conifer to take over and replace the species composition of the stand. Aspen are less prone to wildfire than conifers, so from a wildfire safety stand point this makes aspen a more desirable species around structures. The leaves of the aspen do not contain the volatile chemicals that are found in conifers. Certain species of wildlife also depend upon aspen stands in various stages of maturity. By managing the forest of Arrowhead a good balance of species and age can be kept.

Adverse effects due to over maturity are not limited to aspen stands, but also occur in the conifer stands. Balsam bark beetle has been attacking the over mature Sub-alpine fir and Douglas fir of Arrowhead are beginning to be attacked by the Douglas fir bark beetle. 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 sap as one of their main defense mechanisms against beetles. Once a beetle begins to bore into a healthy tree a flush of sap flows to that area and entraps the beetle. The sap then flows out of the tree with the beetle

entombed. When a tree begins to die back it produces less sap. By allowing older trees to become infested it gives the beetles a chance to build up large populations. Once the large populations have infested and killed the weak and over mature trees, they can begin to attack the younger trees. By managing the forest and removing over mature trees, large populations of beetles have a lower chance of becoming established and completing life cycles.

Most of the high wildfire risk areas in the subdivision can be described as dense conifer stands (Douglas fir or Spruce) with young conifers growing in the shade of mature trees. These conditions are due to the succession of forests in the Rocky Mountains. Succession is a term used to describe how an ecosystem is forever changing. The change is not sudden but spread out over decades and perhaps centuries. The change involves stand composition, structure and biomass.

Conifer makes up approximately 65% of Arrowhead's forests while Aspen make up approximately 30% of the remaining cover type. The Aspen are present because there was a disturbance in the forest, probably wildfire. Aspen require abundant sunlight and regenerate in the openings created by disturbance. The wildfire risk in this cover type is moderate due to the low occurrence of crown fires and absence of volatile chemicals. The remaining 5% of vegetative cover is grass and sage brush. This cover type has a low potential for wildfire. Both the Aspen and the conifer can be managed as healthy, attractive forests, but not managed, forests become overstocked; this is what is happening at Arrowhead. Trees in overstocked forests are unhealthy, vulnerable to insect and disease infestations and wildfire. This describes the forest in Arrowhead.

Another indication of an unhealthy forest is Western spruce budworm (WSBW) infestations. WSBW attacks crowded multi-storied stands of Douglas fir. WSBW has infested the Douglas fir trees in the past. However the Arrowhead Improvements Association began monitoring and spraying the budworm in 1987. Spraying was effective in the sense that it has reduced the WSBW population. No large populations of WSBW have been found in over ten years. However trees are still overcrowded, unhealthy, and susceptible to insects, disease, and wildfire.

The best long term protection to the threats of insects, disease, and wildfire is for Arrowhead to manage their forests. Homeowners should begin management by thinning trees around their homes. This will provide "Defensible Space" for fire fighters to protect homes. It will also increase the health of the forest on individual properties. Defensible space guidelines can be found on [pg 12](#).

## A. Mitigation Treatment Priority

### 1. Risk Analysis

All of the Gunnison Basin has been mapped for wildfire hazard risk. The mapping was done with Arc-view GIS program. A total risk analysis formula was developed to determine a site's risk level and contained the following components which had a specific weight for the final evaluation. The components are: fuel hazard evaluation (based on USGS fuel cover

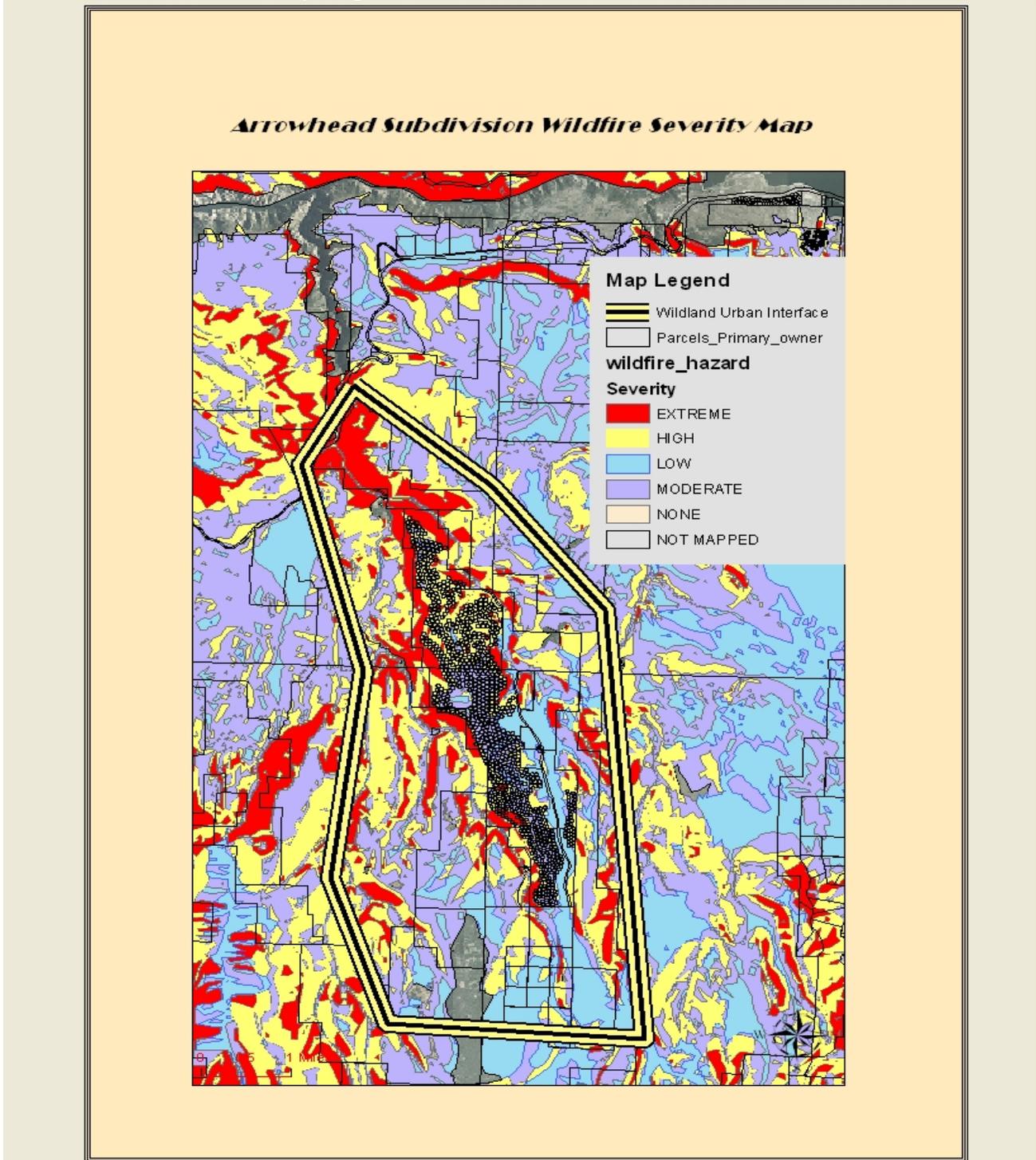
types), slope hazard evaluation, aspect evaluation, ladder fuels, forest density, insect and disease. The total hazard equation is as follows: (fuel hazard\*slope) + aspect hazard+ladder fuel+density+insect and disease=total hazard. The result is a range of wildfire hazard from 0-20, minimum to maximum. The final GIS process evaluates the total hazard and categorizes their values as follows:

**Refer To Wildfire Severity Rating Map on the Next Page**

Total Hazard Rating	Wildfire Hazard Severity	Color Code/Treatment Priority
0	None	Tan
1-4	Low	Blue > 4
5-8	Moderate	Purple > 3
9-12	High	Yellow > 2
13+	Extreme	Red > 1

The Gunnison County Wildfire Hazard Severity Map is the most comprehensive wildfire mapping for the Gunnison basin and is used to determine where the highest priority for fuels mitigation is needed. The data from the wildfire hazard survey has been color coded. The highest wildfire severity areas are colored in red, the second highest is in yellow and the lowest in purple and blue. The two highest levels of wildfire severity have been used in determining the highest treatment priority and current fuels mitigation projects. The northern half of the subdivision has the highest potential for a wildfire according to the mapping data. All of the current and past mitigation projects are located in this general area. With the exception of the Spruce Rd. project. (fuels mitigation map, pg 32) This project is located in the southwest corner of the subdivision. This area was chosen for the same reasons as the above projects, the potential for life and property loss is high, the fuels are heavy, and the terrain is steep. An action plan found in the next section will describe each project and give a start date.

B. Wildfire Severity Map



Total Hazard Rating	Wildfire Hazard Severity	Color Code/Treatment Priority
0	None	Tan
1-4	Low	Blue > 4
5-8	Moderate	Purple > 3
9-12	High	Yellow > 2
13+	Extreme	Red > 1

### C. Fuels Mitigation Action Plan

Thinning projects in Arrowhead subdivision have been carefully chosen over the years. The idea has been to address and focus on areas with the most potential for both life and property destruction. Their destructive potential and treatment priority was determined by the Gunnison Wildfire Severity Hazard map (pg 29) and proximity to structures.

Each timber type requires specific prescription to accommodate for species traits. The type of root system a species has is a key factor in determining a mitigation prescription. Root system characteristics determine how wind firm a species is ie: deep root system equals wind firm species. Trees in a forest depend upon each other to lessen the effects of wind. Each tree absorbs a percent of wind velocity in a forest. The velocity of wind puts pressure on trees causing them to blow down and the fewer trees in a forest the more potential velocity wind can have. If you compound that factor with a shallow root system, blow down problems arise. This problem is accelerated on ridge tops. Not only does the root system play a role in prescription determination. The position were the stand is located on the slope is also a factor in prescription determination. The more wind firm a species is determines how heavily a stand can be thinned. Precautions can also be taken when thinning a non wind-firm species or thinning on a ridge top in order to achieve objectives. Buffers can be left on the outside of a thinning area. Leaving heavier stocking compared to the rest of the thinned stand. The idea is to reduce the velocity of the wind before it reaches the thinned area. Arrowhead subdivision has a diverse selection of species and topography within its forest. Species are generally not found in pure stands. The significant portion of the forest in Arrowhead can be labeled mixed conifer. This means that multiple species of conifer can be found in these stands. A general prescription is developed in the beginning. Accommodations are made in the field by the forester to compensate for diverse species traits.

All of the prescriptions for the projects have been similar except for the specific species adjustments. Below is a general overview of the majority species found in Arrowhead subdivision. All of the stands in the projects have been overstocked. The objective has been to reduce fuel and prevent crown fires. Thinning has been from below with an average spacing of 10-12 feet between stems. Variability was based upon species traits and slope position. Selection criterion for removal is listed in descending order: dead, diseased, and poor form. All residual trees are pruned up ten feet from ground level to prevent ladder fuel issues.

### D. Species Overview

Douglas fir is a prevalent species in Arrowhead 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. The majority of the mitigation work has been in this timber type.

Spruce, both Engelmann and blue are found in Arrowhead subdivision. Both are considered to have a high wildlife value. 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 prefer 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 to heavy. Close attention to thinning prescriptions was paid while thinning on ridge tops.

Sub-alpine fir has similar growth characteristics as spruce. Generally these two species are found growing together. Sub-alpine fir has a fair wildlife value; its elevation range is 8,000 to 11,000 feet and prefers north facing slopes. This species is not considered wind-firm, and the same precautions used for spruce are applied to this species.

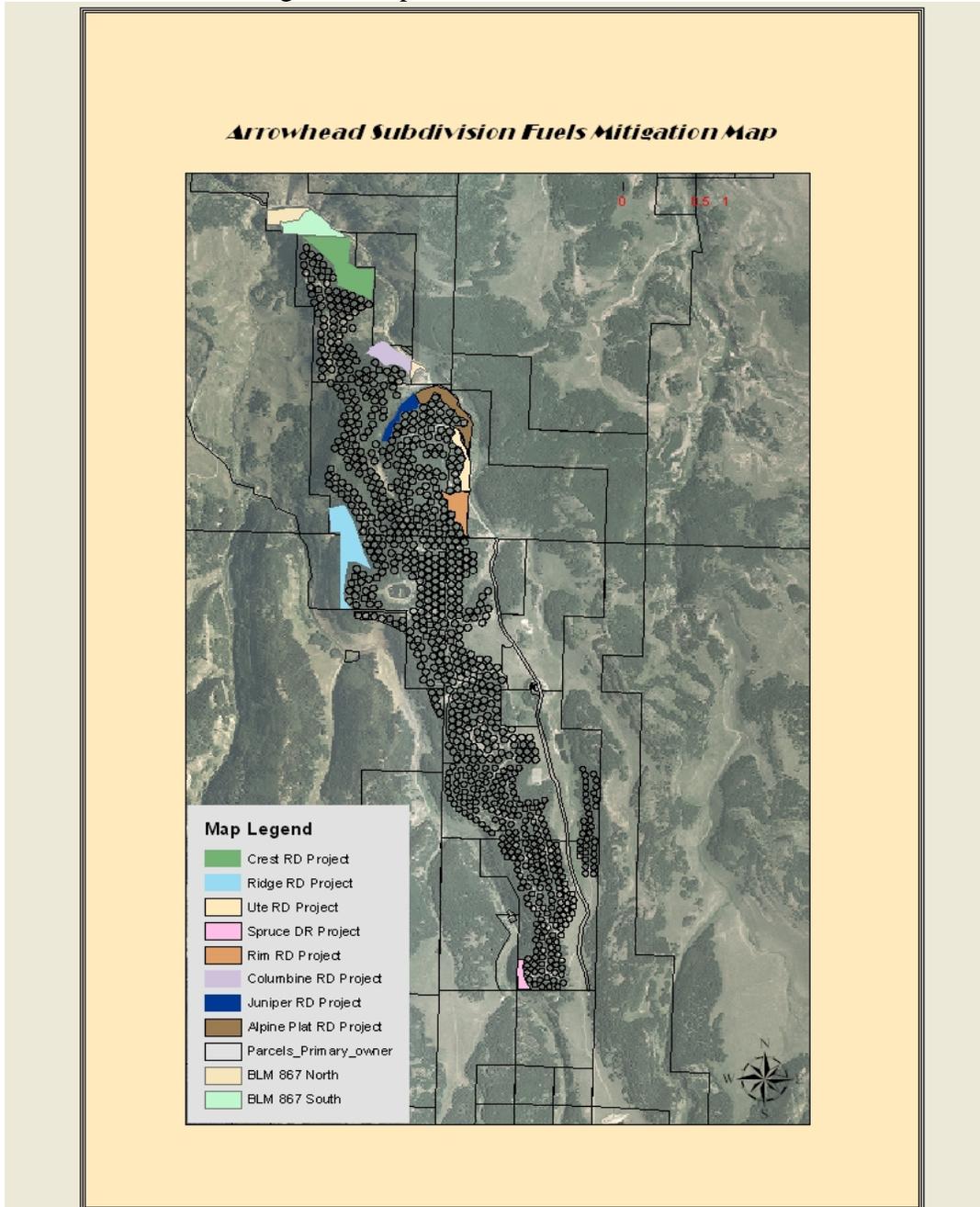
Aspen is the final majority species found in the Arrowhead subdivision. No mitigation work has been done in this species, due to its minimal wildfire risk, as the leaves of aspen do not contain the volatile chemicals found in conifers. Mitigation in this species requires mowing the vegetation in the understory to a height of 6-8 inches.

#### E. Cost/Grants

Vegetation management is a costly procedure in the Gunnison basin area. The average cost of fuels mitigation in Arrowhead has been \$900/acre. There is a cost saving using a Timbco versus a hand crew. However topography limits the use of heavy machinery in the subdivision. 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. The 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 Arrowhead's mitigation projects comes from multiple sources. The first two sources are from within the subdivision, homeowner dues and the second is volunteer hours. The third source of funding is grants. The main program that Arrowhead has taken 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. To date Arrowhead subdivision has received close to \$100,000 in grant money.

F. Fuels Mitigation Map



Project	Description	Acres	Start Date	Complete Date
Alpine Plat. Rd	Fuel Reduction	22.5	2002	2003
BLM 867 S.	Fuel Reduction	25	2004	2004
Ute Rd	Fuel Reduction	14.1	2004	2005
Juniper Rd	Fuel Reduction	15.3	2004	2005
BLM 867 N.	Fuel Reduction	14	2005	2005
Rim Rd	Fuel Reduction	19.2	2005	2005
Spruce Rd	Fuel Reduction	10	2006	2006
Columbine	Fuel Reduction	Fund Dependent	2007	2007
Crest	Fuel Reduction	Fund Dependent	2008	2008
Ridge	Fuel Reduction	Fund Dependent	2009	2009

## G. Project Descriptions

The map on the previous page illustrates where the following projects are located on the landscape. It also gives a good picture of how some of the projects tie into one another. This section gives a synopsis of each project and tells what is unique about each.

### 1. Alpine Plateau Rd. Project

The Alpine Plateau Rd. project is located on the northwest corner of Ute Rd. and Alpine Plateau Rd. It follows the northern half of Ute Rd. and the west half of Alpine Plateau Rd. The average slope of the area is 25% and has a north facing aspect. This area was chosen due to its fuel loading and steep topography. It is also located adjacent to a highly populated area of the subdivision. Work was performed by hand crews with chainsaws and slash was disposed of with the use of chippers.

### 2. BLM 867 South Project

This project is located on the west side of Alpine Plateau Rd (BLM 867) approximately 3-4 miles south from Highway 50. This project is located on federal property and is managed by the Bureau of Land Management. The average slope of this area is 30% and was chosen by the BLM due to its location to the Arrowhead subdivision. It is located down slope from the subdivision and poses a high wildfire risk. It is adjacent to Highway 50, which is an ignition source. The project was completed by hand crews with the use of chainsaws. The slash was disposed of through piling and burning. The project was anchored into the adjacent Alpine Plateau Rd.

### 3. Ute Rd. Project

The Ute road project begins at the southeast corner of Ute Rd and Alpine Plateau Rd. It continues up the southern half of Ute Rd and the western side of Alpine Plateau Rd and it anchors into the alpine Plateau Rd project on its Southern boundary. The average slope of this area is 30% and was chosen due to its fuel loading and steep topography. It is also located adjacent to one of the main escape routes for the subdivision. Work was performed by hand crews with chainsaws and slash was disposed of through piling and burning.

### 4. Juniper Rd. Project

The Juniper Rd Project is located at the northern end of juniper Rd. The average slope of this area is 20% and was chosen due to its fuel loading and steep topography. It is also located adjacent to a highly populated area of the subdivision. The northern boundary is adjacent to Highway 50 which is a main route for commerce and travel and has a high potential for ignition. It anchors into the Alpine Plateau Rd project on its western boundary. The work was performed by both hand crews and a Timb-Co which is a tracked machine

with a grinding head on it that grinds the trees from top to bottom into small pieces 3"-9". This machine is the most cost effective method used by the subdivision and was used on this project due to the relatively gentle topography of the area.

5. BLM 867 North Project

This area is on the west side of Alpine Plateau Rd (BLM 867), approximately 3-4 miles south of Highway 50. This project anchors into both the road and the BLM south project. It has the same hazard factors as the southern project. The same prescription and implementation methods were applied as in the southern BLM project.

6. Rim Rd Project

The Rim Project is located at the western end of Rim Rd and its western boundary is Alpine Plateau Rd. Due to its relatively gentle slope of 25% the Timb-Co machine was used. This project is anchored into the southern boundary of the Ute Rd project.

7. Spruce Rd Project

This is the most recent thinning project completed at Arrowhead subdivision. It is located at the eastern end of Spruce Dr and is very steep with an average slope of 30+%. This area was chosen because of its location to a heavily populated section of the subdivision. The work was completed by a hand crew with chainsaws and slash was disposed of through a method called lop and scatter. The slash and logs are cut into manageable pieces and then scattered evenly through out the project area.

8. Columbine Project

The Columbine project is scheduled to start in 2007. The project is located in treatment priority one and will be along the western border of Alpine Plateau Rd. approximately 5-6 miles south of Highway 50. The project will extend up to the southern end of Columbine Rd., with actual size of the project dependent upon the funding that is available at the time. The terrain is steep with a 30+% slope and will require the use of a hand crew.

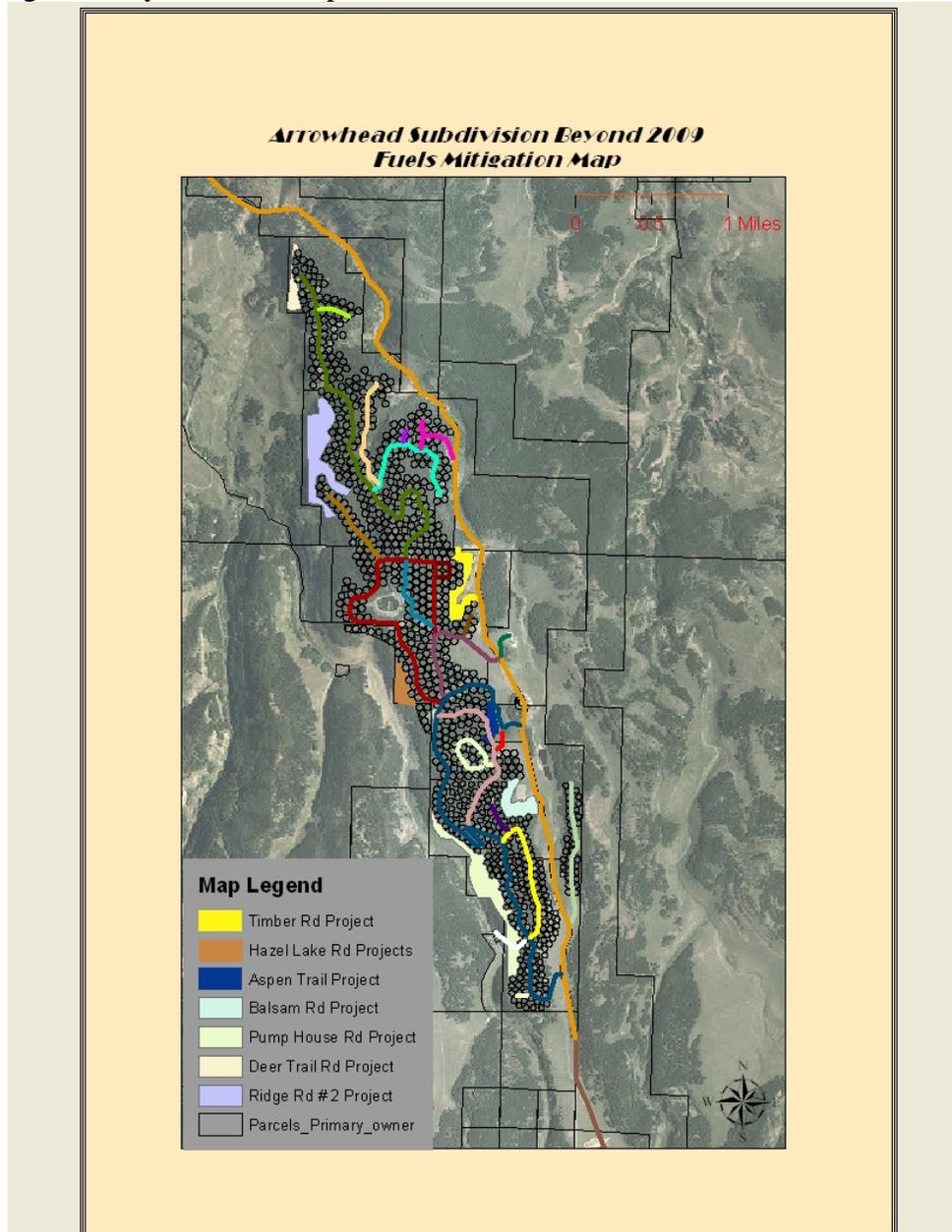
9. Crest Rd Project

This project is scheduled to start in 2008. Its location will be along the western half of Alpine Plateau Rd. approximately 3-4 miles south of Highway 50. It will anchor into the southern BLM 867 project and the size of the project will be determined by the funds available. The slope of the area is 30%+ and will require a hand crew.

10. Ridge Rd Project

The Ridge Rd Project is scheduled to start in 2009. The project is located on the western boundary of the subdivision and is adjacent to the western side of Hazel Lake Rd

H. Mitigation Beyond 2009 Map



Project	Description	Acres	Start Date	Complete Date
Deer Trail Rd Project	Fuel Reduction	11	2010	2010
Ridge Rd #2 Project	Fuel Reduction	58	2011	2014
Hazel Lake Rd Project	Fuel Reduction	12	2015	2015
Pump House Rd Project	Fuel Reduction	55	2016	2019
Balsam Rd Project	Fuel Reduction	21	2020	2020
Aspen Trail Project	Fuel Reduction	12	2021	2021
Timber Rd Project	Fuel Reduction	23	2021	2022

## I. Mitigation Beyond 2009: Project Overview

Fuels mitigation will always be an important part of Rocky Mountain community living. There are still an estimated 192 acres of untreated, contiguous, manageable, common ground which has a high to extreme fire danger. (Mitigation Beyond 2009 Map, Pg 36) The map illustrates the areas of future concern. Seven areas have been identified as targets for future mitigation projects. This is due to their wildfire hazard rating and close proximity to structures. The recommendation is to start with the Deer Trail project in the northwest corner and move in a counter clock wise direction.

The fuels on the west side of the subdivision are denser than the east side. The prevailing winds are from the southwest. In the event of a landscape scale wildfire the defenses on the west side are going to be critical. Once these areas have been treated all contiguous, manageable, common ground has been mitigated.

Mitigation projects will need to be revisited and maintained in the future. Forests continually regenerate themselves. Arrowhead is currently treating an average of 15 acres a year. At this rate once all the manageable common ground has been treated. 20 years will have gone by since the start of the first mitigation project at Arrowhead. Fire is capricious and will find the weakest link in your fire defenses. Therefore the best approach to wildfire safety will always be a proactive one. In the case of Arrowhead subdivision, this requires continual forest management, reviewing the CWPP and landowner education

## APPENDIX 1 DEFINITIONS

**ASPECT** is a position facing a particular direction.

**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 man-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 "Critical 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 breaks 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  
**COLORADO STATE FOREST SERVICE**  
**WILDFIRE HAZARD RATING FORM**  
**- SUBDIVISION -**

CSFS#175 (6/97)

NAME OF SUBDIVISION Arrowhead DATE December 96  
 COUNTY Gunnison SIZE(AC) 2525 #LOTS 834  
 RATING 66 COMMENTS

A. SUBDIVISION DESIGN

- 1. INGRESS/EGRESS:
  - TWO OR MORE ROADS PRIMARY ROADS 1
  - ONE ROAD 3
  - ONE-WAY IN, ONE-WAY OUT 5 X
- 2. WIDTH OF PRIMARY ROAD:
  - 20 FEET OR MORE 1 X
  - 20 FEET OR LESS 3
- 3. ACCESSIBILITY:
  - ROAD GRADE 5% OR LESS 1
  - ROAD GRADE 5% OR MORE 3 X
- 4. SECONDARY ROAD TERMINUS:
  - LOOP ROADS, CUL-DE-SACS WITH OUTSIDE TURNING RADIUS OF 45 FEET OR GREATER 1
  - CUL-DE-SAC TURN-AROUND RADIUS IS LESS THAN 45 FEET 3
  - DEAD-END ROADS 200 FEET OR LESS IN LENGTH 3
  - DEAD-END ROADS GREATER THAN 200 FEET IN LENGTH 5
- 5. AVERAGE LOT SIZE:
  - 10 ACRES OR LARGER 1
  - LARGER THAN 1 ACRE, BUT LESS THAN 10 ACRES 3
  - 1 ACRE OR LESS 5 X
- 6. STREET SIGNS:
  - PRESENT 1 X
  - NOT PRESENT 5

B. VEGETATION

- 1. FUEL TYPES:
  - MODELS 1,2 1
  - MODELS 5,8,9 3
  - MODELS 6,7 5
  - MODELS 10,11,12 8 X
  - MODELS 3,4,14 10
- 2. DEFENSIBLE SPACE:
  - 70% OR MORE OF SITE 1
  - 30% OR MORE, BUT LESS THAN 70% OF SITE 3
  - LESS THAN 30% OF SITE 5 X

C. TOPOGRAPHY

1. PREDOMINANT SLOPE

- 8% OR LESS 1
- MORE THAN 8% BUT LESS THAN 20% 4
- 20% OR MORE BUT LESS THAN 30% 7 X
- 30% OR MORE 10

D. ROOFING MATERIAL

- CLASS A RATED 1
- CLASS B RATED 3 X
- CLASS C RATED 5
- NON-RATED 10

E. FIRE PROTECTION - WATER SOURCE

- 500 GPM HYDRANT WITHIN 1000 FEET 1     HYDRA
- WATER SOURCE 20 MINUTE OR LESS, ROUND TRIP 5 X
- WATER SOURCE FARTHER THAN 20 MINUTES, AND 45 MINUTES OR LESS ROUND TRIP 7
- WATER SOURCE FARTHER THAN 45 MINUTES ROUND TRIP 10

F. EXISTING BUILDING CONSTRUCTION MATERIALS

- NONCOMBUSTIBLE SIDING/DECK 1
- NONCOMBUSTIBLE SIDING/COMBUSTIBLE DECK 5
- COMBUSTIBLE SIDING AND DECK 10 X

G. UTILITIES (GAS AND/OR ELECTRIC)

- ALL UNDERGROUND UTILITIES 1 X
- ONE UNDERGROUND, ONE ABOVE GROUND 3
- ALL ABOVE GROUND 5

H. FIRE PROTECTION

- 1. Response Time:
  - within 15 minutes 1
  - within 16-30 minutes 5
  - greater than 31 minutes 10 X

**TOTAL FOR SUBDIVISION: 66**

RATING SCALE:

MODERATE HAZARD 40 - 59  
 HIGH HAZARD 60 - 74  
 EXTREME HAZARD 75+

APPENDIX 3  
**CSFS Wildfire Hazard Matrix**  
**For**  
**Individual Lots**

Slopes %

Class *	0 - 8%	9 - 20%	21 - 30%	31%+
1	LOW	MODERATE	MODERATE	HIGH
2	MODERATE	HIGH	HIGH	EXTREME
3	MODERATE	HIGH	EXTREME	EXTREME
4	HIGH	EXTREME	EXTREME	EXTREME

\*As described in the NWCG publication *Wildland Home Fire Risk Meter*

APPENDIX 4  
**CSFS Wildland Home Fire Risk Evaluation System**

1. Utilize the "Home Fire Risk Meter" to establish a base rating.
2. Utilize the following list of items to assess "penalty points". Each penalty point is one increment on the Hazard Meter.

ITEM	# PENALTY POINTS
Wood Deck	1
Stilted construction	1
Wood siding	1
Debris on roof (needles, etc)	1
No vent screens	1
No chimney spark arrester	1
Fuelwood on deck, under porch	2
Branches above roof	2
Tree(s) through deck or roof	2
Non-maintained wooden siding	2
Branches within 10 ft of roof	2
Poor access	2

3. Utilize the following Wildland-Urban Interface Individual Home rating form to record data.

**\_\_\_\_\_ FIRE PROTECTION DISTRICT**

**WILDLAND-URBAN INTERFACE  
INDIVIDUAL HOMESITE  
WILDFIRE HAZARD & STRUCTURE TRIAGE RATING**

**COUNTY:\_\_\_\_\_ SUBDIVISION:\_\_\_\_\_ DATE:\_\_\_\_\_**  
**ADDRESS:\_\_\_\_\_ RATED BY:\_\_\_\_\_**

RATE USING: <i>WILDLAND HOME FIRE RISK METER</i>						ADD 1 POINT FOR EACH					
LOT #	OWNER NAME	% SLOPE	VEG TYPE (<100')	ROOF TYPE	PRELIM RATING	WOOD DECK	STILTED HOUSE	WOOD SIDING	ROOF DEBRIS	NO SCREEN ON VENTS	NO SPARK ARRESTOR

ADD 2 POINTS EACH					RECOMMENDATIONS						
FUEL ON OR UNDER DECK	BRANCHES <10" OF ROOF	ROOF/DECK TREE	NON-MTND. WOODEN SIDING	POOR ACCESS	TOTAL CORRECTED POINTS	LOT VEG TYPE	DEFENSE SPACE DIMENSIONS U  D  L  R	PRUNE HEIGHT	DEAD & DOWN	MOW	HAZ-MAT FUELS PRESENT AND TYPE

NFPA OCCUPANCY HAZARD CLASSIFICATION NUMBER:\_\_\_\_\_ NFPA CONSTRUCTION CLASSIFICATION NUMBER:\_\_\_\_\_

STRUCTURE VOLUME:\_\_\_\_\_ VOLUME = (W x L) X (H +1/2AH)MINIMUM WATER SUPPLY:  
MINIMUM WATER SUPPLY = (TOTAL STRUCTURE VOLUME / OCCUPANCY HAZARD CLASS) X CONSTRUCTION CLASS

COMMENTS:

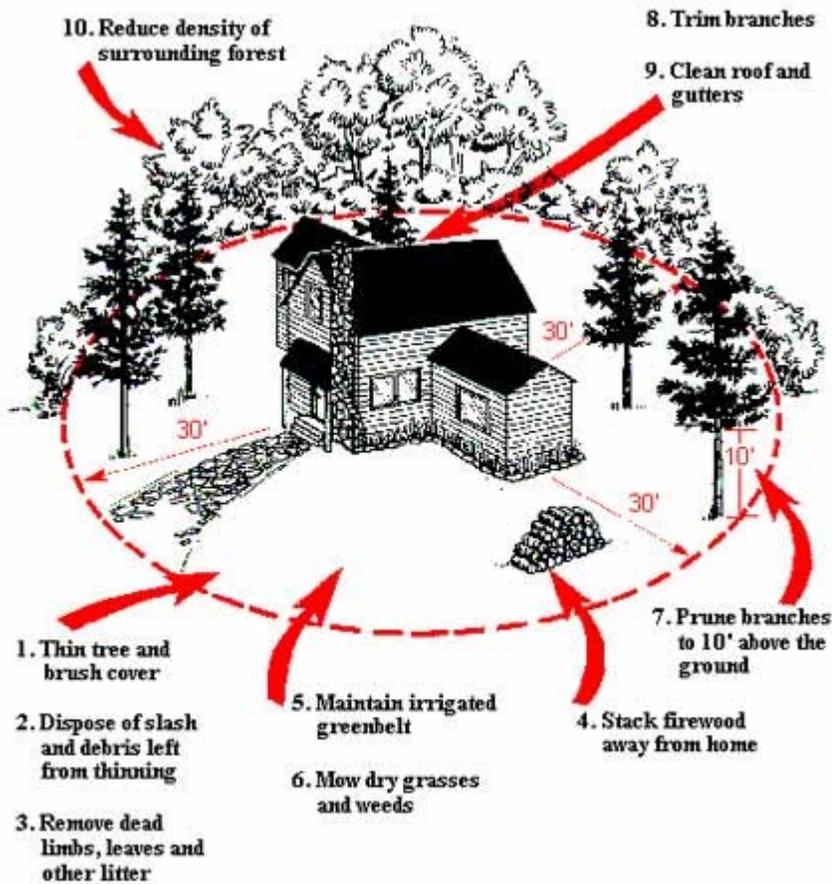
APPENDIX 5  
**Additional Defensible Space Information**

**Definition:** An area either natural or man-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.

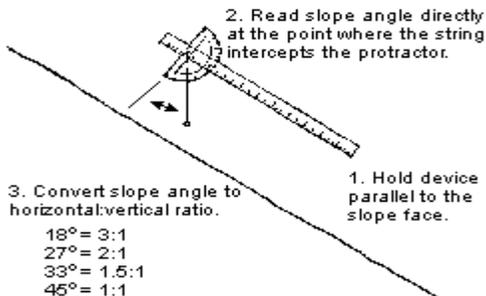
APPENDIX 6  
**Additional Defensible Space Information**  
 6A



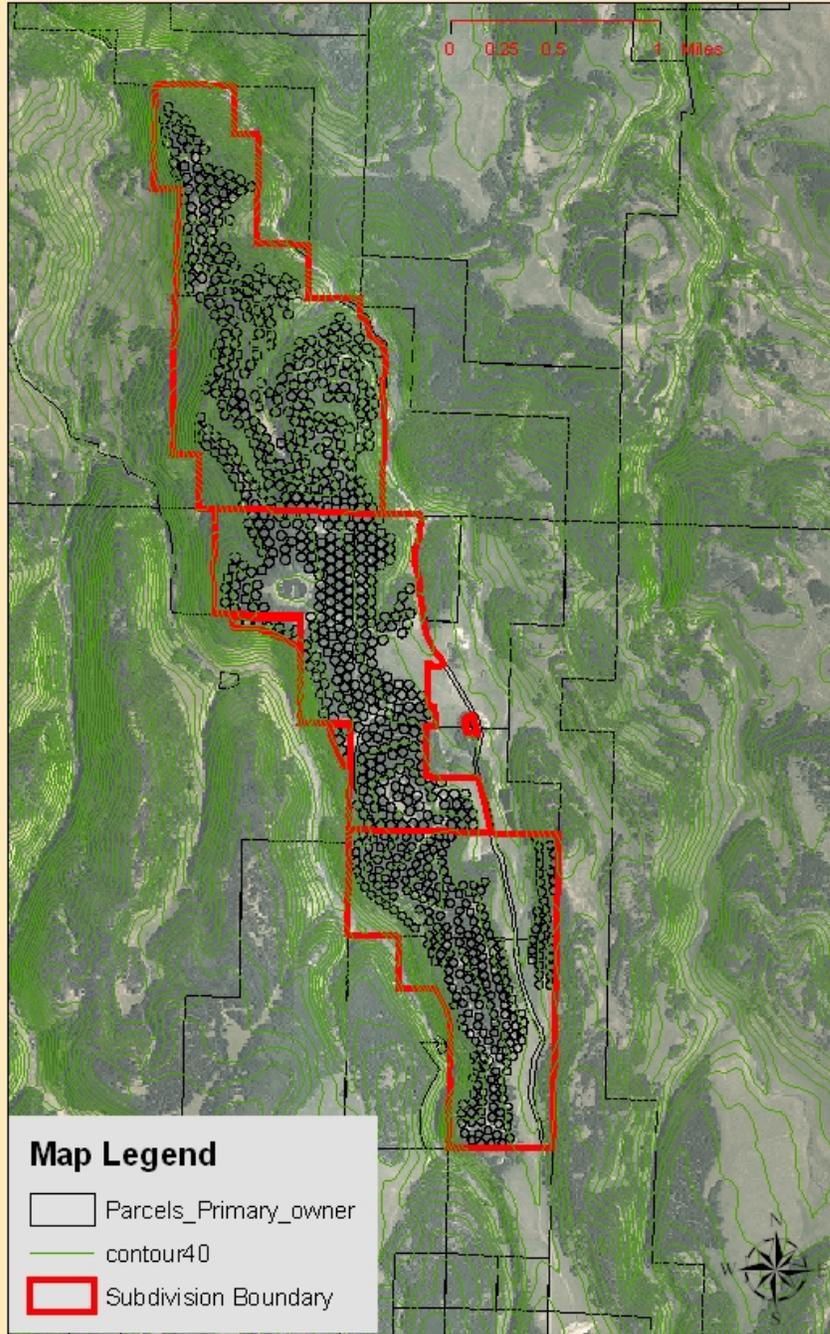
6B You can create a simple tool out of household materials to help you determine your slope.  
 Materials:

- 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.

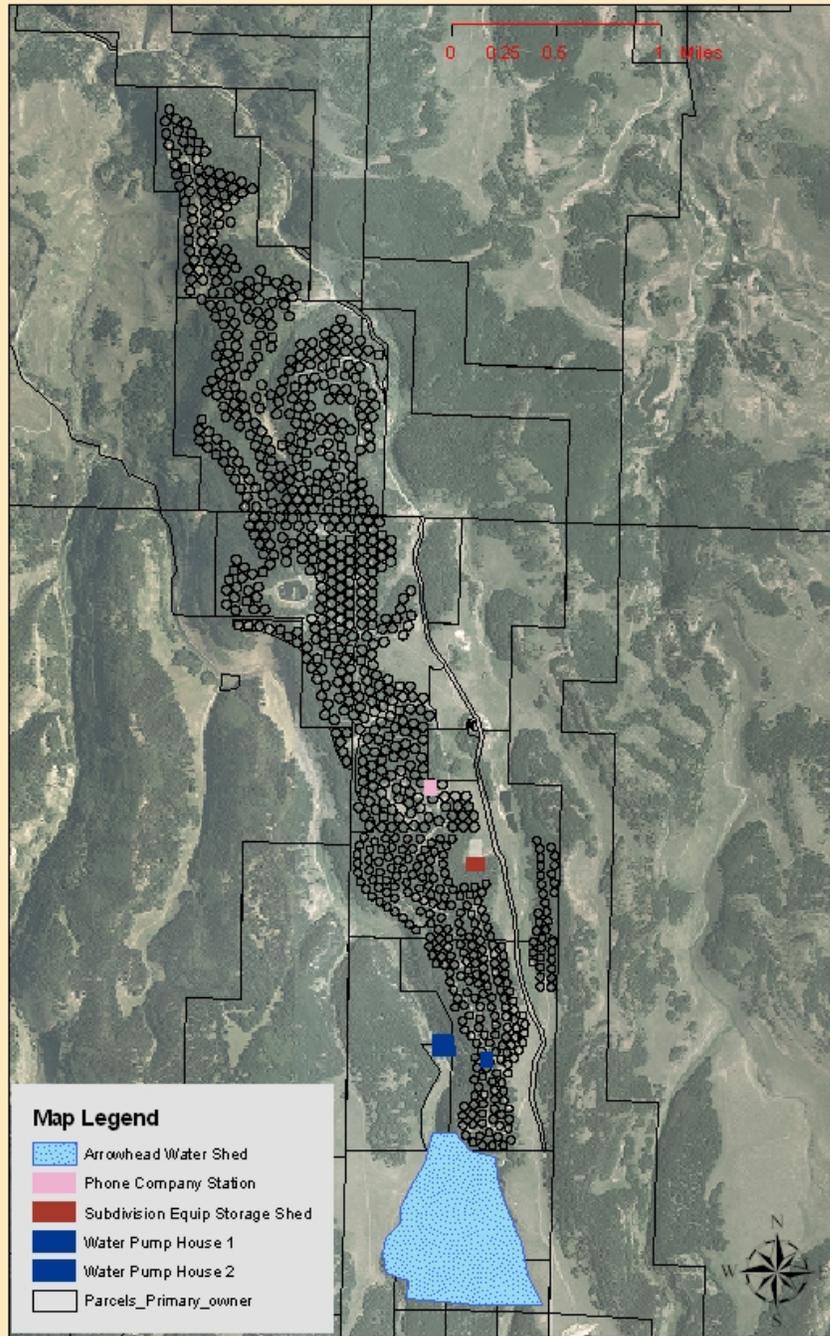


**Appendix # 7**  
**Arrowhead Subdivision Topographic Map**

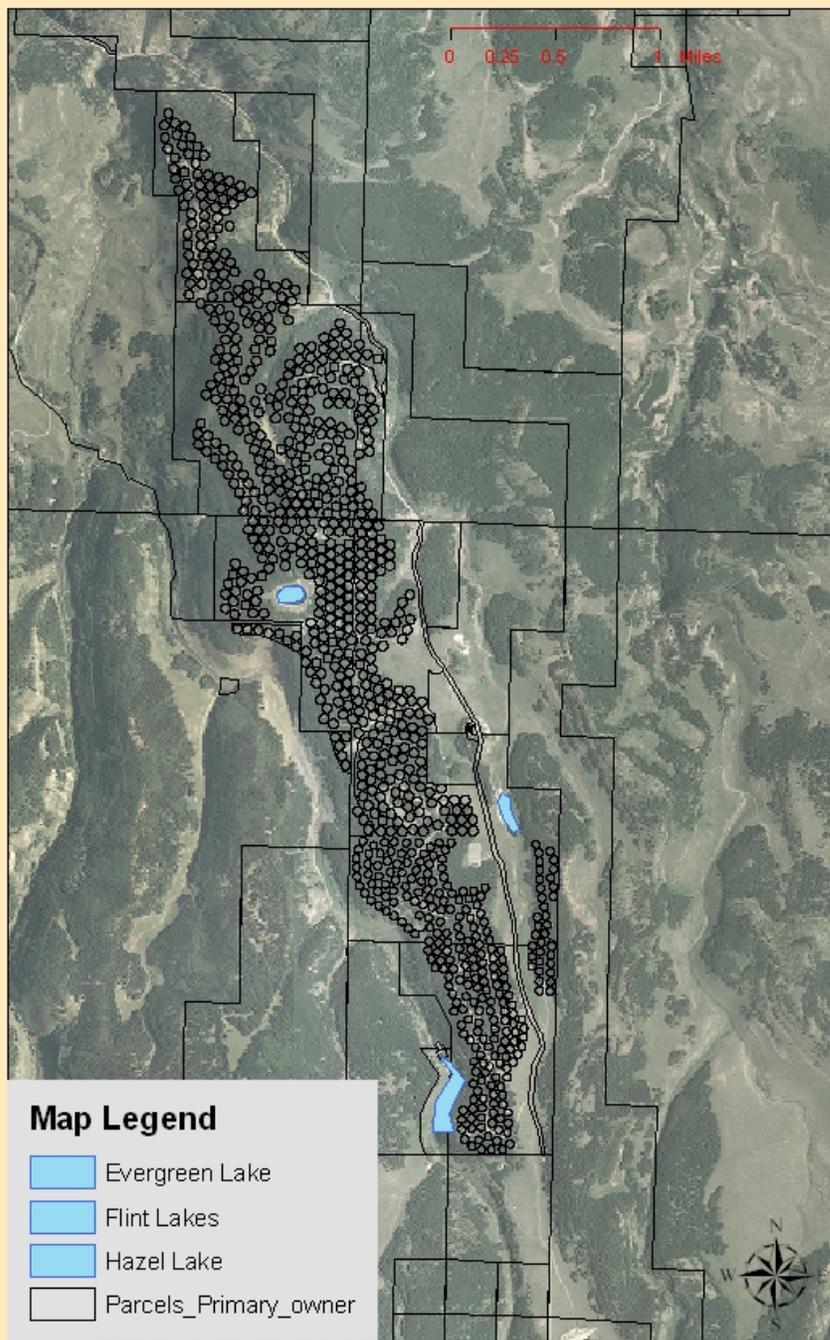


# Community Values Map

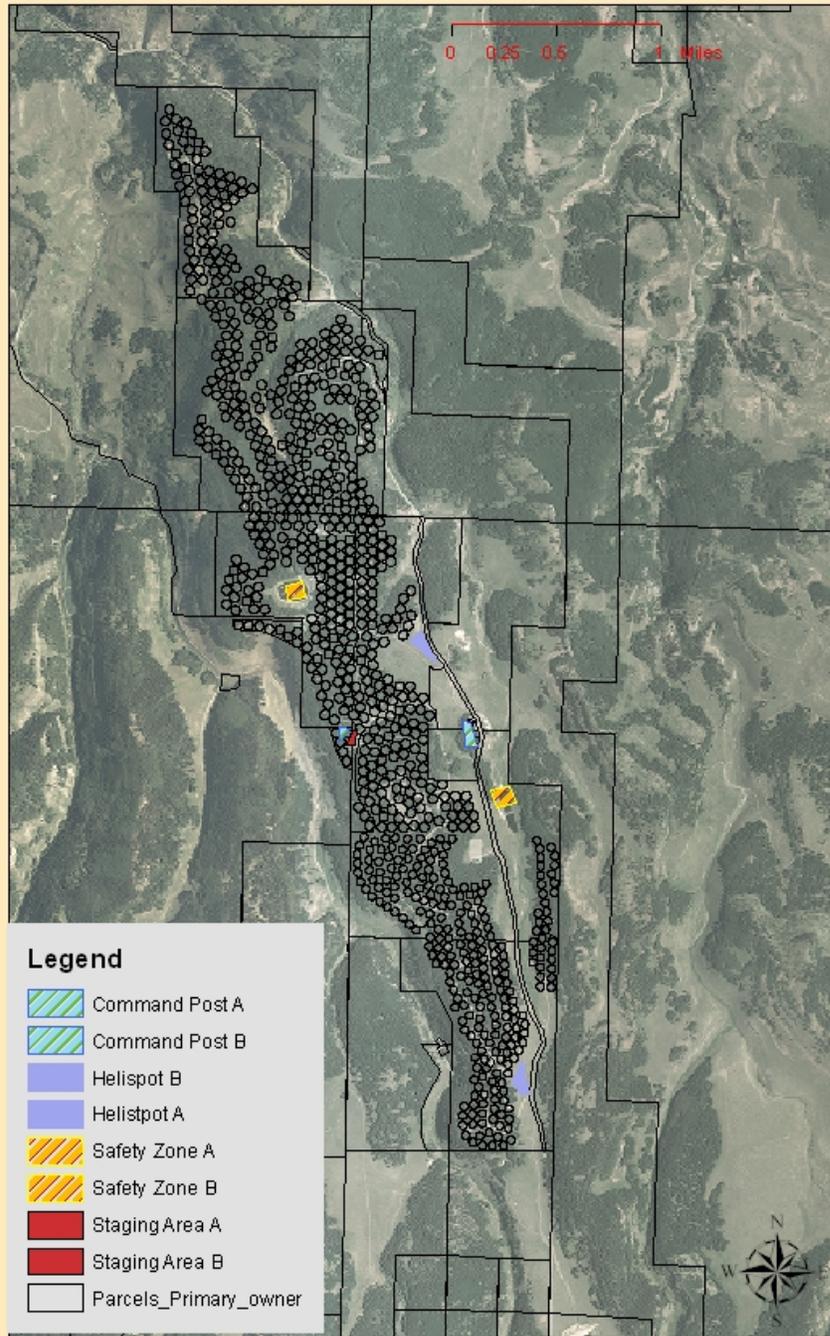
## Appendix # 8 Arrowhead Subdivision Community Values Map



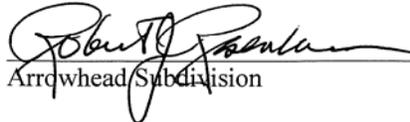
**Appendix # 9**  
**Arrowhead Subdivision Lakes Map**



**Appendix # 10**  
**Arrowhead Subdivision Logistics Map**



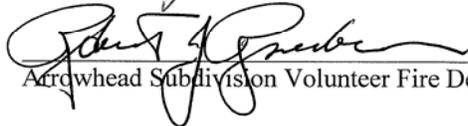
Signature Page

  
Arrowhead Subdivision \_\_\_\_\_ Date 03/07/07

  
CSFS District Forester \_\_\_\_\_ Date 3-16-07

  
Gunnison County OEM \_\_\_\_\_ Date 03/09/07

  
USDI BLM \_\_\_\_\_ Date 3/12/07

  
Arrowhead Subdivision Volunteer Fire Department \_\_\_\_\_ Date 03/07/07

