Ohio City
Community Wildfire Protection Plan

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I. Definition the Ohio City Area Wildland Urban Interface

Wildland Urban Interface is an area where structures are built in close proximity of naturally flammable vegetation. Ohio City is a classic representation of that specific situation. Ohio City is located in the central Rocky Mountains. The forest within and outside of the city are dense and overcrowded. The sage in the area is also dense and very wildfire receptive. This creates the situation where if a wildfire emergency was to occur, the likelihood of potential loss of property and life are high. A collaborative effort of forest management and organization between town residents and adjoining neighbors is the only solution.

Ohio City is a small town with a population of ?. The surrounding mountainsides are heavily populated. The access to many of the surrounding residents is very poor and in need of management for safety improvement.

Defensible space is a key part of safety in the Ohio City area. Variable mitigation efforts by the resident of the Ohio City area, puts the responsibility of safety with each individual landowner. Individual landowners must take ownership of their own safety and manage their forest.

The Wildland Urban Interface map illustrates the boundaries of the interface. The WUI is represented by an orange line and covers an area of 15,000+ acres. The WUI boundaries are based upon wildfire potential. The boundary encompasses the area that has the highest potential to spread a wildfire in the Ohio City populated areas. Cross boundary efforts are essential for wildfire prevention. Fire is capricious and will always find the defenses weakest link. Fire does not respect human boundaries but rather mitigated fuels and natural barriers(less flammable vegetation, rock outcrop etc.). Residents are encouraged to work with the United States Forest Service in strengthening their treatments by extending them onto the private ground.

A. Location

1. County: Gunnison, Colorado

2. Geographic Area: 13 miles South of Gunnison (south of airport)

3. Legal Description R1E, T48N, Sections 21,22,23,29,28,27,26,33 NMPM

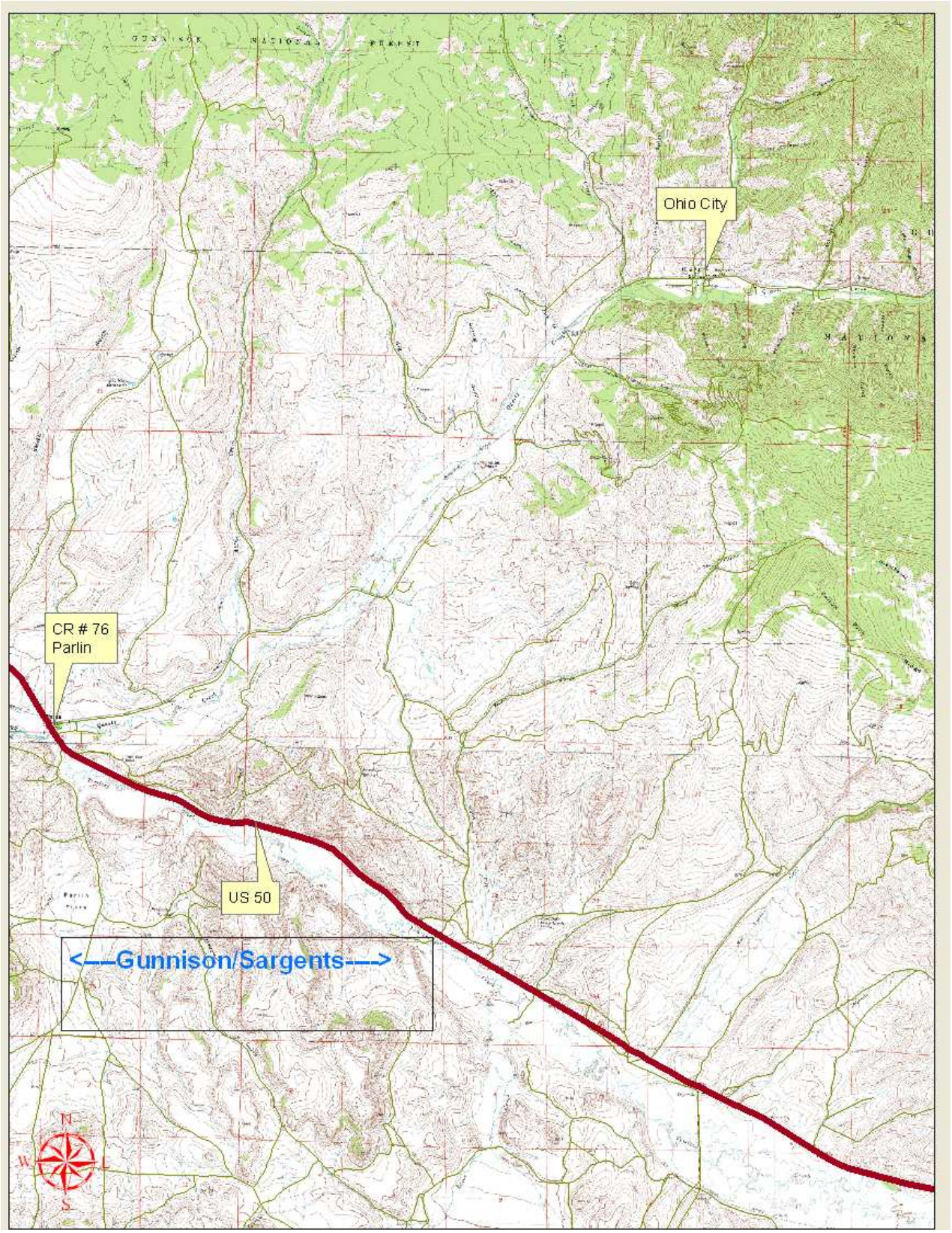
4. USGS Map Quadrangles: Iris NW

B. Ingress/Egress

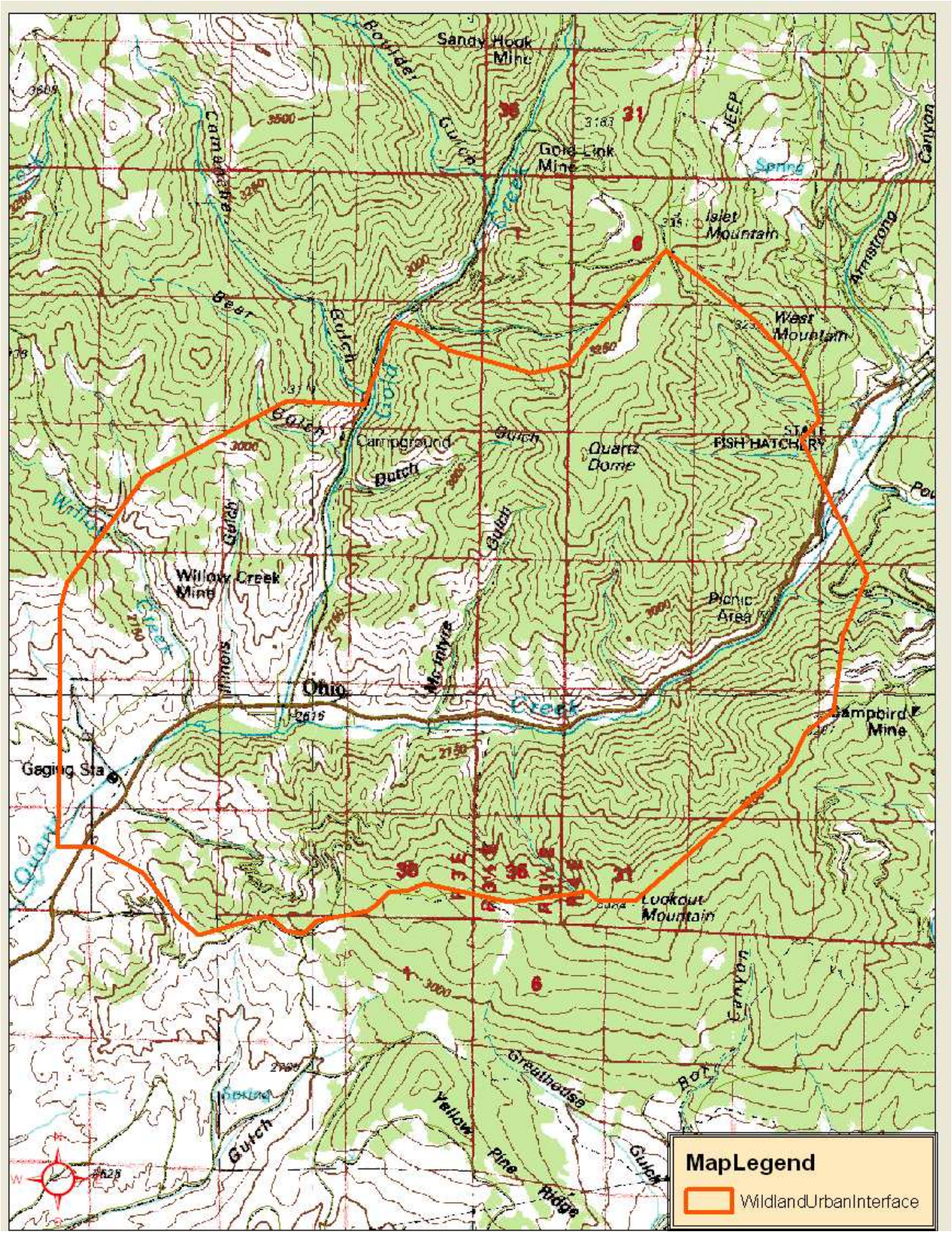
1. Routes: Hwy 50 to County Rd 38 North entry 13 miles south (past airport and BLM Hartman's rocks)

2. Directions: From Gunnison, go west just past airport and before twin bridges, make left onto County Rd 38 go south for 13 miles, through 3 cattle guards, subdivision starts at stop sign.

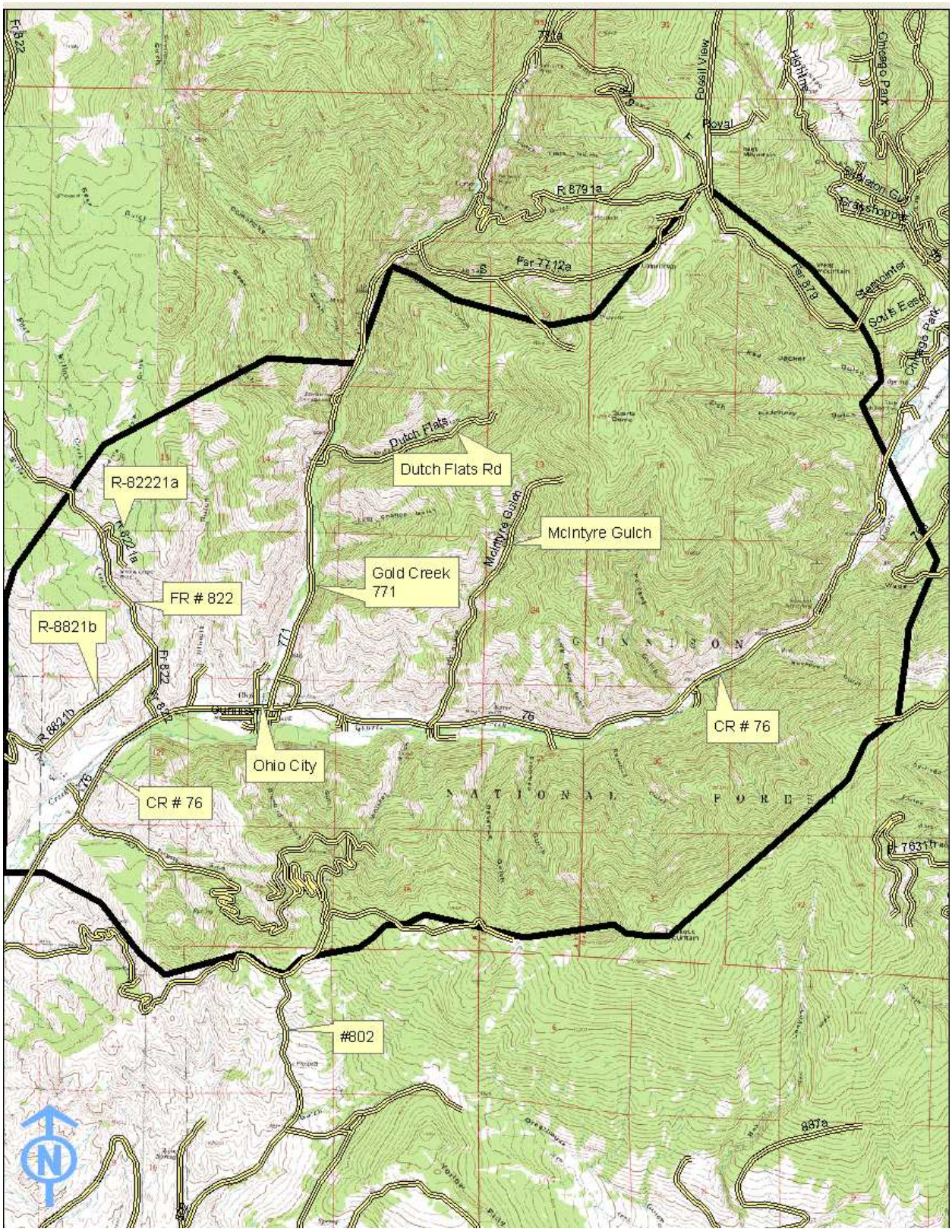
C. Map of Location



D. Ohio City Subdivision Wild Land Urban Interface



E. Ohio City 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:

   # Points 67

   Description High *(Moderate, High, Extreme)*

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

Extreme	High	Moderate	Low
0	4	63	36

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.
Douglas fir Timber

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 West 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	10	10

b. Outputs

1) Average Day

	AVERAGE DAY
Rate of spread (chains/hr)	9.4
Fireline intensity (Btu/ft/s)	100
Average flame length (ft)	5.3

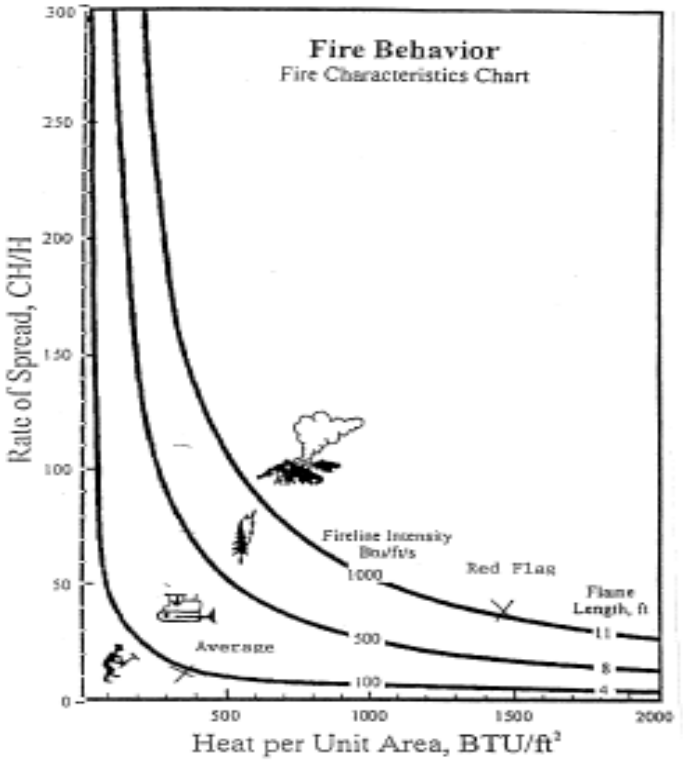
	Response Time	
	.3 HOUR	1 HOUR
Area (acres)	.6	6.5
Perimeter (ft)	660	2310
Estimated spotting distance (mi)	.2	

2) Red Flag Day

	RED FLAG DAY	
Rate of spread (chains/hr)	49	
Fireline intensity (Btu/ft/s)	746	
Average flame length (ft)	12.5	
	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 (Map - appendix 3, pg 51)

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 17 has a wealth of information to help residents become safer both before and during a wildfire emergency. Part 2 of the CPS on pg 20 has a response plan. The response plan, under section E on pg 21, designates locations of command post, staging areas, safety zones and heli-spots. These locations are also mapped on the logistics map in appendix 4 on pg 50. Under section F # 1 of the CPS response plan on pg 22 is the evacuation procedure. Section 2 on pg 22 has the specific evacuation travel routes. Please refer to the road maps on pgs 7-8.

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 13. This topic is further illustrated in appendix 2 on pgs 50-51. Subtitle a. of section A of part 1 under the CPS (pg 17) covers actions homeowners should take prior to a wildfire emergency. These steps will help ensure the protection of structures.

The second community value to be protected is a series of historical building within the city limits. The city hall, jail, and school house are all on the national historic register. The general store, horse corral (224), and train depot (236), are all very old but not on the national historic register. All these structure can be protected by implementing defensible space around them (defensible space section?). The most dangerous time for these buildings is during the fall when the grasses are cured and highly flammable. During the fall, grass around these buildings should be mowed to a height of 6” or less. The cut grass should then be removed from the area.

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.

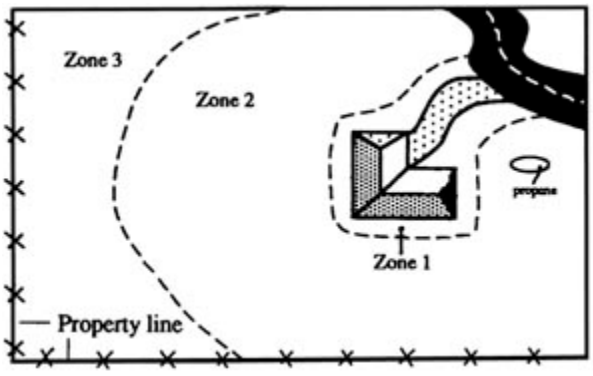
E. Windows

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. 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

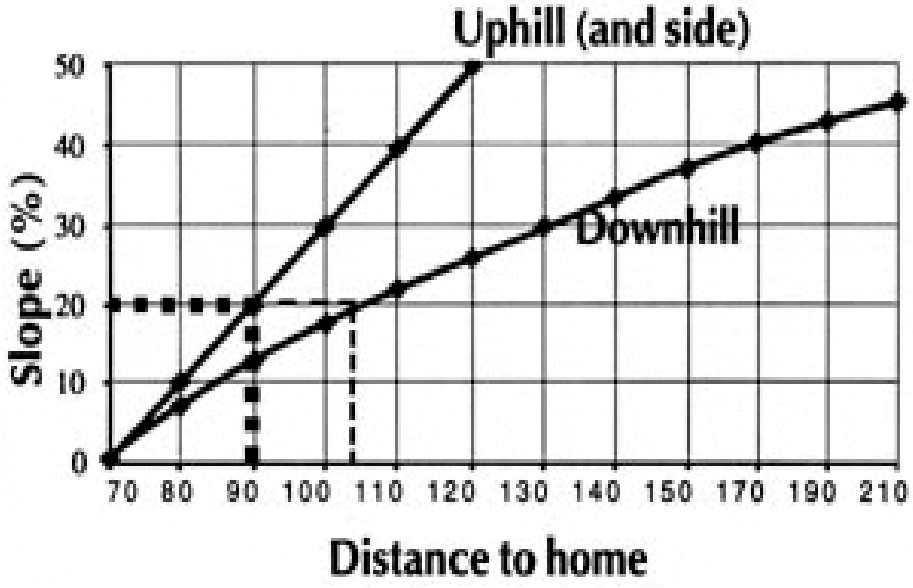
Step 1. Determine average % slope of property (appendix 2b, pg 51)
Step 2. Determine size of zone 2 using provided graph in sec. 2, pg 15
Step 3. Determine fuel type and appropriate mitigation recommendation in sec. 3, pg 15

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

Note: The subdivision has made a stump dump available to its residents. The dump is open to all material removed during fuels mitigation projects. It is located next to the clubhouse on Gold Basin Dr..(BM logistics map appendix # 4 pg 50)

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: Monitor for insect and disease. Refer to appendix #7-8 pg 56-57 for information regarding common Aspen disease problems.

b. Mixed Conifer (fir, spruce)
   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 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.
   3) Zone 3: This is an area of traditional forest management. The same prescription as zone 2 can be followed. With less attention paid to detail. Slash can be lopped and scattered up to a depth of 8 inches. *Close attention should be paid to slash density when lopping and scattering. This type of fuel can carry a wildfire long

distances to a more receptive fuel type. Trees do not have to be limbed up. This area should be monitored for insect and disease problems. Refer to appendix 8 pg 57 for information on prominent conifer insects in the Gold Basin area.

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. Engelmann spruce and Sub-alpine fir are especially prone to wind throw. 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. Only remove 1/3 of the large trees from a wind sensitive stand per entry.

c. Sage

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 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 Gold Basin subdivision. The HOA has hosted the Colorado State Forest Service at annual meeting to discuss wildfire prevention and safety. Many residents have done fuel reduction projects on their properties. These types of collaborative efforts and the ones listed below are essential to a wildfire safe community. Residents are encouraged to continue working with their government agencies in making their community a safer one.

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 13.)

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 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

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: 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
GCFPD	Gunnison	2000 Gal. Tanker	90 minutes
GCFPD	Gunnison	Class one pumper	90 minutes
GCFPD	Gunnison	Brush fire unit	90 minutes
GCFPD	Gunnison	Brush fire unit	90 minutes
USFS	Gunnison	Type 6 Engine	90 minutes
USFS	Gunnison	Type 6 Engine	90 minutes
Ohio City VFD	Ohio City	Type 6 Engine	On Site
Ohio City VFD	Ohio City	Type 4 Engine	On Site

3. Access

    a. Road System
        1) Most are constructed of asphalt.
        2) Some will support two lanes of traffic.
        3) Some are loop roads.
        4) Some are dead-end roads.
        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 (Water supply map appendix # 6 pg 55)

a. Ponds/Creeks/Lakes/Rivers

Type P/C	#/Name	Status P/I	Helicopter Accessible Y/N	Pump Required Y/N	Water Capacity When Full (1,000 GALS.)
C	Quartz Creek	I	N	Y	Continual Flow
P	Carter Lake	P	Y	Y	
P	Hot Springs Res.	P	Y	Y	
P	Gold Creek	P	N	Y	Continual Flow

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 # 4 pg 53)

a. Command Post - The following location(s) are recommended Incident Command Post (ICP) location(s):
1) Fire house on Gold Creek Rd

b. Staging Area(s) - The recommended staging area for operations within the subdivision is/are designated as:
1) General store on CR#76
2)

c. Safety Zone(s) - The recommended safety zone(s) for operations within the subdivision is/are designated as:
1)

2)

:

d. Helispot(s) - The recommended helispot(s) for operations within the subdivision is/are designated as:
1)
2)

6. Evacuation (Ohio City road maps pgs 6-8)

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 (refer to Ohio City Road Maps on Pg 8-9)
   1) Evacuations will use County Road 76 to Parlin

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. Adjacent Property:

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

9. 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

10. 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. Tree Species Overview

Douglas fir is a prevalent species in the Ohio City area. 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 nut crop for food. Deer have been known to browse this species in harsh times.

Many of the Douglas fir stands in and around Ohio City 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 of 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.

Spruce, both Engelmann and Blue are found in the Ohio City area. 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 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 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 tree species found in the Ohio City area.
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.

The aspen of the Ohio City area can be categorized into two sub- categories, High country Aspen (+9,000), Low country Aspen (-9,000). Each sub category occupies sites that differ ecologically from one another. The sites have different amounts of water, nutrients and sun exposure. These factors make each stand grow uniquely.

The high country Aspen (9,000'+ elevation) in Ohio City are present because there was a disturbance in the forest, probably wildfire. These aspen occupy sites that are productive and have adequate amounts of precipitation. Aspen in these sites achieve large diameters. Many of these stands are however over mature and show signs of decline. They are in need of regenerating management.

The low country Aspen, occupy sites below 9,000'. These aspen mainly grow in the low lying areas of the sage. These areas collect additional moisture allowing the aspen to survive. Aspen stands of this type are regionally showing signs of decline (fungus, low crown ratios). Several factors are believed to be the cause. The region has been in a drought trend. This has put increased pressure on the minimal amounts of water available in these delicate ecosystems. Sage is out competing aspen and grasses for water and is dominating sites. This has put an even greater constraint on the dwindling water supply. Sage is able to utilize its tap root and drought resistance traits to have an advantage over other plants. It has moved into areas that have historically been aspen and grass dominated. This encroachment has put an in-balance in the regular processes of these ecosystems. Many of these aspen stands are also in need of regeneration due to age. Aspen live 80-100 years and then begin to decline. When stands are not regenerated through disturbance the central root system begins to die. Once the central root system dies the aspen stand will not regenerate.

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 Ohio City area's ecosystems are constantly changing. As aspen matures it requires change or disturbance in order to survive. Many of the aspen stands in Gold Basin are in a stage of over maturity and decline. The best way to ensure the survival and long term health of aspen in Gold Basin is through management. A mosaic across the landscape which incorporates regenerating patch cuts.

Sage with a grass component is the final vegetative cover found in Gold Basin. 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. The chemicals combust very easy 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 Ohio City area has been in a drought pattern for several years. This lack of precipitation coupled with years of wildfire suppression 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 frequent low intensity wildfires would thin out the sage in a mosaic pattern of burned and unburned areas. This same pattern can be mimicked with the use of machinery and achieve the same goals.

B. Management overview

The forests in the Ohio City area are in declining health. This is due to lack of fire and management, which has created overstocking, over mature timber that is insect and disease susceptible. Below is a general overview of the management prescriptions for vegetative cover types found in the Ohio City area. The objective is to reduce fuel and prevent crown fires. Thinning will be from below with an average spacing of 10-12 feet between stems. Variability is based upon species traits and slope position. Selection criterion for removal is listed in descending order: dead, diseased, and poor form. All residual trees with in defensible space and fuel breaks are to be pruned up six feet from ground level to prevent ladder fuel issues.

In pre-settlement times, low intensity ground fires would periodically burn through the area. The low intensity ground fires thinned the forest by scorching and killing seedlings and saplings. These forests had significantly lower stocking than the current forests. Correctly stocked forests are better able to defend themselves from wildfire and insect and disease. When too many trees compete for the same limited amount of nutrients and sunlight, an unnatural weak forest grows. Overstocked 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.

Age is a second factor in the declining health of the Ohio City area's trees. 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.

Most of the high to extreme wildfire risk areas can be described as dense conifer stands (Douglas fir) 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 ecosystem in the Ohio City's area has relied upon fire to implement change. Since the settlement of the area regular fires have been excluded from this ecosystem. This has caused a stagnation of the ecosystem. A forest ecosystem like the one in the Ohio City area is continually changing. The change is not sudden but spread out over decades and perhaps centuries. The change involves stand composition, structure and biomass.

The USFS has incorporated conifer management into their plan of work for the Ohi City's WUI. The plan addresses the following issues: wildfire, stand composition and forest health. The general prescription is a thinning from below. This type of prescription concentrates on the smaller trees in the under story (>8inches dbh). The prescription is designed to leave the biggest and most fire resilient trees. The understory trees are the target due to the ladder fuel effects. The ladder fuels allow ground fuels to get into crowns of trees. Crown fires are very destructive and hard to control. The aspen will not be cut in these areas due its low wildfire hazard rating.

Aspen should be promoted in WUI areas due to its low wildfire risk. Promoting and preserving aspen stands requires management. Many of the aspen stands in Gold Basin 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 stems connected by 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 the conifer takes over the site. This increases the wildfire potential of a once moderate risk.

The best long term protection to the threats of insects, disease, and wildfire is for Ohio City Residents is to manage their forests. Homeowners should begin management by thinning trees around their homes. This will provide "Defensible Space" for fire fighters to protect structures. It will also increase the health of the forest on individual properties. Defensible space guidelines can be found on pg 13.

C. Fuel Breaks (Fuel Break Map PG 33)

A fuel break is a strip of land in which the fuels have been modified in order to slow the spread of a wildfire. They are most effective when anchored. Examples of fuel break anchor points are rivers, creeks, rock outcrops or less flammable vegetation. It is of varying widths based upon fuel and % slope. Several factors determine the need for a subdivision to install fuel breaks. They are high/extreme wildfire hazard areas, steep slopes, crowning potential, heavy continuous fuels and ignition sources. Gold Basin subdivision has all of the above factors throughout most of the subdivision.

The stand is thinned and remaining trees are pruned to remove ladder fuels. Brush, heavy ground fuels, snags, and dead trees are disposed of and an open park like appearance is established. The idea is to separate the crowns in order to stop a crown fire. The ground fuels and ladder fuels are mitigated to keep the fire on the ground

and prevent it from returning to the crowns. Crown fires consume fuels rapidly and pose the greatest threat of life and property loss.

Sage dominated sites can be treated with various sage reduction machines examples: Fecon Bullhog, brush hog. The equipment depends upon the topography and size of vegetation. Sites with ground in excess of 30% slope generally cannot be treated with a brush hog or other similar machines that are pulled behind a tractor.. Sites with vegetation in excess of +4”dbh will require a Fecon Bullhog or similar machine. The sage is treated to a maximum height of 6 inches. These areas need to be retreated every 10 years.

D. Fuel Break Map

E. General Fuel Break Prescription according to vegetative type

The table below shows the recommended size of a mixed conifer fuel break according to % slope. The section also gives specific prescriptions according to vegetative type.

1. Fuel Break Size for Mixed Conifer Fuel Break

% slope	Uphill distance	Downhill distance	Total width
10	140	165	303
30	120	195	315
60	100	240	340

a. Prescriptions

Note: CSFS has a list of contractors available for projects. Subdivisions are encouraged to work with CSFS in designing projects and obtain a copy of the CSFS handout Fuel Break Guidelines for Forested Subdivisions and Communities.

Crown separation is the key factor in a successful fuel break. A minimum of 10 feet between the edges of tree crowns is recommended. As slope increases crown spacing should also increase. All residual trees should be pruned up 10 feet from ground level. Slash should be removed or lopped and scattered evenly throughout the area.

Precaution: If your trees are susceptible to wind throw and the trees have never been thinned, reduce the amount of trees removed in the first year. Start with a spacing of diameter plus five between stems. 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. Follow the diameter plus five spacing recommendation each year for wind sensitive areas.

2. Fuel Break for Sage

a. Prescription
Mow vegetation to a maximum height of 8 inches. This type of vegetation is best mitigated with a masticator or similar brush mower. Follow size recommendations in the above table.

F. Escape Routes/Safety Zones

G. Safety Zone Locations

H. Safety Zone/Escape Route Map

I. Cost/Grants

Vegetation management is a costly procedure in the Ohio City area and grant programs are available to help reduce or eliminate the cost. The average cost of small acreage timber fuels mitigation in the Ohio City area has been $1500/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. Sage reduction has been costing from $60(less than 45% slopes) to $200 (greater than 45% slope) an acre.

The main program that Ohio City residents 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 (970-641-6852). Funds are available for defensible space, thinning, fuel breaks and sage reduction. Competition is high and funds are not guaranteed for every applicant.

The second grant program available to Ohio City residents is Stevens Funds grant. This grant is available to landowners that are adjacent to USFS grounds that have prescribed fire scheduled. This grant has a cost share rate range from 75% to 100% cost share. This grant is highly competitive. The Stevens Funds grant can be applied for through The State Forest Service (970-641-6852). Funds are available for defensible space, thinning, fuel breaks and sage reduction.

Landowners can do the work themselves and get reimbursed for their time and materials. Contractors are also available to do the work and a list is available through the Colorado State Forest Service office (970-641-6852).

J. United States Forest Service Fuel Treatments (USFS Treatment Map Pg 47)

The United States Forest Service(USFS) Gunnison Field Office, has identified the Ohio City area as a high priority for fuels reduction and forest restoration projects. Under the National Fire Plan, the USFS has developed a long term plan to treat hazardous fuels and restore the health of aspen and conifer stands Ohio City.

The Ohio City /Pitkin Fuel Reduction Project attempts to address fire hazard and forest stand conditions on USFS lands that are directly adjacent to the Ohio City and Pitkin. Treatments considered in this plan include brush removal, prescribed fire understory thinning of conifer stands and aspen regeneration cuts. Treatments will be implemented annually and will be dependent upon annual funding levels.

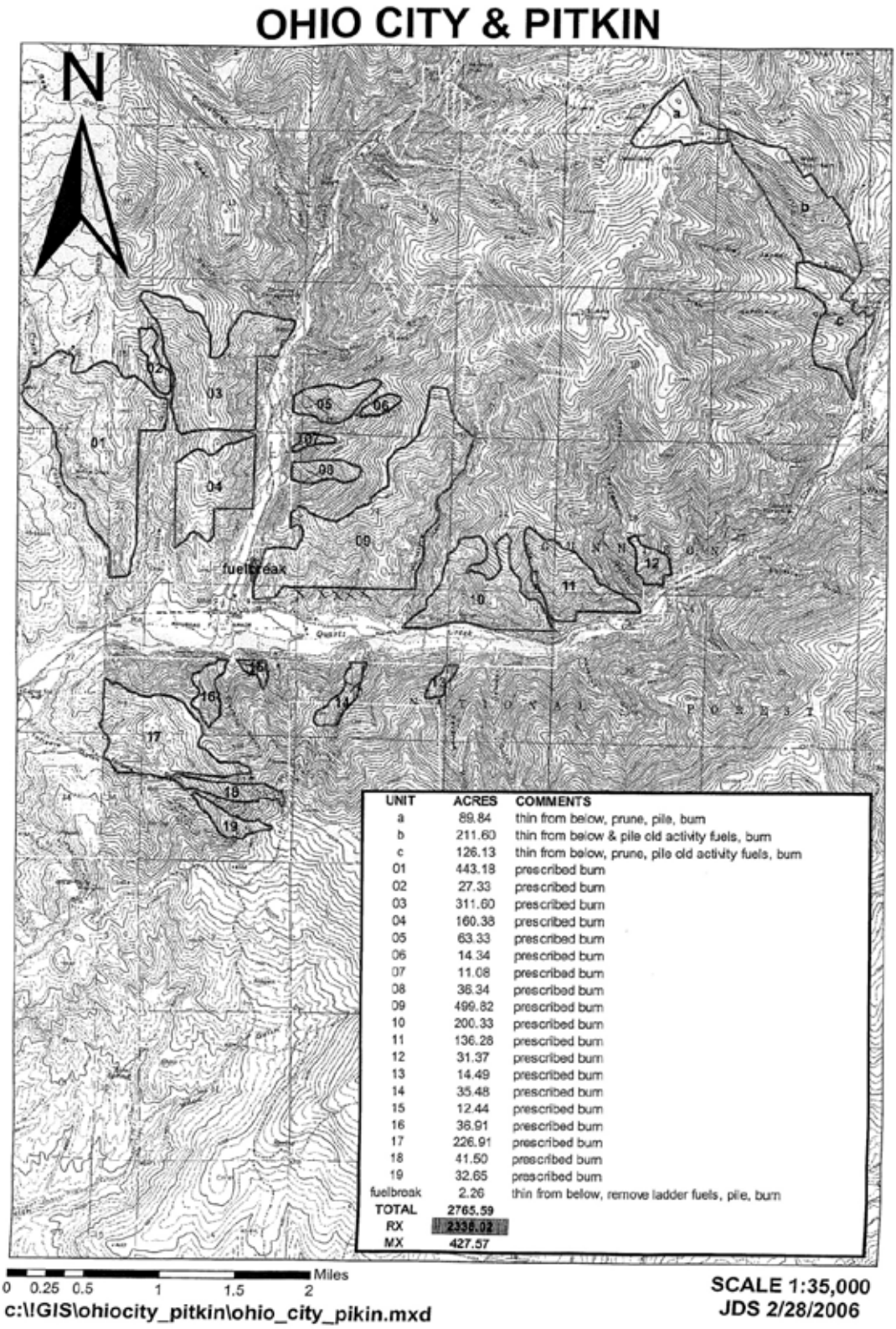
The prescription for sagebrush areas in units 1-19 is a combination of mastication and prescribed fire. These brush treatments have a goal of creating patchy fuel breaks or a

mosaic landscape. This type of treatment addresses both aesthetics concerns and safety. The patchy treatment gives the appearance of an untreated area, while still breaking up the continuity of the fuels. In the event of a wildfire, the treated areas will slow the spread of fire by reducing the fuel.

Douglas fir stands in units A, B, C will be thinned from below, removing many of the small diameter trees (ladder fuels). This particular type of fuel predisposes the stand to crown fires. The small trees can allow a controllable ground fire to climb up into the crowns of trees. Reducing the contain ability of the fire, using conventional fire fighting methods. The residual stand will be thinned in order to break up the continuity of the fuels.

A fuel break is planned for the area just northeast of the town of Ohio City. The timber will be thinned form below and all ladder fuels removed. This is designed to be an added safety factor for the town of Ohio City. The thinning reduces the risk of a crown fire.

K. USFS Treatment Map



L. Fuel Reduction Management: private land fuel reduction to increase effectiveness of USFS treatments

Fire is capricious and will always find the weakest link in your and the subdivisions' defenses. One of the ways that these breaches in wildfire defense can be avoided is through cross boundary treatments. This is where treatments are extended beyond the federal land boundaries and onto private ground. Mitigation treatments are most effective when anchored into less flammable areas (natural fire barriers, less flammable vegetation or roads). Many times these are not always found on public property and the fuel breaks never achieve their full potential. It is then the duty of the adjacent landowner to step up and take an active roll in the safety of both themselves and the subdivision. Wildfire safety has to be a collaborative effort in order to have an end product that a fire will respect. The effort must be equally both on the public and private side. Refer to the USFS private land mitigation recommendation map on page 34 if your property is located within one of the recommended identified areas then you are encouraged to contact the Colorado State Forest Service or your HOA in order to see how you can improve the safety of your property and improve the effectiveness of the USFS treatments.

Unit 1: This unit is all sage and has prescribed fire planned for above it. It is recommended that the landowner reduce the sage in the unit to less than 6" from the ground. The unit is a total of 88 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852

Unit 2: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6" from the ground. The unit is a total of 15 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852

Unit 3: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6" from the ground. The unit is a total of 5 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

Unit 4: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6" from the ground. The unit is a total of 1.5 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

Unit 5: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6" from the ground. The unit is a total of 6 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

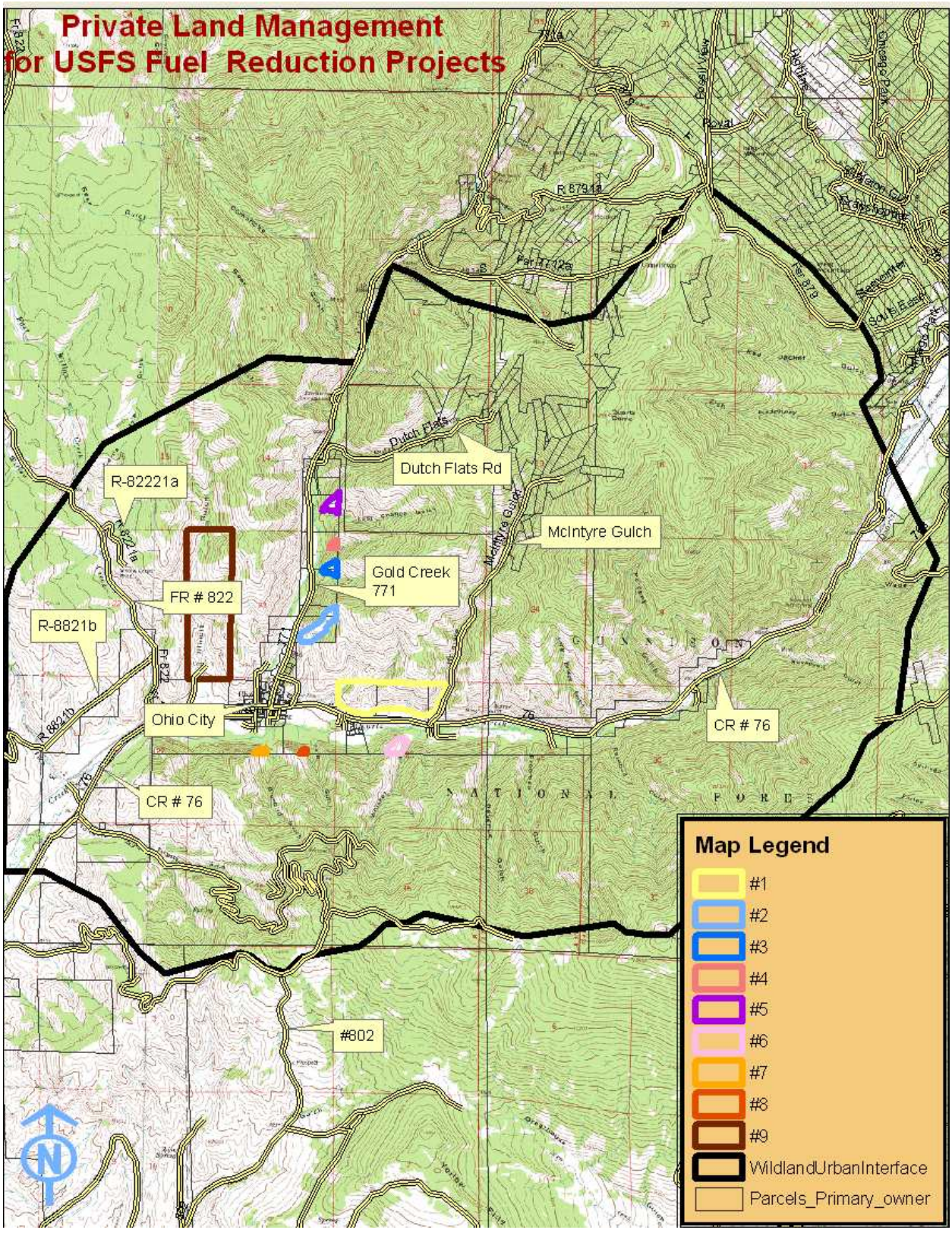
Unit 6: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6” from the ground. The unit is a total of 6.5 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

Unit 7: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6” from the ground. The unit is a total of 1.5 acres. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

Unit 8: This unit is all sage and has prescribed fire planned to the north of it. It is recommended that the landowner reduce the sage in the unit to less than 6” from the ground. The unit is a total of 1 acre. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

Unit 9: This unit is sage and timber and has prescribed fire planned on both sides of it. It is recommended that the landowner reduce the sage in the unit to less than 6” from the ground. The timber should be thinned from below by removing all ladder fuels. The over story should be thinned to an average spacing of 12’ between stems. Timber makes up roughly 25 acres of the unit. The unit is a total of 192 acres although treatment might not be possible in all areas due to terrain. This area is a good candidate for the Stevens Fund grant. Landowners should contact the Colorado State Forest Service (970) 641-6852.

M. Fuel Reduction Management: on private land to increase effectiveness of USFS treatments Map



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 ect.) 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

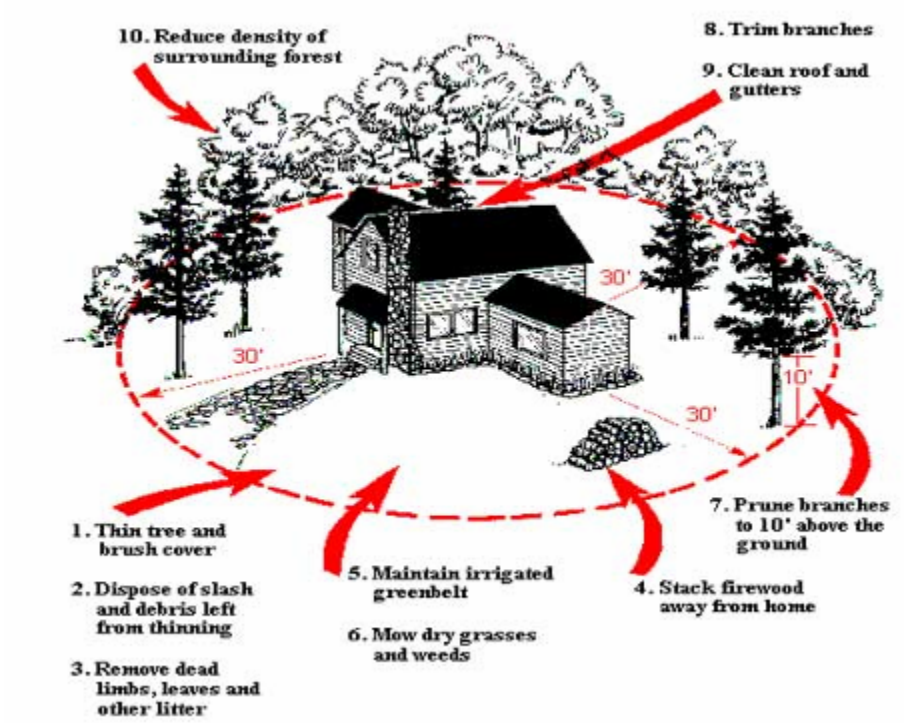
b. Separate brush clumps from each other by a minimum of 10 feet.

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.

2A - **Additional Defensible Space Information**

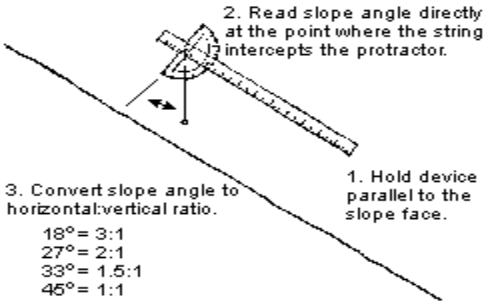


2B - You can create a simple tool out of household materials to help you determine your slope.

Materials:

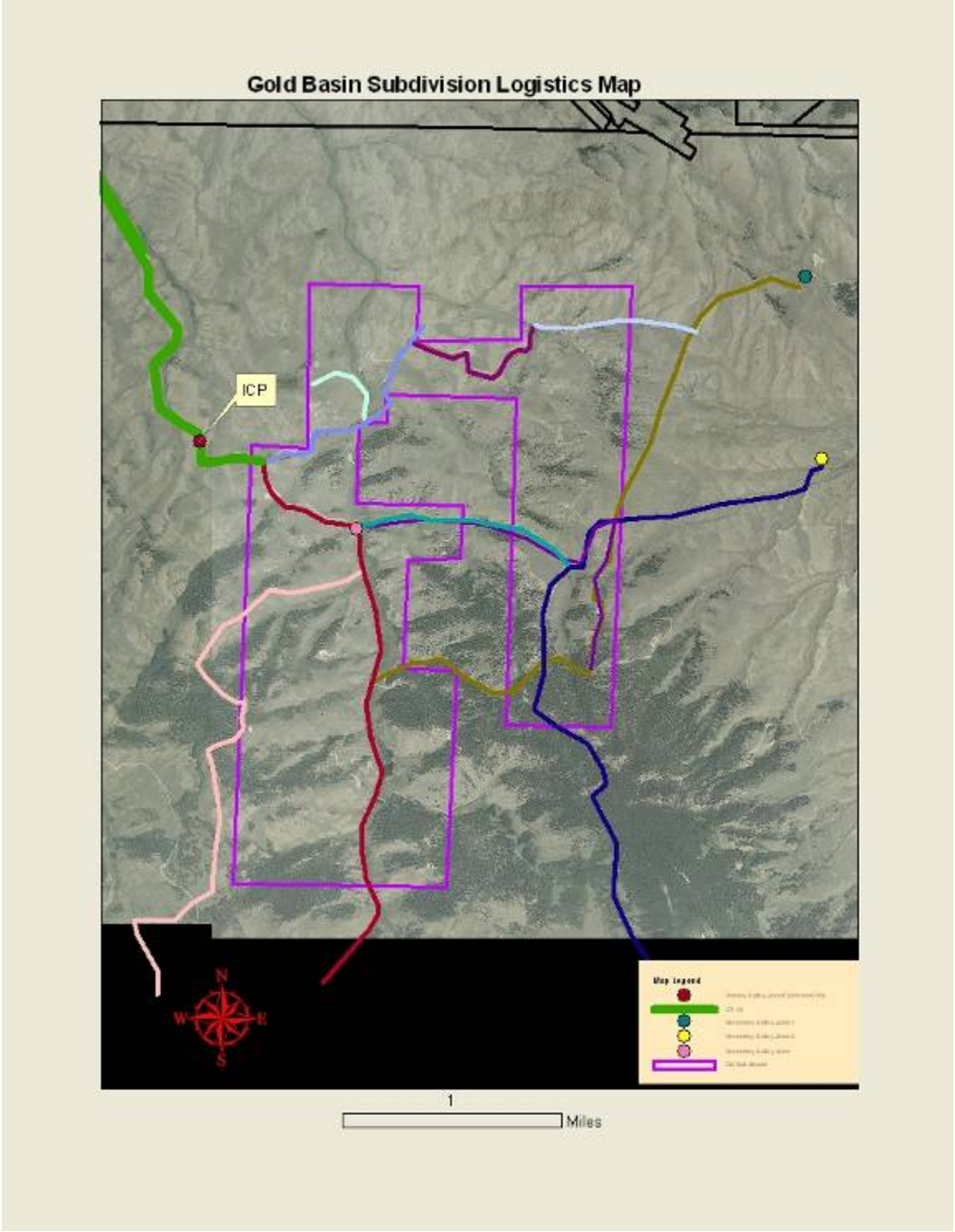
- Protractor
- String
- Weight (heavy washer or something similar)
- Yard or meter stick
- Scientific calculator

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.

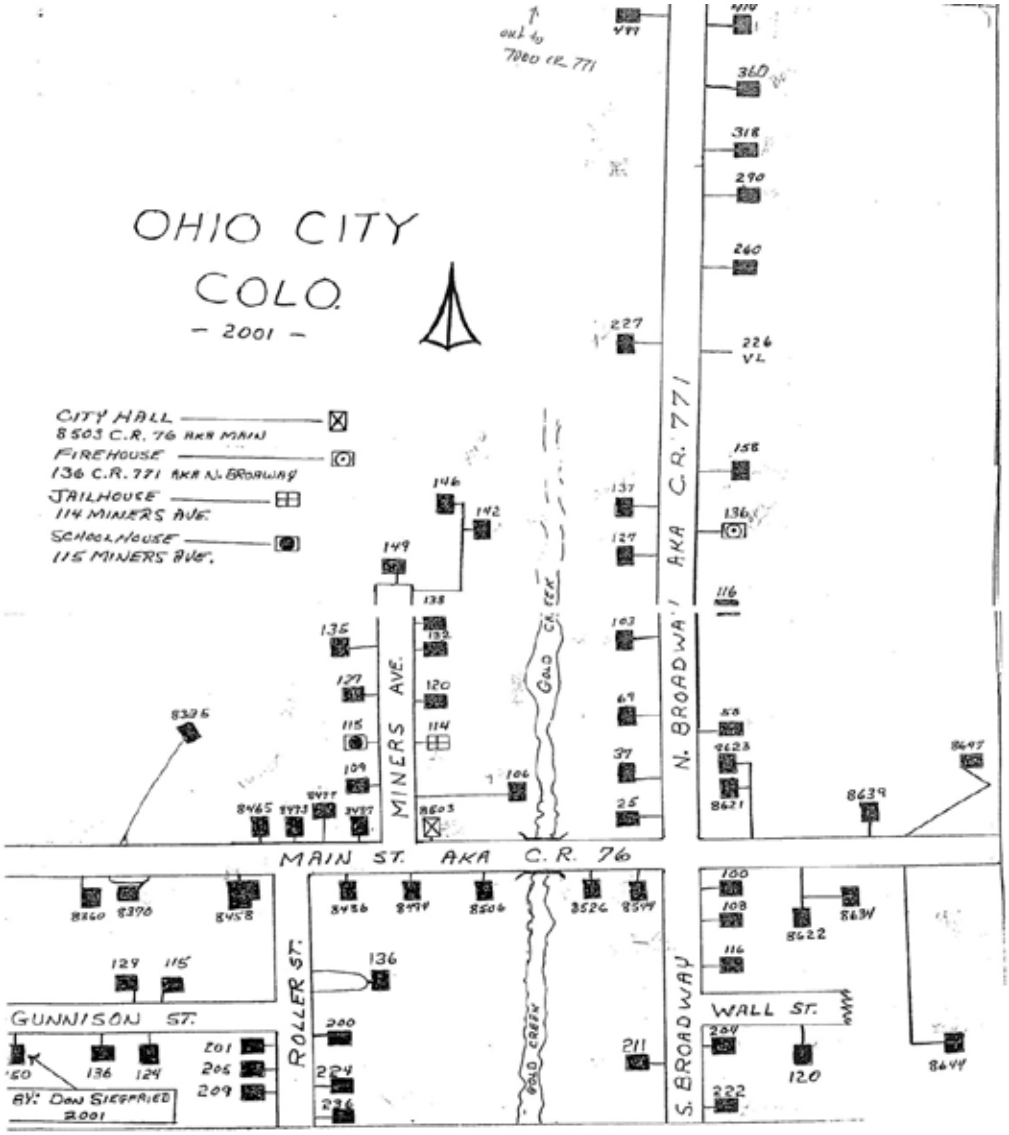


APPENDIX 3
Topographic Map

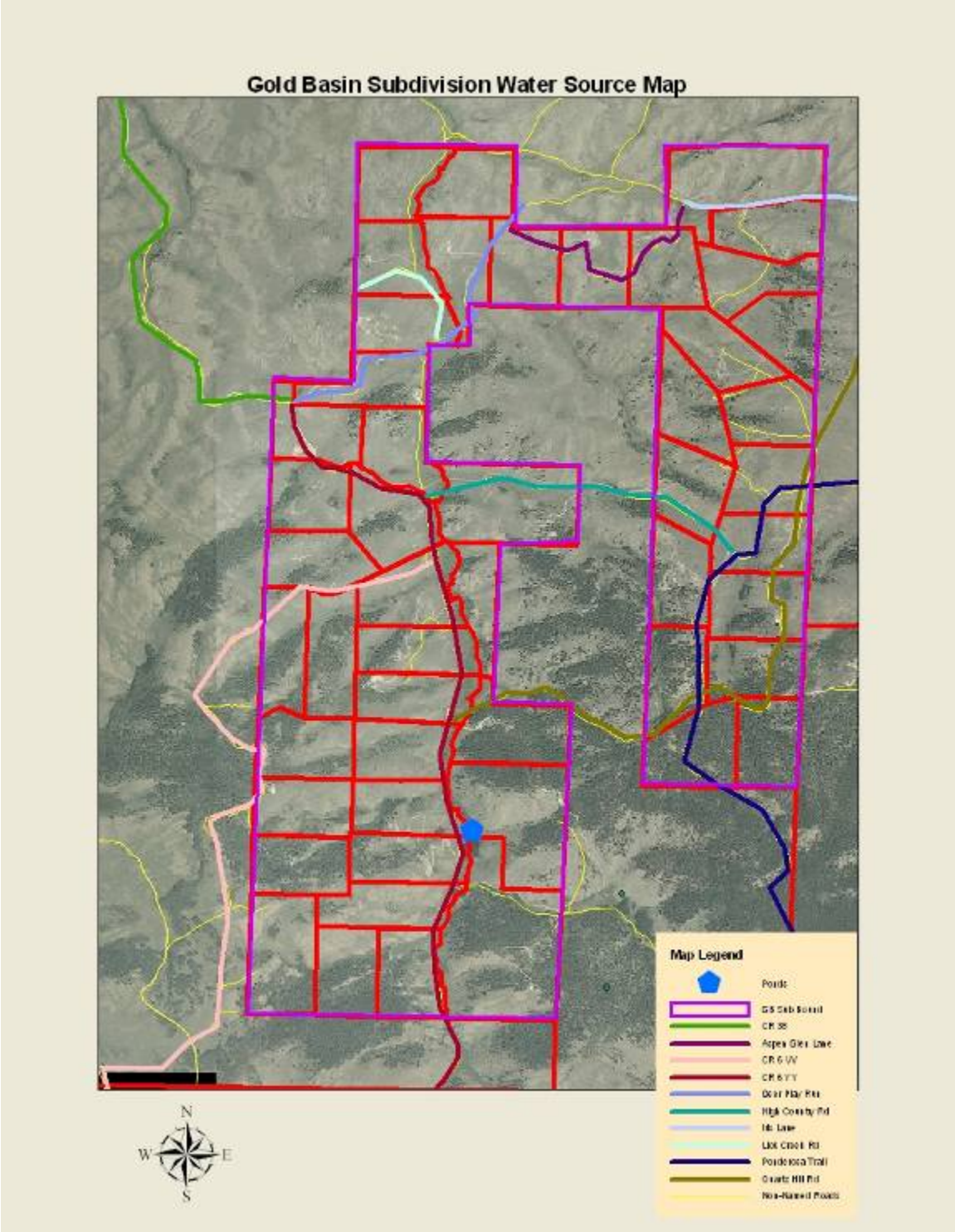
APPENDIX 4


Gold Basin Subdivision Logistics Map
ICP
N
W
E
S
Map legend
1
Miles

APPENDIX 5
Value To Be Protected Map



APPENDIX 6


Gold Basin Subdivision Water Source Map
Map Legend
Ponds
GS Sub Bound
CR 38
Aspen Glen Lane
CR 6 W
CR 6 YY
Deer Play Rd
High Country Rd
Ski Lane
Lick Creek Rd
Ponderosa Trail
Quartz Hill Rd
Non-Named Roads
N
W
E
S

APPENDIX **7**
Common Aspen Disease found in the Gold Basin Subdivision area

Cankers

Canker diseases are among the primary agents in Aspen mortality. The canker is a symptom of fungus. Generally it is an area of dark black discoloration with irregular folds of growth or areas of orange ooze. The fungus enters the tree through a wound and invades the inner bark and cambium. This is very important to remember when working around Aspen trees.

1. Sooty-bark canker: Description: Considered the most serious, for it tends to occur on larger trees (100+ yrs) and kills with in 3-10 years. Young cankers first appear on the bark as sunken oval areas. The bark killed each year by the fungus is readily apparent and begins to slough after 2-3 years. The dead inner bark crumbles to soot like residue. The outer bark sloughs faster in the central portion giving the tree a barber pole appearance.

2. Cryptosphaeria canker: Description: This fungus causes branch, sprout, and sapling mortality; trunk cankers; and discoloration. The cankers are long and narrow, spiraling around the tree like a snake, hence the common name “snake canker. Small trees may be killed within a year after infection. Large trees may have cankers that girdle branches and enlarge onto trunk. Bark near edges usually becomes discolored light brown to orange. The dead, black, stringy, soot like bark adheres tightly to the sapwood and contains scattered lens shaped, light colored areas.

3. Cytospora canker: Description: This fungus is weakly parasitic and normally attacks stressed trees. This canker is the most common one found. It is generally found with other more aggressive fungus. Small branches and twigs can be killed with out the formation of a distinct canker. Trunk cankers usually have an irregular outline, with sunken, orange discolored areas with orange ooze. The first indication of infection is the orange discoloration of the bark caused by wounds. After infection the inner bark turns dark brown and the sapwood underneath light brown. The dead bark falls off of the tree in large pieces after 2-3 years.

Aspen Heart Rot

This fungus produces a fruiting body called conks at branch stubs or wounds on the bole of the tree. Sporulation begins in late winter or early spring and can continue throughout the summer and fall when moist weather prevails. Airborne spores typically infect dead branch stubs and fresh wounds. This is again important to remember when working around aspen especially in damp weather. Fungal growth results in a yellow-white rot with brown or black zone lines traversing decayed wood. The fruiting body or conks are hoofed shaped with gray, or brown upper surface and tan to white lower pore. The presence of conks is indicative of significant stem decay.

1. *Phellinus tremulae*: Description: Produces perennial fruiting bodies or conk. The conk is a hooved shaped fungus with orange and black coloration. The presence of the conk is indicative of significant stem decay. Trees with fruiting bodies should be monitored closely especially around structures, due to there unsoundness.

APPENDIX 8
Common conifer insects found in the Ohio City area

Bark Beetle

Bark beetles are the most destructive insects in the western coniferous forest. Adult bark beetles bore through the outer bark to the inner cambial layer, where they channel out galleries in which to lay eggs. Larvae hatch in these galleries and may excavate additional channels as they feed. As bark beetles carve out galleries they introduce blue-stain fungi. This fungus grows in the wood interfering with the tree's water transport system. Tree deterioration and eventual mortality result from two factors. 1) tree girdling caused by gallery excavation 2) spread of blue stain fungi. Infested trees can be recognized at a distance by fading foliage high in the tree, initially a light green, changing to a light straw color in a few weeks, and eventually to a yellowish brown. Close inspection may show a fine red-brown dust in the bark crevices and at the base of the tree trunk. Cream to dark red pitch tubes, resin mixed with boring dust, ¼-1/2 inches in diameter, are an indication of a successful bark beetle attack. In some cases where the number of attacking beetles is low, the tree may have sufficient resin available to eject the attacking beetle by extruding resin at the attack site (pitching out). Pitch tubes of whitish resin ¾'' long. The "pitching out tube" is void of boring dust, because the beetle was unsuccessful.

Bark beetles are a natural part of the ecosystem. In Ohio City area the beetles are found in endemic levels. The beetles attack weak and suppressed trees. The best preventative approach is a proactive one. This involves managing the forest through thinning. Thinning improves the vigor of the residual stand. Vigorous trees have a better chance of not attracting beetles and also defending themselves during attacks.

Signs of <u>successful</u> attack

a. Red boring dust found in crevices or base of tree
b. Fading in the entire tree
c. Pitch Flow
d. Galleries under bark in a pattern

A. 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.

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)

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 is the result.

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.

The MPB prefers trees weakened by overcrowded conditions, advanced age and damage caused by lightning, porcupines, and 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. Western Balsam Bark Beetle (WBBB)

WBBB is the most conspicuous in a long list of bark beetles that attack western conifers. This beetle is the most widespread of the bark beetles in Gunnison County. Trees are often attacked in groups and have a dark red appearance after death for about 3 years. This insect is often associated with Armillaria root disease. The disease weakens the tree and then the beetle moves in for the kill. Its primary host is Subalpine fir that are >90 years of age and >10 inches in diameter at breast height.

The main flight begins in late May or June. Pioneering males make a nuptial chamber and then release pheromones that attract both male and female beetles. Males are polygamous and mate with 3-7 females. The beetle has a two year life cycle. Attacked trees generally turn a yellow/red within a year.

Signature Page

Ohio City Fire Department	Date
USDA Forest Service	Date
Gunnison County OEM	Date
Colorado State Forest Service	Date