

APPENDIX A PROJECT MAPS

- MAP 1. ASSESSMENT AREA
- MAP 2. WILDLAND URBAN INTERFACE (WUI) HAZARD RATINGS
- MAP 3. PUBLIC LANDS
- MAP 4. FIRE BEHAVIOR FUEL MODEL - LANDFIRE
- MAP 5. MITIGATION RECOMMENDATIONS
- MAP 6. AGENCY TREATMENTS

**APPENDIX B
NFPA WILDLAND FIRE RISK AND HAZARD SEVERITY
ASSESSMENT FORM 1144**

WILDLAND FIRE RISK AND HAZARD SEVERITY ASSESSMENT FORM

Assign a value to the most appropriate element in each category and place the number of points in the column on the right.

Element	Points	
A. Means of Access		
1. Ingress and egress		
a. Two or more roads in/out	0	_____
b. One road in/out	7	_____
2. Road width		
a. ≥ 7.3 m (24 ft)	0	_____
b. ≥ 6.1 m (20 ft) and < 7.3 m (24 ft)	2	_____
c. < 6.1 m (20 ft)	4	_____
3. All-season road condition		
a. Surfaced road, grade $< 5\%$	0	_____
b. Surfaced road, grade $> 5\%$	2	_____
c. Non-surfaced road, grade $< 5\%$	2	_____
d. Non-surfaced road, grade $> 5\%$	5	_____
e. Other than all-season	7	_____
4. Fire Service Access		
a. ≤ 91.4 m (300 ft) with turnaround	0	_____
b. > 91.4 m (300 ft) with turnaround	2	_____
c. < 91.4 m (300 ft) with no turnaround	4	_____
d. ≥ 91.4 m (300 ft) with no turnaround	5	_____
5. Street signs		
a. Present [10.2 cm (4 in.) in size and reflectorized]	0	_____
b. Not present	5	_____
B. Vegetation (Fuel Models)		
1. Characteristics of predominate vegetation within 91.4 m (300 ft)		
a. Light (e.g., grasses, forbs, sawgrasses, and tundra) NFDRS Fuel Models A, C, L, N, S, and T	5	_____
b. Medium (e.g., light brush and small trees) NFDRS Fuel Models D, E, F, H, P, Q, and U	10	_____
c. Heavy (e.g., dense brush, timber, and hardwoods) NFDRS Fuel Models B, G, and O	20	_____
d. Slash (e.g., timber harvesting residue) NFDRS Fuel Models J, K, and L	25	_____
2. Defensible space		
a. More than 30.48 m (100 ft) of vegetation treatment from the structure(s)	1	_____
b. 21.6 m to 30.48 m (71 ft to 100 ft) of vegetation treatment from the structure(s)	3	_____
c. 9.14 m to 21.3 m (30 ft to 70 ft) of vegetation treatment from the structure(s)	10	_____
d. < 9.14 m (30 ft) of vegetation treatment from the structure(s)	25	_____
C. Topography Within 91.4 m (300 ft) of Structure(s)		
1. Slope $< 9\%$	1	_____
2. Slope 10% to 20%	4	_____
3. Slope 21% to 30%	7	_____
4. Slope 31% to 40%	8	_____
5. Slope $> 41\%$	10	_____

(NFPA 1144, 1 of 2)

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Element	Points
D. Additional Rating Factors (rate all that apply)	
1. Topographical features that adversely affect wildland fire behavior	0-5 _____
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations (e.g., heavy lightning, railroads, escaped debris burning, and arson)	0-5 _____
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds	0-5 _____
4. Separation of adjacent structures that can contribute to fire spread	0-5 _____
E. Roofing Assembly	
1. Class A roof	0 _____
2. Class B roof	3 _____
3. Class C roof	15 _____
4. Nonrated	25 _____
F. Building Construction	
1. Materials (predominate)	
a. Noncombustible/fire-resistive siding, eaves, and deck (see Chapter 8)	0 _____
b. Noncombustible/fire-resistive siding and combustible deck	5 _____
c. Combustible siding and deck	10 _____
2. Building setback relative to slopes of 30% or more	
a. ≥ 9.14 m (30 ft) to slope	1 _____
b. < 9.14 m (30 ft) to slope	5 _____
G. Available Fire Protection	
1. Water source availability	
a. Pressurized water source availability	
1802.7 L/min (500 gpm) hydrants ≤ 304.8 m (1000 ft) apart	0 _____
946.4 L/min (250 gpm) hydrants ≤ 304.8 m (1000 ft) apart	1 _____
b. Nonpressurized water source availability (off site)	
≥ 946.4 L/min (250 gpm) continuous for 2 hours	3 _____
< 946.4 L/min (250 gpm) continuous for 2 hours	5 _____
c. Water unavailable	10 _____
2. Organized response resources	
a. Station ≤ 8 km (5 mi.) from structure	1 _____
b. Station > 8 km (5 mi.) from structure	3 _____
3. Fixed fire protection	
a. NFPA 13, 13R, 13D sprinkler system	0 _____
b. None	5 _____
H. Placement of Gas and Electric Utilities	
1. Both underground	0 _____
2. One underground, one aboveground	3 _____
3. Both aboveground	5 _____
I. Totals for Home or Subdivision (Total of all points)	
Hazard Assessment	Total Points
Low hazard	< 40
Moderate hazard	40-69
High hazard	70-112
Extreme hazard	> 112

(NFPA 1144, 2 of 2)

1144 digital field survey form example:

Wildfire Fire Risk and Hazard Severity Field Form NFPA 1144	
Community	Rating
Means of Access	
Ingress and Egress	0
2 or more roads in & out	0
One road in & out	7
Road Width	0
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	0
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	0
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	0
Present - reflective	0
Not present	5
Vegetation (fuel models)	
Characteristics of predominant veg w/in 300 ft	0
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	0
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	0
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	0
Topographic features that adversely affect fire behavior (0 - 5)	0
Areas with a history of high fire occurrence - ignition potential (0 - 5)	0
Severe fire weather potential (0 - 5)	0
Separation of adjacent structures contributing to fire spread (0 - 5)	0
Roofing Assembly	
Roofing	0
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	0
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	0
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	0
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	0
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	0
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	0
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	0
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

**APPENDIX C
COMMUNITY/NEIGHBORHOOD/SUBDIVISION HAZARD
AND RISK SURVEY SUMMARIES**

Blue Mountain

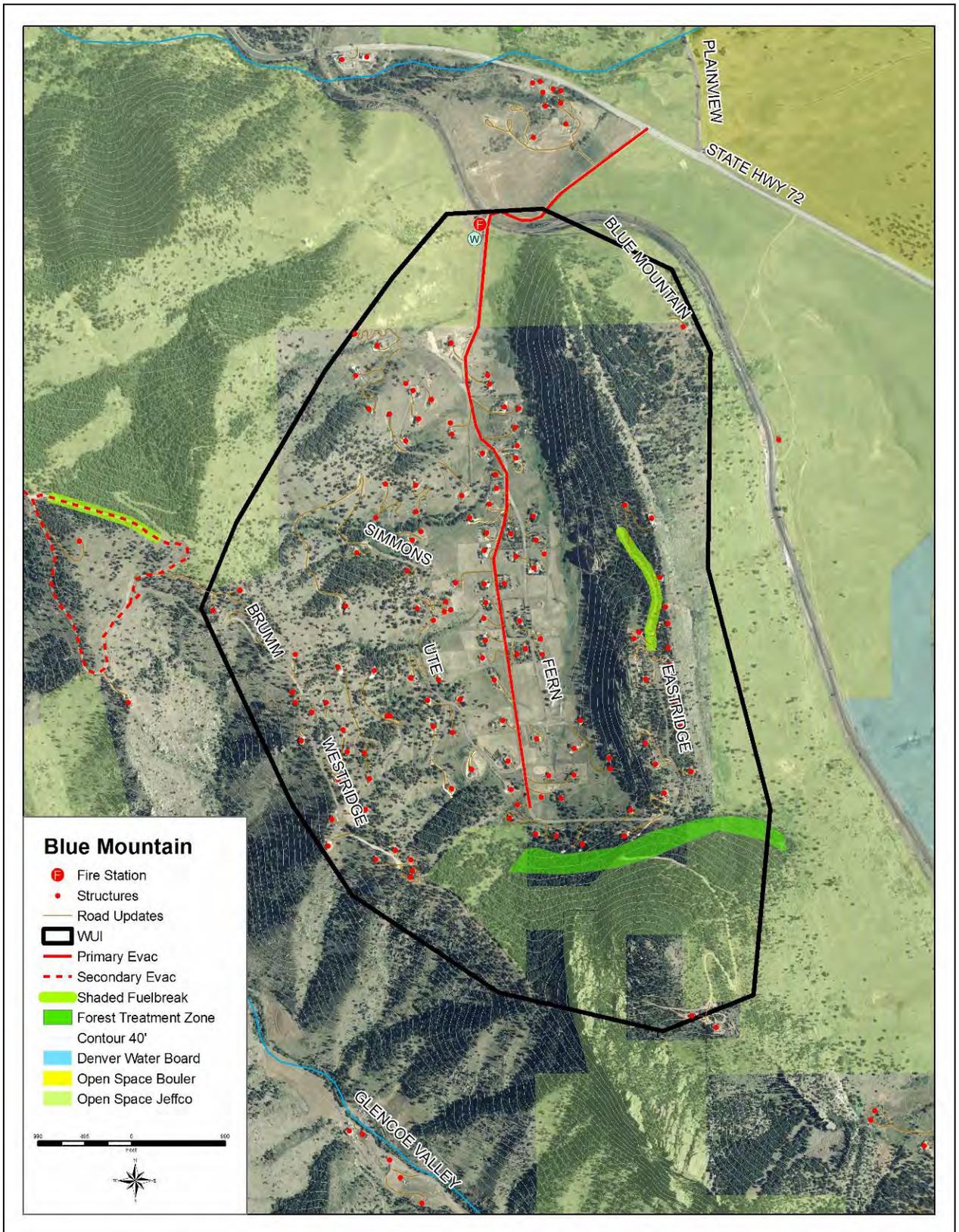
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Blue Mountain	
WUI Hazard Rating moderate	
Means of Access	
Ingress and Egress	
2 or more roads in & out	0
One road in & out	7
Road Width	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	
Topographic features that adversely affect fire behavior (0 - 5)	3
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	1
Roofing Assembly	
Roofing	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	
Hazard Rating Scale	
< 40 LOW	0
> 40 MODERATE	0
> 70 HIGH	0
> 112 EXTREME	0

Description: 125 observed structures; open valley meadow in a box canyon that strikes north; steep bounding slopes to the east, south, and west; dense conifer stands on north and west aspects, open conifer and grass on the east aspect, facing the central valley, which is primarily irrigated meadow and grazing land; primary access is paved and 2 lane; secondary roads are 1 ½ to 2 lane and groomed; potential secondary access through Brumm Rd. is private and gated but provides alternative access to Coal Creek Canyon Drive; 2 long cul de sacs, both have turnarounds; street signage and home addressing standard and reflective; 1 to 5 acre lots most common; defensible space – 8% have < 30’, 7% have 30’ to 70’, 27% have 70’ to 100’, 59% have > 100’; roofing – 2% wood shake, 81% asphalt, 17% non-combustible; construction – 81% of structures have combustible siding; above ground utilities, subdivision is served by a pressurized water supply and a hydrant is located at the fire station.

Vegetation: Irrigated grassy meadows of FBFM 1 characterize broad valley floor; grassy slopes and open stands of ponderosa pine, FBFM 1 & 2, dominate the east facing slopes along Westridge Dr.; dense stands of ponderosa pine and mixed conifer, FBFM 8 & 9, characterize the north and west facing slopes of Eastridge Dr.

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinate throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Forest thinning recommended at the south end of the main valley road, along the base of the ridge, breaking continuity of the dense mixed conifer stand adjacent to structures.
- Implement shaded fuel break along forested zone of Eastridge Dr.
- Seek necessary emergency access permissions through Brumm Rd and implement necessary road and shaded fuel break improvements.



Burke

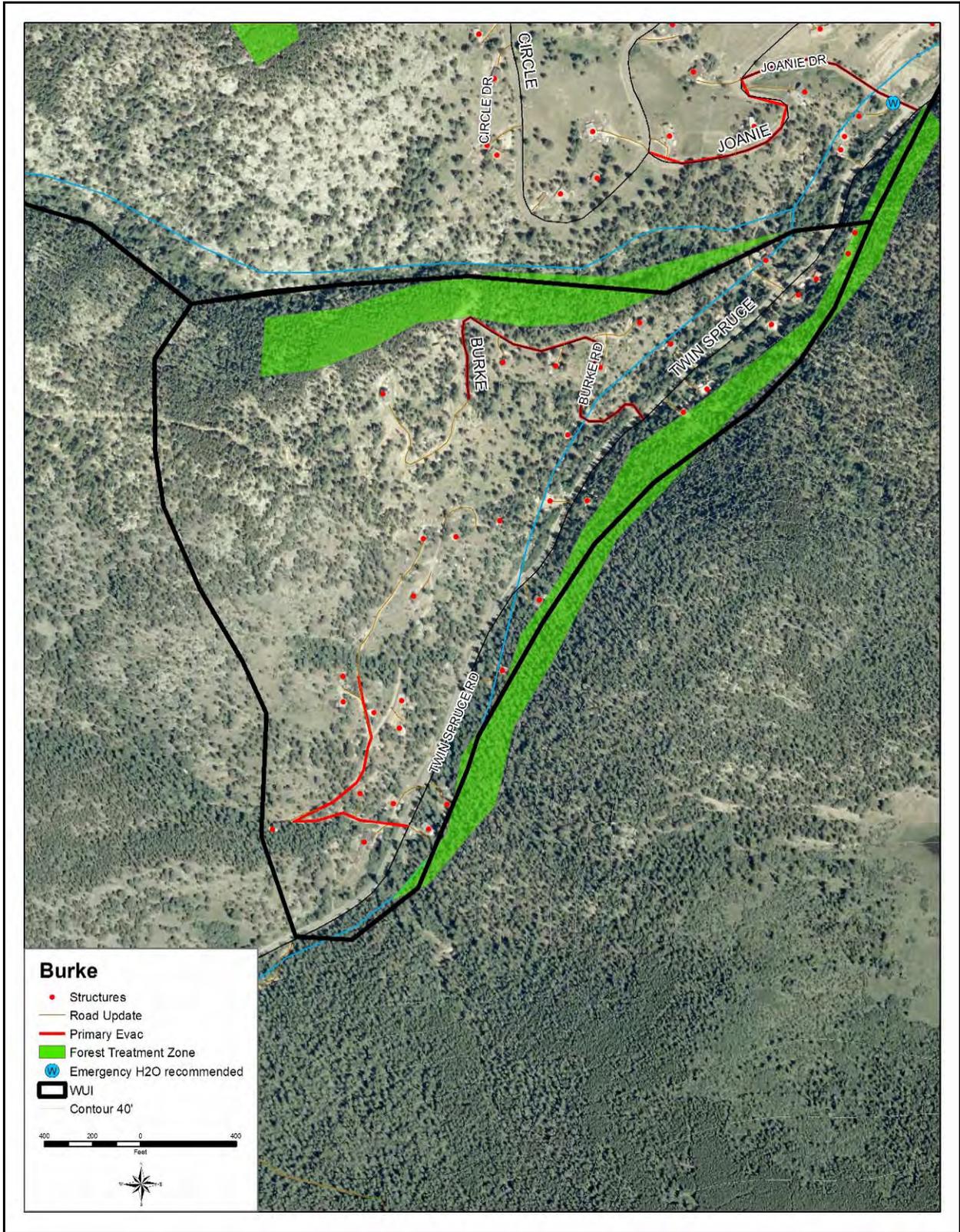
Wildfire Fire Risk and Hazard Severity Form NFPA 1144		
Burke		
WUI 1 Hazard Rating		EXTREME
Means of Access		
Ingress and Egress 7		
2 or more roads in & out	0	
One road in & out	7	
Road Width 4		
> 24 ft	0	
> 20 ft < 24 ft	2	
< 20 ft	4	
All-Season Road Condition 6		
Surfaced Road, grade <5%	0	
Surfaced Road, grade >5%	2	
Non-surfaced Road, grade <5%	2	
Non-surfaced Road, grade >5%	5	
Other than all season	7	
Fire Service Access 4		
< 300 ft with turnaround	0	
> 300 ft with turnaround	2	
< 300 ft with no turnaround	4	
> 300 ft with no turnaround	5	
Street Signs (predominant) 4		
Present - reflective	0	
Not present	5	
Vegetation (fire behavior fuel models)		
Characteristics of predominant veg w/in 300 ft 8		
Light - 1, 2, 3	5	
Medium - 5, 6, 7, 8, 9	10	
Heavy - 4, 10	20	
Slash - 11, 12, 13	25	
Defensible Space - vegetation treatment around structure 18		
> 100 ft around structure	1	
> 70 ft < 100 ft around structure	3	
> 30 ft < 70 ft around structure	10	
< 30 ft around structure	25	
Topography Within 300 ft of Structures		
Slope 7		
< 9%	1	
10% to 20%	4	
21% to 30%	7	
31% to 40%	8	
> 41%	10	
Additional Rating Factors (rate all that apply)		
Additional factors 13		
Topographic features that adversely affect fire behavior (0 - 5)	5	
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3	
Severe fire weather potential (0 - 5)	3	
Separation of adjacent structures contributing to fire spread (0 - 5)	2	
Roofing Assembly		
Roofing 3		
Class A	0	
Class B	3	
Class C	15	
Unrated	25	
Building construction		
Materials (predominant) 15		
Non-combustible fire-resistive siding, eaves and deck	0	
Non-combustible siding, eaves and combustible deck	5	
Combustible siding and deck	15	
Building set-back relative to slope of 30% or more 5		
> 30 ft to slope	1	
< 30 ft to slope	5	
Available Fire Protection		
Water source availability 7		
Hydrants 500 gpm < 1000 ft apart	0	
Hydrants 250 gpm < 1000 ft apart	1	
Non-pressurized water source > 250 gpm for 2 hours	3	
Non-pressurized water source < 250 gpm for 2 hours	5	
Water unavailable	10	
Organized response resources 1		
Station < 5 mi from structure	1	
Station > 5 mi from structure	3	
Fixed fire protection 5		
NFPA 13, 13R, 13D sprinkler system	0	
None	5	
Placement of gas and Electric Utilities		
Utilities 5		
Both underground	0	
One above, one below	3	
Both above ground	5	
Totals for home or subdivision 112		
Hazard Rating Scale		
< 40 LOW		
> 40 MODERATE		
> 70 HIGH		
> 112 EXTREME		

Description: 32 observed structures; Steep southeast facing slope overlooking Twin Spruce Rd.; 2 single ingress/egress roads; Burke Rd. is groomed, 2 lane with turnaround, Fischer Road is single lane, unimproved, dead end with no adequate apparatus access; street signage visible from Twin Spruce Rd., many addresses missing; most homes on Burke Rd. have 1 to 5 acre lots, Fischer Road < ½ acre lots; defensible space – 63% have < 30’, 38% have 30’ to 70’; roofing – > 95% asphalt; construction – 100% of structures have combustible siding; above ground utilities, no static emergency water supply.

Vegetation: Open ponderosa pine FBFM 9, 2 and meadow FBFM 1 characterize primary southeast slope. Dense stands of mixed conifer are located on north facing slope north of subdivision.

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinate throughout the neighborhood to increase effectiveness on smaller lots.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Forest thinning recommended on north slope north of Burke Rd. and behind structures along Twin Spruce Rd.
- Recommended static emergency water supply north of subdivision near Joanie Rd. and Twin Spruce Rd.



Camp Eden

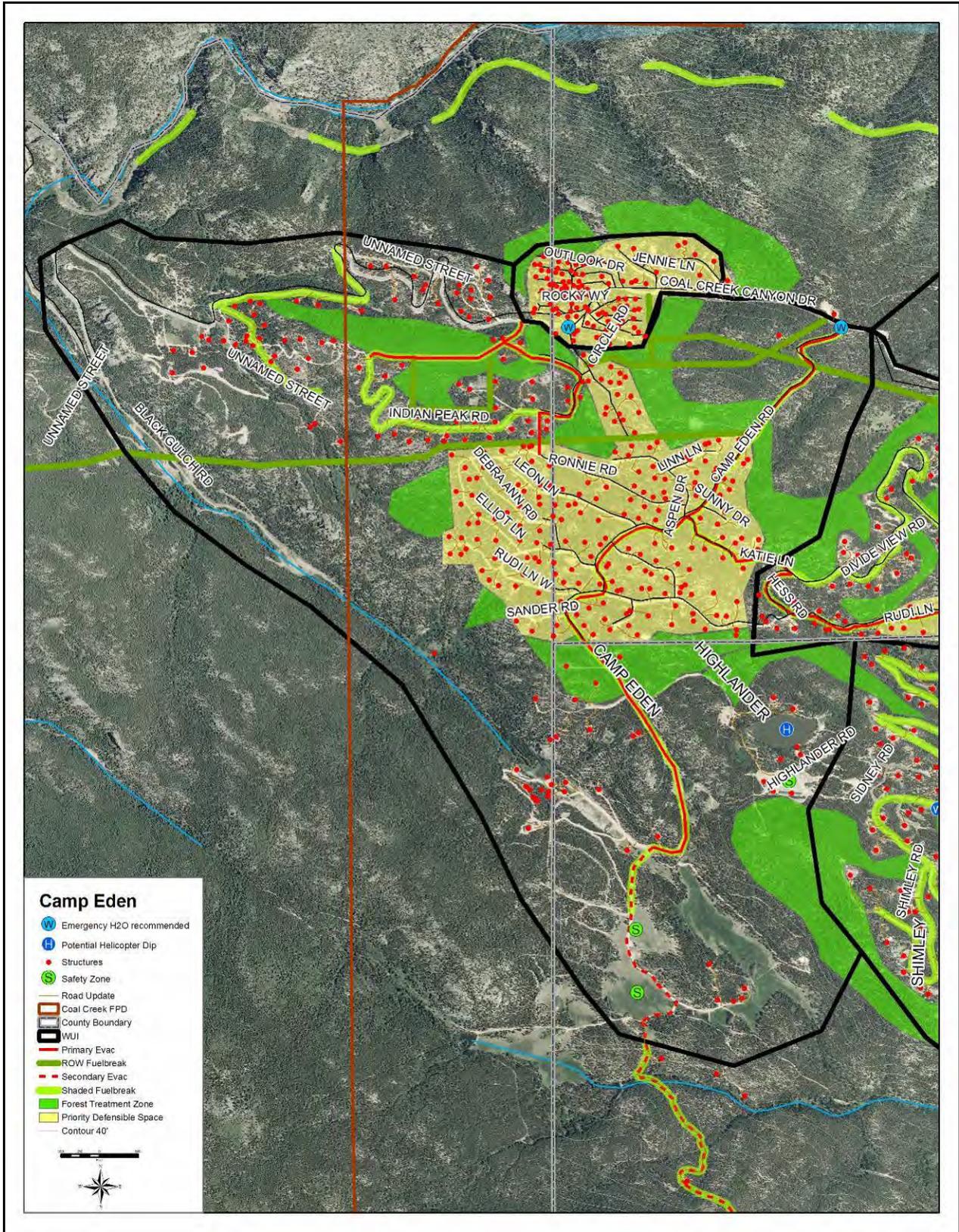
Wildfire Fire Risk and Hazard Severity Form NFPA 1144		
Camp Eden		
WUI Hazard Rating		HIGH
Means of Access		
Ingress and Egress		
2 or more roads in & out		0
One road in & out		7
Road Width		
> 24 ft		0
> 20 ft < 24 ft		2
< 20 ft		4
All-Season Road Condition		
Surfaced Road, grade <5%		0
Surfaced Road, grade >5%		2
Non-surfaced Road, grade <5%		2
Non-surfaced Road, grade >5%		5
Other than all season		7
Fire Service Access		
< 300 ft with turnaround		0
> 300 ft with turnaround		2
< 300 ft with no turnaround		4
> 300 ft with no turnaround		5
Street Signs (predominant)		
Present - reflective		0
Not present		5
Vegetation (fire behavior fuel models)		
Characteristics of predominant veg w/in 300 ft		
Light - 1, 2, 3		5
Medium - 5, 6, 7, 8, 9		10
Heavy - 4, 10		20
Slash - 11, 12, 13		25
Defensible Space - vegetation treatment around structure		
> 100 ft around structure		1
> 70 ft < 100 ft around structure		3
> 30 ft < 70 ft around structure		10
< 30 ft around structure		25
Topography Within 300 ft of Structures		
Slope		
< 9%		1
10% to 20%		4
21% to 30%		7
31% to 40%		8
> 41%		10
Additional Rating Factors (rate all that apply)		
Additional factors		
Topographic features that adversely affect fire behavior (0 - 5)		4
Areas with a history of high fire occurrence - ignition potential (0 - 5)		3
Severe fire weather potential (0 - 5)		3
Separation of adjacent structures contributing to fire spread (0 - 5)		4
Roofing Assembly		
Roofing		
Class A		0
Class B		3
Class C		15
Unrated		25
Building construction		
Materials (predominant)		
Non-combustible fire-resistive siding, eaves and deck		0
Non-combustible siding, eaves and combustible deck		5
Combustible siding and deck		15
Building set-back relative to slope of 30% or more		
> 30 ft to slope		1
< 30 ft to slope		5
Available Fire Protection		
Water source availability		
Hydrants 500 gpm < 1000 ft apart		0
Hydrants 250 gpm < 1000 ft apart		1
Non-pressurized water source > 250 gpm for 2 hours		3
Non-pressurized water source < 250 gpm for 2 hours		5
Water unavailable		10
Organized response resources		
Station < 5 mi from structure		1
Station > 5 mi from structure		3
Fixed fire protection		
NFPA 13, 13R, 13D sprinkler system		0
None		5
Placement of gas and Electric Utilities		
Utilities		
Both underground		0
One above, one below		3
Both above ground		5
Totals for home or subdivision		
Hazard Rating Scale		96
< 40 LOW		
> 40 MODERATE		
> 70 HIGH		
> 112 EXTREME		

Description: 165 observed structures; subdivision located on north facing slope directly south of Wondervu and Cola creek Canyon Dr., and bordered on the south by a steep slope dropping into Black Gulch; cartographically Camp Eden falls into 3 counties; multiple established accesses provide adequate ingress/egress; alternative secondary emergency available south on Camp Eden Dr. to Nadm and Twin spruce Dr.; main access paved 2 lane, majority of secondary roads are groomed 1 ½ to 2 lane and range from low to steep grade; turnarounds are established at ends of most cul de sacs; inconsistent street signage is noted with some home addressing missing or difficult to find; housing density is moderate to high with many ¼ to 1 acre lots; defensible space – 25% have < 30’, 72% have 30’ to 70, 3% have 70’ to 100’; roofing – 77% asphalt, 23% non-combustible; construction – 94% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: High elevation and north facing slope support lodgepole pine and mixed conifer in moderate to high density stands (FBFM 8), ponderosa pine and mixed conifer dominate most south facing slopes (FBFM 9 & 8), the area is characterized by a rather continuous canopy cover with shrub and grass (FBFM 1, 2, & 6) in areas where canopy is open or lacking.

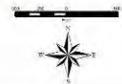
Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along primary evacuation routes.
- Forest treatment and thinning zones are identified for most surrounding timber stands.
- Survey and note condition of turnarounds and improve where needed for apparatus access.
- Conduct qualified survey of lake near Highlander Rd. for use as a helicopter dip site.
- Install strategic static emergency water supply, recommend area of Camp Eden Rd. and Coal Creek Canyon Dr.
- Investigate Camp Eden Rd. (south) to Nadm for use as a secondary emergency evacuation route.
- Improve existing powerline ROW.



Camp Eden

- Emergency H2O recommended
- Potential Helicopter Dip
- Structures
- Safety Zone
- Road Update
- Coal Creek FPD
- County Boundary
- WUI
- Primary Evac
- ROW Fuelbreak
- Secondary Evac
- Shaded Fuelbreak
- Forest Treatment Zone
- Priority Defensible Space
- Contour 40'



Coal Creek Heights

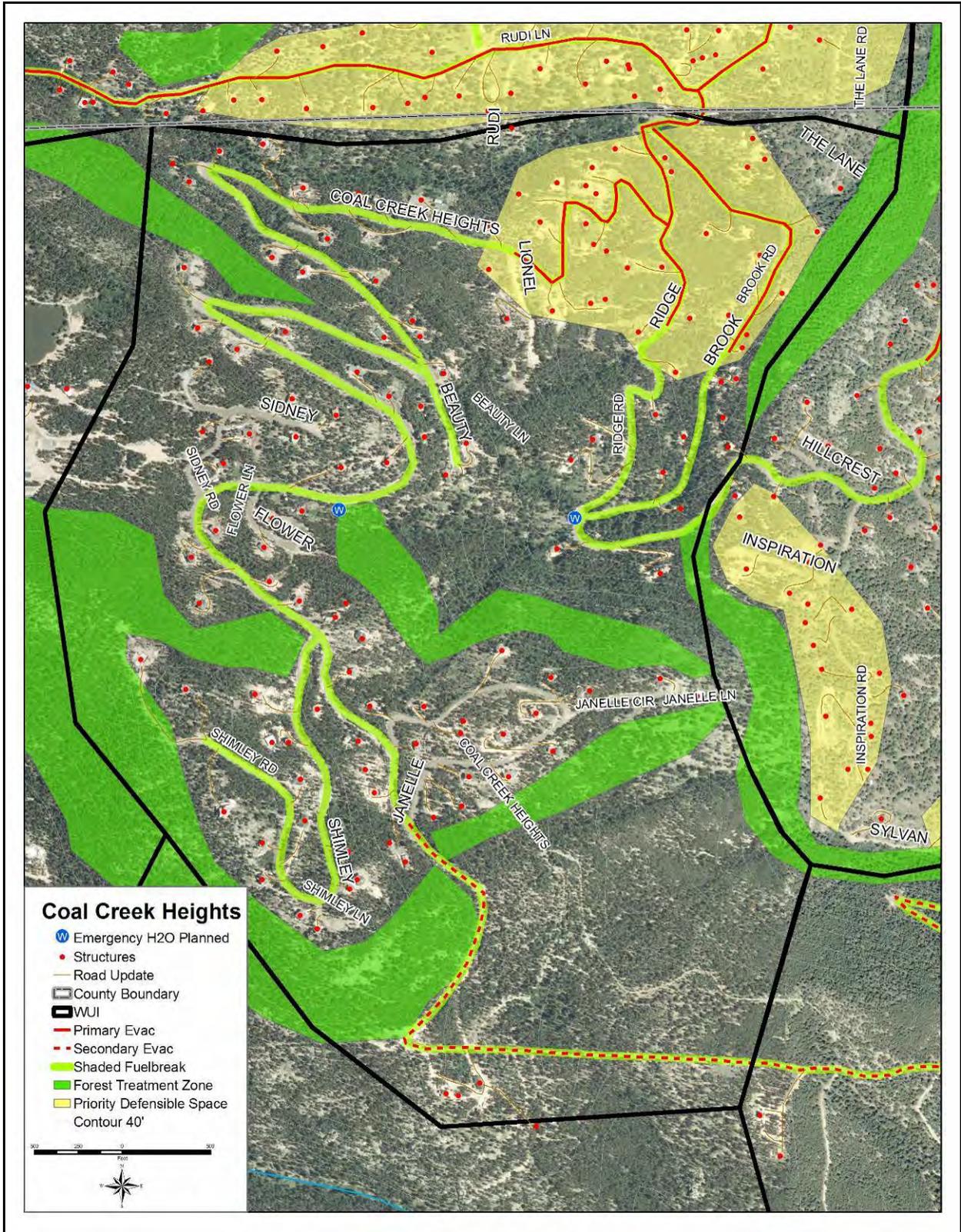
Wildfire Fire Risk and Hazard Severity Form NFPA 1144		
Coal Creek Heights		
WUI Hazard Rating	HIGH	
Means of Access		
Ingress and Egress		
	2 or more roads in & out	0
	One road in & out	7
Road Width		
	> 24 ft	0
	> 20 ft < 24 ft	2
	< 20 ft	4
All-Season Road Condition		
	Surfaced Road, grade <5%	0
	Surfaced Road, grade >5%	2
	Non-surfaced Road, grade <5%	2
	Non-surfaced Road, grade >5%	5
	Other than all season	7
Fire Service Access		
	< 300 ft with turnaround	0
	> 300 ft with turnaround	2
	< 300 ft with no turnaround	4
	> 300 ft with no turnaround	5
Street Signs (predominant)		
	Present - reflective	0
	Not present	5
Vegetation (fire behavior fuel models)		
Characteristics of predominant veg w/in 300 ft		
	Light - 1, 2, 3	5
	Medium - 5, 6, 7, 8, 9	10
	Heavy - 4, 10	20
	Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure		
	> 100 ft around structure	1
	> 70 ft < 100 ft around structure	3
	> 30 ft < 70 ft around structure	10
	< 30 ft around structure	25
Topography Within 300 ft of Structures		
Slope		
	< 9%	1
	10% to 20%	4
	21% to 30%	7
	31% to 40%	8
	> 41%	10
Additional Rating Factors (rate all that apply)		
Additional factors		
	Topographic features that adversely affect fire behavior (0 - 5)	5
	Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
	Severe fire weather potential (0 - 5)	3
	Separation of adjacent structures contributing to fire spread (0 - 5)	3
Roofing Assembly		
Roofing		
	Class A	0
	Class B	3
	Class C	15
	Unrated	25
Building construction		
Materials (predominant)		
	Non-combustible fire-resistive siding, eaves and deck	0
	Non-combustible siding, eaves and combustible deck	5
	Combustible siding and deck	15
Building set-back relative to slope of 30% or more		
	> 30 ft to slope	1
	< 30 ft to slope	5
Available Fire Protection		
Water source availability		
	Hydrants 500 gpm < 1000 ft apart	0
	Hydrants 250 gpm < 1000 ft apart	1
	Non-pressurized water source > 250 gpm for 2 hours	3
	Non-pressurized water source < 250 gpm for 2 hours	5
	Water unavailable	10
Organized response resources		
	Station < 5 mi from structure	1
	Station > 5 mi from structure	3
Fixed fire protection		
	NFPA 13, 13R, 13D sprinkler system	0
	None	5
Placement of gas and Electric Utilities		
Utilities		
	Both underground	0
	One above, one below	3
	Both above ground	5
Totals for home or subdivision		
		96
Hazard Rating Scale		
< 40 LOW		
> 40 MODERATE		
> 70 HIGH		
> 112 EXTREME		

Description: 117 observed structures; subdivision located on north and northeast facing slope south of Divide View and west of Vonnie Claire WUIs; accesses to neighboring WUIs provide dual ingress/egress but upper portion of subdivision is dependent on secondary emergency access into the Hilltop WUI via Wundertal; all roads are well groomed, 1 ½ to 2 lane with moderate to steep grade with wide switchbacks; standard street signage is present with most home addressing green reflective; housing density is moderate; defensible space – 39% have < 30’, 49% have 30’ to 70, 12% have 70’ to 100’; roofing – 78% asphalt, 20% non-combustible; construction – 87% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: Dense lodgepole pine stands intermixed with mixed conifer are found on north facing slopes(FBFM 8); ponderosa pine and mixed conifer on east and south facing slopes (FBFM 9 & 8), grassy understory where canopy is open (FBFM 2).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along primary evacuation routes, main roads, and secondary evacuation routes.
- Strategic forest treatment and thinning zones are recommended for several stands surrounding the subdivision and several stands within the subdivision.
- Survey and note condition of turnarounds switchbacks and improve where needed for apparatus access.
- Install strategic static emergency water supply in planned sites.
- Investigate and formalize secondary emergency evacuation route to the Hilltop subdivision. Improve where necessary.



Chute Road

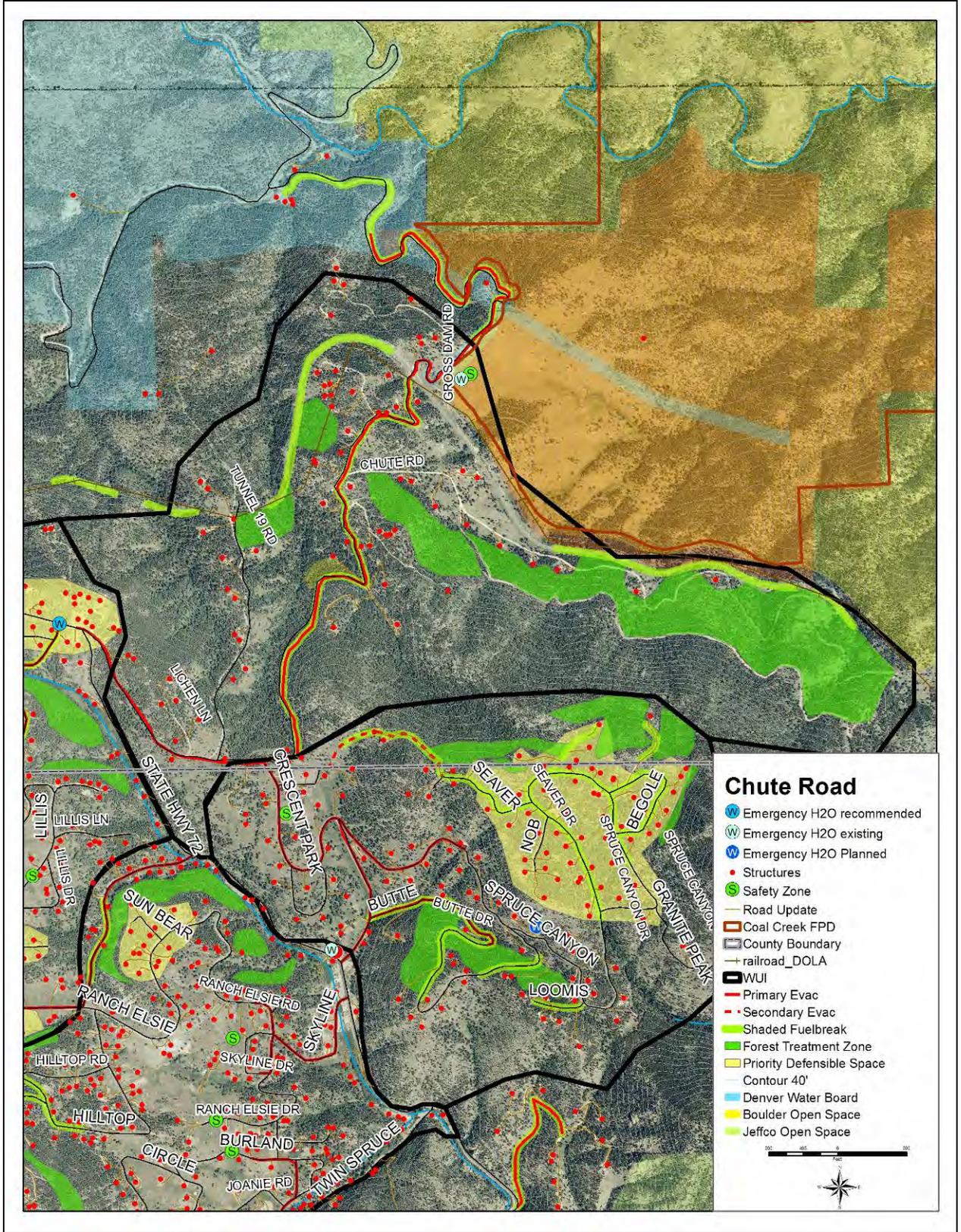
Copperdale	
WUI Hazard Rating	
	HIGH
Means of Access	
Ingress and Egress	
2 or more roads in & out	0
One road in & out	7
Road Width	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	
Topographic features that adversely affect fire behavior (0 - 5)	5
Areas with a history of high fire occurrence - ignition potential (0 - 5)	5
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	2
Roofing Assembly	
Roofing	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	
107	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 44 observed structures; subdivision located on predominantly north facing slope along Gross Dam Rd. which provides dual ingress/egress through the area; homes are scattered upslope from major railway line mostly on dead end secondary roads; turnarounds are present on Lichen Rd. and Tunnel 19 Rd., no turnaround on Juniper Heights Rd.; roads are generally well groomed and 1 ½ to 2 lane; some step grades present; standard street signage is present with most home addressing green reflective; housing density is light; defensible space – 39% have < 30’, 39% have 30’ to 70, 20% have 70’ to 100’; roofing – 59% asphalt, 36% non-combustible, 5% wood shake; construction – 89% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: Dense mixed conifer on steep north facing slopes (FBFM 8 & 9); grassy understory where canopy is open (FBFM 2) and open meadow on flat terrain (FBFM 1), aspen stands noted at the top of Tunnel 19 Rd.

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed.
- Develop and maintain shaded fuel breaks along forested portions of Gross Dam Rd. and forested zones of the railroad ROW to buffer fire spread potential from sparking brakes.
- Associated strategic forest treatment and thinning zones are recommended for stands upslope from railroad ROW along Chute Rd. and Tunnel 19 Rd. area.
- Survey and note condition of turnarounds switchbacks and improve where needed for apparatus access.
- Survey meadow north of railroad on Gross Dam Rd. for potential safety zone.



Crescent Park

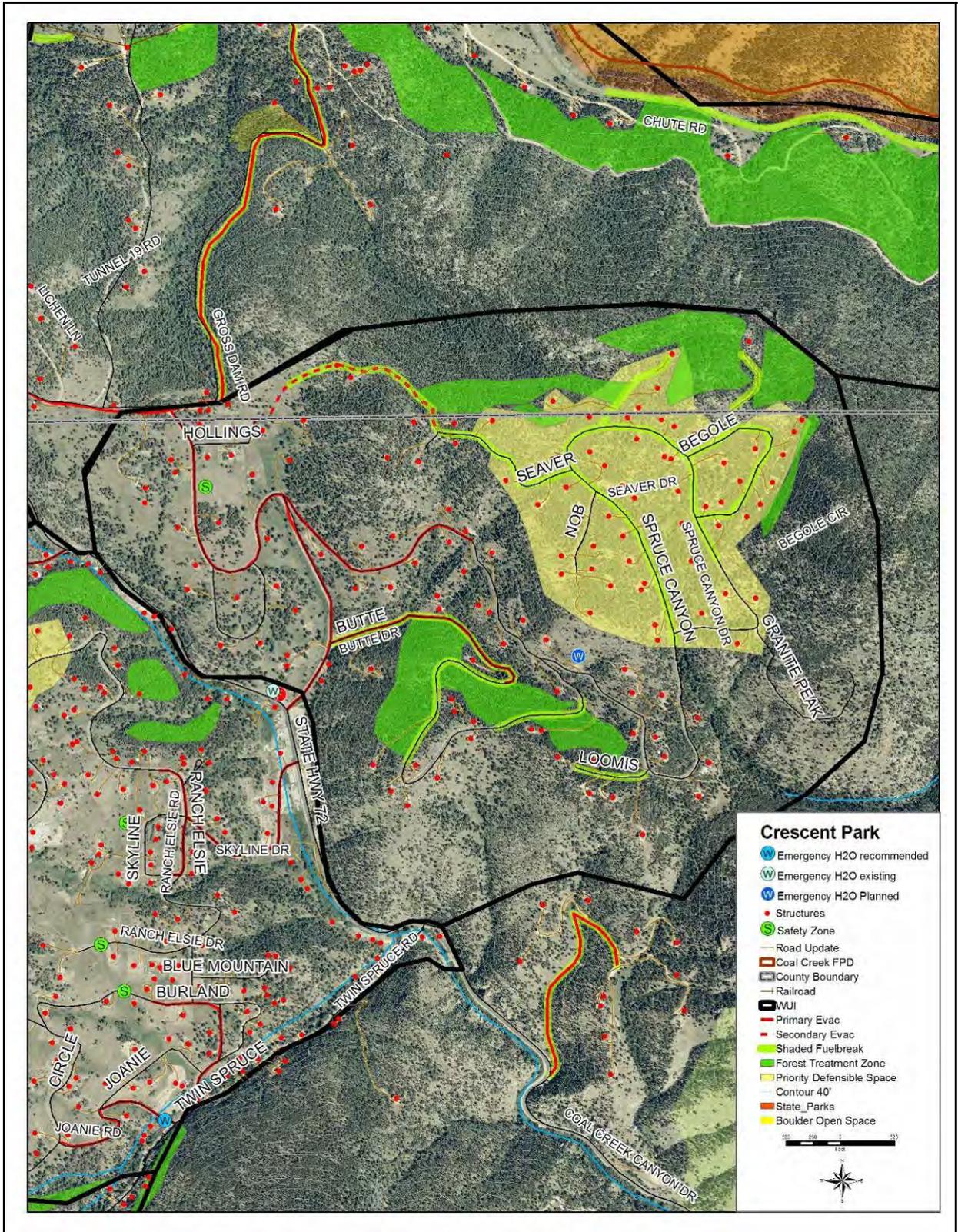
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Crescent Park	
WUI Hazard Rating	HIGH
Means of Access	
Ingress and Egress 4	
2 or more roads in & out	0
One road in & out	7
Road Width 2	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition 4	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access 2	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant) 1	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft 8	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure 14	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope 4	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors 13	
Topographic features that adversely affect fire behavior (0 - 5)	4
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	3
Roofing Assembly	
Roofing 2	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant) 13	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more 2	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability 5	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources 1	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection 5	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities 5	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision 85	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 105 observed structures; subdivision located on ridge above railroad ROW and Chute Rd., and on slopes and drainages leading south to Coal Creek Canyon Dr.; technically dual ingress/egress but most homes are limited to single access along Spruce Canyon Dr.; looping road design limits cul de sacs but turnarounds are located at most dead ends; primary road is paved with secondary roads generally groomed with low to moderate grade; standard street signage is present, home addressing is generally present and reflective; housing density is moderate with higher density found along Begole Cir.; defensible space – 29% have < 30’, 54% have 30’ to 70, 21% have 70’ to 100’; roofing – 88% asphalt, 16% non-combustible, 3% wood shake; 95% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: Isolated north and northwest slope stands of dense lodgepole pine and mixed conifer (FBFM 8 & 9); extensive open south facing slopes with grass, shrub and grassy understory in open ponderosa pine stands (FBFM 1, 2, 6); extensive open meadows in flat or low grade slope areas (FBFM 1).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along upper Spruce Canyon Dr. and forested access in lower portions of the subdivision. forested portions of Gross Dam Rd.
- Associated strategic forest treatment and thinning zones are recommended for stands adjacent north and east of Spruce Canyon Dr., and Butte Dr.
- Install planned cistern near Loomis and Butte Dr.
- Survey meadow at Hollings and Gross Dam Rd for potential community safety zone.
- Investigate possible secondary evacuation route from Seaver Dr. to Hollings Dr.



Copperdale

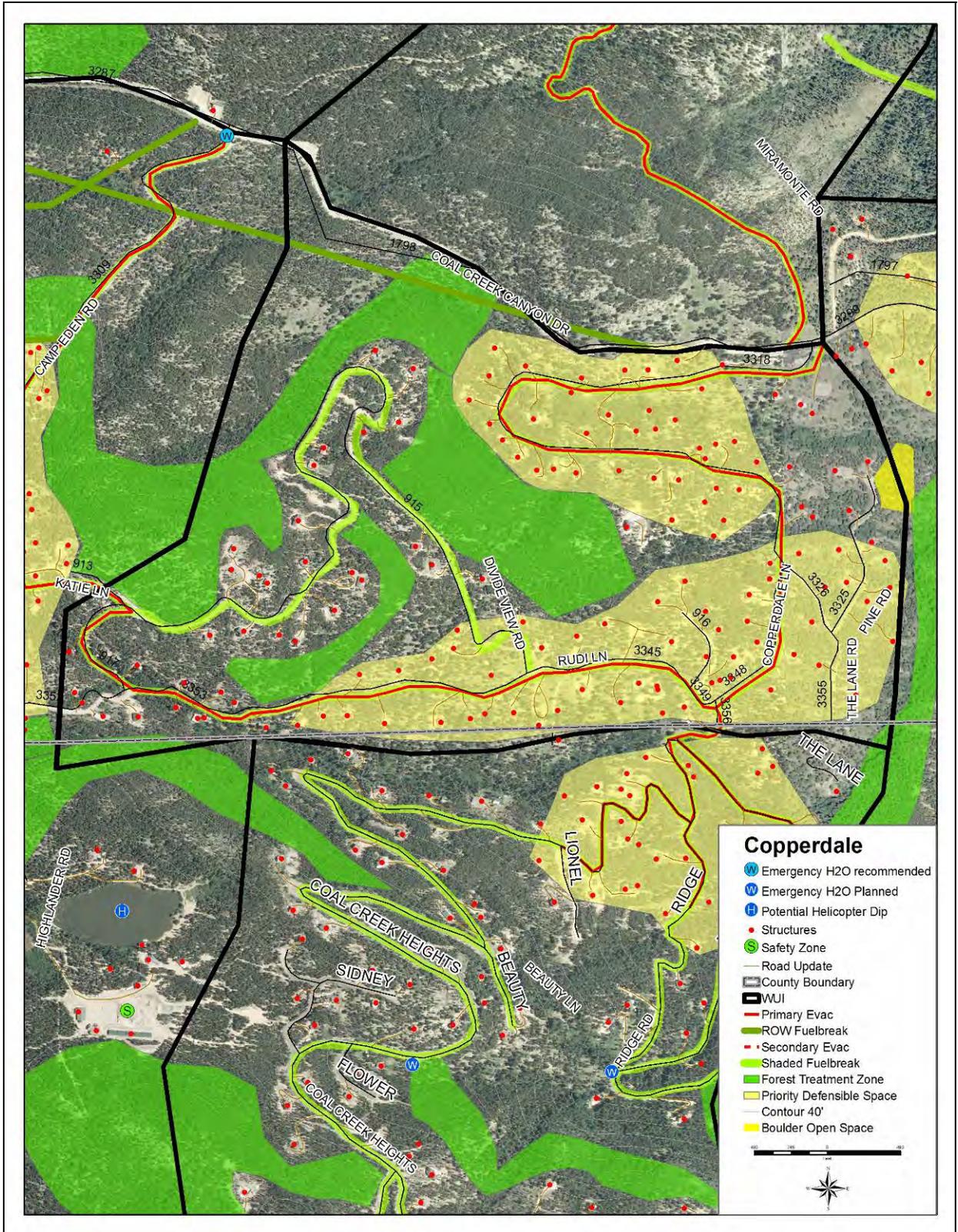
Wildfire Fire Risk and Hazard Severity Form NFPA 1144		
Divide View		
WUI Hazard Rating		HIGH
Means of Access		
Ingress and Egress		
2 or more roads in & out		0
One road in & out		7
Road Width		
> 24 ft		0
> 20 ft < 24 ft		2
< 20 ft		4
All-Season Road Condition		
Surfaced Road, grade <5%		0
Surfaced Road, grade >5%		2
Non-surfaced Road, grade <5%		2
Non-surfaced Road, grade >5%		5
Other than all season		7
Fire Service Access		
< 300 ft with turnaround		0
> 300 ft with turnaround		2
< 300 ft with no turnaround		4
> 300 ft with no turnaround		5
Street Signs (predominant)		
Present - reflective		0
Not present		5
Vegetation (fire behavior fuel models)		
Characteristics of predominant veg w/in 300 ft		
Light - 1, 2, 3		5
Medium - 5, 6, 7, 8, 9		10
Heavy - 4, 10		20
Slash - 11, 12, 13		25
Defensible Space - vegetation treatment around structure		
> 100 ft around structure		1
> 70 ft < 100 ft around structure		3
> 30 ft < 70 ft around structure		10
< 30 ft around structure		25
Topography Within 300 ft of Structures		
Slope		
< 9%		1
10% to 20%		4
21% to 30%		7
31% to 40%		8
> 41%		10
Additional Rating Factors (rate all that apply)		
Additional factors		
Topographic features that adversely affect fire behavior (0 - 5)		4
Areas with a history of high fire occurrence - ignition potential (0 - 5)		3
Severe fire weather potential (0 - 5)		3
Separation of adjacent structures contributing to fire spread (0 - 5)		3
Roofing Assembly		
Roofing		
Class A		0
Class B		3
Class C		15
Unrated		25
Building construction		
Materials (predominant)		
Non-combustible fire-resistive siding, eaves and deck		0
Non-combustible siding, eaves and combustible deck		5
Combustible siding and deck		15
Building set-back relative to slope of 30% or more		
> 30 ft to slope		1
< 30 ft to slope		5
Available Fire Protection		
Water source availability		
Hydrants 500 gpm < 1000 ft apart		0
Hydrants 250 gpm < 1000 ft apart		1
Non-pressurized water source > 250 gpm for 2 hours		3
Non-pressurized water source < 250 gpm for 2 hours		5
Water unavailable		10
Organized response resources		
Station < 5 mi from structure		1
Station > 5 mi from structure		3
Fixed fire protection		
NFPA 13, 13R, 13D sprinkler system		0
None		5
Placement of gas and Electric Utilities		
Utilities		
Both underground		0
One above, one below		3
Both above ground		5
Totals for home or subdivision		
82		
Hazard Rating Scale		
< 40 LOW		
> 40 MODERATE		
> 70 HIGH		
> 112 EXTREME		

Description: 128 observed structures; subdivision located on northeast facing slope on the south side of Coal Creek Canyon Dr.; WUI is surrounded by other subdivisions and multiple accesses are available; lower ½ of main access is paved and 2 lane; 3 cul de sacs are 1 ½ to 2 lane with turnarounds, secondary roads leading to Camp Eden are steep and 1 to 1 ½ lane dirt; standard reflective street signage is present, home addressing is generally present but non standard; housing density is moderate to high; defensible space – 49% have < 30’, 38% have 30’ to 70’, 16% have 70’ to 100’; roofing – 82% asphalt, 17% non-combustible; 92% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: Dense stands of lodgepole pine observed throughout assessment area (FBFM 8), mixed stands of Douglas-fir and ponderosa pine elsewhere in the subdivision (FBFM 8 & 9).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along identified evacuation routes and primary all access roads.
- Associated strategic forest treatment and thinning zones are recommended for stands along subdivision margins and stands between areas of concentrated housing.
- Improve existing powerline ROW.
- WUI would be served by recommended static emergency water supplies at Coal Creek Canyon Dr and Camp Eden Rd. and Crescent Lake Dr.



Hilltop

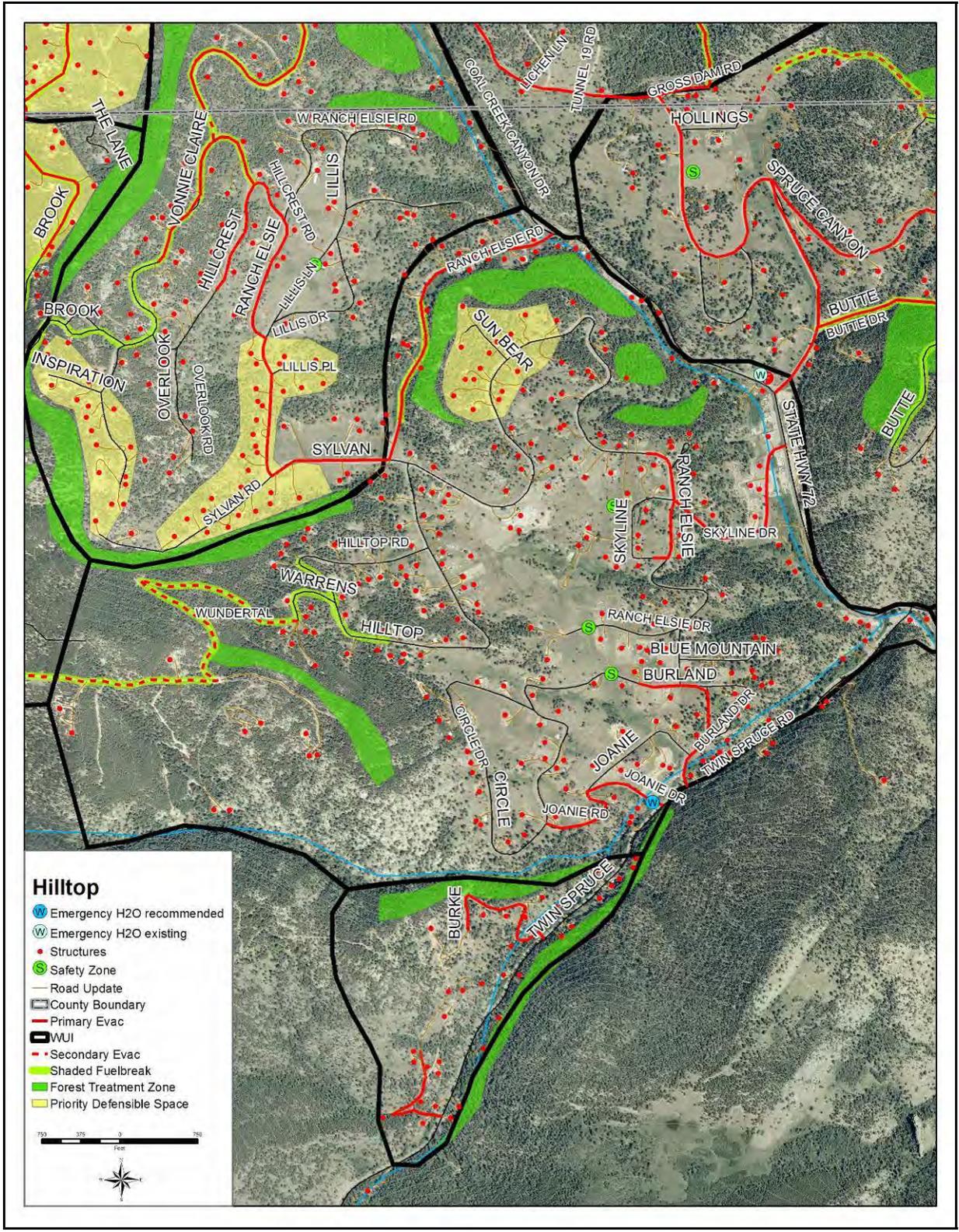
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Hilltop	
WUI Hazard Rating Moderate	
Means of Access	
Ingress and Egress	
2 or more roads in & out	0
One road in & out	7
Road Width	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	
Topographic features that adversely affect fire behavior (0 - 5)	2
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	3
Roofing Assembly	
Roofing	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	
68	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 222 observed structures; subdivision characterized by a broad central plateau and an extensive series of central meadows with a forested ridge rising to the south and west; multiple accesses to Twin Spruce Rd., Coal Creek Canyon Dr., and Vonnie Claire subdivision; Ranch Elsie area paved 2 lane, all other roads groomed, 2 lane, low to moderate grade; turnarounds on most cul de sacs; street signage and home addressing inconsistent; housing density moderate to high along access routes ; defensible space – 18% have < 30’, 28% have 30’ to 70’, 29% have 70’ to 100’, 25% have > 100’; roofing – 90% asphalt, 9% non-combustible; construction – 92% of structures have combustible siding; above ground utilities, cistern located at fire station near Skyline Dr. and Coal Creek Canyon Dr.

Vegetation: Open meadows and grassy understory characterize most of the subdivision (FBFM 1 & 2); isolated dense stands of mixed conifer are found on most north facing slopes (FBFM 8 & 9).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Develop and maintain shaded fuelbreaks along forested portions of Ranch Elsie Rd. and Hilltop Dr.
- Forest thinning recommended in stands on the north and west margins of the subdivision.
- Investigate possible secondary evacuation route along Wundertal to Coal Creek Heights.
- Static emergency water supply recommended at Joanie Dr. and Twin Spruce Rd.
- Investigate the use of meadows for community safety zones.



Lyttle Dowdle

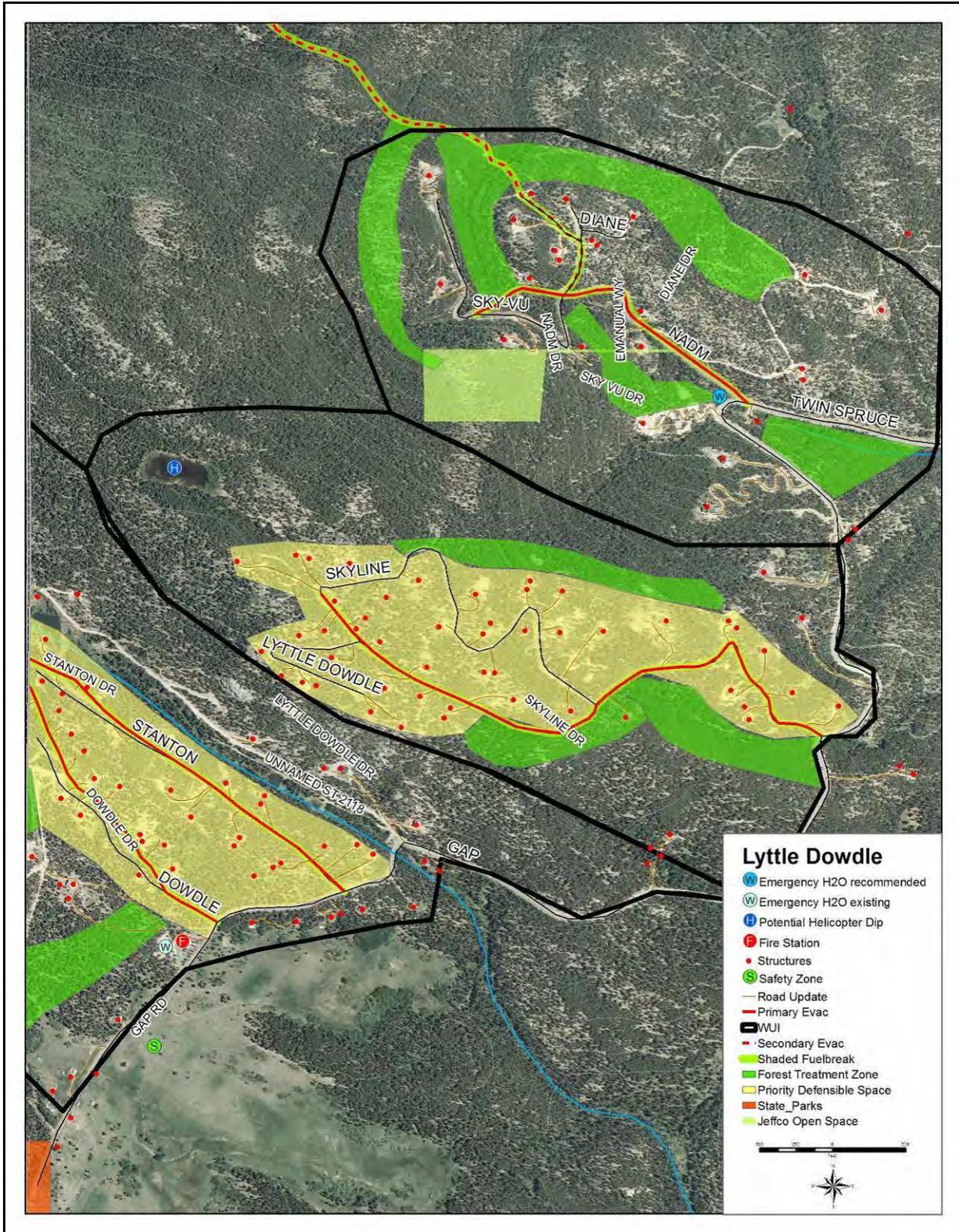
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Lyttle Dowdle	
WUI 1 Hazard Rating	HIGH
Means of Access	
Ingress and Egress	7
2 or more roads in & out	0
One road in & out	7
Road Width	2
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	5
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	3
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	3
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft	14
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	15
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	5
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	12
Topographic features that adversely affect fire behavior (0 - 5)	4
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	2
Roofing Assembly	
Roofing	3
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	15
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	2
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	5
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	3
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	5
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	5
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	104
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 38 observed structures; subdivision located on heavily forested east sloping ridge between Nadm and Stanton WUIs; single ingress/egress; primary access 2 lane groomed, secondary single lane dirt; both moderate to steep grade; standard street signs are present and most homes have installed reflective addressing; 1 cul de sac, 1 turnaround; housing density is moderate to high along access roads; defensible space – 37% have < 30’, 53% have 30’ to 70’, 11% have 70’ to 100’; roofing – 95% asphalt; 95% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: Predominantly mixed conifer including ponderosa pine, Douglas-fire, and lodgepole pine (FBFM 8 & 9); some dense stands of lodgepole pine with dead and downed timber (FBFM 8 & 10).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along primary evacuation route.
- Associated strategic forest treatment and thinning zones are recommended for stands adjacent to the subdivision on the north and south margins.
- Emergency static water supply recommended for Nadm and Twin Spruce Dr., and existing static water supply at CCCFPD station on Gap Rd. would serve Lyttle Dowdle WUI.
- Conduct qualified survey of pond northwest of subdivision for use as a helicopter dip site.



Miramonte

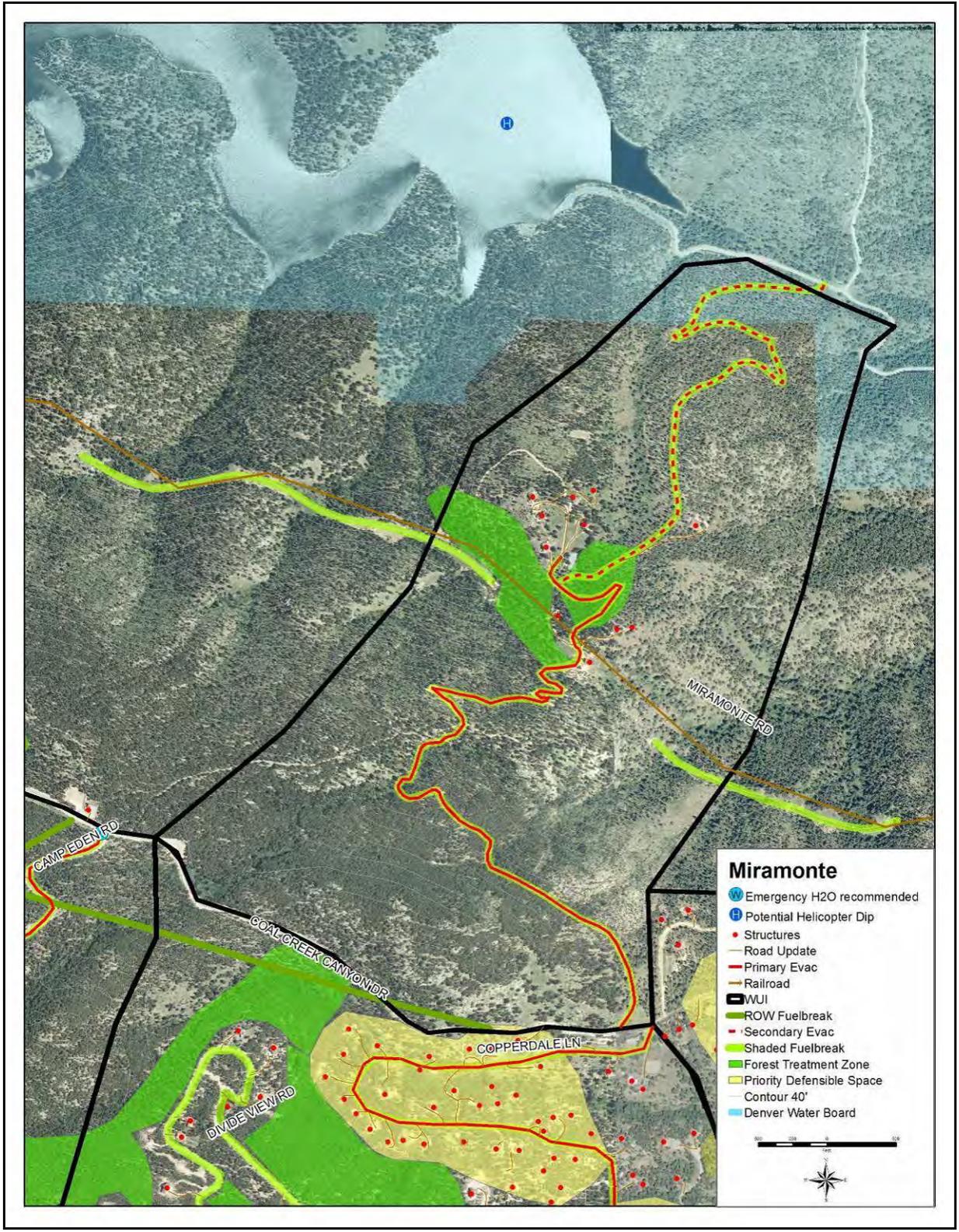
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Miramonte	
WUI Hazard Rating	HIGH
Means of Access	
Ingress and Egress 2	
2 or more roads in & out	0
One road in & out	7
Road Width 2	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition 5	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access 3	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant) 3	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft 9	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure 5	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope 3	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors 14	
Topographic features that adversely affect fire behavior (0 - 5)	4
Areas with a history of high fire occurrence - ignition potential (0 - 5)	5
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	2
Roofing Assembly	
Roofing 3	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant) 13	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more 1	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability 5	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources 3	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection 5	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities 5	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision 81	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 11 observed structures; gated subdivision located along railroad ROW just south of Gross Reservoir; primary access is off Coal Creek Canyon Dr. and terminates at Miramonte Ranch, secondary access is unimproved and continues north to Gross Dam Rd.; main access is well signed, home addressing is unknown; housing density is light although somewhat clustered around a main living area; defensible space – 18% have < 30’, 45% have 30’ to 70’, 36% have 70’ to 100’; roofing – unknown; construction – unknown; above ground utilities, no static emergency water supply noted.

Vegetation: Dense mixed vegetation on steep north slope including lodgepole pine (FBFM 8 & 10), mixed conifer with Douglas-fir and ponderosa pine (FBFM 8 & 9), some aspen and shrub (FBFM 8 & 6), some open meadow and grassy understory (FBFM 1 & 2).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed.
- Develop and maintain shaded fuel breaks along upper and lower Miramonte Rds. and along forested portions of the local railroad ROW to buffer fire spread potential from sparking brakes.
- Associated strategic forest treatment and thinning zones are recommended for stands adjacent to the subdivision in the vicinity of the railroad tunnel.
- Recommended static water supply at Camp Eden Rd. and Coal Creek Canyon Dr., and existing water supply at CCCFD station would serve WUI.



Nadm

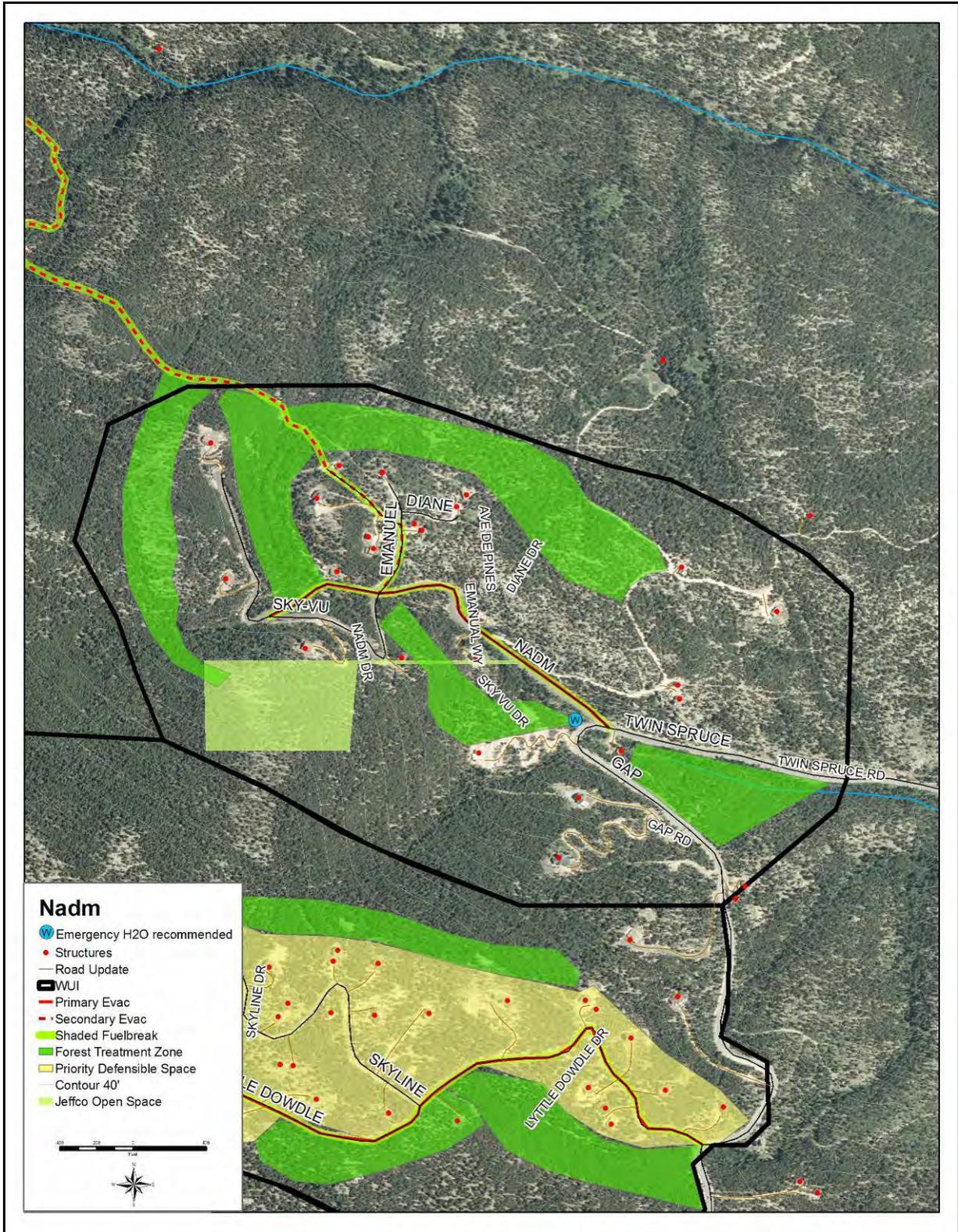
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Nadm	
WUI 1 Hazard Rating HIGH	
Means of Access	
Ingress and Egress 7	
2 or more roads in & out	0
One road in & out	7
Road Width 3	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition 5	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access 4	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant) 3	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft 14	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure 16	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope 6	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors 13	
Topographic features that adversely affect fire behavior (0 - 5)	5
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	2
Roofing Assembly	
Roofing 3	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant) 15	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more 2	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability 5	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources 3	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection 5	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities 5	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision 109	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 46 observed structures; subdivision located in a short valley striking northwest of Twin Spruce rd. single ingress/egress; primary access 2 lane groomed with a tight looping turnaround, secondary road is 1 to 1 ½ lane dirt with no turnaround; both moderate grade; standard street signs are present, inconsistent home addressing; housing density is low; defensible space – 47% have < 30’, 33% have 30’ to 70, 20% have 70’ to 100’; roofing – 80% asphalt; 93% of structures have combustible exterior construction; above ground utilities, no static emergency water supply observed.

Vegetation: South facing slope medium to high density ponderosa pine (FBFM 9), north facing slope dense lodgepole pine and mixed conifer (FBFM 8 & 10).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed.
- Develop and maintain shaded fuel breaks along primary and secondary evacuation routes, and other identified primary access routes.
- Associated strategic forest treatment and thinning zones are recommended for stands surrounding to the subdivision.
- Emergency static water supply installation is recommended for Nadm and Twin Spruce Dr.
- Investigate possible secondary evacuation route from Emanuel to Camp Eden.



Stanton

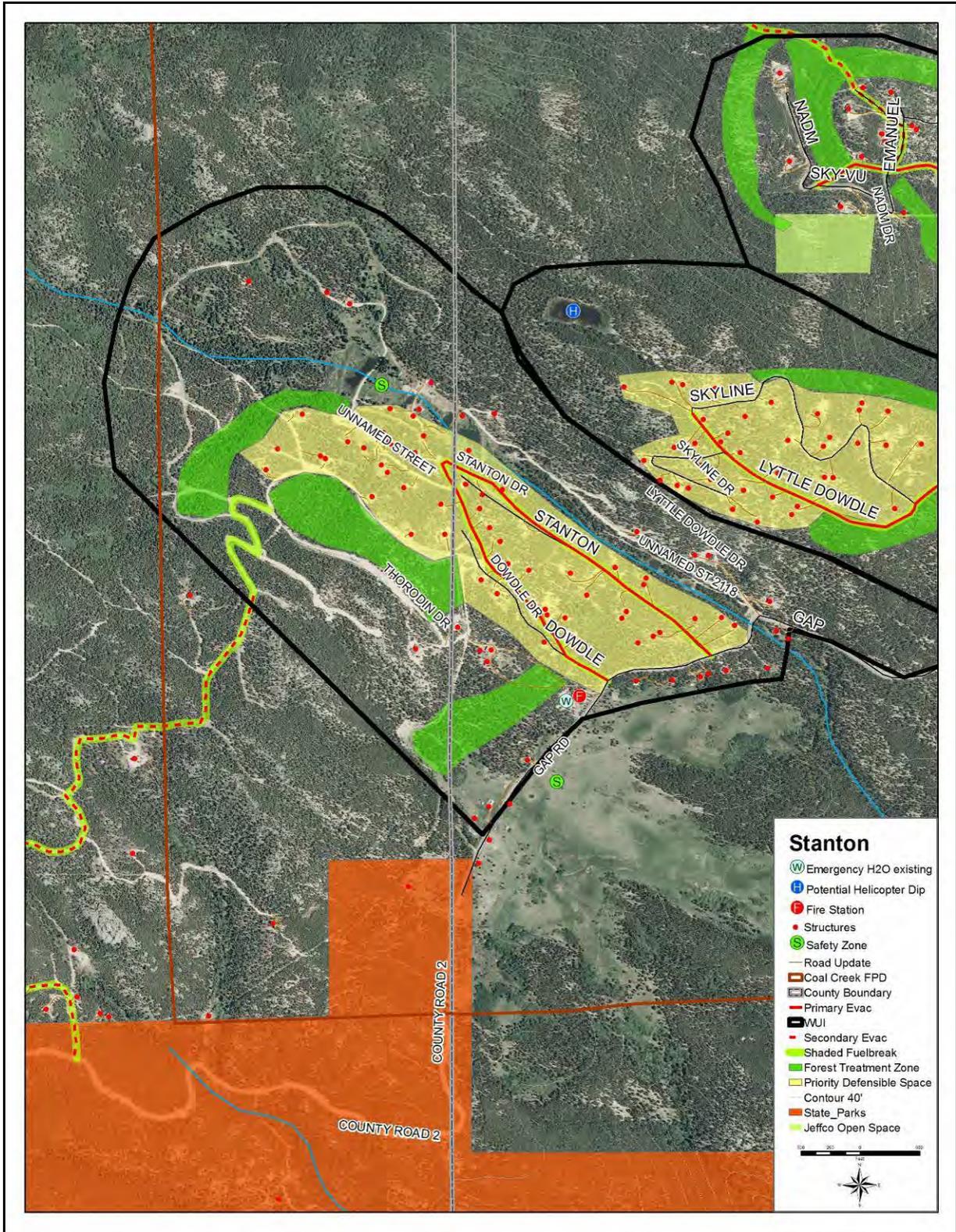
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Stanton	
WUI 1 Hazard Rating	HIGH
Means of Access	
Ingress and Egress 2	
2 or more roads in & out	0
One road in & out	7
Road Width 2	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition 5	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access 4	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant) 5	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft 14	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure 13	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope 3	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors 11	
Topographic features that adversely affect fire behavior (0 - 5)	3
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	2
Roofing Assembly	
Roofing 2	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant) 13	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more 1	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability 5	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources 1	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection 5	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities 5	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision 91	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 51 observed structures; subdivision located along a drainage striking northwest from Gap/Twin Spruce Rd.; dual ingress/egress but accesses are close in proximity; primary access 2 lane groomed, secondary roads are 2 to 1 ½ lane groomed; low to moderate grade; street signage is inconsistent with a confusing road network, inconsistent home addressing; housing density is moderate along access roads; defensible space – 30% have < 30’, 52% have 30’ to 70’, 17% have 70’ to 100’; roofing – 76% asphalt, 24% non-combustible; 85% of structures have combustible exterior construction; above ground utilities, static emergency water supply observed at fire station on Gap Rd.

Vegetation: Some stands of ponderosa pine and Douglas-fir mixed with lodgepole pine (FBFM 8 & 9), extensive stands of lodgepole pine with areas of dead and downed timber (FBFM 8 & 10), extensive meadow complex southeast off Gap rd.

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Develop and maintain shaded fuel breaks along primary and secondary evacuation routes, and other identified primary access routes.
- Associated strategic forest treatment and thinning zones are recommended for stands northwest and west of the subdivision.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Investigate possible secondary evacuation route from Thorodin Dr. to Gap Rd. inside Golden Gate State Park.
- Investigate the use of meadows north of WUI and south of Gap Rd. for community safety zones.



Vonnie Claire

Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Vonnie Claire	
WUI Hazard Rating	HIGH
Means of Access	
Ingress and Egress	
2 or more roads in & out	0
One road in & out	7
Road Width	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant)	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors	
Topographic features that adversely affect fire behavior (0 - 5)	3
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	3
Roofing Assembly	
Roofing	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant)	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision	
80	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 203 observed structures; subdivision characterized by a northeast facing slope and an extensive central meadow; primary access along Ranch Elsie Rd. and the Hilltop WUI, secondary access is available through Coal Creek Heights; Crescent Lake Rd. bisects the assessment area but does not provide through access to the central Vonnie Claire area; primary roads are 2 lane paved or 2 lane groomed, secondary roads are 1 ½ lane and groomed, grade is moderate to steep as they climb the ridge south and west; turnarounds present on most cul de sacs but some are very limited; street signage standard and present, home addressing is inconsistent; housing density moderate to high along access routes ; defensible space – 36% have < 30’, 42% have 30’ to 70’, 12% have 70’ to 100’, 10% have > 100’; roofing – 86% asphalt, 13% non-combustible; construction – 98% of structures have combustible siding; above ground utilities, no emergency water source observed.

Vegetation: Open meadows and grassy understory characterize the central portion of the subdivision (FBFM 1 & 2); dense stands of ponderosa pine Douglas-fir are found on all margins of the subdivision (FBFM 8 & 9).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Develop and maintain shaded fuelbreaks along forested portions evacuation routes and primary residential accesses.
- Forest thinning recommended in timber stands along subdivision margins.
- Establish emergency access from Vonnie Claire to Crescent Lake road.
- Static emergency water supply recommended at Crescent Lake Rd. and Coal Creek Canyon Dr..
- Investigate the use of central meadow for community safety zone.

Wonderview

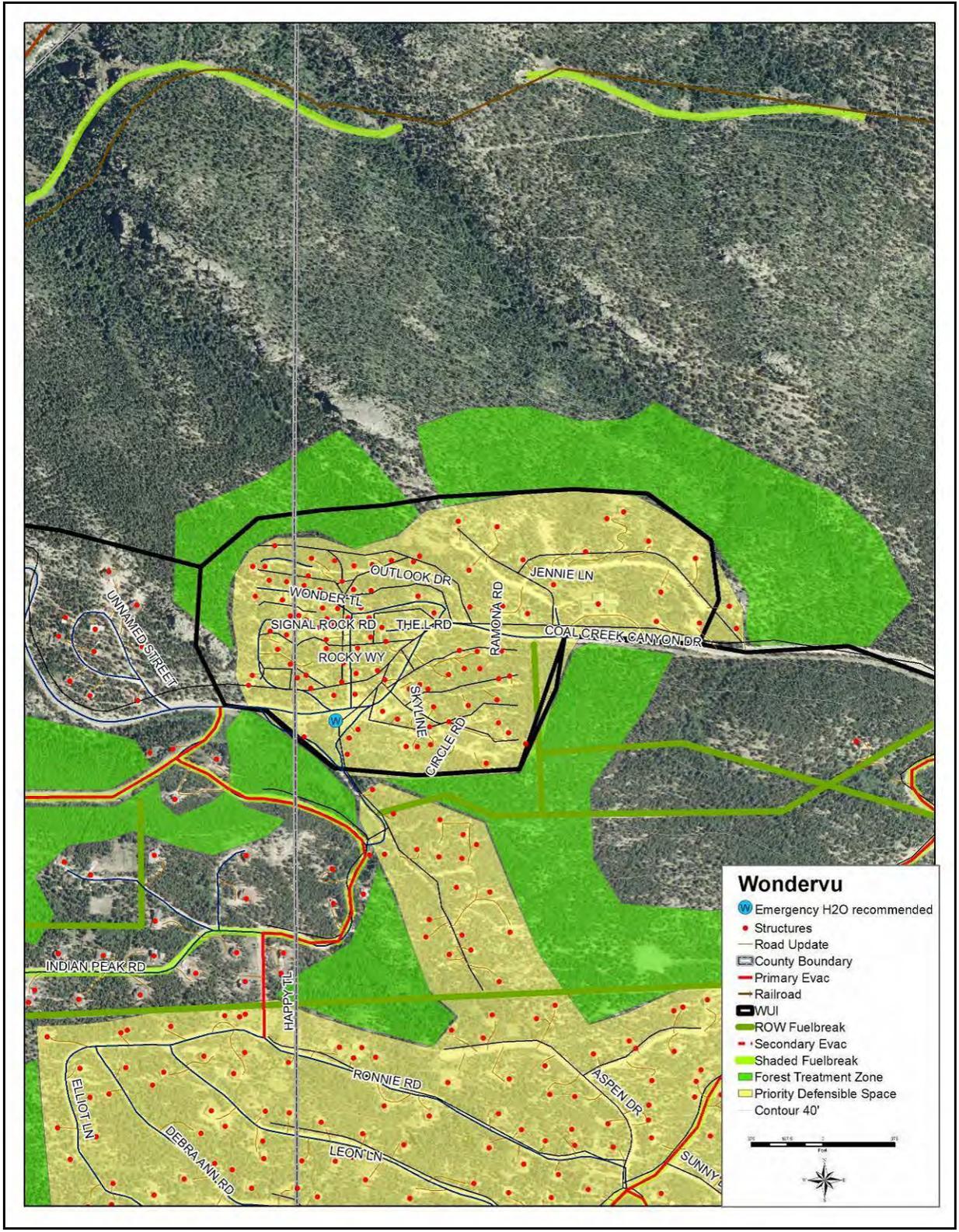
Wildfire Fire Risk and Hazard Severity Form NFPA 1144	
Wonderview	
WUI Hazard Rating EXTREME	
Means of Access	
Ingress and Egress 5	
2 or more roads in & out	0
One road in & out	7
Road Width 4	
> 24 ft	0
> 20 ft < 24 ft	2
< 20 ft	4
All-Season Road Condition 6	
Surfaced Road, grade <5%	0
Surfaced Road, grade >5%	2
Non-surfaced Road, grade <5%	2
Non-surfaced Road, grade >5%	5
Other than all season	7
Fire Service Access 5	
< 300 ft with turnaround	0
> 300 ft with turnaround	2
< 300 ft with no turnaround	4
> 300 ft with no turnaround	5
Street Signs (predominant) 5	
Present - reflective	0
Not present	5
Vegetation (fire behavior fuel models)	
Characteristics of predominant veg w/in 300 ft 12	
Light - 1, 2, 3	5
Medium - 5, 6, 7, 8, 9	10
Heavy - 4, 10	20
Slash - 11, 12, 13	25
Defensible Space - vegetation treatment around structure 20	
> 100 ft around structure	1
> 70 ft < 100 ft around structure	3
> 30 ft < 70 ft around structure	10
< 30 ft around structure	25
Topography Within 300 ft of Structures	
Slope 2	
< 9%	1
10% to 20%	4
21% to 30%	7
31% to 40%	8
> 41%	10
Additional Rating Factors (rate all that apply)	
Additional factors 14	
Topographic features that adversely affect fire behavior (0 - 5)	3
Areas with a history of high fire occurrence - ignition potential (0 - 5)	3
Severe fire weather potential (0 - 5)	3
Separation of adjacent structures contributing to fire spread (0 - 5)	5
Roofing Assembly	
Roofing 5	
Class A	0
Class B	3
Class C	15
Unrated	25
Building construction	
Materials (predominant) 15	
Non-combustible fire-resistive siding, eaves and deck	0
Non-combustible siding, eaves and combustible deck	5
Combustible siding and deck	15
Building set-back relative to slope of 30% or more 1	
> 30 ft to slope	1
< 30 ft to slope	5
Available Fire Protection	
Water source availability 5	
Hydrants 500 gpm < 1000 ft apart	0
Hydrants 250 gpm < 1000 ft apart	1
Non-pressurized water source > 250 gpm for 2 hours	3
Non-pressurized water source < 250 gpm for 2 hours	5
Water unavailable	10
Organized response resources 3	
Station < 5 mi from structure	1
Station > 5 mi from structure	3
Fixed fire protection 5	
NFPA 13, 13R, 13D sprinkler system	0
None	5
Placement of gas and Electric Utilities	
Utilities 5	
Both underground	0
One above, one below	3
Both above ground	5
Totals for home or subdivision 112	
Hazard Rating Scale	
< 40 LOW	
> 40 MODERATE	
> 70 HIGH	
> 112 EXTREME	

Description: 110 observed structures; subdivision characterized by high structure density in a densely forested plateau; WUI is bisected by Coal Creek Canyon Dr. which provides dual ingress/egress to the area; secondary roads throughout the community are single lane unimproved dirt; grade is low to flat; roads generally terminate in dead ends within a home cluster; street signage is non-standard and inconsistent, home addressing is inconsistent; housing density is high; defensible space – 72% have < 30’, 28% have 30’ to 70’, roofing – 88% asphalt, 5% non-combustible, 7 % wood shake; construction – 100% of structures have combustible siding; above ground utilities, no emergency water source observed.

Vegetation: Lodgepole pine with some mix Douglas-fir and ponderosa pine characterize the timber in the area (FBFM 8 & 9); high concentration of small homes and some grass and shrub characterize the understory (FBFM 2 & 6).

Recommendations:

- Reduce structural ignitability through building upgrades and seasonal maintenance.
- Improve and maintain defensible space where needed and coordinated throughout the neighborhood to accommodate smaller lots and enhance effectiveness of adjacent forest treatments. Focus coordination in areas designated as priority defensible space.
- Improve emergency access throughout community, grade and widen roads, establish turnarounds at dead ends.
- Seasonal road margin maintenance including mowing and conifer reproduction reduction.
- Forest thinning recommended in timber stands along subdivision margins.
- Improve existing powerline ROW.
- Static emergency water supply recommended near the Wonderview Café.



**APPENDIX D
COAL CREEK CANYON FIRE PROTECTION DISTRICT
QUESTIONNAIRE**



Coal Creek Canyon Fire Protection District Community Wildfire Protection Plan (CWPP) Questionnaire



Your input on this very important topic will help to create an effective plan. Please provide the following information:

1. What community, neighborhood, or subdivision do you live in or closest to?

2. How great of a risk do you feel wildfire poses to your community?
 Extreme Risk Moderate Risk Low Risk No Risk

3. Do you feel your community is currently protected against potential wildfire?
 Yes. If so, how: _____
 No. If not, why: _____

4. Do you feel your community is currently prepared to deal with a wildfire?
 Yes. If so, how: _____
 No. If not, why: _____

5. Rank the types of areas in your community that you think pose a fire risk to homes or property (1 being the highest risk, 4 the lowest)
 ___ Forests ___ Shrubs/Scrub ___ Meadows/Grasses ___ Residential Structures ___ Other: _____

6. Do you feel there are areas of extreme wildfire hazard in or near you community?
 No. Yes, if so, where: _____

7. Rank what you consider to be the best ways to mitigate or reduce wildfire risks (1 providing the highest benefit and 10 the lowest).

___ Reduce vegetation (grasses, trees, etc.) on public land by mechanical treatments (tree thinning, etc.) ___ Reduce vegetation on public land by controlled burns. ___ Develop shaded fuel breaks along roads and strategic locations. ___ Upgrade firefighting equipment. ___ Improve fire department volunteer recruitment efforts.	___ Increase water availability. ___ Encourage private landowners to develop defensible spaces around structures. ___ Conduct community outreach and education programs. ___ Other: _____ _____ _____
---	--

8. Have actions been taken to reduce the risk of wildfire in your community?
 Not that I am aware of. Yes. Please explain: _____

9. Have fire education programs occurred in your community?
 Not that I am aware of. Yes. Please describe: _____

10. Are you or someone you know willing to become involved with the implementation of this CWPP?
 No. Yes, if so, Please provide contact information:
 Name: _____ Email: _____
 Address: _____ Phone: _____

Response Due April 15, 2008

Please email, fax or mail your response to:
 Walsh Environmental
 CCCFPD CWPP Project Manager
 4888 Pearl E. Circle, Suite 108 • Boulder, CO 80301-2475
 EMAIL: cwpp@walshenv.com
 FAX 303-443-0387
 PHONE: 303-443-3282

**APPENDIX E
COAL CREEK CANYON FIRE PROTECTION DISTRICT
QUESTIONNAIRE FEEDBACK SUMMARY**

Coal Creek Canyon CWPP Questionnaire

1) What community do you live closest to?

Community	Count
Kaulman / Kuhlmann Heights	2
Kulman Heights III	1
Lillis Lane Area	1
Coal Creek Canyon Camp Elder Area	1
Crescent Park	5
30934 Skyline Drive	1
Blue Mountain Estates	5
Gap Road / Lyttle Dowdle Drive	1
Kuhlman Heights No. II	1
Coal Creek Heights Drive	3
Coal Creek Canyon Road	1
Pooles Camelot Subdivision/ Lyttle Dowdle Neight	1
NADM Acres	1
Georgian Woods	1
Sylvan Heights - Jefferson County	1
Burland Ranch	1
Summit Ranch	1
Lazy Z Estates	1
Stanton Subdivision	2
Hilltop	1

2) How great of a risk do you think wildfire poses to your community?

Extreme	Moderate	Low	None
15	16	1	0

3) Do you think your community is currently protected against potential wildfire?

Yes	No
9	24

If yes, why?

Roads surround and close to Fire Station #1.
 Hydrants, fire stations nearby, awareness.
 As best it can by CCFD and the increased awareness of homeowners; slowly increasing mitigation efforts.
 Two wildfires have been stopped in the last 5 years.
 Trained professionals to fight fire (past experiences).
 We are very close to the fire station.
 Many homeowners cut their grass and vegetation early in summer and some lower in the valley
 Many are aware of the danger around us.
 community awareness program.
 Protected to a certain degree; people are generally good about keeping lots clear; two close fire stations;

If no, why?

Trees are too close to the houses; no grass has been mowed around the houses.
 The trees are too thick and too many are diseased.
 100 years of growth since the last fire.
 High density of trees.
 Nothing has been done to prepare.
 Minimal fire mitigation by neighbors.
 We're lucky.
 Next to National Forest and open space.
 There is so much forest and inaccessible areas.
 Some properties are not well maintained - dense forest not thinned, dead trees not removed, vacant properties.
 Only a few households have been pro active.
 Forest Service adjacent land on Winiger Ridge has large stand of dead trees.
 Limited equipment, limited firefighters, away from main canyon fire stations.
 Some lots still need tree thinning; others, including mine, have tall grasses that should be cut.
 Inconsistent efforts by landowners to develop defensible spaces.
 Neighbors have not mitigated.

4) Do you think your community is currently prepared to deal with a wildfire?

Yes	No
14	16

If yes, why?

Currently working on it.
Good volunteers and neighbors.
In past, fires have been brought under control such as the Walker Ranch Fire, but not sure about the future.
Hydrants, fire stations nearby, awareness.
There are lots of plans about and slash has been lessened.
Getting better - the two recent fires on East Ridge - Blue Mtn. and Plain View make the folks aware.
Awareness of community/available slurry bombs.
There is a lot of faith in the firefighters; reverse 911.
Fire department has good equipment and well trained volunteers; though the department is sometimes understaffed.
Reverse 911 system and volunteer fire department.
Dedicated firefighters; helps available.
Property of Station 4; need more community involvement and coordination.
Not really sure how we would cope, but seen several fires and evacuated.
Highly competent fire department nearby; shielded fire break; thinning in open space.
Started the process by reducing vegetation, slash pick-up, education, etc.

If no, why?

No good plans are in place and residents are not aware of any plans
Many need to be educated about the risk and how to evacuate the Canyon if needed.
Inadequate water, poor defensible/survivable spaces.
They do not care.
Our subdivision is only accessed by one road. We've been trapped in two times by accidents - a fire would be deadly.
There is still more to be done.
No meetings, no practice against emergencies. Too many homes have no fire mitigation.
Members of the community know nothing.
Nothing has been done to prepare.
No known plan.
Not enough water.
Only one access to get in and out of neighborhood.
Lack of fire hydrants and limited ability to transport water to affected areas.
If it occurs with strong winds and high temperatures, bringing it under control would be very difficult.

5) Rank the types of areas in your community that you think pose a fire risk to homes or property (1 highest, 4 lowest)

Forest	Meadows and Grass	Shrubs and Bushes	Residential Structures
24 ranked this as #1	7 ranked this as #1	4 ranked this as #1	2 ranked this as #1

If other, describe:

Steep canyon.
Vacant properties, dense forest, dead trees

6) Do you feel there are areas of extreme fire hazard in or near you community?

Yes

No

26

6

If yes, what?

Forests; pine beetles

All around

Much of property surrounding us appears to be owned by out of state owners - property, forest management non-existent.

Steep hillsides facing NW overlooking Gross and Walk Ranch above railroad.

Areas where an excessive amount of fuel has built up with little or no work done to mitigate it.

Crescent Park; all the Canyon.

Everywhere.

The entire Canyon, due to so many beetle killed trees and too many trees.

State Forests have a lot of dead trees.

Any area with dense lodge pole pine.

Hillsides South of Blue Mountain, others...

Many dead, sick, north facing slopes.

The forest to the South of Blue Mountain's valley

Vacant lot behind house.

Adjacent to the railroad tracks.

National Forest.

The open land west - between our house and Hwy 72 has a lot of dead timber and are inaccessible by vehicles.

Large tracts of vacant land, rough terrain, etc.

S. Beaver Creek, private lands, steep canyon.

All around.

Forest Service adjacent land on Winiger Ridge has large stand of dead trees.

Higher elevations with vast abundance of trees.

We are "down-wind" from star Peak and National Forest has lots of fuel.

Land where no actions have been taken to remove ladder fuels and low branches.

Neighbors' yards.

7) Rank what you consider to be the best ways to mitigate or reduce wildfire risk (1 highest, 10 lowest):

Conduct community outreach	5 ranked this as #1
Develop shaded fuel breaks along roads and strategic locations	4 ranked this as #1
Encourage private landowners to develop defensible space	18 ranked this as #1
Improve fire dept volunteer recruitment	2 ranked this as #1
Increase water availability	9 ranked this as #1
Reduce vegetation on public land by controlled burn	1 ranked this as #1
Reduce vegetation on public land by mechanical treatment	15 ranked this as #1
Upgrade firefighting equipment	1 ranked this as #1
Other	1 ranked this as #1

Other comments

Conduct a house by house assessment and give recommendations to homeowners based on their situation.

Ensure there is approved plans that coordinate use of other firefighting jurisdictions in case of a major wildfire.

Keep slash day at upper fire department and try to have it twice a year

Make it cheaper to register for a controlled burn to remove slash from scrub and branches.

Make sure there are 2 ways in and out of each residential area.

Reduce vegetation on private land through controlled burns.

8) Have actions been taken to reduce the risk of wildfire to your community?

Yes	Not that I am aware of
20	10

If yes, what?

Some residents have done defensible space cleaning.
Many of us continue to work on wildfire mitigation, but need more participation for success.
Tree thinning, slash days (drop off sites).
Homeowners have done work to increase defensible space areas.
Education.
Tree thinning in Golden Gate State Park and new fire station built on Gap Road.
The Environmental Group organized slash removal days years ago.
By individual homeowners and wild land and firefighter recruitment.
Thinning of trees along Gap Road.
Some people have reduced scrub.
Slash days.
Some residents have developed defensible space around structures; tree thinning.
A few have cleared fuel from around their homes.
Homeowners are thinning trees and chipping.
Have been encouraging to cut down trees and clear dead trees and shrubs that are fire hazards.
Building permits not granted without pruning of low tree branches.
Community education - but not recently.
Over the years homeowners have removed limbs and scrub around their homes and installed rock around homes.
Community education; slash days; articles in local publications.
Slash collection; homeowners clearing dead trees.

9) Have fire education programs occurred in your community?

Yes	Not that I am aware of
13	16

If yes, what?

Fire department has had some.
Community hall sponsored forestry department talks.
Flyers from fire department and articles in newsletters.
Public meetings and mailings.
Fire mitigation articles in local paper.
Organized slash removal days.
Blue Mountain HOA meeting.
Information updates in local newsletters.
A few community meetings, publication articles.
CCVFD
Fire department visits to our HOA.
Articles in Mountain Messenger and at HOA meetings.

**APPENDIX F
FUELBREAK GUIDELINES FOR FORESTED
SUBDIVISIONS AND COMMUNITIES**



Fuelbreak Guidelines for Forested Subdivisions & Communities

By

Frank C. Dennis

**Colorado
State**
FOREST
SERVICE
Knowledge to Go Places

This publication was developed for use by foresters, planners, developers, homeowners' associations and others. Implementation of these measures cannot guarantee safety from all wildfires, but will greatly increase the probability of containing them at more manageable levels.



Inadequate fire planning can result in loss of life or property and costly suppression activities.



Colorado's forested lands are experiencing severe impacts from continuing population increases and peoples' desire to escape urban pressures. Subdivisions and developments are opening new areas for homesite construction at an alarming rate, especially along the Front Range and around recreational areas such as Dillon, Vail, and Steamboat Springs.

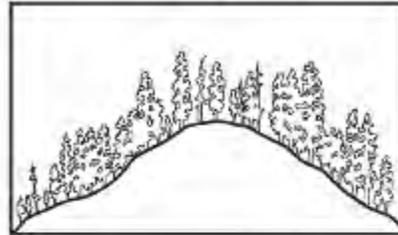
But with development inevitably comes a higher risk of wildfire as well as an ever-increasing potential for loss of life and property. Methods of fire suppression, pre-suppression needs, and homeowner and fire crew safety must all be considered in the planning and review of new developments as well as for the "retrofitting" of existing, older subdivisions.

Fuelbreaks should be considered in fire management planning for subdivisions and developments; however, the following are guidelines **only**. They should be customized to local areas by professional foresters experienced in Rocky Mountain wildfire behavior and suppression tactics.

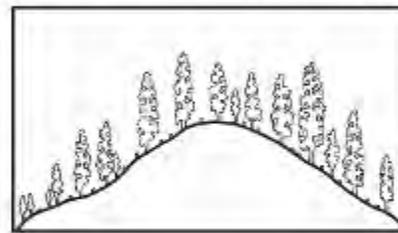
Fuelbreak vs Firebreak

Although the term fuelbreak is widely used in Colorado, it is often confused with firebreak. The two are entirely separate, and aesthetically different, forms of forest fuel modification and treatment.

- A firebreak is strip of land, 20 to 30 feet wide (or more), in which all vegetation is removed down to bare, mineral soil each year prior to fire season.



Above, cross section of mixed conifer stand before fuelbreak modification. Below, after modification.



- A fuelbreak (or shaded fuelbreak) is an easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced, thus improving fire control opportunities. 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 following is a discussion of the uses, limitations, and specifications of fuelbreaks in wildfire control and fuels management.

Fuelbreak Limitations

Fuelbreaks provide quick access for wildfire suppression. Control activities can be conducted more safely due to low fuel volumes. Strategically located, they break up large, continuous tracts of dense timber, thus limiting uncontrolled spread of wildfire.

Fuelbreaks can aid firefighters greatly by slowing fire spread under normal burning conditions. However, under extreme conditions, even the best fuelbreaks stand little chance of arresting a large



Before and after photos of a forest stand thinned to reduce fuel loads.

fire, regardless of firefighting efforts. Such fires, in a phenomenon called "spotting," can drop firebrands 1/8-mile or more ahead of the main fire, causing very rapid fire spread. These types of large fires may continue until there is a major change in weather conditions, topography, or fuel type.

It is critical to understand: A fuelbreak is the line of defense. The area (including any homes and developments) between it and the fire may remain vulnerable.

In spite of these somewhat gloomy limitations, fuelbreaks have proven themselves effective in Colorado. During the 1980 Crystal Lakes Subdivision Fire near Fort Collins, crown fires were stopped in areas with fuelbreak thinning, while other areas of dense lodgepole pine burned completely. A fire at O'Fallon Park in Jefferson County was successfully stopped and controlled at a fuelbreak. The Buffalo Creek Fire in Jefferson County (1996) and the High Meadow Fire in Park and Jefferson Counties (2000) slowed dramatically wherever intense forest thinning had been completed. During the 2002 Hayman Fire, Denver Water's entire complex of offices, shops and caretakers' homes at Cheesman Reservoir were saved by a fuelbreak with no firefighting intervention by a fuelbreak.



Burned area near Cheesman Reservoir as a result of the Hayman Fire. Note the unburned green trees in the middle right of the photo, a treated fuelbreak.

The Need For A Fuelbreak

Several factors determine the need for fuelbreaks in forested subdivisions, including: (1) potential problem indicators; (2) wildfire hazard areas; (3) slope; (4) topography; (5) crowning potential; and (6) ignition sources.

Potential Problem Indicator

The table below explains potential problem indicators for various hazards and characteristics common to Colorado's forest types. All major forest types, except aspen, indicate a high potential for wildfire hazard.

Fuel Type	Characteristics			Hazards			
	Acidotheric	Wildfire	Soil	Wildfire	Avalanche	Flood	Climate
Aspen	2	3	3	2	4	3	2
Douglas-fir	2	2	3	5	2	2	3
Greasewood-Saltbrush	4	2	2	2	1	3	3
Lumber-Bristlecone Pine	3	2	4	3	4	2	5
Lodgepole Pine	2	2	3	5	4	2	4
Meadow	5	4	4	2	3	4	3
Mixed Conifer	2	1	1	5	3	1	3
Mountain Grassland	5	3	4	3	3	2	4
Mountain Shrub	3	5	4	4	2	2	3
Pinyon-Juniper	2	3	4	4	2	3	2
Ponderosa Pine	2	3	1	5	2	2	3
Sagebrush	4	4	3	3	3	2	3
Spruce-Fir	2	3	3	4	5	3	4

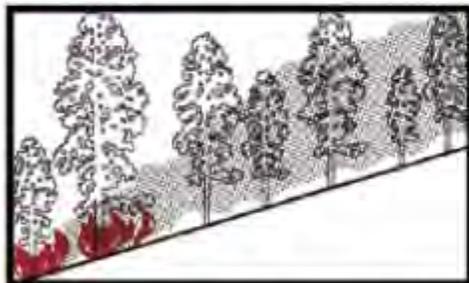
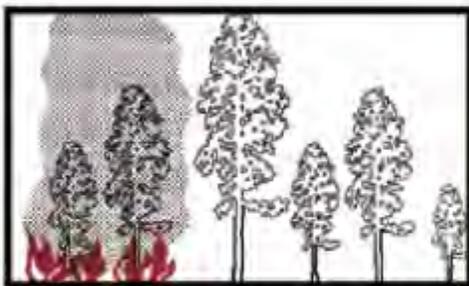
Legend: 5 – Problem may be crucial; 4 – Problem very likely;
 3 – Exercise caution; 2 – Problem usually limited;
 1 – No rating possible

Wildfire Hazard Maps

The Colorado State Forest Service (CSFS), numerous counties and some National Forests have completed wildfire hazard mapping for many areas within Colorado, particularly along the Front Range. These maps typically consider areas with 30 percent or greater slope; hazardous fuel types; and hazardous topographic features such as fire chimneys. Wildfire Hazard Ratings may be depicted in several ways. Whatever system is used, areas rated moderate or higher should be considered for fuel modification work.

Slope

Rate of fire spread increases as the slope of the land increases. Fuels are preheated by the rising smoke column or they may even come into contact with the flames themselves.



Fire effects, flat vs steep terrain. Note preheating of fuels on steep ground from passage of smoke column.

At 30 percent slope, rate of fire spread doubles compared to rates at level ground, drastically reducing firefighting effectiveness. Areas near 30 percent or greater slopes are critical and must be reviewed carefully.

Topography

Certain topographic features influence fire spread and should be evaluated. Included are fire chimneys, saddles, and V-shaped canyons. They are usually recognized by reviewing standard U.S.G.S. quad maps.

- Chimneys are densely vegetated drainages on slopes greater than 30 percent. Wind, as well as air pre-heated by a fire, tends to funnel up these drainages, rapidly spreading fire upslope.



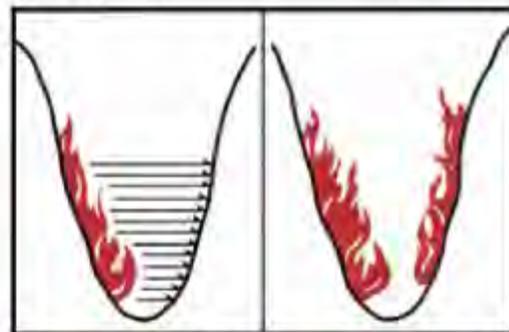
Chimney.

- Saddles are low points along a main ridge or between two high points. Like chimneys, they also funnel winds to create a natural fire path during a fire's uphill run. Saddles act as corridors to spread fire into adjacent valleys or drainages.



Saddle.

- Narrow, V-shaped valleys or canyons can ignite easily due to heat radiating from one side to the other. For example, a fire burning on one side of a narrow valley dries and preheats fuels on the opposite side until the fire "flashes over." The natural effect of slope on fire then takes over and fire spreads rapidly up drainage and uphill along both sides of the valley.



4 *Flashover in V-shaped valley.*

Crowning Potential

An on-site visit is required to accurately assess crowning potential. A key, below, helps determine this rating. Fuel modification is usually unnecessary if an area has a rating of 3 or less.

Crowning Potential Key

	Rating
A. Foliage present, trees living or dead — B	
B. Foliage living — C	
C. Leaves deciduous or, if evergreen, usually soft, pliant, and moist; never oily, waxy, or resinous.	0
CC. Leaves evergreen, not as above — D	
D. Foliage resinous, waxy, or oily — E	
E. Foliage dense — F	
F. Ladder fuels plentiful — G	
G. Crown closure > 75 percent	9
GG. Crown closure < 75 percent	7
FF. Ladder fuels sparse or absent — H	
H. Crown closure > 75 percent	7
HH. Crown closure < 75 percent	5
EE. Foliage open — I	
I. Ladder fuel plentiful	4
II. Ladder fuel sparse or absent	2
DD. Foliage not resinous, waxy, or oily — J	
J. Foliage dense — K	
K. Ladder fuels plentiful — L	
L. Crown closure > 75 percent	7
LL. Crown closure < 75 percent	4
KK. Ladder fuels sparse or absent — M	
M. Crown closure > 75 percent	5
MM. Crown closure < 75 percent	3
JJ. Foliage open — N	
N. Ladder fuels plentiful	3
NN. Ladder fuels sparse or absent	1
BB. Foliage dead	0

The majority of dead trees within the fuelbreak should be removed. Occasionally, large, dead trees (14 inches or larger in diameter at 4 1/2 feet above ground level) may be retained as wildlife trees. If retained, all ladder fuels must be cleared from around the tree's trunk.

Ignition Sources

Possible ignition sources, which may threaten planned or existing developments, must be investigated thoroughly. Included are other developments and homes, major roads, recreation sites, railroads, and other possible sources. These might be distant from the proposed development,

yet still able to channel fire into the area due to slope, continuous fuels, or other topographic features.

Fuelbreak Locations

In fire suppression, an effective fire line is connected, or "anchored," to natural or artificial fire barriers. Such anchor points might be rivers, creeks, large rock outcrops, wet meadows, or a less flammable timber type such as aspen. Similarly, properly designed and constructed fuelbreaks take advantage of these same barriers to eliminate "fuel bridges." (Fire often escapes control because of fuel bridges that carry the fire across control lines.)

Since fuelbreaks should normally provide quick, safer access to defensive positions, they are necessarily linked with road systems. Connected with county-specified roads within subdivisions, they provide good access and defensive positions for firefighting equipment and support vehicles. Cut-and-fill slopes of roads are an integral part of a fuelbreak as they add to the effective width of modified fuels.

Fuelbreaks without an associated road system, such as those located along strategic ridge lines, are still useful in fire suppression. Here, they are often strengthened and held using aerial retardant drops until fire crews can walk in or be ferried in by helicopter.

Preferably, fuelbreaks are located along ridge tops to help arrest fires at the end of their runs. However, due to homesite locations and resource values, they can also be effective when established at the base of slopes. Mid-slope fuelbreaks are least desirable, but under certain circumstances and with modifications, these too, may be valuable.

Fuelbreaks are located so that the area under management is broken into small, manageable units. Thus, when a wildfire reaches modified fuels, defensive action is more easily taken, helping to keep the fire small. For example, a plan for a subdivision might recommend that fuelbreaks break up continuous forest fuels into units of 10 acres or less. This is an excellent plan, especially if defensible space thinnings are completed around homes and structures, and thinning for forest management and forest health are combined with the fuelbreak.

When located along ridge tops, continuous length as well as width are critical elements. Extensive long-range planning is essential in positioning these types of fuelbreaks.

Aesthetics

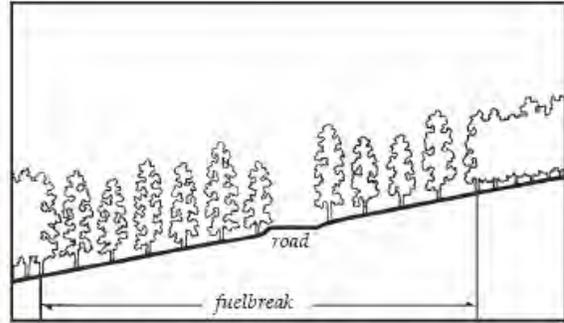
Improperly planned fuelbreaks can adversely impact an area's aesthetic qualities. Careful construction is necessary when combining mid-slope fuelbreaks with roads involving excessive cut-and-fill.



These photos, far- and near- views of the same site, illustrate that forest can be thinned without impacting aesthetics.

Care must also be taken in areas that are not thinned throughout for fuel hazard reduction. In such cases the fuelbreak visually sticks out like a "sore thumb" due to contrasting thinned and unthinned portions of the forest. (Especially noticeable are those portions of the fuelbreak above road cuts).

These guidelines are designed to minimize aesthetic impacts. However, some situations may require extensive thinning and, thus, result in a major visual change to an area. Additional thinning beyond the fuelbreak may be necessary to create an irregular edge and to "feather," or blend, the fuelbreak thinning into the unthinned portions of the forest. Any thinning beyond the fuelbreak improves its effectiveness and is highly recommended.



Cross-section of a typical fuelbreak built in conjunction with a road.

Constructing the Fuelbreak

Fuelbreak Width and Slope Adjustments

Note: Since road systems are so important to fuelbreak construction, the following measurements are from the toe of the fill for downslope distances, and above the edge of the cut for uphill distances.

The minimum recommended fuelbreak width is approximately 300 feet for level ground. Since fire activity intensifies as slope increases, the overall fuelbreak width must also increase. However, to minimize aesthetic impacts and to maximize fire crew safety, the majority of the increases should be made at the bottom of the fuelbreak, below the road cut.

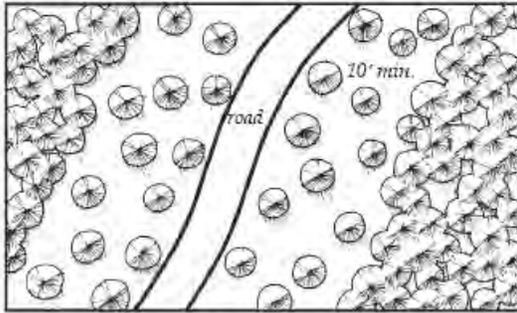
Widths are also increased when severe topographic conditions are encountered. Guidelines for fuelbreak widths on slopes are given below:

Fuelbreak Width/Slope			
Percent Slope (%)	Minimum Uphill Distance (ft)	Minimum Downhill Distance (ft)	Total Width of Modified fuels (ft)*
0	150	150	300
10	140	165	303
20	130	180	310
30	120	195	315
40	110	210	320
50	100	225	325
60	100	240	340

*As slope increases, total distance for cut-and-fill for road construction rapidly increases, improving fuelbreak effective width.

Stand Densities

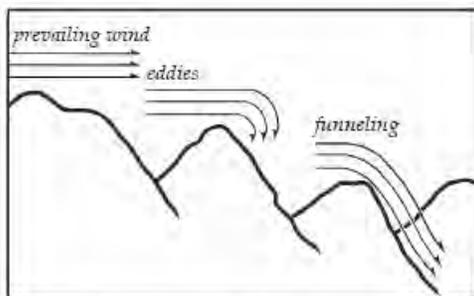
Crown separation is a more critical factor for fuelbreaks than a fixed tree density level. A *minimum* 10-foot spacing between the edges of tree crowns is recommended on level ground. As slope increases, crown spacing should also increase. However, small, isolated groups of trees may be retained for visual diversity. Increase crown spacing around any groups of trees left for aesthetic reasons and to reduce fire intensities and torching potential.



Plan view of fuelbreak showing minimum distance between tree crowns.

In technical terms, a fuelbreak thinning is classified as a heavy "sanitation and improvement cut, from below." Within fuelbreaks, trees that are suppressed, diseased, deformed, damaged, or of low vigor are removed along with all ladder fuels. Remaining trees are the largest, healthiest, most wind-firm trees from the dominant and co-dominant species of the stand.

Because such a thinning is quite heavy for an initial entry into a stand, prevailing winds, eddy effects, and wind funneling must be carefully evaluated to minimize the possibility of windthrow. It may be necessary to develop the fuelbreak over several years to allow the timber stand to "firm-up" — this especially applies to lodgepole pine and Engelmann spruce stands.



Topography affects wind behavior — an important consideration during fuelbreak construction.

Area-wide forest thinning is recommended for any subdivisions. Such thinning is not as severe as a fuelbreak thinning, but generally should be completed to fuelbreak specifications along the roads (as outlined on page 6.) In addition, "defensible space thinning" are highly recommended around all structures (see CSU Coop. Extension Fact sheet 6.302, *Creating Wildfire-Defensible Zones*).

Debris Removal

Limbs and branches left from thinning (slash) can add significant volumes of fuel to the forest floor, especially in lodgepole pine, mixed-conifer, or spruce/fir timber types. These materials can accumulate and serve as ladder fuels, or can become "jackpots," increasing the difficulty of defending the fuelbreak during a wildfire. Slash decomposes very slowly in Colorado and proper disposal is essential. Proper treatment reduces fire hazard, improves access for humans and livestock, encourages establishment of grasses and other vegetation, and improves aesthetics.

Three treatment methods are commonly used. These are lopping-and-scattering, piling and burning, and chipping. Mulching of small trees and slash using equipment similar to Hydro-axes or Timbcos equipped with mulching heads are becoming a popular method of treatment. Size, amount, and location of slash dictates the method used, in addition to cost and the final desired appearance. The method chosen will also depend on how soon an effective fuelbreak is needed prior to construction in new developments.



Lop and scatter: slash should be no deeper than 12" above ground surface.



Chipping is the most desirable, but also the most expensive method of slash disposal.



Piled slash can be burned but only during certain conditions, such as after a snowfall.

Fuelbreak Maintenance

Following initial thinning, trees continue to grow (usually at a faster rate). The increased light on the forest floor encourages heavy grass and brush growth where, in many cases, where little grew before. The site disturbance and exposed mineral soil created during fuelbreak development is a perfect seed bed for new trees that, in turn, create new ladder fuels. Thus, in the absence of maintenance, fuelbreak effectiveness will decrease over time.



Fuelbreak maintenance is essential. Ingrowth, shown above, will minimize the effectiveness of this fuelbreak within a few years.

Fuelbreak maintenance problems are most often the result of time and neglect. Misplaced records, lack of follow-up and funding, and apathy caused by a lack of fire events are some of the major obstacles. In addition, the responsibility for fuelbreak maintenance projects is often unclear. For example, control of a fuelbreak completed by a developer passes to a homeowner's association, usually with limited funds and authority to maintain fuelbreaks.

If fuelbreak maintenance is not planned and completed as scheduled, consider carefully whether the fuelbreak should be constructed. An un-maintained fuelbreak may lead to a false sense of security among residents and fire suppression personnel.

Conclusion

An image of well-designed communities for Colorado includes:

- Forested subdivisions where the total forest cover is well-managed through carefully planned, designed, and maintained thinnings. This contributes to reduced wildfire hazards and a much healthier forest — one that is more resistant to insects and disease.
- A system of roads and driveways with their associated fuelbreaks that break up the continuity of the forest cover and fuels. These help keep fires small, while also providing safer locations from which to mount fire suppression activities. In addition to allowing fire personnel in, they will allow residents to evacuate if necessary.
- Individual homes that all have defensible space around them, making them much easier to defend and protect from wildfire, while also protecting the surrounding forest from structure fires.

Creation of such communities is entirely feasible if recognition of the fire risks, a spirit of cooperation, an attitude of shared responsibility, and the political will exists.

Colorado's mountains comprise diverse slopes, fuel types, aspects, and topographic features. This variety makes it impossible to develop general fuelbreak prescriptions for all locations. The previous recommendations are guidelines only. A professional forester with fire suppression expertise should be consulted to "customize" fuelbreaks for particular areas.

APPENDIX G
CREATING WILDFIRE DEFENSIBLE ZONES



FORESTRY

Creating Wildfire-Defensible Zones no. 6.302 by F.C. Dennis¹

Quick Facts...

Wildfire will find the weakest links in the defense measures you have taken on your property.

The primary determinants of a home's ability to survive wildfire are its roofing material and the quality of the "defensible space" surrounding it.

Even small steps to protect your home and property will make them more able to withstand fire.

Consider these measures for all areas of your property, not just the immediate vicinity of the house.

Fire is capricious. It can find the weak link in your home's fire protection scheme and gain the upper hand because of a small, overlooked or seemingly inconsequential factor. While you may not be able to accomplish all measures below (and there are no guarantees), each will increase your home's, and possibly your family's, safety and survival during a wildfire.

Start with the easiest and least expensive actions. Begin your work closest to your house and move outward. Keep working on the more difficult items until you have completed your entire project.

Defensible Space

Two factors have emerged as the primary determinants of a home's ability to survive wildfire. These are the home's roofing material and the quality of the "defensible space" surrounding it.

Use fire-resistant materials (Class C or better rating), not wood or shake shingles, to roof homes in or near forests and grasslands. When your roof needs significant repairs or replacement, do so with a fire-resistant roofing material. Check with your county building department. Some counties now restrict wood roofs or require specific classifications of roofing material.

Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire towards the structure. It also reduces the chance of a structure fire moving from the building to the surrounding forest. Defensible space provides *room for firefighters to do their jobs*. Your house is more likely to withstand a wildfire if grasses, brush, trees and other common forest fuels are managed to reduce a fire's intensity.

The measure of fuel hazard refers to its continuity, both horizontal (across the ground) and vertical (from the ground up into the vegetation crown). Fuels with a high degree of both vertical and horizontal continuity are the most hazardous, particularly when they occur on slopes. Heavier fuels (brush and trees) are more hazardous (i.e. produce a more intense fire) than light fuels such as grass.

Mitigation of wildfire hazards focuses on breaking up the continuity of horizontal and vertical fuels. Additional distance between fuels is required on slopes.

Creating an effective defensible space involves developing a series of management zones in which different treatment techniques are used. See Figure 1 for a general view of the relationships among these management zones. Develop defensible space around each building on your property. Include detached garages, storage buildings, barns and other structures in your plan.

The actual design and development of your defensible space depends on several factors: size and shape of buildings, materials used in their construction, the slope of the ground on which the structures are built, surrounding topography,



Putting Knowledge to Work

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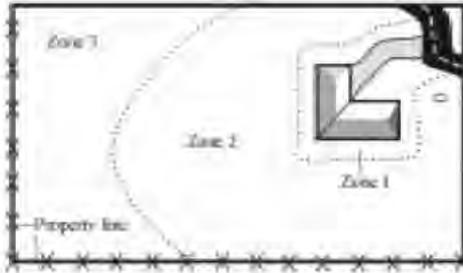


Figure 1: Forested property showing the three fire-defensible zones around a home or other structure.

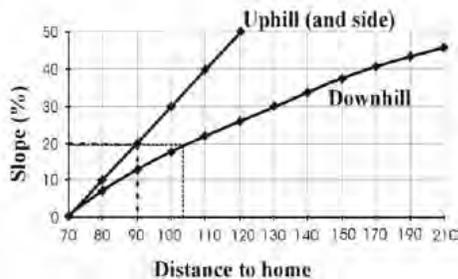


Figure 2: This chart indicates the minimum recommended dimensions for defensible space from the home to the outer edge of Zone 2. For example, if your home is situated on a 20 percent slope, the minimum defensible space dimensions would be 90 feet uphill and to the sides of the home and 104 feet downhill from the home.

and sizes and types of vegetation on your property. These factors all affect your design. You may want to request additional guidance from your local Colorado State Forest Service (CSFS) forester or fire department. (See the Special Recommendations section of this fact sheet for shrubs, lodgepole pine, Engelmann spruce, and aspen.)

Defensible Space Management Zones

Zone 1 is the area of maximum modification and treatment. It consists of an area of 15 feet around the structure in which all flammable vegetation is removed. This 15 feet is measured from the outside edge of the home's eaves and any attached structures, such as decks.

Zone 2 is an area of fuel reduction. It is a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend *at least* 75 to 125 feet from the structure. See Figure 2 for the appropriate distance for your home's defensible space. Within this zone, the continuity and arrangement of vegetation is modified. Remove stressed, diseased, dead or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing homesite safety and the aesthetics of the property.

Zone 3 is an area of traditional forest management and is of no particular size. It extends from the edge of your defensible space to your property boundaries.

your property boundaries.

Prescriptions

Zone 1

The size of Zone 1 is 15 feet, measured from the edges of the structure. Within this zone, several specific treatments are recommended.

Plant nothing within 3 to 5 feet of the structure, particularly if the building is sided with wood, logs or other flammable materials. Decorative rock, for example, creates an attractive, easily maintained, nonflammable ground cover.

If the house has noncombustible siding, widely spaced foundation plantings of low growing shrubs or other "fire wise" plants are acceptable. Do not plant directly beneath windows or next to foundation vents. Be sure there are no areas of continuous grass adjacent to plantings in this area.

Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems and leaves.

Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend the gravel coverage under the decks. Do not use areas under decks for storage.

Ideally, remove all trees from Zone 1 to reduce fire hazards. If you do keep a tree, consider it part of the structure and extend the distance of the entire defensible space accordingly. Isolate the tree from any other surrounding trees. Prune it to at least 10 feet above the ground. Remove any branches that interfere with the roof or are within 10 feet of the chimney. Remove all "ladder fuels" from beneath the tree. Ladder fuels are vegetation with vertical continuity that allows fire to burn from ground level up into the branches and crowns of trees. Ladder fuels are potentially very hazardous but are easy to mitigate. No ladder fuels can be allowed under tree canopies. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/2 the height, whichever is the least).

Zone 2

Zone 2 is an area of fuel reduction designed to reduce the intensity of any fire approaching your home. Follow these recommended management steps.

Thin trees and large shrubs so there is at least 10 feet between crowns. Crown separation is measured from the furthest branch of one tree to the nearest branch on the next tree (Figure 3). On steep slopes, allow more space between tree crowns. (See Figure 4 for *minimum recommended* spacing for trees on steep slopes.) Remove all ladder fuels from under these remaining trees. Carefully prune trees to a height of at least 10 feet.

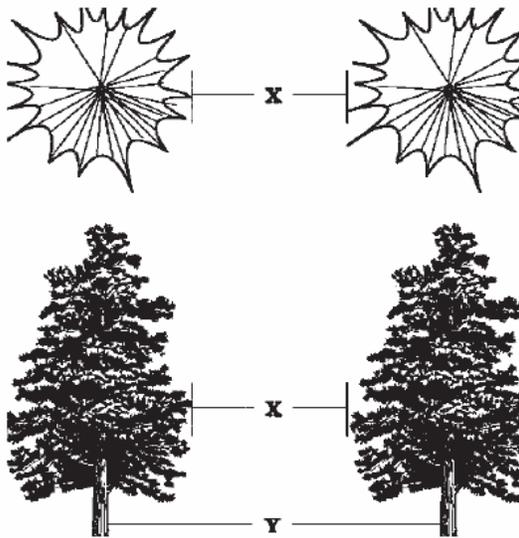


Figure 3: X = crown spacing; Y = stem spacing. Do not measure between stems for crown — measure between the edges of tree crowns.

Small clumps of 2 to 3 trees may be occasionally left in Zone 2. Leave more space between the crowns of these clumps and surrounding trees.

Because Zone 2 forms an aesthetic buffer and provides a transition between zones, it is necessary to blend the requirements for Zones 1 and 3. Thin the portions of Zone 3 adjacent to Zone 2 more heavily than the outer portions.

Isolated shrubs may remain, provided they are not under tree crowns. Prune and maintain these plants periodically to maintain vigorous growth. Remove dead stems from trees and shrubs annually. Where shrubs are the primary fuel in Zone 2, refer to the Special Recommendations section of this fact sheet.

Limit the number of dead trees (snags) retained in this area. Wildlife needs only one or two snags per acre. Be sure any snags left for wildlife cannot fall onto the house or block access roads or driveways.

Mow grasses (or remove them with a weed trimmer) as needed through the growing season to keep them low, a maximum of 6 to 8 inches. This is extremely critical in the fall when grasses dry out and cure or in the spring after the snow is gone but before the plants green up.

Stack firewood and woodpiles uphill or on the same elevation as the structure but at least 30 feet away. Clear and keep away flammable vegetation within 10 feet of these woodpiles. Do not stack wood against your house or on or under your deck, even in winter. Many homes have burned from a woodpile that ignited as the fire passed. Wildfires can burn at almost any time in Colorado.

Locate propane tanks at least 30 feet from any structures, preferably on the same elevation as the house. You don't want the LP container below your house — if it ignites, the fire would tend to burn uphill. On the other hand, if the tank is above your house and it develops a leak, LP gas will flow downhill into your home. Clear and keep away flammable vegetation within 10 feet of these tanks. Do not screen propane tanks with shrubs or vegetation.

Dispose of slash (limbs, branches and other woody debris) from your trees and shrubs through chipping or by piling and burning. Contact your local CSFS office or county sheriff's office for information about burning slash piles. If neither of these alternatives is possible, lop and scatter slash by cutting it into very small pieces and distributing it over the ground. Avoid heavy accumulations

% slope	Tree Crown Spacing	Brush and Shrub Clump Spacing
0 -10 %	10'	2 1/2 x shrub height
11 - 20%	15'	3 x shrub height
21 - 40%	20'	4 x shrub height
> 40%	30'	6 x shrub height

Figure 4: Minimum tree crown and shrub clump spacing.

Grasses

Keep dead, dry or curing grasses mowed to less than 6 inches. Defensible space size where grass is the predominant fuel can be reduced (Figure 5) when applying this practice.

Windthrow

In Colorado, certain locations and tree species, including lodgepole pine and Engelmann spruce, are especially susceptible to damage and uprooting by high winds (windthrow). If you see evidence of this problem in or near your forest, or have these tree species, consider the following adjustments to the defensible space guidelines. It is highly recommended that you contact a professional forester to help design your defensible space.

Adjustments: If your trees or homesite are susceptible to windthrow and the trees have never been thinned, use a stem spacing of diameter plus five instead of the guides listed in the Zone 3 section. Over time (every 3 to 5 years) *gradually* remove additional trees. The time between cutting cycles allows trees to “firm up” by expanding their root systems. Continue this periodic thinning until the desired spacing is reached.

Also consider leaving small clumps of trees and creating small openings on their lee side (opposite of the predominant wind direction). Again, a professional forester can help you design the best situation for your specific homesite and tree species. Remember, with species such as lodgepole pine and Engelmann spruce, the likelihood of a wildfire running through the tree tops or crowns (crowning) is closely related to the overabundance of fuels on the forest floor. Be sure to remove downed logs, branches and *excess* brush and needle buildup.

Maintaining Your Defensible Space

Your home is located in a forest that is dynamic, always changing. Trees and shrubs continue to grow, plants die or are damaged, new plants begin to grow, and plants drop their leaves and needles. Like other parts of your home, defensible space requires maintenance. Use the following checklist each year to determine if additional work or maintenance is necessary.

% slope	D-space size (uphill, downhill, sidehill)
0 - 20 %	30'
21 - 40%	50'
> 40%	70'

Figure 6: Minimum defensible space size for grass fuels.

Defensible Space and FireWise Annual Checklist

- Trees and shrubs are properly thinned and pruned within the defensible space. Slash from the thinning is disposed of.
- Roof and gutters are clear of debris.
- Branches overhanging the roof and chimney are removed.
- Chimney screens are in place and in good condition.
- Grass and weeds are mowed to a low height.
- An outdoor water supply is available, complete with a hose and nozzle that can reach all parts of the house.
- Fire extinguishers are checked and in working condition.
- The driveway is wide enough. The clearance of trees and branches is adequate for fire and emergency equipment. (Check with your local fire department.)
- Road signs and your name and house number are posted and easily visible.
- There is an easily accessible tool storage area with rakes, hoes, axes and shovels for use in case of fire.
- You have practiced family fire drills and your fire evacuation plan.
- Your escape routes, meeting points and other details are known and understood by all family members.
- Attic, roof, eaves and foundation vents are screened and in good condition.



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Stilt foundations and decks are enclosed, screened or walled up.

- Trash and debris accumulations are removed from the defensible space.
- A checklist for fire safety needs inside the home also has been completed. This is available from your local fire department.

References

Colorado State Forest Service, Colorado State University, Fort Collins, CO 80523-5060; (970) 491-6303:

- *FireWise Construction — Design and Materials*
- *Home Fire Protection in the Wildland Urban Interface*
- *Wildfire Protection in the Wildland Urban Interface*
- *Landowner Guide to Thinning*

Colorado State University Cooperative Extension, 115 General Services Bldg., Fort Collins, CO 80523-4061; (970) 491-6198; E-mail: resourcecenter@ucm.colostate.edu:

- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*
- 6.306, *Grass Seed Mixes to Reduce Wildfire Hazard*
- 7.205, *Pruning Evergreens*
- 7.206, *Pruning Shrubs*
- 7.207, *Pruning Deciduous Trees*



This fact sheet was produced in cooperation with the Colorado State Forest Service.

¹Wildfire Hazard Mitigation Coordinator,
Colorado State Forest Service.

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**APPENDIX H
PRESCRIBED PILE BURNING GUIDELINES**

Colorado State FOREST SERVICE GOLDEN DISTRICT

This handout is designed to be used by forest landowners, land managers, and fire department personnel in planning and conducting safe and effective burning of piled forest debris (“slash”) called “pile burns.” These guidelines cannot guarantee safety against accidents, unforeseen circumstances, changing burning conditions, or negligent actions of the individuals conducting the prescribed fire. By following the intent of these guidelines and using common sense, the landowner or forest manager can reduce slash accumulations, improve the appearance of their forest land, and reduce wildfire risk on their property. The reader should contact a local office of the Colorado State Forest Service (CSFS) or their local fire authority for updated versions of this publication and current requirements about the use of open fires.

DEFINITIONS:

Slash: The accumulation of vegetative materials such as tops, limbs, branches, brush, and miscellaneous residue resulting from forest management activities such as thinning, pruning, timber harvesting, and wildfire hazard mitigation.

Pile Burning: The treatment of slash by arranging limbs and tops into manageable piles. Piles are burned during safe burning conditions, generally during the winter following cutting.

Chunking-In: The process of moving unburned materials from the outside perimeter into the center of the still burning piles. This is done after the pile has initially burned down and is safe to approach, but before the hot coals in the center have cooled. Chunking-in allows greater consumption of the piled slash.

Mop-up: The final check of the fire to identify and extinguish any still-burning embers or materials. This is accomplished by mixing snow, water, or soil with the burning materials.

MATERIALS TO BE INCLUDED IN PILES:

All limbs, tops, brush, and miscellaneous materials recently cut in the area, no greater than 3 inches in diameter and from 1 to 8 feet in length. Older branches can be used as long as they still have needles/foilage attached or have not started decaying. Materials

greater than 3 inches in diameter do not significantly help a fire spread rapidly, will generally burn longer and require more chunking-in or mopping-up than is cost-effective, produce greater amounts of smoke, and should be used for sawtimber, posts and poles, firewood, or left for wildlife habitat. **Do not place garbage or debris in the piles.**

LOCATION OF PILES:

Piles should be located in forest openings or between remaining trees, in unused logging roads and landings, meadows, and rock outcrops. Piles should be preferably at least 10 feet from the trunk of any overhead trees. In denser stands of trees, piles can be located closer to the trees and even under the overhanging branches, but these piles should be smaller in size and burned when snow or moisture is present in the tree crowns. Piles should NOT be located on active road surfaces, in ditches, near structures or poles, under or around power lines, or on top of logs or stumps that may catch fire and continue smoldering.

CONSTRUCTION OF PILES:

Piles should be constructed by hand whenever possible, but if constructed by machine they should clean of dirt and debris. Piles should be started with a core of kindling-like materials such as needles, small branches, or paper in the bottom of the pile. Pile slash soon after cutting (while still green) and before winter snowfall. Do not include wood products such as firewood and logs. Pile branches and tops with the butt ends towards the outside of the pile, and with the branches overlapping so as to form a series of dense layers piled upon each other. The piles should be compact, packed down during construction, and with no long branches that will not burn from sticking out into the surrounding snow. Piles should be up to 8 feet in diameter, and at least 4 to 6 feet high. These measures prevent snow and moisture from filtering down into the piles and extinguishing the fire before it gets going. If the fuels do not have sufficient needles or fine fuels to carry the fire or kept moisture out (such as oak brush or very old conifer branches), then you should cover the piles with 6 mil plastic to keep them dry until the day of the burn, and then remove it.

PLANNING YOUR BURNING EFFORT:

Individuals should check with the local CSFS office or fire authority for the current requirements on open fires. Generally, you must complete one or more of the following steps before burning slash:

1. Complete and have an approved open burning permit from the local (county) Health Department.
2. Obtain authorization from the legally constituted fire authority for your area. This may be part of the health department's permit process.
3. Land management agencies must complete and have approval of an open burning permit from the Colorado Department of Health - Air Pollution Control Division.

Copies of all permits should be available on-site during the burning operation. Burning activities should also include plans for safety, supplemental water sources, and extra assistance from the local fire authority or the landowner. The individual(s) planning the burning operation should notify the following entities on the day of a burn: the local fire

authority, county sheriff's department, and adjacent landowners who may be affected by smoke. Notification should include the date, times, and exact location of the burn.

Pile burning must be conducted under suitable weather conditions. Periods of snow or light rain, with steady, light winds (for smoke dispersal), and sufficiently snow cover (6-12 inch depths) are ideal. Do not burn during periods of high winds, low humidity or drying conditions, temperature inversions (especially "Red Air Quality" days in metropolitan areas), with a lack of snow cover or these conditions are expected to develop after starting the burn. Persons burning slash piles should have the following: leather gloves; shovels; suitable footwear; masks for covering the mouth and nose; and proper eye protection.

BURNING SLASH PILES:

Piles may be ignited by several means. If the needles and fine fuels within the pile have dried though the summer, ignition can be easily started with matches and a large ball of newspaper placed within the bottom of the pile. If fuels are still partially green, or the pile is wet from rain or melting snow, then a hotter and longer burning source may be necessary. Drip torches (a specially designed gas can used by foresters for igniting fires) or sawdust soaked with diesel fuel can be used to ignite the pile. Flares used for highway emergencies can also be utilized to ignite the piles. **Do not use gasoline for this purpose.**

One test pile should be ignited to see if it burns and at what rate, prior to igniting other piles. If suitable burning conditions exist, then additional piles may be started. Ignite only those piles that can be controlled by the available manpower and resources until they have burned down. You can slow the rate of burning (and possible scorching of adjacent trees) by shoveling snow or spraying water into the pile and cooling the fire down. Depending upon weather conditions, pile size, and moisture content of the fuels, piles should burn down in 30-60 minutes. As a general rule, one person can manage three to six closely situated piles.

After the piles have burned down, chunk-in any unburned slash and wood into the hot coals in the center of the pile. As much as 95 percent of the original slash can be consumed by aggressive chunking-in. Do not start any new piles on fire after 2:00 pm, as they may continue burning into the evening, and will not burn as completely because of lower temperatures and higher relative humidity. Smoke inversions may be a problem for piles still burning after sunset. At all times, piles may need to be actively mopped-up if the weather conditions will not extinguish the fire, or if the fires could escape. If high winds or melting snow increases this risk, then all burning materials must be mopped-up.

ADDITIONAL ASSISTANCE:

If landowners have questions about burning slash, they should contact a local CSFS office (<http://csfs.colostate.edu/>). CSFS can assist landowners with planning or conducting prescribed fire activities such as pile burning or broadcast (area) burning. Local, state, and fire department authorities may require a burn plan, smoke management plan, and weather monitoring for complex burning operations.

APPENDIX I
GRASS SEED MIXES TO REDUCE WILDFIRE HAZARD



FORESTRY

Grass Seed Mixes to Reduce Wildfire Hazard no. 6.306

by F.C. Dennis¹

Quick Facts...

Plant “FireWise” grass species to reduce the risk of wildfire damage.

“FireWise” grass mixes may contain only native species or a combination of native and non-native species.

Sow half the seed north to south and the other half east to west.

Rake the seed into the soil.

Mulch erosion-prone areas.

If possible, water often and lightly.

Maintain the area properly.



Putting Knowledge to Work

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During much of the year, grasses ignite easily and burn rapidly. Tall grass will quickly carry fire to your house. Plant “FireWise” grasses in the defensible space around your home. Defensible space is an area around a structure where fuels and vegetation are treated, cleared or reduced to slow the spread of wildfire. See fact sheet 6.302, *Creating Wildfire-Defensible Zones*.

Seed Mixes for Colorado

Grass seed mixes developed for Colorado use native or a combination of native and non-native grass species. While the basic mixes (Tables 1 and 3) work reasonably well on all sites, they were modified for moist sites and/or those with northern exposures (Tables 2 and 4).

Grasses included in these mixes have the following characteristics:

- They are lower growing.
- They need less maintenance.
- Seed is readily available and relatively inexpensive.

Grass seed mixes made up entirely of native seed may take longer to establish — up to three years — than those with a percentage of non-native seed.

Planting

Use either a drop or a cyclone seeder to seed your defensible space.

A drop seeder is more accurate in placing seed, especially if wind is a problem. However, if the ground is rough or rocky, the cyclone seeder will be easier to use.

Seed at the rates shown in the tables below. Divide seed into two equal parts. Sow half of the seed by crossing the area north to south and the other half by crossing east to west.

Rake seed into the soil as soon as possible after sowing to reduce the chances of it blowing or washing out. Soil cover also helps to protect the young seedlings from drying out. When sowing on slopes prone to erosion, cover the seeded area with mulch. Recommended mulches include **clean** straw (straw with no seeds in it), netting or matting of some kind.

If you have water from a central community system or a well permit that allows outside irrigation, water the newly seeded areas frequently and lightly. Water enough to keep the soil moist but not so heavily as to cause soil washing and loss of the grass seed.

Maintenance

Even “FireWise” grasses need proper maintenance. See 6.303, *Fire-Resistant Landscaping*, for tips on proper mowing and other maintenance and landscaping suggestions.



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Wildfire Hazard Mitigation Coordinator,
Colorado State Forest Service.

Native Grass "Fire Mixes"

Table 1: All exposures.

Species	Variety	Percent of Mix	Broadcast Rate PLS* Lbs/Acre
Arizona fescue	Redondo	20	9.0 x .20 = 1.80
Western wheatgrass	Barton/Rosana	20	32.0 x .20 = 6.40
Streambank wheatgrass	Sodax	20	22.0 x .20 = 4.40
Indian ricegrass	Nezpar	20	25.0 x .20 = 5.00
Blue grama	Lowington	20	6.0 x .30 = 1.20
TOTALS		100%	18.80

Table 2: Northerly exposures and/or moist sites.

Species	Variety	Percent of Mix	Broadcast Rate PLS* Lbs/Acre
Arizona fescue	Redondo	25	9.0 x .25 = 2.25
Western wheatgrass	Barton/Rosana	25	32.0 x .25 = 8.00
Streambank wheatgrass	Sodax	25	22.0 x .25 = 5.50
Indian ricegrass	Nezpar	25	25.0 x .25 = 6.25
TOTALS		100%	22.00

Non-Native/Native Grass "Fire Mixes"

Table 3: All exposures.

Species	Variety	Percent of Mix	Broadcast Rate PLS* Lbs/Acre
Canada bluegrass	Reubens	10	2.0 x .10 = 0.20
Western wheatgrass	Barton/Rosana	20	32.0 x .20 = 6.40
Streambank wheatgrass	Sodax	15	22.0 x .15 = 3.30
Indian ricegrass	Nezpar	15	25.0 x .15 = 3.75
Sheep fescue	Covar	20	8.0 x .20 = 1.60
Blue grama	Lowington	20	6.0 x .20 = 1.20
TOTALS		100%	16.45

Table 4: Northerly exposures and/or moist sites.

Species	Variety	Percent of Mix	Broadcast Rate PLS* Lbs/Acre
Canada bluegrass	Reubens	15	2.0 x .15 = 0.30
Western wheatgrass	Barton/Rosana	20	32.0 x .20 = 6.40
Streambank wheatgrass	Sodax	20	22.0 x .20 = 4.40
Indian ricegrass	Nezpar	15	25.0 x .15 = 3.75
Sheep fescue	Covar	30	8.0 x .30 = 2.40
TOTALS		100%	17.25

*Pure Live Seed.

References

For additional information on protecting your homestead, see:

- 6.302, *Creating Wildfire-Defensible Zones*
- 6.303, *Fire-Resistant Landscaping*
- 6.304, *Forest Home Fire Safety*
- 6.305, *FireWise Plant Materials*

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APPENDIX J WILDFIRE HISTORY

Significant Wildfire History within Wildland Urban Interface CSFS Golden District and Immediate Vicinity

(Prepared by Allen Gallamore, Colorado State Forest Service, 8/15/07 – subject to revision/correction)

Fire Name	Location	Size	Dates	Additional Information
Owl's Head	Clear Creek County: Mt Evans (future wilderness) area on USFS lands.	Approx: 177 acres	1952	Human-caused wildfire on USFS lands, west of Mt Evans State Wildlife Area.
Devil's Canyon	Clear Creek County: Mt Evans (future wilderness) area on USFS lands.	Approx: 715 acres	June, 1956	Lightning-caused wildfire on USFS lands, near Lincoln Lake.
Rest House	Clear Creek County: Mt Evans (future wilderness) area on USFS lands.	Approx: 1,007 acres	Sept 9 – 21, 1962	Human-caused wildfire at end of "fire season" on USFS lands.
Lincoln	Clear Creek County: Mt Evans (future wilderness) area on USFS lands.	Approx: 740 acres	1968	Lightning-caused wildfire, near Rest House fire location on USFS lands.
Reservoir	Clear Creek County: near Idaho Springs reservoir on USFS lands.	Approx: 400 acres	1978	Human-caused wildfire on USFS lands.
Murphy Gulch	Jefferson County: Inter-Canyon FPD & West Metro (Bancroft) FPD; along foothills west of Ken-Caryl Ranch subdivision	Approx: 3,300 acres	Sept. 10-20, 1978	First EFF fire in Front Range, 1,800 acre run in strong winds on first day. Several structures lost, subdivisions evacuated, interagency resources ordered to supplement local fire departments' resources from multiple counties, until snowstorm on Sept 20th. CSFS takes over under EFF, returns to Jeffco SO control for Sept. 17 th -20th.
North Table Mountain	Jefferson County: Fairmount FPD. Top, west and east sides of North Table Mountain.	Approx: 1300 – 2000 acres	Sept. 7 – 9, 1988	Human caused fire off CO 93 crossed mountain to threaten subdivisions on east side of mountain. Over 250 firefighters from 20 fire departments and National Guard respond as well as a helicopter. Structure protection and evacuations in many areas.
Mt. Falcon	Jefferson County: Indian Hills FPD; primarily on Jefferson County OS (Mt. Falcon park)	Approx: 125 acres	April 23 - 24, 1989	Fire within open space property, leading to voluntary fire reimbursement program by county open space agencies to local fire departments to support initial attack. Created impetus for Jefferson County Wildland Committee as a working group of the Jefferson County Fire Council.
Black Tiger	Boulder County private lands west of Boulder, CO in Boulder Canyon	Approx: 2,100 acres	July 9 – 12, 1989	Fire north of Golden District, but is considered a "watershed-event" fire for Colorado and Wildland Urban Interface mitigation. Fire was extensively studied at National level. 44 homes destroyed.
O'Fallon	Jefferson County: Evergreen FPD. DMP parkland east of Kittredge	Approx: 52 acres	March 24 – 25, 1991	Fire within Denver Mountain Parks' open space, leading to 100 firefighters from 5 departments responding. Dry winter conditions, gusty winds, and limited access slowed control efforts.
Elk Creek	Jefferson County: Golden Gate FPD. North of Clear Creek Canyon and east of Centennial Cone, in Michigan Creek and Elk Creek drainages.	Approx: 102 acres	May 13 – 18, 1991	Fire in steep terrain with limited access, leading to use of hand crews formed from 80+ firefighters representing 15 fire departments from several counties. Jefferson County Sheriff's Office' helicopter used to make water drops and county bulldozer cut fire line. Fire managed jointly by FPD and Jefferson County Sheriff's Office's newly formed Incident Management Group (IMG).

Fire Name	Location	Size	Dates	Additional Information
Carpenter Peak / Chatfield	Douglas County: USFS & West Metro (then Roxborough FPD). Two fires, one uphill from Roxborough State Park & one across South Platte River from Jefferson County	Approx: 45 acres & 23 acres	July 9 – 11, 1994	Dry lightning caused fires during larger fire bust throughout Front Range – multiple initial attacks occurring in all locations with limited availability of air resources. Evacuations of Roxborough Park and structure protection occurred, using 300 firefighters and 40 engines from throughout Denver metro area, and National Guard helicopters.
Rooney Rd	Jefferson County: West Metro (Lakewood-Bancroft) FPD; along Dakota Hogback between C-470, I-70, and Alameda Pkwy	Approx: 185 acres	Dec. 19, 1994	High winds and faulty electrical transformer outside “normal” fire season; Rates of Spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Fire departments from throughout Denver Metro area responded, and several structures were threatened – one outbuilding damaged.
Buffalo Creek	Jefferson County: USFS & North Fork FPD	Approx: 10,400 acres	May 18- 25, 1996	High winds and human cause, extreme fire behavior, 10 mile run in 6 hours; 10 homes or outbuildings lost; first “large” fire in Front Range WUI. Cold front on day 2 suppresses fire activity to prevent significant growth. Type 1 IMT (Great Basin) takes over on day 2 from local IMT3 and manages until closeout.
Beartracks	Clear Creek County: USFS lands, within Evergreen FPD and Clear Creek Fire Authority boundaries; immediately southwest of Mt Evans State Wildlife Area	Approx: 485 acres	June 27, 1998 – July 5, 1998	Heavy fuel loading in roadless area and human caused fire leads to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to Upper Bear Creek drainage and numerous homes; Type 2 IMT (Rocky Mountain) takes over from local IMG on day 3 and manages to closeout. At the time of this incident the costs of \$2,886/acre were the highest recorded in Colorado.
Whiteside	Park County, Pike National Forest northeast of Grant, CO.	Approx: 100 acres	June 29 – July 3, 1998	Wildfire in roadless area adjacent to Mt Evans Wilderness, at same time as Beartracks fire. Local resources from Platte Canyon FPD assist with initial attack. Type 2 IMT (Oregon) manages till closeout with local USFS district.
Lininger Mountain	Jefferson County: Genesee FPD & Foothills FPD; immediately southeast of Genesee community	Approx: 35 acres	Feb. 26-28, 1999	Dry conditions outside “normal” fire season leads to wildfire threatening several subdivisions during first night, and utilizing local fire resources for several days. Jefferson County Sheriff’s Office helicopter makes multiple water drops.
Green Mountain	Jefferson County: West Metro FPD; Green Mountain from C-470 to homes on north and east sides of park	Approx: 200 acres	March 8, 1999	Multiple departments responding to human caused fire in grass fuels with high Rates of Spread, high flame lengths and limited access, outside “normal” fire season; homes, communications sites were threatened.
Hi Meadow	Park County & Jefferson County: Platte Canyon FPD, Elk Creek FPD, North Fork FPD; from Burland Ranchettes on west to CO 126 on east, and south to Buffalo Creek fire and town of Pine	Approx: 10,800 acres	June 12-25, 2000	Human cause fire under initial attack by local FPD, blows up on same day as 10,000 ac Bobcat fire in Larimer County. 52 homes lost & misc. structures; considered “benchmark” WUI fire for Colorado at the time. Type 1 IMT (Rocky Mountain) takes over on day 2 from local IMT3 and manages until closeout.
El Dorado/ Walker Ranch	Boulder County: Cherryvale FPD and Coal Creek FPD; west of El Dorado Canyon State Park, through Walker Ranch park to Gross Reservoir; adjacent to border with Jefferson County.	Approx: 1,100 acres	Sept. 16-22, 2000	Heavy fuel loading in steep terrain leads to heavy initial attack and extended attack by local fire agencies from Boulder, Gilpin, and Jefferson Counties along with air resources; fire poses threat to Gross Reservoir and numerous homes in Boulder and Jefferson County; Type 2 IMT (Rocky Mountain) takes over from zone Type 3 IMT on day 2 and manages to closeout.

Fire Name	Location	Size	Dates	Additional Information
Snaking	Park County: USFS and Platte Canyon FPD; north of US 285 from Platte Canyon HS to Crow Hill.	Approx: 3,000 acres	April 22 – May 2, 2002	High winds and human cause outside “normal” fire season; heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources; fire poses threat to numerous homes. Type 1 IMT (Rocky Mountain) takes over from local type 3 IMT on day 2 and manages until closeout.
Black Mountain	Park County, Jefferson County, Clear Creek County: USFS, Elk Creek FPD and Evergreen FPD; north of Conifer Mountain and south of Brook Forest	Approx: 300 acres	May 5 – 11, 2002	Heavy fuel loading in steep terrain leads to heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources; fire poses threat to multiple subdivisions in Conifer and Evergreen; Type 2 IMT (Rocky Mountain) takes over from local Type 3 IMT on day 2 and manages to closeout.
Schoonover	Douglas County: USFS & North Fork FPD (Trumbull VFD in 2002); immediately south across S. Platte River from Jefferson County, from west of Deckers to near Moonridge.	Approx: 3,000 acres	May 21 – 31, 2002	Lightning cause fire under initial attack by USFS and local FPDs, blows up on 2 nd day and makes 3,000 acre/4 mile run in steep terrain. Fire threatens homes, camps businesses, watershed, regional powerline; approx. cabins & misc. structures lost. Type 1 IMT (Rocky Mountain) takes over on day 3 from local IMT3 and manages until closeout.
Hayman	Park, Douglas, Teller, and Jefferson Counties: USFS, multiple FPDs and county sheriffs (North Fork FPD in Jefferson County); from Lake George in Park County to Deckers/CO 126 in Jefferson County to Schoonover fire area and Manitou Exp. Station in Douglas/Teller Counties.	Approx: 138,000 + acres	June 8 to mid-July, 2002	Human cause fire under initial attack and extended attack by USFS and local FPDs under direction of interagency IMT3, blows up on 2 nd day for historic 17 mile run and 70,000 acres. Multiple evacuations over two-week period as fire made several additional “runs”. Over 150 homes & misc. structures lost; large areas of damage to Cheeseman Reservoir and South Platte Watershed areas; fire is considered of nationally significant WUI fire for Colorado and Rocky Mountain region. Type 1 IMT (Eastern Great Basin) takes over on day 3 from IMT3; fire is eventually managed by series of Type 1 IMTs under an Area Command team, until closeout.
Fountain Gulch	Clear Creek County and Gilpin County: Clear Creek Fire Authority, Central City FD, Clear Creek and Gilpin County Sheriff’s Offices. Along county line immediately north of I-70 at the Hidden Valley exit.	Approx: 200 acres	June 29- July 5, 2002	Significant fire activity in steep terrain with poor road access leads to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to I-70 and CO 119 travel corridors, businesses, and distant subdivisions. Interagency handcrews are ordered to replace local fire resources; continued use of air resources; fire is managed by local IMT to closeout.
Blue Mountain	Jefferson County: Coal Creek FPD. Immediately south of CO 72 at mouth of Coal Creek Canyon.	Approx: 35 acres	August 14 - 15, 2002	Railroad caused fire in light fuels spreads rapidly due to continued drought conditions into adjacent timber and subdivision, leading to heavy initial attack and extended attack by local fire agencies along with air resources; fire poses threat to CO 72 and Coal Creek Canyon, businesses, and multiple subdivisions. Fire is managed by local IMT to closeout.
Cherokee Ranch	Douglas County: Littleton FPD, South Metro FPD, Louviers FPD. Between US 85 and Daniels Park Road.	Approx: 1,240 acres	October 29 – 31, 2003	High winds and downed power line outside “normal” fire season; Rates of Spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Fire occurs in “open space” area on same day as 3,500 ac Overland fire in Boulder County. Multiple subdivisions on all sides of fire are threatened as resources from throughout Denver Metro area respond. Fire is managed by local IMT to closeout.

Fire Name	Location	Size	Dates	Additional Information
Waterton Fire	Douglas County: Above the south side of South Platte River across from Jefferson County on USFS lands and adjacent to West Metro FPD.	Approx: 20 – 40 acres	June 28-30, 2005	Lightning-caused fire(s) in steep inaccessible portion of Waterton Canyon, west of Roxborough subdivision & Denver Water's Kessler water treatment plant. Large initial attack response from local fire departments and USFS; access issues requires use of swift water rescue team and boats to cross river. Two "SWIFT" (Department of Corrections) handcrews are used to complete containment and control of the fire burning in heavy gambel oak forests. Fire is managed by Pueblo zone IMT3.
North Table Mtn	Jefferson County: Fairmount FPD. Top, and east, north, west sides of North Table Mountain outside Golden, CO.	Approx: 300 acres	July 22 – 24, 2005	Human cause fire in steep terrain on open space that escapes initial attack. Heavy use of air resources during initial attack & structure protection on day 1. Multiple subdivisions on all sides of fire are threatened as resources from throughout Jefferson County respond. Fire is managed by local IMT3 to closeout.
Plainview	Jefferson County: Coal Creek FPD. Immediately north of CO 72 at mouth of Coal Creek Canyon and east to CO 93, north to approximately Boulder County line.	Approx: 2,700 acres	Jan. 9 – 10, 2006	High winds and human cause outside "normal" fire season. Rates of Spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads) – 60 mph winds at midnight cause 2 mile fire run in under 5 minutes. Heavy initial attack and extended attack by local fire agencies from Jefferson and Boulder Counties; fire poses threat to numerous homes and businesses. Fire is managed by local IMT3 to closeout.
Rocky Flats	Jefferson, Boulder, Adams, and Broomfield Counties: multiple FPDs. Immediately north of CO 128 onto Rocky Flats NWR and east to Indiana Street.	Approx: 1,200 acres	April 2, 2006	High winds and human cause outside "normal" fire season; Fire occurs in "open space" area of Rocky Flats NWR and adjacent lands. Rates of Spread, flame lengths and limited access had fire threatening to cross several man-made barriers (roads). Heavy initial attack and extended attack by local fire agencies from Jefferson, Boulder, Gilpin, and Adams Counties. Winds prevent use of air resources; multiple subdivisions, businesses, and Rocky Mountain Airport are threatened. Difficulties with communications and fire management across multiple jurisdictional boundaries noted.
Pine Valley	Jefferson County: Elk Creek FPD. Immediately northwest of Town of Pine.	Approx. 102 acres	May 28-30, 2006	High winds and human cause near homes; heavy initial attack and extended attack by local fire agencies from Jefferson and Park Counties along with air resources, local USFS resources, and interagency handcrews. Fire poses threat to numerous homes, while winds limit use of air resources during initial attack. Fire is managed by local IMT3 to closeout.
Ralston Creek	Jefferson County: No-man's lands adjacent to Fairmount FPD and Golden Gate FPD. North end of White Ranch OS park and adjacent uranium mine (private).	Approx: 26 acres	June 17 – 19, 2006	Fire within open space property under initial attack by local FPD, "blows up" and forces resources to retreat to safety zones. Significant fire activity in steep terrain with poor road access leads to heavy use of air resources; fire poses threat to Ralston Reservoir and numerous subdivisions. Interagency handcrews supplement local fire resources and continued use of air resources on day 2; fire is managed by local IMT3 to closeout.
Centennial Cone	Jefferson County: No-man's lands adjacent to Golden Gate FPD. Entirely within Centennial Cone OS park.	Approx: 22 acres	July 21 – 23, 2006	Fire within open space property with significant fire activity in steep terrain with no road access during height of 2006 national fire season leads to limited initial attack; fire poses threat to US 6 in Clear Creek Canyon and distant subdivisions. Limited air resources are utilized to slow fire spread, and an interagency "hotshot" handcrew supplements local fire resources on day 2 for direct attack. Fire is controlled by day 3 as summer monsoons also reduce fire danger.

Fire Name	Location	Size	Dates	Additional Information
Oxyoke	Jefferson County: immediately west of Oxyoke on USFS lands, in South Platte River drainage.	110 acres	July 20-July 23, 2008	Fire, possibly from power line, on USFS Lands and near to private cabins and Denver Water Board land. Rapid growth, crowning and spotting on hot, dry day. Local fire resources assisted with structure protection, road closures, and initial attack; 15 residences evacuated for 3 days. Large use of aircraft helped prevent more spread. PIDC IMT3 managed incident, which had 250 personnel that included 6 handcrews, aircraft, and USFS engines for 3 days.
Green Mountain	Jefferson County: West Metro FPD; Green Mountain Open Space above homes on east side of park and north side of park over to above Jefferson County Fairgrounds	Approx: 388 acres	August 4 -5, 2008	Multiple departments and agencies responded to lightning caused fire in grass fuels with high Rates of Spread, flame lengths 4-8 feet, steep slopes, and limited access; homes (1 slightly damaged) and communications sites were threatened. Use of a Single Engine Air Tanker, Air Attack plane, and a type 3 helicopter (USFS-Monument helitack) supported efforts into the early evening. Multiple media helicopters interfere with air operations until a Temporary Flight Restriction (TFR) is placed over the fire. Difficulties with communications occur between departments and agencies using different 800 mhz and VHF radio systems.

Other smaller wildfires within the WUI that posed high potential for significant impacts to adjacent communities, and had large initial attack response by local fire departments, include:

- Coal Creek fire, September 1988: 14 separate fires over 42 acres from train in Coal Creek Canyon area, resulting in response from multiple fire agencies and Single Engine Air Tanker, and CO National Guard Huey – dip site Ralston Reservoir.
- Beaver Brook, 7/20/98-7/21/98: 25-acre fire immediately downhill from Mt. Vernon Country Club in Clear Creek Canyon, resulting in air resources and structural protection.
- Red Rocks fire, 3/9/00: 10-acre grass and brush fire with high winds immediately southwest of Red Rocks amphitheatre, resulting in response from multiple fire agencies in Jefferson County.
- Bald Mountain fire, 5/6/00: 5-acre fire in Genesee park, immediately west of Mt. Vernon Country Club.
- Silver Bullet fire, 6/15/00: approximately 20-acre fire on South Table Mountain immediately above Coors Plant in Golden, requiring air tanker use to assist local fire departments. Fire occurred during same time that Hi Meadow fire was making significant run in southern Jefferson County.
- Mt Galbraith fire, 8/11/00: 2 acres in three dry lightning fires on top of Mt. Galbraith above City of Golden, threatening subdivisions in town.
- US 6 fire, 4/6/02: 50-acre grass and brush fire west of US 6 and south of 19th street in City of Golden, threatening multiple subdivisions.

- North Spring Gulch fire, 6/6 - 6/7/02: 20-acre fire northwest of Idaho Springs in Clear Creek County requiring significant air tanker use to assist local fire departments.
- Leyden fire, 1/18/05: 300-acre grass fire northwest of Arvada runs 5 miles in 25-30 mph winds, causing minor damage to numerous homes being protected by 60+ firefighters and multiple engines from Arvada, Evergreen, Rocky Flats, and Golden Fire departments.

APPENDIX K
WEB REFERENCE GLOSSARY

Resource	Web Site
Jefferson County Emergency Operating Plan	http://www.co.jefferson.co.us/ca/chap06016.htm#P6_19
Jefferson County Policies and Procedures	http://www.co.jefferson.co.us/ca/ca_T148_R2.htm
Jefferson County CWPP project site	http://www.co.jefferson.co.us/emerg/index.htm
Jefferson County Environmental Health Services	www.co.jefferson.co.us/health/health_T111_R38.htm
Colorado State Forest Service Library	http://csfs.colostate.edu/library.htm
Rocky Mountain Geographic Science Center – Wildfire Support	http://wildfire.cr.usgs.gov
Firewise National Firewise Community Program	http://www.Firewise.org .
Searchable Grants Database	http://www.rockymountainwildlandfire.info/
Jefferson County Department of Emergency Management	http://jeffco.us/sheriff/sheriff_T62_R191.htm
Coal Creek Fire & Rescue	http://www.coalcreekcanyonfd.org
Landfire Geospatial Data	http://www.landfire.gov/products_overview.php
Colorado State Forest Service	http://csfs.colostate.edu
National Fire Weather	http://fire.boi.noaa.gov
RAWS Station index for the Rocky Mountain Geographic Coordinating Area	http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=RMCC&rawsflag=2
Fort Collins Interagency Wildfire Dispatch Center Web Index	http://www.fs.fed.us/r2/arnf/fire/fire.html
Colorado Forest Industries Directory	http://www.colostate.edu/programs/cowood/New_site/Publications/Articles/Colorado%20Forest%20Industry%20Directory.pdf
Current Weather Summary for Rocky Mountain Geographic Coordinating Area	http://raws.wrh.noaa.gov/cgi-bin/roman/raws_ca_monitor.cgi?state=RMCC&rawsflag=2
U.S. Forest Service, Kansas City Fire Access Software	http://famweb.nwcg.gov/kcfast
Fire Regime Condition Class	www.frcc.gov
National Climate Data Center	www.ncdc.noaa.gov

APPENDIX L
LIST OF PREPARERS

Preparer	Company
George Greenwood, Wildland Fire Specialist	Walsh Environmental Scientists and Engineers, LLC
Geoff Butler, Wildland Fire Specialist	Alpenfire, LLC
Kelly Close, Fire Behavior Analyst	Independent Contractor