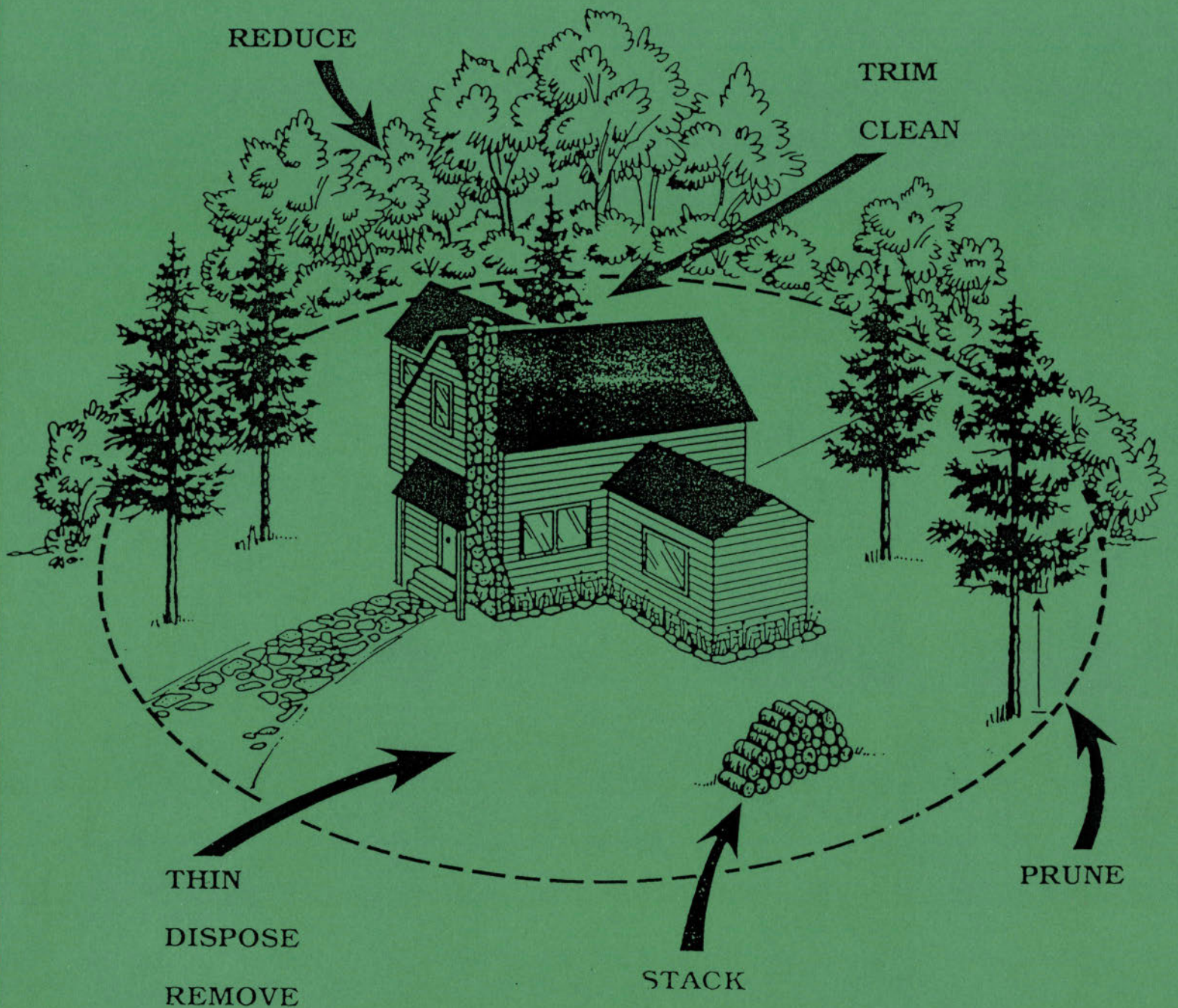
PROACTIVE VEGETATION MANAGEMENT BY OWNERS OF FORESTED RESIDENTIAL PROPERTY IN BOULDER COUNTY

DIRECT HANDS-ON ASSISTANCE BY: JOSEPH A. TURNER
FOREST FIRE/FUELS SPECIALIST



A DEFENSIBLE SPACE
PROGRESS REPORT

FORESTED SUBDIVISIONS -- SOME HAZARD - SOLUTION INNOVATIONS

BACKGROUND:

THE FRONT RANGE OF COLORADO IS LOCATED IN THE RAIN SHADOW ON THE EASTERN SLOPE OF THE ROCKY MOUNTAINS. A WILDLAND/URBAN INTERFACE HAS DEVELOPED IN THE 5000-9000 FT ELEVATION IN STEEP TERRAIN. THE PREDOMINATE FUEL IS DENSELY OVERGROWN PONDEROSA PINE AND FIR. A SIGNIFICANT PORTION OF THIS AREA IS WITHIN COMMUTING DISTANCE OF GREATER DENVER OF WHICH 5 COUNTIES ARE PART OF A NONATTAINMENT AIR QUALITY AREA. WOOD BURNING IS SEVERELY RESTRICTED BELOW 7000 FT NOVEMBER THRU APRIL. WHAT SNOWFALL DOES OCCUR HERE TENDS TO MELT OFF RAPIDLY IN THE 310 DAYS OF SUNSHINE PER YEAR. BEING DOWN HILL AND ON THE LEE SIDE OF THE MOUNTAIN RANGE MAKES FOR FREQUENT STRONG WINDS IN THE FOOTHILLS. IN BOULDER COUNTY ALONE THERE ARE 250 FORESTED SUBDIVISIONS. THE AVERAGE PARCEL SIZE IS 2 ACRES. THERE ARE 25 VOLUNTEER FIRE DISTRICTS WITHIN THE COUNTY. ALL VARYING IN SIZE, EQUIPMENT, WATER SUPPLY AND FIREFIGHTER SKILLS.

PROBLEMS:

LANDFILLS ARE CLOSING AND MANY MORE ARE NEARING CAPACITY. AS EPA STANDARDS COME ON LINE COSTS ARE RISING. THE VOLUME AND TYPE OF MATERIALS THAT WILL BE ACCEPTED BECOMES INCREASINGLY RESTRICTED. THIS IS ESPECIALLY TRUE OF GRASS CLIPPINGS, YARD TRIMMINGS AND TREE BRANCHES. THE TECHNOLOGY TO RECYCLE THIS ORGANIC MATERIAL IS CURRENTLY AVAILABLE. AN ARRAY OF CHIPPER/SHREDDERS ARE AVAILABLE FOR THE URBAN HOME OWNER AT LOCAL LAWN AND GARDEN SHOPS. ON THE INDUSTRIAL SCALE COMMERCIAL RECYCLING FACILITIES ARE TURNING URBAN TREE LIMBS, PALLETS AND SHINGLES INTO MULCH FOR LANDSCAPING. LAWN AND GARDEN SIZE CHIPPERS ARE INADEQUATE TO PROCESS THE VOLUME OF SLASH INVOLVED IN FUEL HAZARD REDUCTION IN FORESTED SUBDIVISIONS. THE COSTS INVOLVED IN MANUAL LABOR REQUIRED TO MOVE THE SLASH TO A TRUCK AND THE HAUL DISTANCE TO A REGIONAL PROCESSING FACILITIES IS AN EXPENSIVE ENDEAVOR. BY USING A SMALL COMMERCIAL CHIPPER TOWED BY AN ATV THE SLASH CAN BE PROCESSED ON SITE THUS PROVIDING THE PROPERTY OWNER WITH MULCH. THE DISCHARGE CAPABILITY CAN MOVE THE MATERIAL AWAY FROM THE STRUCTURES TO CREATE MINIMUM GROUND FUEL IN THE 30 FT DEFENSIBLE SPACE ZONE.

THE PUBLIC PERCEPTION THAT ALL FIRE IS BAD IS ESPECIALLY STRONG AMONGST NEW ARRIVALS TO FORESTED SUBDIVISIONS WHO MOVED FROM THE CITY AND FLATLANDS BACK EAST. ATTEMPTS TO USE CONTROLLED BURNING AS A MANAGEMENT TOOL IN AN SEMI-ARID AREA WHERE PRESCRIPTIVE FIRE WINDOWS OCCUR INFREQUENTLY HAS RESULTED IN EXCESSIVE FALSE ALARMS FOR VOLUNTEER FIRE DEPARTMENTS. THIS ALONG WITH INCREASINGLY STRICT REGULATION FOR NONATTAINMENT AIR QUALITY AREAS VIRTUALLY ELIMINATES THE OPPORTUNITY TO BURN EVEN A FEW HAND PILES.

HISTORICALLY THE OCCURRENCE OF WILDFIRE SERVED AS A MEANS OF NATURAL SELECTION THINNING OUT AND REMOVING EXCESSIVE GROWTH AND ACCUMULATION OF FOREST VEGETATION. WESTWARD EXPANSION BROUGHT MINERS AND RANCHERS DRASTICALLY ALTERING THE LANDSCAPE BY BUILDING RAILROADS, USING LUMBER FOR TIES, MINE SUPPORTS AND BUILDINGS. CATTLE AND SHEEP GRAZING ALTERED THE SUCCESSION OF PLANTS. THE OCCURRENCE OF MAN CAUSED FIRE INCREASED WITH THE GROWING POPULATION RESULTING IN THE INSTITUTION OF FIRE SUPPRESSION. TODAY THESE SAME AREAS ARE SUBDIVISIONS IN THE MIDST OF HEAVILY OVERGROWN, DENSELY STOCKED FORESTS. WILDFIRES ARE NOW OF FAR GREATER INTENSITY WITH A STRONG POTENTIAL TO DESTROY ENTIRE COMMUNITIES. WILDLAND FIREFIGHTERS REFER TO THIS CONDITION AS HAZARDOUS FUEL LOADING.

SOLUTIONS/COMPROMISES:

OVERCROWDING SEVERELY IMPACTS THE DEVELOPMENT OF LARGE HEALTHY TREES. EXCESSIVE DENSITY ESPECIALLY INHIBITS THE GROWTH IN DIAMETER. THINNING STIMULATES TREE STANDS, IMPROVING THEIR VIGOR AND RESISTANCE TO FIRE, INSECTS AND DISEASE. CHIPPING CREATES MULCH THAT RETURNS NUTRIENTS TO THE EARTH. THE MOISTURE FROM SNOWFALL THAT WOULD OTHERWISE BE LOST TO EVAPORATION AND RUNOFF CAN BE RETAINED. ALSO LESS MOISTURE IS LOST THROUGH TRANSPIRATION THUS RETAINING A GREATER AMOUNT OF GROUND WATER ENABLING THE PREFERRED VEGETATION TO HAVE A HIGHER MOISTURE CONTENT. THE YIELD OF THE WATERSHED ALSO INCREASES FOR DOMESTIC USES SUCH AS STORAGE TANKS AND HYDRANT SYSTEMS FOR FIRE PROTECTION. THUS THE POTENTIAL FOR FIRE TO DAMAGE A MAJOR PORTION OF THE WATERSHED CAN BE DRAMATICALLY REDUCED.

THINNING OVER STOCKED STANDS ALLOWS WILDLIFE GREATER FREEDOM OF MOVEMENT TO ACCESS WATER AND FOOD SUPPLIES. IT PROVIDES THE RESIDENT WITH A SIGNIFICANTLY ENHANCED OPPORTUNITY TO VIEW WILDLIFE.

TYPICALLY HOME OWNERS HAVE FAVORITE TREES WITHIN A 50 FT PERSONAL SPACE ZONE THAT ARE SELECTED AS LEAVE TREES. OFTEN THE FOREST FURTHER AWAY IS PERCEIVED AS "WILDERNESS". SELECTION OF LEAVE TREES PROVIDES FOR DIVERSITY IN SPECIES, SIZE, ARRANGEMENT OR GROUPING ALLOWING FOR WILDLIFE TREES AND THE ARTISTIC EXPRESSION THAT ONLY MOTHER NATURE CAN PROVIDE. AN AESTHETICALLY PLEASING SETTING IS CREATED AVOIDING THE GRID PATTERN OF A TREE FARM.

CHIP/THINNING OPERATIONS ARE A CAREFULLY CONTROLLED MECHANICAL PROCESS THAT WILL REMOVE OVERGROWTH JUST AS THE NATURAL OCCURRENCE OF WILDFIRE HAS BUT NOW HOMEOWNERS CAN BE PROACTIVE TO HELP PROTECT THEIR LIFETIME INVESTMENT AND COLLECTION OF SENTIMENTAL TREASURES. CARELESSNESS, APATHY AND NEGLECT IN NURTURING THE HOMESTEAD HAS RESULTED IN THE LOSS OF WHOLE COMMUNITIES. THE HORIZONTAL CONTINUITY AND VERTICAL LADDERING OF HAZARDOUS FOREST FUELS IS ELIMINATED. LEAVE TREES ARE LOW LIMBED TO 8-10 FT. THE RULE OF THUMB IS THAT THE SPACE BETWEEN TREES EQUALS OR EXCEEDS THE DIAMETER OF THE CANOPY OF THE LARGER ADJACENT LEAVE TREE. SELECTION REMOVES THE DEFORMED, STORM DAMAGED, DEAD, DISEASED AND INSECT INFESTED. THE STEMS 3"-12" WILL PROVIDE WARMTH AND BEAUTY AT THE OWNER'S HEARTH.

TALL NON-NATIVE GRASSES COVERING THE LEACH FIELD IMMEDIATELY DOWN SLOPE ARE A FLASH FUEL HAZARD THAT CAN RAPIDLY SPREAD FIRE UP TOWARDS THE HOME. PLANTING NATIVE DROUGHT RESISTANT SHORT STEMMED GRASSES SIGNIFICANTLY REDUCES THE FIRE HAZARD, WATER CONSUMPTION AND MOWING.

TOOLS UTILIZED FOR FUELS REDUCTION ARE A POWER POLESAW, CHAINSAW WITH BOWBAR, A QUAD ATV TO SKID THE LARGER STEMS AND TOW THIS EQUIPMENT PERMITS EASY MANEUVERING IN CONFINED SPACES WITH MINIMUM IMPACT TO THE SURFACE. SUCH SITES CONTAIN SEPTIC TANKS, LEACH FIELDS, BLUE GRASS LAWNS WITH PLASTIC IRRIGATION SYSTEMS AND ELECTRONIC DOG FENCES.

THE ULTIMATE OBJECTIVE IS THAT THE RESULTING VEGETATION ON THE ENTIRE PARCEL WILL NOT SUPPORT THE SPREAD OF CROWNFIRE AND READY ACCESS WILL EXIST FOR FIREFIGHTERS TO ATTACK LOW INTENSITY SURFACE FIRE WITH HAND TOOLS TO PROTECT THE FOREST FROM STRUCTURE FIRE AND VISA VERSA. CREATING DEFENSIBLE SPACE IS NECESSARY TO PROVIDE A REASONABLE MEASURE OF PROTECTION FROM THE INEVITABLE DEVASTATION OF WILDFIRE. INDIVIDUAL HOME OWNER'S PARTICIPATION IN FUELS REDUCTION WILL PROVIDE FOR A SAFER LIVING ENVIRONMENT, A HEALTHIER FOREST AND NATURAL SETTING, AND AN ENHANCEMENT TO THE GENERAL WELL BEING OF THE LANDOWNERS, THE WILDLIFE AND THE COMMUNITY.

JAMESTOWN

LEFT HAND

INCLUDES ..... AREAS
(SEE DETAIL MAP)

BOULDER HEIGHTS

LEFT HAND F.P.D
SERVICE ONLY

GOLD HILL

SUNSHINE

PINE BROOK HILLS

FOUR MILE CANYON

PINE BROOK HILLS F.P.D SERVICE ONLY

BOULDER RURAL

SUGARLOAF

FOUR MILE F.P.D. SERVICE ONLY

CHERRYVALE

OLIVE RIDGE
Creek Ranch
ALLENSPARK
FERNCLIFFE
Arrowood
Post Hill
Pine Valley
Rock Ledge Park
SKI ROAD
BUNCE SCHOOL RD
Taylor Mt 9134
Big John Mt 9353
South Sheep Mt
Smithy Mt 7134
Coffintop Mt 8049
S ST VRAIN DR
OLD ST VRAIN
Lyons
Walz
RIVERSIDE
RAYMOND
BALARAT
HEATHERMEADE
HWY 7
HWY 103
PEAK TO PEAK HWY
Foothills Ranch
Mountain Ridge
GEER CANYON DR
Lake of the Pines
Allens
ALTONA
Cannon Mt 8615
Sky Ranch Estates
Bald Mt
Fairview Pk 8560
CAMP DICK
PEACEFUL VALLEY
Mattoons Highlands
Overland
OVERLAND RD.
Porphyry Mt 8336
Overland Mt 8715
Bueno Mt 8662
JAMESTOWN
Bar-K Ranch
Golden Age Hill 8378
Crestview Estates
Henderson /McCann
Le Mann
Figi and The Pynes
Mardick
Saddle Club Estates
Joder Reservoir
SIX—MILE FOLD
BUCKINGHAM PARK
JAMES CANYON DR
Rice Estates
Stapp Lakes
Beaver Res
BEAVER RES RD
Santazakers
Tumbleson Lake
Hidden Lake
Walker Mt 8825
Nugget Hill 8582
Lazy Acres
Olde Stage Settlement
BEECH OPEN SPACE
MATTHEWS WINTHROP
LEE HILL DR
Sixmile Creek
Boulder Heights
Duck Lake
Gold Lake
Bell Gulch
GOLD LAKE RD
ROWENA
Burnt Mt 9353
SPRING GULCH RD
WARD
LEFTHAND CANYON
Butzel Hill 8264
Lee Hill
OLDE STAGE RD
Point of Pines
Carriage Hills Estates
Bow Mountain
Fountaintree
GOLD HILL
Gold Hill
SUNSHINE
FOURMILE CANYON CREEK OPEN SPACE
Pine Brook Hills
Wonderland Lake
Two Mile Creek
Spring Valley Estates
LINDEN AVE
Gold Run
SUMMERVILLE
GOLD RUN RD
Melvina Hill
SALINA
Monument Hill 7984
Emancipation Hill
SUNSHINE CANYON DR
BALD MOUNTAIN SCENIC AREA
Sierra Antigua
Seven Hills
SAWMILL RD
GOLD HILL RD.
SWITZERLAND
WALLSTREET
LOGAN MILL RD
FOURMILE CANYON DR
Logan Mt 7791
Arkansas Mt 7710
Saxon Estates
Poorman Hill 6485
Seven Hills
Sugarloaf Mt 8917
Bald Mt 9147
Swiss Peaks
Mountain Pines
Mountain Meadows
SUGAR LOAF
SUGARLOAF RD
Tall Timbers
ORODELL
Canyonside
Knollwood
MAPLETON
Pride of the West
Sugarloaf Acres
Silver Springs
PENNSYLVANIA
Glacier Lake
Peewink Mt 8310
Comforter Mt 8215
Boulder Falls
WHEELMAN
SUNNYSIDE
CANYON DR
CAÑON PARK
Flagstaff Mt
Canyon View
Tram Hill
FLAGSTAFF RD
Caribou City
St. Anton Highlands
Cold Spring
BOULDER RIDGE RD
MAGNOLIA DR
Green Mt 8144
BOULDER MOUNTAIN PARK
Kossler Lake
Woods Gulch
Hurricane Hill 8770
Bonanza Mtn Estates
Whispering Pines
Aspen Meadows
Twin Sisters Pk 8738
Forsythe Rock
Pine Needle Notch
Lakeshore Park
Bear Pk 8461
CARIBOU RD
Barker Reservoir
Beaver Valley Estates
NEDERLAND
Ridgewood
Tungsten Mt 8930
South Boulder Pk 8549
Devils Thumb
WALKER RANCH
COAL CREEK CANYON DR
KELLY DAHL
CENTRAL CITY 16 MILES
Los Lagos Res
Glen Res
Opalair Res
PINECLIFFE
WONDERVU
Cedar-Ridge Estates
Copperdale Lane
Shady Wood
Kuhlmann Hts
The Dell
TUNNEL 19
ELDORADO CANYON STATE PARK
Eldorado Mt 8660
Gross Reservoir
GROSS DAM RD
DENVER AND RIO GRANDE WESTERN RR

FIRE DISTRICT ADDRESS	SUBDIVISION	OWNER ACTIVITY	SERVICE PERFORMED		STATUS
ALLENSPARK					
502 HWY 7		CUT/HAUL	BURNING		COMPLETED 500 CUBIC YARDS
BOULDER RURAL					
	PRESIDENT FIRE BOARD		CONSULTATION		WANTS PRESENTATION
515 POORMAN RD		THINNING LIMBING	THINNING LIMBING		SCHEDULED SPRING 93
FOUR MILE					
450 MELVINA HILL		SKIDDING	THINNING BUCKING		NEW HOME UNDER CONST
611 MELVINA HILL		BUCKING SPLITING	THINNING/BUCKING SKIDDING/CHIPPING		COMPLETED 2 ACRES
	SIERRA ANTIGUA				
214 ARROYO CHICO		MANUAL LOPPING	THINNING/BUCKING		COMPLETED 1 ACRE
CHERRYVALE					
	BASELINE HTS				
6708 BASELINE			CHIPPING		COMPLETED 4 ACRES
GOLD HILL	BIG HORN MTN	THINNING LIMBING HANDPILE BURNING	CHIPPING	½ ACRE	ON GOING

FIRE DISTRICT ADDRESS	SUBDIVISION	OWNER ACTIVITY	SERVICE PERFORMED	STATUS
JAMESTOWN				
167 SPRUCE		REPLACED SHAKE SHINGLES	THINNING/LIMBING CHIPPING	COMPLETED 4/10 ACRE
157 SPRUCE			THINNING/LIMBING CHIPPING	COMPLETED 30 FEET
170 MESA			THINNING/LIMBING CHIPPING	30 FEET
LEFTHAND	B-BAR-K PRES HOME ASSOC		CONSULTATION BURNING PROJECT	PENDING
PINE BROOK HILLS				
120 BALSAM			THINNING/LIMBING CHIPPING	COMPLETED 1 ACRE
65 BEAVER WAY			THINNING/LIMBING CHIPPING	COMPLETED 1 ACRE
LOT 128			THINNING/LIMBING SKID/EROSION CONTROL	COMPLETED 2 ACRES
LOT 127			THINNING/LIMBING SKID/HANDPILE + BURN	PARTIAL
LOT 65		HAUL TO DUMP	THINNING/LIMBING	COMPLETED 1 ACRE
LOT 66		HAUL TO DUMP	THINNING/LIMBING	COMPLETED 1 ACRE

FIRE DISTRICT ADDRESS	SUBDIVISION	OWNER ACTIVITY	SERVICE PERFORMED	STATUS
LOT 77			ONLY LIMB/CHIP DEAD BRANCHES PER OWNER HAUL FOR MULCH	SUBSTANDARD 50 FT
SUGARLOAF				
	MOUNTAIN MDWS			
193 PLAINVIEW		THINNING LIMBING	CHIPPING DEAD MISTLETOE	COMPLETED 1 ACRE
	MOUNTAIN PINES			
42 MOUNTAIN KING		THINNING LIMBING DRAG SLASH	THINNING/LIMBING CHIPPING	COMPLETED 3 ACRES
	SWISS PEAKS			
169 S. PEAK LANE		PRUNEING DRAG SLASH	THINNING/LIMBING CHIPPING	COMPLETED 1 ACRE
4211 SUGARLOAF MTN RD		THINNING BUCKING	THINNING/BUCKING	ON GOING 2 ACRES
SUNSHINE				
3039 SUNSHINE CANYON RD			THINNING/LIMBING CHIPPING	COMPLETED 50 FEET
6305 SUNSHINE CANYON RD		LIMBING DRAG SLASH	THINNING/LIMBING CHIPPING	COMPLETED 2 ACRES

TOTAL:

23 RESIDENCES

24 ACRES
6 EACH 30-50 FEET PERIMETER

CHIPPER COMPARISON CHART

	HORSEPOWER	DIAMETER CAPACITY	BLADES	GROSS WEIGHT	TOWING EQUIPMENT	MOBILIZATION	COST	OPERATOR
MAC KISSIC	8	3"	1	250	MAN	$10/HR	$10/HR	$10/HR

REMARKS
VERY SLOW, NOT WELL SUITED TO CHIPPING FOREST SLASH

MACHETE	18	12	3"	2	400	ATV $5/HR	$10/HR	$10/HR $70/DAY	$10/HR

REMARKS
GOOD MOBILITY ON CONTOUR OF MODERATE SLOPES WHERE LARGER EQUIPMENT CANNOT ACCESS. REQUIRES FREQUENT SHARPENING AND GREATER AMOUNT OF CHAIN SAW PREPARATION OF SLASH. NOT RECOMMENDED FOR DEAD WOOD.

KWIK-WAY	18	3"	2	650	ATV $5/HR	$10/HR	$20/HR $180/DAY	$10/HR $10/HR

REMARKS
POOR DESIGN OF SAFETY SHIELD TO MEET OSHA IS VERY COUNTER PRODUCTIVE. LOCAL RENTAL RATE EXCESSIVELY HIGH COMPARED TO CAPABILITY OF OTHER MACHINES.

VERMEER 620	24	6"	2	1500	ATV $5/HR	$10/HR	$35/HR $210.DAY $840//WEEK	$10/HR

REMARKS
VERY PRODUCTIVE, STRONG MACHINE HANDLES DEADWOOD WELL. CAN BE TOWED BY IMPORT TRUCK TO SITE, ATV CAN TOW THROUGH SITE ON GENTLE SLOPE. BOBCAT RECOMMENDED FOR TOWING THROUGH SITES ON MODERATE SLOPE

CHIPPER COMPARISON CHART

	HORSEPOWER	DIAMETER CAPACITY	BLADES	GROSS WEIGHT	TOWING EQUIPMENT	MOBILIZATION	COST	OPERATOR
EAGER BEAVER	60	12"	4	3000	4WD D-4	? ?	$45/HR W/	1 MAN

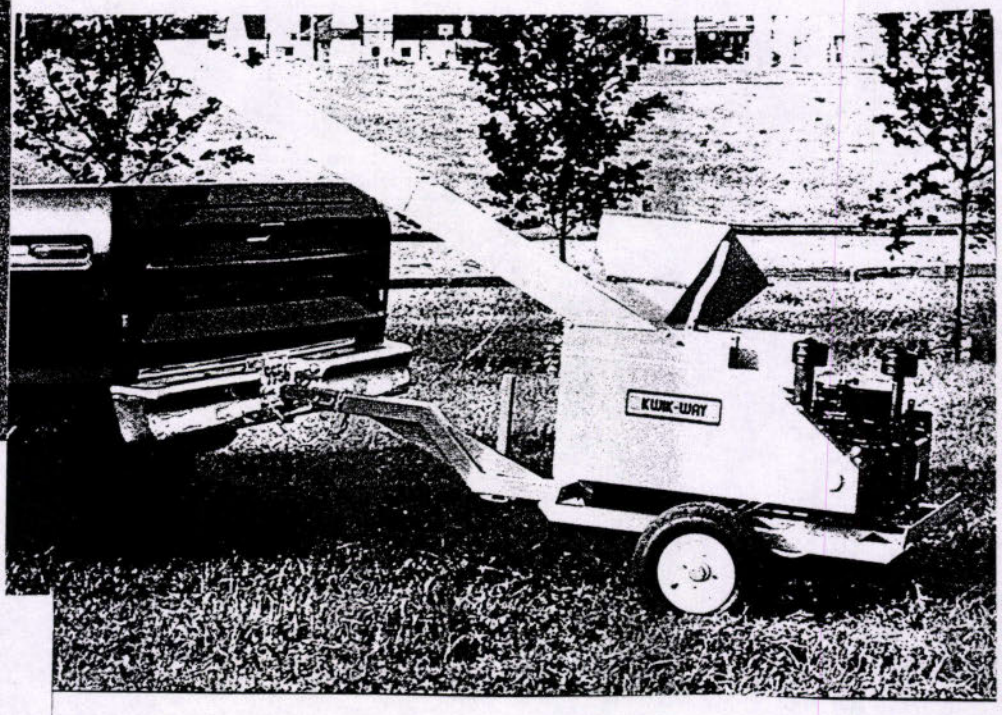
REMARKS
4 WHEEL DRIVE RECOMMENDED FOR HWY TOWING. RECOMMEND D-4 CAT FOR TOWING THROUGH SITE.

VERMEER 1250	100	12"	4	5000	1-½ TON	?	$75/HR W/	2 MEN

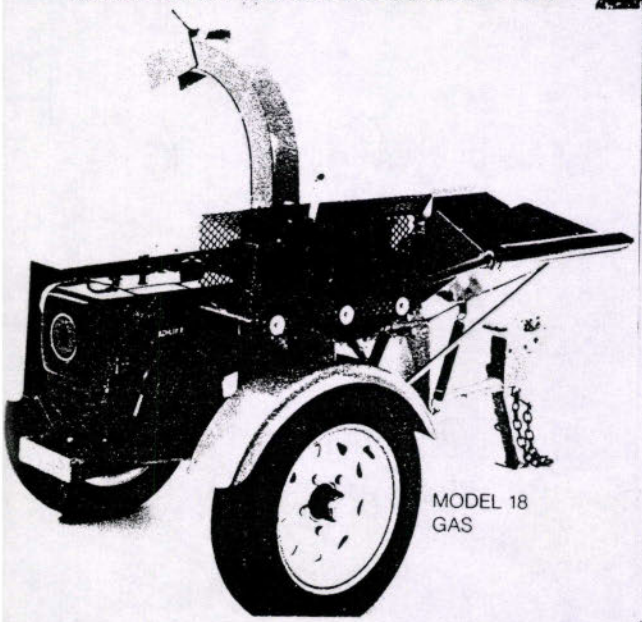
REMARKS
A REAL WORK HORSE OF INDUSTRY GOOD FOR CHIPPING AT A CENTRAL HAUL SITE. NEED 10 ABLE BODIED PERSONS TO KEEP MACHINE FED. NEED 1½ TON TRUCK TO TOW ON HWY AND HEAVY CONSTRUCTION EQUIPMENT TO TOW THROUGH SITE.

EQUIPMENT IS BASED AT VARIOUS LOCATIONS ALONG FRONT RANGE. EQUIPMENT MOBILIZATION FEE BEGINS/ENDS BASED ON ONE ROUND TRIP TO PROJECT SITE. PRIOR SCHEDULING REQUIRED TO CONFIRM AVAILABILITY. DAILY OR PROJECT MINIMUMS APPLY. FUEL AND SAW ADDITIONAL. SITE SPECIFIC PROJECT SITUATIONS DETERMINE WHICH IS BEST TOOL FOR THE JOB. THE CONTROLABLE INFLOW FEED RATE OF THESE "DISK" STYLE CHIPPERS IS FAR SAFER THAN DRUM TYPE CHIPPERS.

Mighty Mac shredder/chipper

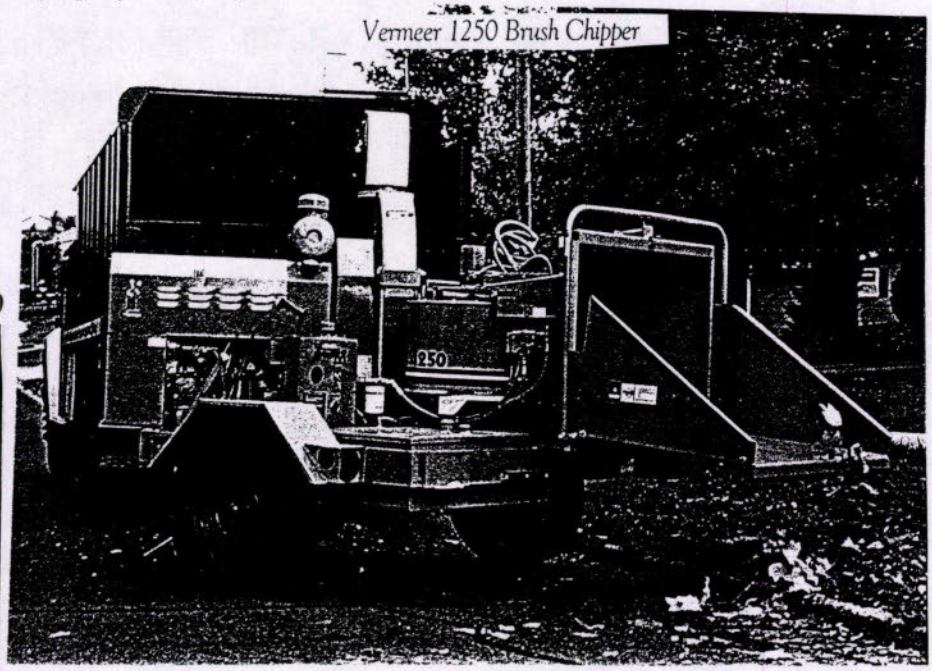


MACHETE POWER FEED CHIPPER

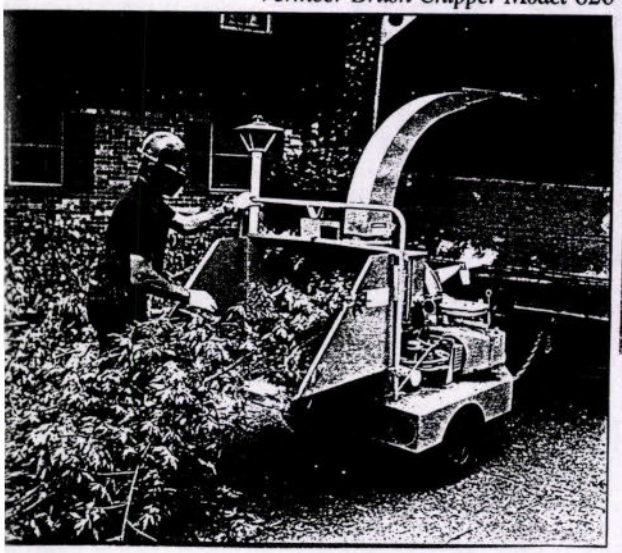


MODEL 18
GAS

Vermeer 1250 Brush Chipper



Vermeer Brush Chipper Model 620



BASIC FORESTRY EQUIPMENT

FALLING SAW 28" BAR		569.95
SERVICE MANUAL		25.00
TREE TRIMMING SAW		249.95
SERVICE MANUAL		25.00
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SERVICE MANUAL		25.00
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SAW FILES		10.95
BAR WRENCH	2 @ 2.95	5.90
GREASE GUN		6.95
GREASE TUBE		1.25
BAR OIL 1 GALLON		4.95
2 CYCLE OIL 1 PINT		2.50
PREMIUM UNLEADED 1½ GALLONS		1.80
MIX GAS 1½ GALLON/ BAR OIL ½ GALLON CONTAINER		10.95
FALLING WEDGE	2 @ 2.25	5.50
WEDGE POUCH		10.95
FLAGGING 1 ROLL		1.25
FALLING AXE		21.95
FIRE SHOVEL		9.95
FIRE EXTINGUISHER		9.95
FIRE EXTINGUISHER POUCH		5.95
CANTEEN 4 QUART		12.95
HEAVY DUTY PACK SACK		69.95
MEASURING TAPE 50 FT		26.95
COMPASS		42.95
MARKING CRAYON		.75
FIRST AID KIT		54.95
MANUAL WINCH 3400 LB CAPACITY		199.95
	TOTAL	2158.25

PERSONAL PROTECTIVE EQUIPMENT

HARD HAT WITH FULL FACE SCREEN AND EAR PROTECTORS	34.95
LEATHER GLOVES	6.95
HEAVY TWILL WORK SHIRT	16.95
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FRONT PROTECTIVE KEVLAR PAD INSERTS	32.95
HEAVY DUTY SUSPENDERS	6.95
HEAVY DUTY WORK SOCKS	5.50
"SMOKEJUMPER" BOOTS WITH EXTRA HEAVY TOE PROTECTION	295.00
	432.20

MR TURNER HAS BEEN INVOLVED IN FORESTRY FOR OVER 20 YEARS. DURING HIS 13 YEARS AS WILDLAND FIREFIGHTER, ASSIGNMENTS INCLUDED OVER 300 WILDFIRES OF WHICH MORE THAN TWO DOZEN WERE MAJOR PROJECT SIZED FIRES. PROJECT WORK BETWEEN FIRES HAS DEVELOPED EXTENSIVE EXPERIENCE IN MANAGING FOREST FUELS. THE VEGETATIVE MODIFICATION DESCRIBED IN THIS REPORT WAS ACCOMPLISHED ON AN INTERMITTENT BASIS DURING THE LAST 2½ YEARS. JUST GOES TO SHOW WHAT A DEDICATED INDIVIDUAL CAN ACCOMPLISH IN THEIR SPARE TIME.

WILDLAND/URBAN INTERFACE VIDEO LIBRARY

PERSONAL PROPERTY OF JOE TURNER

VIDEOS LOANED FOR EDUCATIONAL PURPOSES. USERS RESPONSIBLE FOR ADMINISTRATIVE/COPY COSTS FOR REPLACEMENT

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FIRE SAFE LIVING SPACE 20 MIN
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WILDFIRE
NATIONAL AUDUBON SOCIETY

YELLOWSTONE AFLAME 30 MIN
FINLEY-HOLIDAY FILM CORP BOX 619 WHITTIER CA 90601 213-945-3325

WILDFIRE 91 SET OF THREE TAPES N.F.P.A. TELECAST AVAILABLE THUR
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U.S.D.A. FOREST SERVICE PNW RESEARCH STATION FIRE AND AIR RESOURCE MGMT SEATTLE WA.

FIRE FIGHTER HEALTH RISKS 8 MIN
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303-989-6747 1-800-745-6747

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ENVIRONMENTAL SYSTEMS RESEARCH INSTITUTE INC
REDLANDS CA. 92373 714-793-2853

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COMMITTEE WORK

WILDLAND/URBAN INTERFACE COMMITTEE
BOULDER COUNTY FIRE FIGHTERS ASSOCIATION

WILDFIRE HAZARD IDENTIFICATION & MITIGATION SYSTEM
BOULDER COUNTY WILDFIRE MITIGATION GROUP

EDUCATION/AWARENESS TASK FORCE
STATE WILDFIRE SUBCOMMITTEE
COLORADO NATURAL HAZARDS MITIGATION COUNCIL

ONGOING PROFESSIONAL DEVELOPMENT

1992 SEVERE FOREST FIRE BEHAVIOR
RICHARD C. ROTHERMEL, INTERMOUNTAIN FIRE SCIENCE LAB
CSU NATURAL RESOURCE DEPT.

1992 GIS IN THE ROCKIES
COLORADO SCHOOL OF MINES GOLDEN
DENVER ASPRS-ACSM

1992 THE POWER OF POLITICS CONFERENCE,
THE MEDIA AND THE PUBLIC
TO AFFECT WILDLAND/URBAN FIRE PROTECTION PROGRAMS IN THE 1990'S
UNIVERSITY OF MONTANA MISSOULA
SPONSORS-FEDERAL AND STATE FIRE & FORESTRY AGENCIES

1992 PROTECTING & MAINTAINING A HEALTHY FOREST
A CONFERENCE ON MANAGING AND UTILIZING FOREST BIOMASS
REGION 5 USDA FOREST SERVICE, CALIFORNIA DEPT. OF FORESTRY & FIRE AND
PROTECTION, ELECTRIC UTILITIES AND PRIVATE TIMBER COMPANIES

1991 11TH ANNUAL FIRE & FOREST METEOROLOGY CONFERENCE
UNIVERSITY OF MONTANA MISSOULA
AMERICAN METEOROLOGICAL SOCIETY, SOCIETY OF AMERICAN FORESTERS, USFS

1991 INTERIOR WEST FIRE COUNCIL
HOSTED BY COLORADO STATE FOREST SERVICE, DENVER, CO

1991 ASSOCIATED LANDSCAPE CONTRACTORS OF COLORADO
ANNUAL CONFERENCE

1990 NATIONAL WILDLAND FIRE TRAINING CONFERENCE, DENVER, CO

MEMBERSHIP

ASSOCIATE MEMBER-BOULDER COUNTY FIREFIGHTER ASSOCIATION

COLORADO FORESTRY ASSOCIATION

MEMBER-WILDFIRE MANAGEMENT SECTION
NATIONAL FIRE PREVENTION ASSOCIATION

Buffalo Canyon

Structure Protection Plan

Buffalo Canyon Structure Protection Plan

MILEAGE CHART SYMBOLS

From Hwy 26-287 on Buffalo Canyon Road

Box K	1.1 miles
Atkinson Motel	1.3 miles
Buffalo Valley Ranch	1.4 miles
Heart 6 Ranch	1.5 miles
Fern Creek Ranch	3.6 miles
Mt. View Ranch	7.6 miles
Diamond D	7.8 miles
Turpin Meadow	10.0 miles

LEGEND

B	= BARN	WP	= WOOD PILE
H	= HOME	W	= WATER SOURCE
S	= SHACK	F	= FUEL*

** Propane / Gas / Diesel*

TACTICAL AREAS

The Buffalo Canyon Structural Protection Plan is designed to quickly and safely place forces to save structures. The plan is divided into the following tactical areas:

1. Turpin Meadow Lodge Area
2. Turpin Meadow Summer Homes
3. Mid Canyon Area
4. Heart 6 - 6 - Atkinson Motel Area

MAPS

Each area is marked 1-4 on a forest map. Each individual area is laid out on a tactical map.

The road into each area is flagged coded.

1. Yellow - homes on road
2. Blue - water supply
3. Hot Pink - Haz Mat, i.e., propane tanks or fuel storage

If there is no flagging on a road, there are no structures on it.

CONTENT

Each segment area can be used individually it contains:

1. Maps
2. General Information

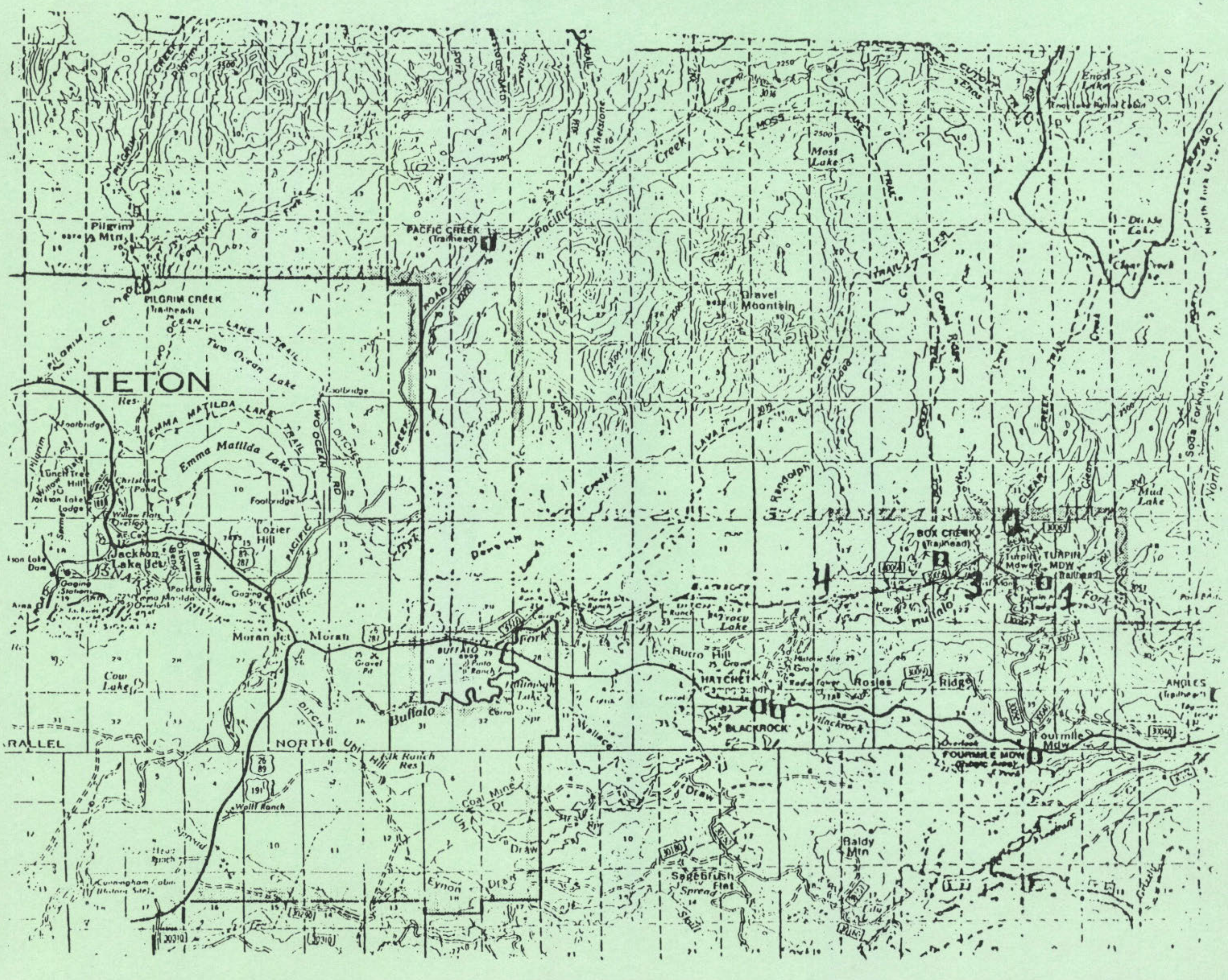
3. Water supply

4. Tactics (suggested)

5. Equipment required

6. Probability for success rate from:

   Poor 20%
   Fair 40%
   Good 60%
   Very Good 80%



TETON
Pilgrim Mtn
PILGRIM CREEK (Trailhead)
Two Ocean Lake
TWO OCEAN LAKE TRAIL
EMMA MATILDA LAKE TRAIL
Emma Matilda Lake
PACIFIC CREEK (Trailhead)
Pacific Creek
Gravel Mountain
Moss Lake
MOSS LAKE TRAIL
Enos Lake
Mud Lake
Soda Fork
Lunch Tree Hill
Jackson Lake Lodge
Christian Pond
Willow Flats Overlook
Lozier Hill
Jackson Lake Jct
Jackson Lake Dam
Gaging Station
Oxbow Bend
Moran Jct
Moran
Cow Lake
Buffalo
Buffalo Fork
Gravel Pit
Tracy Lake
Rosies Ridge
HATCHET
BLACKROCK
BOX CREEK (Trailhead)
TURPIN MDW (Trailhead)
Turpin Mdws
Fourmile Mdw
FOURMILE MDW
ANGLES (Trailhead)
Baldy Mtn
Sagebrush Flat
Coal Mine Dr
Eynon Draw
Elk Ranch Res
Wolff Ranch
Cunningham Cabin Historic Site
NORTH
PARALLEL
4
3
2
1

PRE-PLAN

Discuss this plan with each company under your command. Each strike team leader should have a copy.

HELPFUL HINTS

1. Always stay mobile
2. Back your engine in so you can get out fast
3. Coil a short 1-1/2" charged line with fog nozzle on your engine for safety and quick knock down
4. Don't make long lays
5. Check roads before the fire hits
6. Check each home for defense: move wood piles; close windows and doors
7. Leave home lights on inside and out day and night
8. Place owners ladder at a corner of home on least fire threat side
9. Coil and charge garden hoses
10. Check and mark Haz Mats, i.e., LPG-Fuel
11. If a home becomes well involved, LEAVE IT, yes leave it and move on to one you can save
12. ALWAYS wear your SAFETY GEAR
13. Fire fighter safety and survival is always our number one priority

GOOD LUCK

STRATEGY

The Buffalo Valley area will become Branch II under operations.

There will be two structural protection groups, Group "S" and Group "T" working under Branch II. Each group will contain four strike teams of engines.

Two light dozers (D-4 Type) on transports and three hand crews will be under Branch Control and will be assigned as needed. Also, four water tenders and four portable pumps will be assigned to the groups. Two WT's and two pumps with 1,000 feet 1-1/2" hose each to each group.

TOTAL EQUIPMENT

8 Strike Team Engines (2 Type 1 or 2, 4 Type 3, and 2 Type 4)

3 Hand Crews (Type 2)

4 Water Tenders

4 Portable Pumps - 4,000 Ft 1-1/2"

1 Type 3 Copter (Day only)

TURPIN MEADOW LODGE AREA

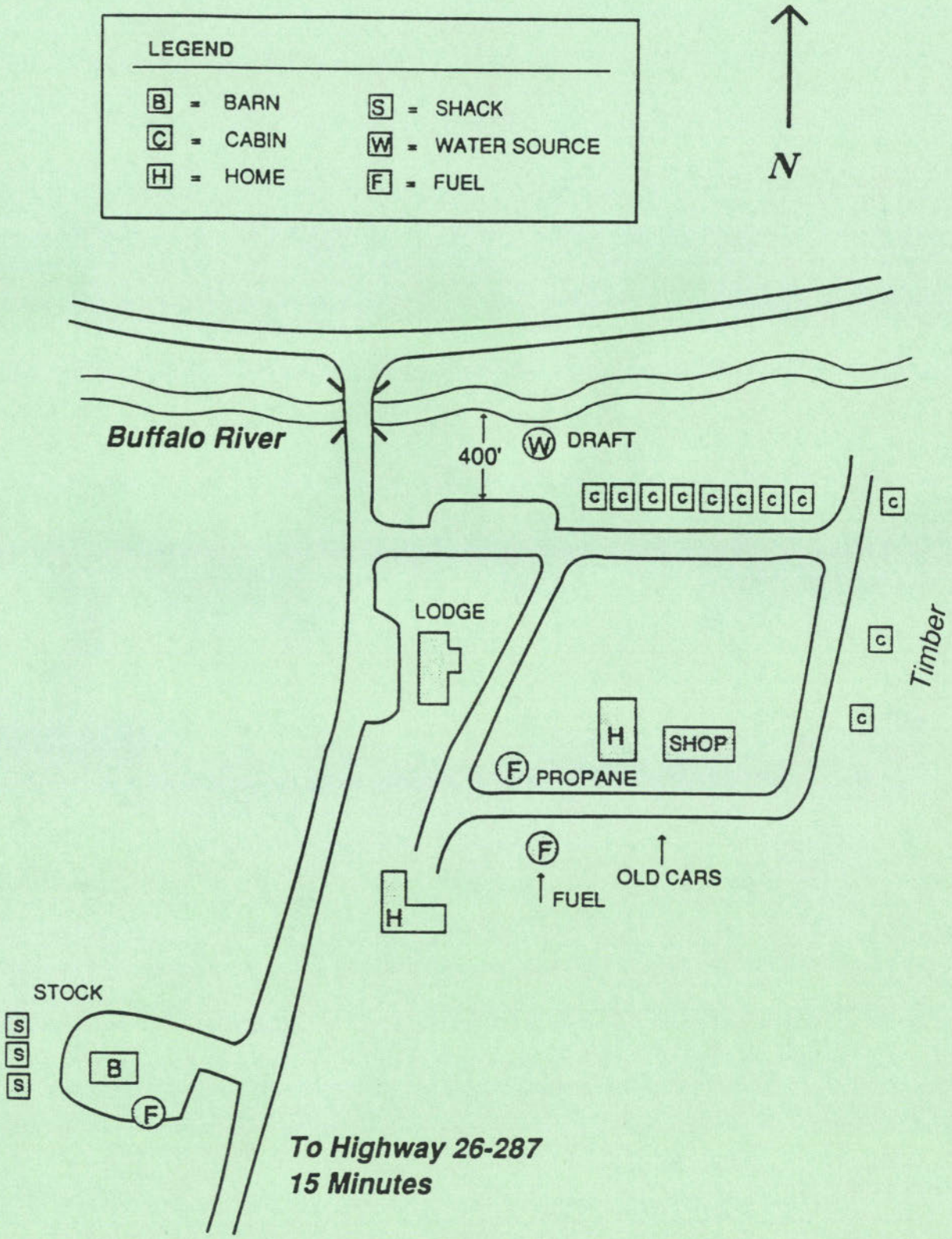
General: This area is 10 miles east of the junction of Buffalo Canyon Road and Highway 26-287. It contains a ranch complex of 18 structures. Buildings are of log and tin roof construction. Little fuel except on the east side. Good clearance in most areas. Above ground storage of fuel and propane tanks.

Water Supply: Use water tenders draft from creek.

Tactics: Fire out east side. Construct hand line behind east side cabins. Have hand crew remove wood piles.

Equipment: 1 S.T. Engines Type 1, 2, 3 - 1 water tender - 1 hand crew

Probability for success: Good


LEGEND
B = BARN
C = CABIN
H = HOME
S = SHACK
W = WATER SOURCE
F = FUEL
N
Buffalo River
400'
W DRAFT
C C C C C C C C
C
LODGE
Timber
C
C
H
SHOP
F PROPANE
F
FUEL
OLD CARS
H
STOCK
S
S
S
B
F
To Highway 26-287
15 Minutes

TURPIN MEADOW SUMMER HOME AREA

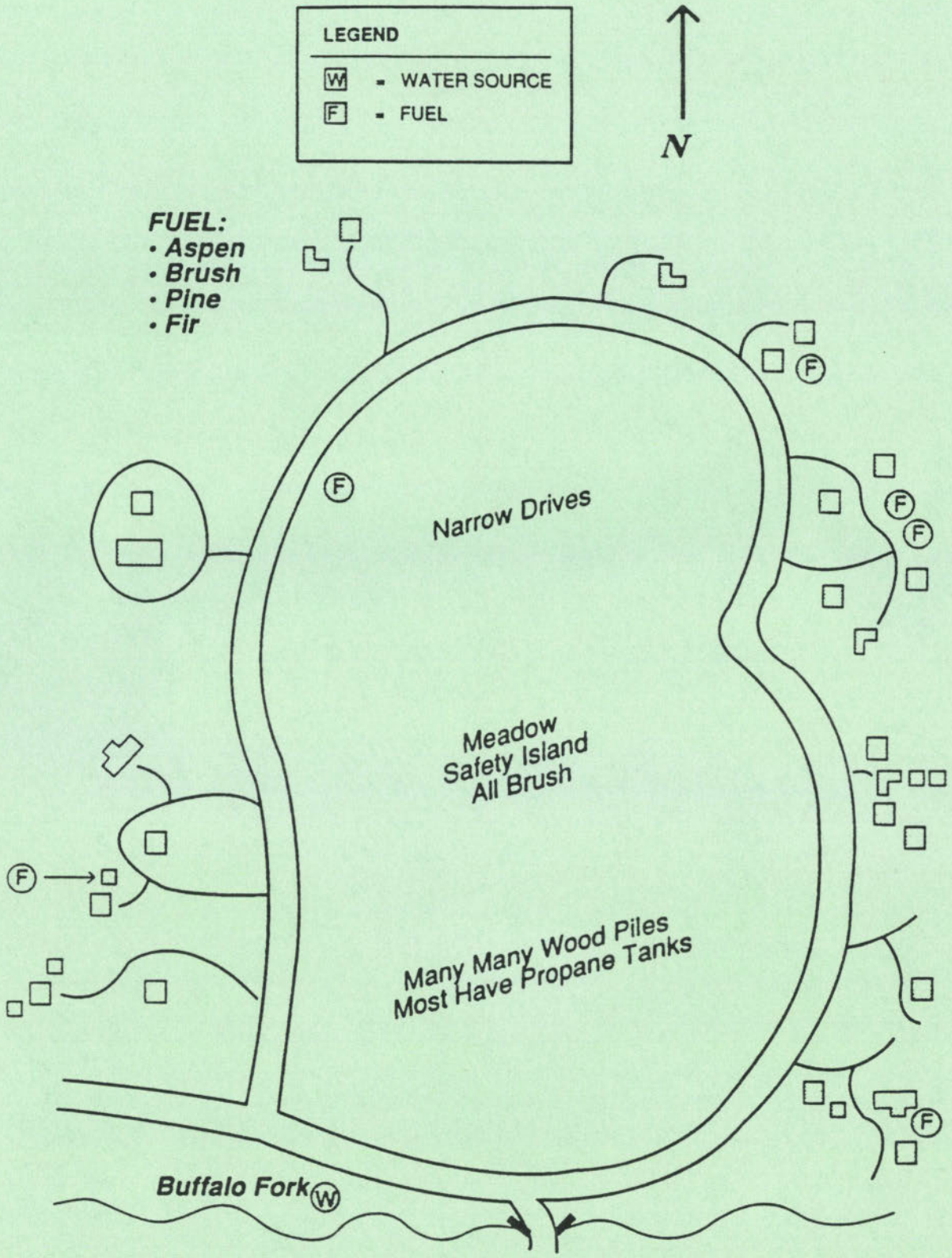
General: This area is 10 miles east of the junction of Buffalo Canyon Road and Highway 26-287. It contains 19 homes and many out buildings. Homes have very poor clearance, built in the timber on a slope. All are of wood construction and some have shake roofs and close wood piles. There is heavy flash fuel near these homes and several have steep driveways.

Water Supply: Use water tenders

Tactics: Fire from back yards is a major safety problem for crews if fire crowns - clear safety area in meadow first!

Equipment: 3 S.T. Engines on Line, 1 with Reserve - 3 Hand Crews - 2 Dozers - 2 Water Tenders

Probability of Success: Poor


LEGEND
W - WATER SOURCE
F - FUEL
N
FUEL:
• Aspen
• Brush
• Pine
• Fir
Narrow Drives
Meadow
Safety Island
All Brush
Many Many Wood Piles
Most Have Propane Tanks
Buffalo Fork

MID-CANYON AREA

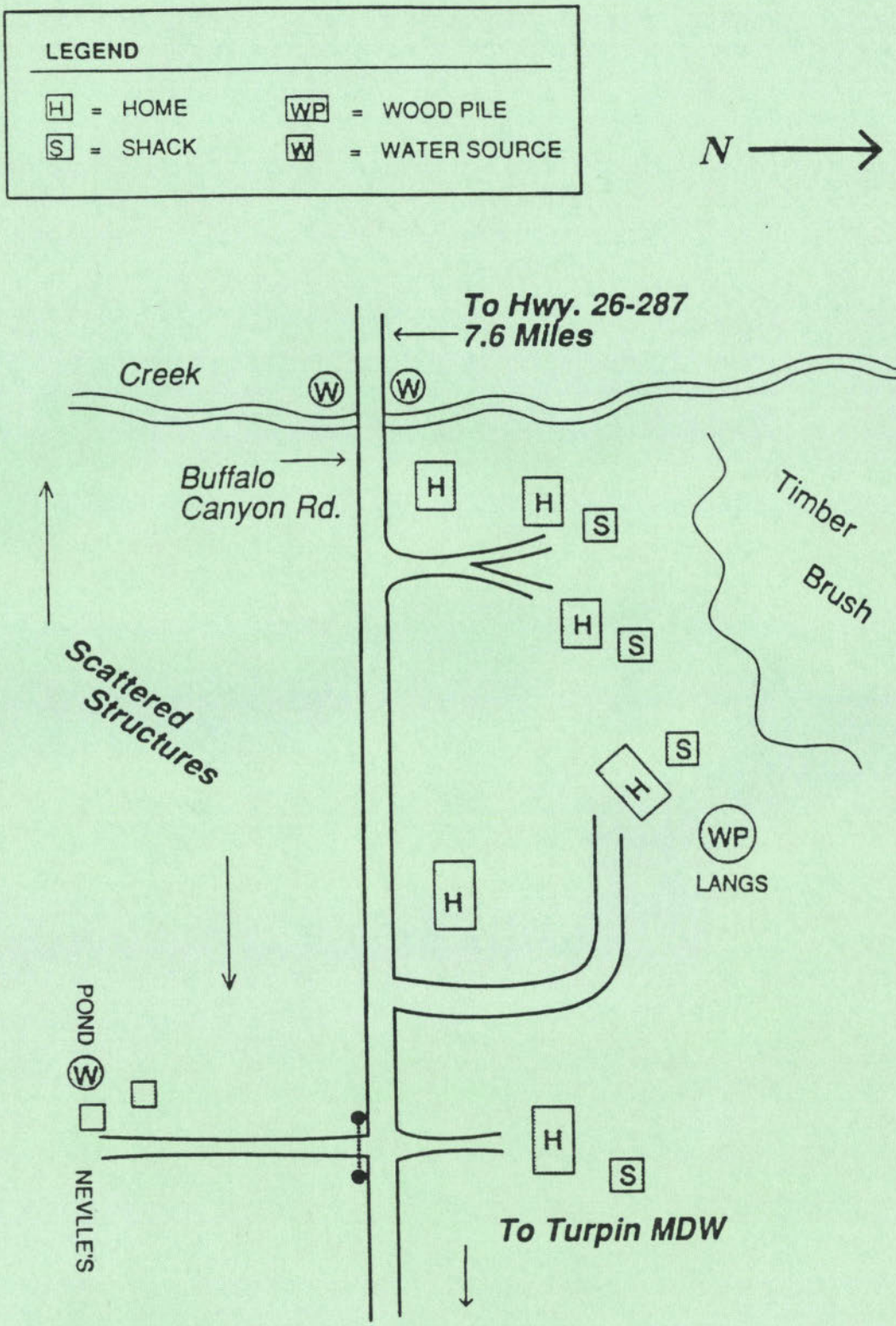
General: This area is 7.6 miles in on Buffalo Canyon Road. It contains some 25 homes; however, only the structures on the north side of the road area are at risk. South side homes are in the clear and would take little effort to protect. North side homes are near the road and back into the brush line.

Water Supply: Water tenders, draft from Neville's pond and creek crossing just west of the area.

Tactics: Fire out behind homes and hold fire north of road.

Equipment: 2 S.T. Engines (any Type) - 1 Hand Crew - 1 Water Tender

Probability for Success: Good


LEGEND
H = HOME
S = SHACK
WP = WOOD PILE
W = WATER SOURCE
N
To Hwy. 26-287
7.6 Miles
Creek
W
W
Buffalo
Canyon Rd.
H
H
S
Timber
Brush
H
S
Scattered
Structures
S
H
WP
LANGS
H
POND
W
NEVLLE'S
H
S
To Turpin MDW

HEART 6 - ATKINSON MOTEL AREA

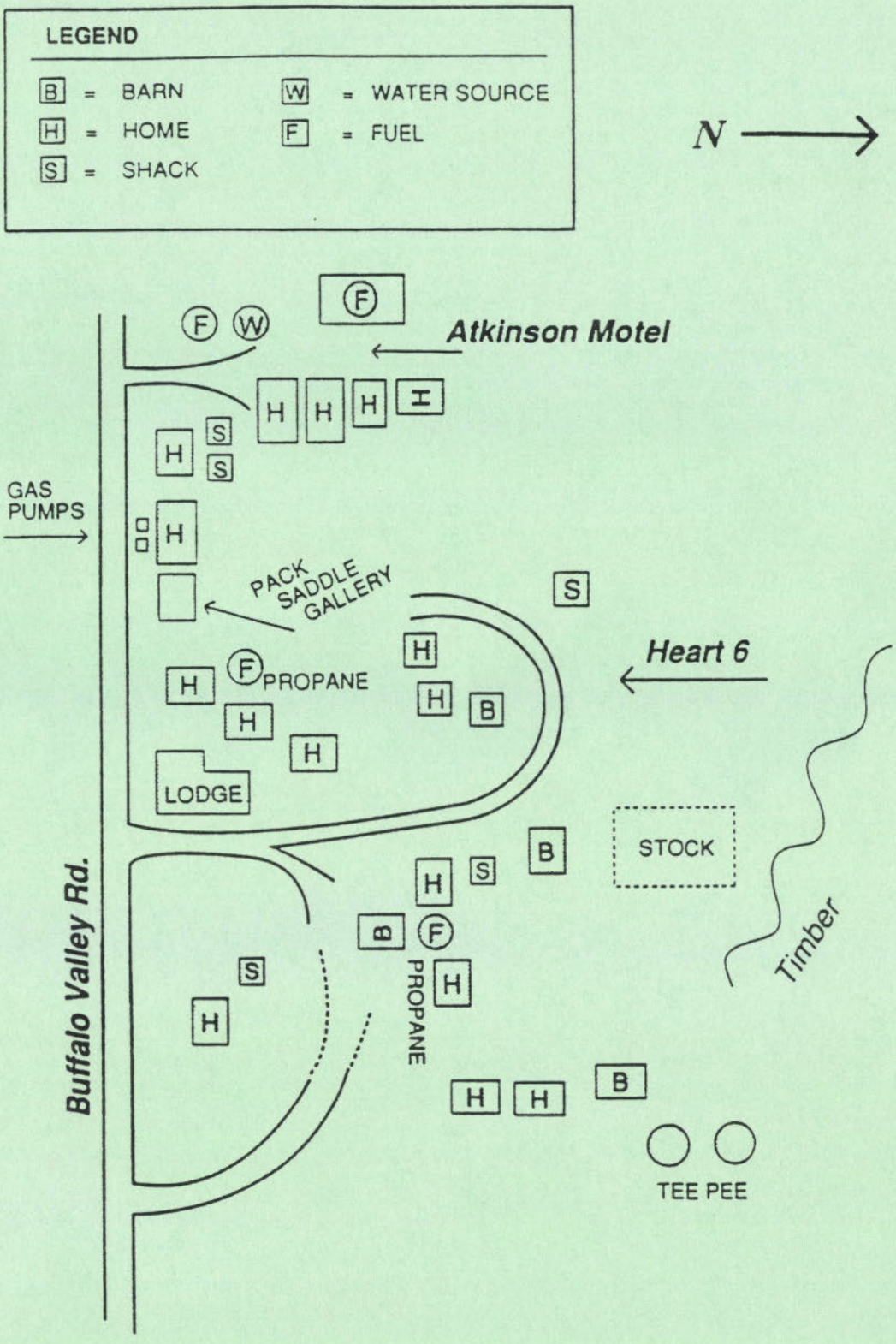
General: This area is 1.5 miles in on the Buffalo Canyon Road. Both the Heart 6 and motel are right next to the road with good fuel clearance. The area contains 27 structures and stock pens. Dangerous fuel storage 1000+ gas with tin garage at Atkinson's (flagged) and many propane tanks.

Water Supply: Water tenders and a 1,000 stock tank at Atkinson's.

Tactics: Fire out slowly and have engines stand by.

Equipment: 2 S.T. Engines (any Type) - 1 Water Tender - 1 Hand Crew

Probability for Success: Good


LEGEND
B = BARN
H = HOME
S = SHACK
W = WATER SOURCE
F = FUEL
N
Atkinson Motel
GAS PUMPS
PACK SADDLE GALLERY
PROPANE
Heart 6
LODGE
STOCK
Timber
Buffalo Valley Rd.
PROPANE
TEE PEE

FireWise

Wildland Fire
Defensible Space Standards

Definition of Defensible Space: The area between your house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and to provide firefighters an opportunity to safely and effectively defend the house. **No defensible space = No chance!**

You modify the vegetation by breaking up **vertical** (from the ground up) and **horizontal** (across the ground) **continuity** of the fuels (vegetation). Many times a defensible space is simply a properly maintained and watered back yard. A lawn can be a very effective defensible space.

Bare ground is *not* what is meant by defensible space!

How slope affects defensible space size: Fires travel much more quickly on slopes because heat rises and preheats the fuels up the slope ahead of the fire making it ignite more quickly.

> **Homes on slopes <u>especially</u>** *need to have a* **wider defensible** *space* **downhill**, *and more separation between plants.*

Horizontal Continuity Standards: Separation between plants <u>across</u> the ground for different slopes, different vegetation & **how far downhill.**

> **Shrubs and Pinon & Juniper:** Keep edges of shrub or tree crowns...
> 0%-20% slope: twice (2X) as far apart as they are tall for **30 ft.**
> 21%-40% slope: four times (4x) as far apart as they are tall for **200 ft.**
> +41% slope: six times (6x) as far apart as they are tall for **200 ft.**
>
> **Trees:** Distance between edges of tree crowns...
> 0%-20% slope: at least 10 feet apart for **30 ft.**
> 21%-40% slope: at least 20 feet apart for **100 ft.**
> +41% slope: at least 30 feet apart for **200 ft.**

Vertical Continuity Standards: Separation of **ladder fuels** to keep fires out of tree crowns.

> **Grasses & Shrubs:** Should be removed under trees *or* prune limbs of the tree to a height 3 times (3x) higher than the height of the grasses or shrubs. Grass kept mowed to about 4 inches is good.

Defensible Space to this standard will earn a FireWise sign for your property!

FIRESAFE PRACTICES FOR YOUR HOME & SUBDIVISION

Colorado State FOREST SERVICE

A SUBSTANTIAL WILDFIRE HAZARD EXISTS ON MOST FORESTED HOMESITES. THESE HAZARDS CAN, IN MANY CASES, BE REDUCED TO ACCEPTABLE LEVELS BY FOLLOWING THESE FIRE SAFETY GUIDELINES.

CREATE A "SAFETY ZONE" AROUND YOUR HOME

1. **THIN** out continuous tree and brush cover within 30 feet of homesite. Adequate thinning is reached in the 30 foot Safety Zone when the outer edge of tree crowns are at least 10 to 12 feet apart. Occasional clumps of 2 or 3 trees may be retained for natural landscape effects. Also, small patches of brush or shrubs may be left, but should be separated by at least 10 foot clear areas of irrigated grass or noncombustible material. If your home is on a slope, you will need to enlarge the Safety Zone, especially on the downhill side. If it is located at the crest of a steep hill, fuels should be thinned at least 100 feet below the crest.

2. **DISPOSE** of all slash and debris left from thinning. Common disposal methods include (1) lopping and scattering (to facilitate more rapid decomposition), (2) piling and burning (only when snow cover is sufficient to prevent fire spread), and (3) chipping.

3. **REMOVE** dead limbs, leaves, and other ground litter from within the Safety Zone.

4. **MAINTAIN** an irrigated greenbelt immediately around your home using grass, flower garden, or ornamental shrubbery. Another option is rock or other noncombustible material. Avoid use of bark or wood chips in this area.

5. **MOW** dry grasses and weeds to a height of 2 inches or less and remember to keep well watered, especially during periods of high fire danger.

6. **PRUNE** branches from trees within the zone to a height of 10 feet above the ground. Also remove shrubs, small trees, or other potential fuels from beneath large trees. Left in place, these create "ladder fuels" which can carry a ground fire into the tree crowns.

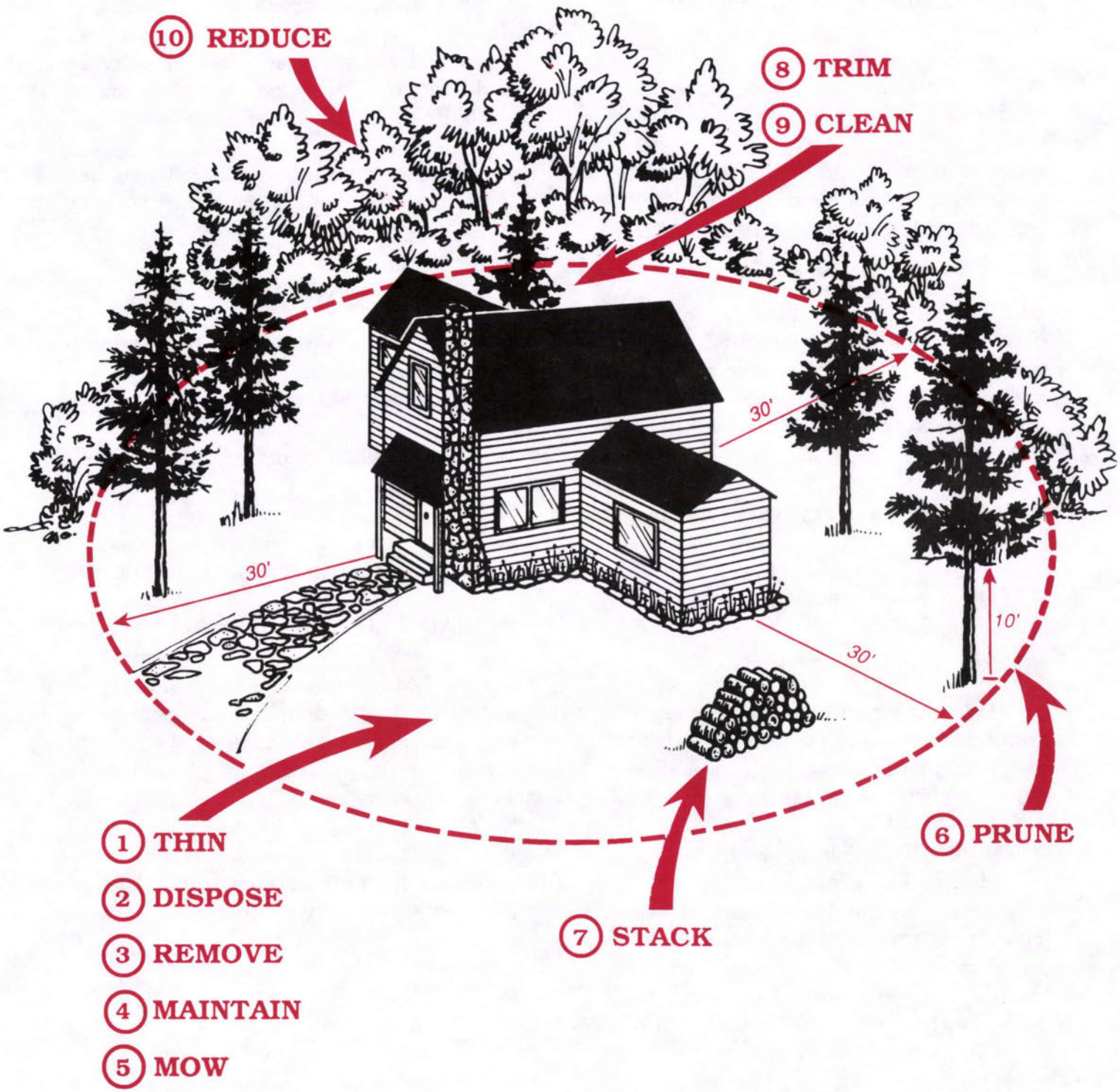
7. **STACK** firewood uphill and at least 15 feet from your home.

8. **TRIM** any branches which extend over the eaves of your roof. Branches within 15 feet of a chimney should be removed.

9. **CLEAN** gutter and roof of pine needles and leaves to eliminate an ignition source for firebrands, especially during the hot, dry weather of the fire season.

10. **REDUCE** density of surrounding forest at least 100 feet out from homesite (it is preferable to thin your entire lot). Thin trees so crowns do not touch each other. Whenever possible, harvest sawlogs, posts, poles, or firewood.

THE "SAFETY ZONE"



OTHER WILDFIRE SAFETY PRACTICES

- **USE** noncombustible or fire resistant building material, especially on the roof.

- **INSTALL** chimney screen or spark arrestor

- **ENCLOSE** or screen off porch, foundation, roof, or attic openings to keep debris from accumulating underneath or firebrands from entering.

- **POST** house or lot number so that it is clearly visible.

- **PROVIDE** adequate driveway and turnaround space for emergency vehicle access with 10 feet of clearance on each side of drive.

- **PROTECT** windows and sliding glass doors with nonflammable shutters and provide fire resistant drapes or blinds on the interior, especially on the side of the house that would most likely be exposed to a fire, e.g., the downhill side.

- **INSPECT** and clean your chimney on a regular basis.

- **EQUIP** your home with smoke detectors and a 10 pound ABC-class fire extinguisher.

- **BURY** power and telephone lines underground. If not possible to bury lines, then keep them clear of branches and remove fuel from around poles.

- **DEVELOP** an external water supply for firefighting. This can be a small pond, cistern, well, swimming pool, etc. If you have a well, provide a power source for the pump motor separate from the house. Have an outside water faucet located away from your home with sufficient hose to reach all parts of your residence.

- **STORE** tools such as shovels, axes, rakes, or hoes for use in case of fire.

- **DISPOSE** of leaves and debris with your trash. In most areas open burning is prohibited. If burning is allowed, provide an approved, properly screened incinerator.

- **PLAN** and rehearse a home fire escape drill. Know where safety areas are within your subdivision. Meadows, rock outcrops, and wide roads are good examples. Know of all the emergency escape routes.

- **REPORT** all fires immediately to your local fire department or the county sheriff's office.

SUBDIVISION ACTIVITIES

- **FORM** a fire protection or forestry committee to organize and oversee needed projects and activities.

- **INSTALL** fuelbreaks at strategic locations throughout your subdivision.

- **THIN** dense stands of trees and/or brush in common ground and greenbelts.

- **MAINTAIN** all road and street signs

- **INSTALL** a fire danger sign at the entrance to your subdivision (ratings must be kept current on a daily basis) and other fire prevention signs throughout the subdivision.

- **CLEAR** at least three feet around and above fire hydrants and make sure they are checked periodically for adequate flow and pressure.

- **REDUCE** fuel under utility lines and around poles.

FOR ASSISTANCE WITH LAYOUT AND INSTALLATION OF SAFETY ZONES CONTACT YOUR LOCAL CSFS OFFICE

Firewise Landscaping

Firewise Landscaping Checklist

Things to consider when designing and installing a Firewise Landscape:

- ☐ Site location and overall terrain.
- ☐ Property contours and boundaries.
- ☐ Native vegetation.
- ☐ Prevailing winds and seasonal weather.
- ☐ Local area fire history.
- ☐ Plant characteristics and placement. (duffage, water and salt retention ability, aromatic oils, fuel load per area, and size)
- ☐ Irrigation requirements.

To create a firewise landscape, remember that the primary goal is fuel reduction. To this end:

- ☐ Use "fuel breaks" like driveways, gravel walkways, and lawns.
- ☐ Provide a "defensible space" of a minimum of 30'.
- ☐ Carefully space the trees you plant.
- ☐ Take out the "ladder fuels" - - - that vegetation that serves as a link between grass and the tree tops. It can carry fire to a structure or from a structure to vegetation.
- ☐ Create protection zones. Those below, listed one to four, progressively reduce flammability and fuel.

  - Zone 1. This area is an area for domestic planting of carefully spaced fire resistant species. It should be well irrigated. (immediate vicinity of structure)
  - Zone 2. The place for fire retardant plant materials (those which are more fire resistant). They should be low-growing. An irrigation system should be installed here.
  - Zone 3. An area of low fuel volume and selective planting. Place low growing plants and well-spaced trees here.
  - Zone 4. This is a natural area. Selectively thin here, and remove highly flammable vegetation. (furthest zone from the structure)

Things to consider when maintaining a landscape:

- ☐ Be sure the irrigation system is well maintained.
- ☐ Remove all leaf clutter.
- ☐ Mow regularly.
- ☐ Keep trees and shrubs pruned. Prune all trees up 6' - 10' from the ground.
- ☐ Store firewood away from the structure.
- ☐ Safe refueling and regular maintenance of garden equipment.
- ☐ Careful disposal of smoking materials.
- ☐ Proper storage and use of flammable liquids.
- ☐ Disposal of cuttings and debris
- ☐ Local regulations regarding vegetative clearances, disposal of debris, and fire safety requirements for equipment.
- ☐ Fertilization and pest control.

For additional information, contact Bill Baden at (617) 984-7484 or fax (617) 984-7056

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LANDSCAPE MAINTENANCE PROCEDURES WHICH REDUCE FIRE HAZARD

Since the healthiest plants are those with the highest moisture content and high moisture content reduces flammability, it is apparent that a healthy vigorous specimen of any given species will be less flammable than a specimen whose foliage is devoid of adequate moisture.

Fuel moisture content gradually declines in most parts of the country to its lowest point in October. The Ponderosa Pine, Pinjon Pine, Rocky Mountain and Alligator Juniper mix in Southern Colorado is at its most flammable at that time.

In Los Angeles, that low point is near 60% foliage moisture content, which is defined as the critical level.

We obviously cannot control the other environmental characteristics which contribute to high fire danger, as slope of the site, annual winds, low air humidity levels or sometimes the species on-site and their relative natural flammability.

We can, however, maintain these and introduced plants in the best health by appropriate irrigation and fertilizing procedures and by pruning procedures appropriate to the species which also reduce flammability.

Higher than necessary flammability in the landscape due to poor plant performance is related primarily to one or all of these causes:

- Inappropriate plant species for the site
- Poor installation procedures
- Poor irrigation system design
- Poor maintenance procedures used

My presentation deals only with this last subject.

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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

The most important piece of knowledge necessary to reduce maintenance failures is a clear understanding of the conditions the plant will have to tolerate to perform well.

The second most important step is understanding how to use that knowledge.

This information should include an understanding of the macro-conditions such as normal high and low temperatures of the site, typical wind direction, speed and frequency and a general knowledge of the top soil type, its depth, and sub-soil character and its depth.

Irrigation

Irrigation procedures usually play a key part in maintaining a plant in the best health.

This should not be taken to mean that more irrigation is necessarily better irrigation.

To understand the logic behind appropriate irrigation programming, one must understand basic plant physiology.

Active, vigorous roots are necessary to produce active, vigorous vascular tissue, which is, in turn necessary to produce foliage which effectively produces carbohydrates for storage in trunks and roots, as a source of stored sugars for production of the following year's foliage.

If those roots aren't active and healthy, they will not be effective at absorbing water and minerals to facilitate the rest of the process.

As example, if irrigation is so frequent, especially in poorly drained soils, that water occupies all of the space between soil particles, no room is left for oxygen in the root zone, and roots gradually decline and die.

The ideal balance of contents in soil is 25% by volume water, 25% air and 50% solids. If less than 10% by volume of air is present in the soil, roots will gradually decline.

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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

The result of overwatering, ironically, is wilted foliage, because roots are not active enough to carry water to the foliage.

Wilted foliage can also be caused by lack of water in the soil, as well, of course.

As example, many plants which are native to Colorado are naturally adapted to perform well, with less than 30% of reference Eto.

(ET is the Evapotranspiration Rate or the amount of water used by a plant on a given day.)

If these plants are frequently irrigated, especially during warm weather, at worst, roots will be killed by water mold diseases, or at least, roots will be weakened, and will not transport water to the foliage effectively.

The result is a more flammable plant.

These plants must either be irrigated very seldom (once per month) if sprinklers are used, or by drip or soaker hose.

Irrigation emitters, whether bubblers or drip must put the water on the root ball, not beside the root ball in the first year (or two or three for larger root balls) if the root ball is to be kept alive while it is producing new roots in the surrounding fill soil.

Unfortunately, many fine landscape designs are ruined by overpruning and overwatering, both symptoms of underknowledge.

Irrigation Suggestions

Install an irrigation system which supplies water on the roots, not on the stem.

Avoid watering when the soil is already wet, but water often enough to maintain turgid healthy foliage. Use a soil probe to detect actual soil moisture in the root zone.

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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

Water seldom but thoroughly, avoid watering a little bit, frequently.

Don't allow irrigation patterns to keep the stems wet.

> If sprinklers or mist emitters strike the trunk base of a large number of species during hot weather, water mold infections will commonly result in girdling of the base of the trunk by the disease and death of the plant. This is very common on Azaleas and Rhododendrons.

Pruning

Pruning to reduce the flammability of a plant must not ignore the other aspects of the plant's landscapes function.

It must be attractive, in some cases it must prevent erosion and it must stay alive to fulfill those functions.

So the challenge to the gardener living in a fire-prone area is to reduce flammability without destroying the plants aesthetic contribution.

How is that done?

Pruning Time

Spring is spent by most plants using stored carbohydrates to produce new foliage (savings taken from the savings account if you will). After the foliage hardens in early summer, it begins replacing those carbohydrates, until that is essentially their only function in late summer and early fall.

If we prune in mid to late summer, as many commercial gardeners do, we prevent the plant from replacing all of the carbohydrates used that spring. If this is done often enough and/or severely enough we can literally prune a plant to death by removing too large a proportion of its foliar production facilities or by preventing mature foliage from replacing the carbohydrates previously taken "from savings".

Prepared by: BARRIE D. COATE AND ASSOCIATES
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Consulting Arborists
23535 Summit Rd
Los Gatos, CA 95030
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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

So, severe pruning of deciduous plants should, only be done during the dormant season.

A greater timing problem is pruning of broad-leaf evergreens, as English Laurel, Prunus laurocerasus. Any pruning which will remove 30% or more of the foliage of this type of plant should only be done during the time new foliage is just beginning to appear but past danger of the last frost, not after foliage has hardened in summer.

In other words, hard pruning just before the October fire season may seem good timing from a fuel reduction standpoint but it is a poor practice from the horticultural viewpoint.

This implies that good horticultural practice requires planning ahead.

Coincidentally, good fire prevention requires planning ahead as well.

What good pruning practices will reduce fire danger?

Groundcovers

Don't let groundcovers develop into 2-1/2 feet to 3 feet tall mounding forms with an understory of dead wood.

Cut most groundcovers to 8 to 12 inches tall every other year in spring, fertilize then lightly and water in the fertilizer. The result will be a full, green cover by mid-summer with very little dead fuel beneath.

Shrubs and Trees

Prune out dead wood and prune for structure during winter (for deciduous shrubs) or early spring (for evergreen broadleaf or coniferous shrubs)./

Since plants identified as shrubs form the predominant portion of a "fire ladder", some thought might be given to removal of at least the most flammable species (as Junipers) from beneath trees.

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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

In any case, good pruning practices should always be used for good horticultural reasons.

1. Don't stub-cut any plant unless you are positive the shrub will respond with vigorous growth from dormant buds and even then only as an infrequent restorative process, as with old overgrown Rhododendrons.

2. Always fertilize lightly as an accompaniment to any heavy pruning, and water the fertilizer in with at least 1 inch of water.

3. Only prune when you aren't interrupting the carbohydrate-replacement cycle.

As example, never mow a groundcover to 3 inch tall as a renovation treatment during summer. Do this only in early spring.

4. Light pruning, as follow-up to a heavy pruning may be done anytime in summer.

5. Don't remove any live wood from a weak unhealthy plant, since it needs all of the leaf surface it has to generate new roots.

In the areas where unhealthy, weak plants create a disproportionately high fire danger, remove them.

Fertilizing

When?

Woody plants absorb minerals most effectively after leaves have hardened up in early summer. This is the conclusion of recent research by Richard Harris, U.D. Davis Emeritus. As a result, fertilizing in mid-California between May and September is recommended.

Weak shrubs and trees should be fertilized twice during that period with one-half strength fertilizer applications.

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LANDSCAPE MAINTENANCE PROCEDURES
WHICH REDUCE FIRE HAZARD

Herbaceous plants should be fertilized in spring, after new growth begins, in my experience.

How?

Top-dressing is the most convenient method of application but a complete fertilizer will not be completely used by this method since the phosphorous portion is not mobile in the soil and will remain on the surface.

A critical key to effective fertilizing is watering it in, since nitrogen supplies based on ammonium sources will volatilize within 4 hours of application if not leached into the soil.

For large woody plants, as trees, soluble fertilizers mixed with water and injected into the root zone may offer a more effective method of application.

What Type?

If the nitrogen source in the fertilizer is a slow release product like urea formaldehyde or IBDU, a longer, more ideal nutrient release curve is produced than the release "spikes" create by the use of ammonium products.

The specific formula used should be designed to replace whichever minerals are low or missing in the soil of the site.

Since nitrogen and to a much lesser degree potassium are leached from the soil with each irrigation, those are the major elements to be concerned with replacing.

With good irrigation fertilizing and pruning practices, reduction of fire danger and good horticultural practice can be synonymous.

HOMEOWNER'S LANDSCAPE FIRE SAFETY CHECKLIST

Prepared by Owen E. Dell, Landscape Architect
PO Box 30433, Santa Barbara, CA 93130, (805) 962-3253

OK	NEEDS HELP	ITEM
		PLANTINGS
		Zone 1 (0 to 30 feet from house): Vegetation with high moisture content
		Zone 2 (30 to 60 feet from house): Lawn, ground covers, erosion control grasses, succulents
		Zone 3 (60 to 100 feet from house): Low fuel volume planting
		Zone 4 (100 to 200 feet from house): Thinned native vegetation with shrubs in groups 20 feet apart minimum
		All Zones:
		Avoid planting highly flammable vegetation (Pine trees, junipers and others)
		Remove ladder fuels
		Tree branches removed 3 to 6 ft. from ground
		Consider planting trees at least 15 ft. from structures
		Trees kept away from power lines
		Trees trimmed at least 10 ft. away from chimney openings
		18 ft. minimum separation between groups of shrubs
		Brush, weeds & grass trimmed to 3" or less within 10 ft. away of roadways
		Plants cleared 10 ft. from LPG tanks
		Deadwood and fine dead aerial fuel removed from trees & shrubs
		Weeds removed or mowed to height of 3" (consider erosion)
		Pine needles, leaves and other flammable debris removed from roof, gutters, ground
		All rubbish, debris & resultant plant material removed & disposed of legally
		Bare soil covered with plants or mulch to prevent erosion

NOTES:

HOMEOWNER'S LANDSCAPE FIRE SAFETY CHECKLIST

Prepared by Owen E. Dell, Landscape Architect
PO Box 30433, Santa Barbara, CA 93130, (805) 962-3253

Use this checklist to evaluate the fire safety of your landscaping. Make a note of anything that needs improvement and follow up with action before the beginning of fire season. If you have any questions, contact your local fire department.

A NOTE ABOUT THE LOCATION OF YOUR HOUSE

The terrain and the location of your house play a big role in fire safety. If you live on a hillside or in a canyon, you're at greater risk than if you live on flat land. A house that is located at the top of a slope is more vulnerable than one that is set back from the slope. If you're building a new home, consider these factors. If your existing home is in a high risk location, pay particular attention to fire safety.

OK	NEEDS HELP	ITEM
		HOUSE & OTHER BUILDINGS
		Roofing (tile or other Class A material best)
		Siding (Stucco or other fireproof material best)
		Eaves (no eaves or boxed-in eaves best)
		Vents (screened vents best, no eaves adjacent to brush areas)
		Windows (small, few, double pane, away from fire side of house best)
		LANDSCAPE STRUCTURES
		Fire resistive materials used (Stone, concrete, etc. best)
		Wood structures of heavy timber or fire retardant materials/1 hour fire rating
		Solid skirting enclosing underside of decks
		Fencing (stucco or masonry walls or wire fencing best)
		Masonry walls used to deflect fire
		Mulches (rock, gravel, decomposed granite best)
		Woodpiles located away from structures
		Pool or pond available for emergency water supply

RELATIVE FIRE SAFETY

Prepared by: Owen E. Dell, Landscape Architect, Santa Barbara, CA

LANDSCAPING

	POOR	BETTER	BEST
Fuel Volume/Biomass	High		Low
Fuel Moisture	Low		High
Fuel Continuity	Continuous		Discontinuous
Plant Oil Content	High		Low
Plant Growth Habit	Tall, spreading		Low, mounding
Plant Varieties	Conifers Junipers Any trees near house See list of plants	Trees at least 30 ft. from house	See list of plants
Irrigation	Drip	Garden Sprinklers	Special fire sprinkler system
Mulch	Wood chips Dry grass Tree trimmings Leaf litter	Walk-on bark	Gravel Cinders Decomposed Granite
Maintenance	Overgrown shrubbery Dead leaves/litter Dry soil Trees growing over house	Pruned shrubbery Regular cleanups Moist soil Trees trimmed regularly	Greenbelt, turf or clear space around house

For more information, contact Owen E. Dell at (805) 962-3253

RELATIVE FIRE SAFETY

Prepared by: Owen E. Dell, Landscape Architect, Santa Barbara, CA

HOUSE/BUILDINGS

	POOR	BETTER	BEST
Placement	Top of hill Saddle Bottom of canyon	Side of hill Flat land	Antarctica
Framing/Basic Construction	Wood		Concrete block Poured concrete Adobe
Siding	Shingles or shakes Plywood Other wood siding	Stucco	Brick Concrete Stone
Roofing	Shingles or shakes Steel roofing, especially if installed over shakes	Asphalt shingles Roll roofing Gravel	Clay tile Fireproof roofing
Fencing/Free-standing Walls	Wood	Stucco over wood frame Chain link (not vinyl)	Concrete Block Stucco over concrete block Poured Concrete Stone
Water Supply	Municipal supply	Well with gas or diesel backup pumping system	Swimming pool or tank with gas or diesel pump
Water System	No system	Roof Sprinklers	Perimeter sprinklers (see landscaping) Wet roof system
Window coverings	Open windows	Plywood over windows Manual steel shutters	Automatic steel shutters Automatic fire curtains

For more information, contact Owen E. Dell at (805) 962-3253

CREATING THE FIRE-STUPID LANDSCAPE

- The house
- Wood structures
- Plants
- The only other thing needed is a source of ignition

BACKGROUND: WILDFIRES

- Fires and people
- Local Plant Communities
- The Fire Cycle
- Local Fire History
- Fire Control

WILDFIRE BEHAVIOR

- Natural History of Fires

FIREWISE LANDSCAPING & THE LANDSCAPE PROFESSIONAL

- Firewise landscape design as a valuable service to offer clients
- Firewise techniques are a filter through which all plans should be reviewed

FIRE-WISE LANDSCAPE DESIGN

- Tips
- Site analysis
- In order of importance:
- House construction
- Topography
- Proper Plantings
- Irrigation
- Safe landscaping structures

POSTFIRE MANAGEMENT

- Water and fertilize to reestablish native vegetation
- Ryegrass and barley seeding
- Plastic sheeting
- Wooden deflector barriers (check dams)
- Jute netting
- Chain Link Fence debris barriers
- Sandbags

RESOURCES

- Display books, videos, etc.

FIREWISE LANDSCAPING WORKSHOP

NOVEMBER 29, 1994
DENVER, CO

9:00 a.m.	Introduction and logistics Bill Baden, Senior Fire Service Specialist, NFPA, Quincy, MA
9:15 a.m.	Welcome Judith Leraas, Consultant, Dayton, OH
9:45 a.m.	Firewise Landscaping (Videotape I- Overview)
10:30 a.m.	Break
11:00 a.m.	Firewise Landscaping (Videotape II - Design)
11:15 a.m.	Design Presentation Owen Dell, Owner, County Landscape, Santa Barbara, CA
12:30 p.m.	Lunch (12:30 - 1:15) Speaker (1:15 - 1:40) Jim Hubbard, Colorado State Forester, Fort Collins, CO
2:00 p.m.	Firewise Landscaping (Videotape III - Maintenance)
2:15 p.m.	Maintenance Presentation Barrie Coate, Horticultural Consultant and Consulting Arborist, Barrie Coate Associates, Los Gatos, CA
3:00 p.m.	Panel of the day's speakers. To cover: Questions, checklist framework; business opportunities with firewise landscaping; benefits to the participants; action-oriented things.
3:55 p.m.	Adjourn.

National Fire Protection Association
International

Executive Offices
1 Batterymarch Park
P.O. Box 9101
Quincy, Massachusetts 02269-9101 USA
Telephone (617) 770-3000 Fax (617) 770-0700

Learn about Landscaping for Fire Protection at the Firewise Landscaping Workshop.

1994 was one of the worst years for wildfire in recent history. As woodland and rangelands were lost, woodland homes, subdivisions, small communities and vacation retreats were destroyed as well.

Learn how you can enhance your clients' or customers' chances of surviving a fire. The National Firewise Landscaping Task Force has designed a seminar, complete with video handouts and handy checklists, to teach you some basic firewise principles.

On November 29, 1994, the Firewise Landscaping Workshop will be presented in Denver, Colorado, at the Sheraton West Hotel & Conference Center, 360 Union Boulevard Denver, CO 80228. You can attend this valuable and interesting presentation, which includes design and maintenance information, as well as local applications of firewise principles. The registration fee of $25 includes the workshop, a luncheon (with a speaker), and a set of three instructional videos to take home with you.

The session will be held from 8:45 a.m. until 4:00 p.m. You can register by contacting the Public Fire Protection Division by mail at the National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02669 or calling (617) 984-7173.

This presentation is sponsored by the National Wildland Urban Interface Fire Protection Program, a consortium of federal and state agencies and associations committed to wildfire protection.

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3:55 p.m.	Adjourn.

CAUGHT IN A WILDFIRE

If your home is threatened by wildfire, you may be contacted by a fire or law enforcement official and advised to evacuate. However, if you are not contacted in time, or if you decide to stay with your home, we offer the following suggestions:

- If you are able, evacuate your pets and all family members who are not essential to protecting the home, but do not jeopardize your life.

- Be properly dressed to survive the fire. Cotton and wool fabrics are preferable to synthetics. Wear long pants and boots, and carry with you for protection a long-sleeved shirt or jacket, gloves, a damp handkerchief to shield your face, and goggles.

OUTSIDE YOUR HOUSE:

- Remove combustible items from around the house. This includes lawn and poolside furniture, umbrellas, and tarp coverings. If they catch fire, the added heat could ignite your home.

- If possible, close outside attic, eave, and basement vents. This will eliminate the possibility of sparks blowing into hidden areas within the house. Close window shutters.

- Locate garden hoses so they will reach any place on the house. Use the spray-gun type nozzle, adjusted to spray.

- Place large plastic trash cans or buckets around the perimeter of the house and fill them with water. Soak burlap sacks, small rugs, large rags. They can be helpful in beating out burning embers or small fires.

- Place a ladder against the roof of the house opposite the side of the approaching fire. If you have a combustible roof, set a lawn sprinkler on it. This will be more effective than a hose. However, do not turn on the water ahead of time, as wood shingles will dry quickly and you will have wasted water.

- If you have a portable gasoline-powered pump to take water from a swimming pool or tank, make sure it is operating and in place.

INSIDE YOUR HOUSE:

- Close all windows and doors to prevent sparks from blowing inside, but do not lock them. If firefighters arrive to help save your home, they may need instant access.

- Close all doors inside the house to block the circulation of air and movement of fire from room to room.

- Open the damper on your fireplace to help stabilize outside/inside pressure, but close the fireplace screen so sparks will not ignite the room.

- Turn on a light in each room of the house, on the porch, in the garden and in the yard. This will make the house more visible in heavy smoke and at night.

- Fill bathtubs, sinks and other containers with water. Toilet tanks and water heaters are important water reservoirs.

- Shut off gas at the meter.

- If you have time, take down your drapes and curtains. If you don't have time to take them down, leave them open. Close all venetian blinds or fire resistive window coverings to reduce the amount of heat radiating into your home.

- Move overstuffed furniture away from windows and sliding glass doors and into the center of the house.

- Park your car in the garage, heading out; close car windows; leave keys in the ignition.

- Close garage door but leave it unlocked. Disconnect the automatic garage door opener.

- Place valuable documents and mementos inside the car in the garage for quick departure, if necessary. Any pets still with you should also be put in the car.

WHEN THE FIRE IS AT YOUR HOUSE:

- Enter your home with your family, closing but not locking the doors. Keep the entire family together and remain calm. Remember: If it gets hot in the house, it is four or five times hotter outside.

AFTER THE FIRE PASSES:

- Check the roof immediately. Extinguish any sparks or embers with a garden hose, barrels of water and your small rugs. Then, check inside the attic for hidden sparks. Still keep the doors and windows closed in the house. Continue checking for at least six to ten hours after a fire is thought to be out. The key is being your own successful firefighter is preparation. To be safe, not sorry, plan procedures and provide necessary equipment ahead of time. This advance work can give you and your home a fighting chance should you be caught in a wildfire this season.

Protecting Your Home from Wildfire

SPONSORS

County Interagency Urban-Wildland Fire Committee

Society of American Foresters

Sangre de Cristo Resource Conservation Development Area

Certificate of Appreciation

Presented To

_____

For outstanding contributions in promoting The County Urban Wildland Interface Fire Program. Your efforts serve as a lasting contribution toward the prevention/reduction of damage to lives, property, and natural resources due to wildfire.

Presented by the _____ County Interagency Urban-Wildland Interface Fire Committee

_____ _____

Coordinator Date

CONSIDERATIONS
OF
FUEL HAZARD RECUCTION IN THE WILDLAND/URBAN INTERFACE

PROPERTY BOUNDARIES OCCUR WITHOUT REGARD TO TOPOGRAPHY-SLOPE, ASPECT OR TYPE OF VEGETATION.

ACCESS TO PROPERTY BY VEHICLES.

I.E. IS DOWNHILL OR CONTOUR SKIDDING POSSIBLE?

WILL ADJACENT PROPERTY OWNERS ALLOW ACCESS THROUGH THEIR PROPERTY NECESSITATED BY SLOPE, ROCK OUTCROPPINGS, TYPE OR THICKNESS OF VEGETATION?

LOCATIONS OF UTILITY LINES COMPLICATE OR OBSTRUCT FELLING.

LOCATIONS OF LEACH FIELDS RESTRICT ACCESS FOR VEHICLES.

ELECTRONIC DOG FENCES ARE EASILY DAMAGED.

ARE PETS AND CHILDREN WELL TRAINED AND OR CONFINED FROM THE WORK AREA?

OFTEN EXACT PROPERTY LINES ARE NOT KNOWN BY THE OWNERS.

THINNING AND LOW LIMBING SHARPLY REDUCE PRIVACY.

PROPERTY OWNERS' FAVORITE TREES USUALLY ARE WITHIN THE 30 FOOT ZONE TO BE CLEARED OF VEGETATION.

OUR SOCIETY IS GEARED TOWARDS OBTAINING THE END RESULT OR PRODUCT ON AN IMMEDIATE GRATIFICATION BASIS WHICH IS INCONSISTENT WITH WORKING WITH NATURE. I.E. ALLOWING FIREWOOD TO CURE-SIGNIFICANTLY, LESS WEIGHT TO MOVE, ALLOWING SLASH TO COMPLETELY DRY PRIOR TO BURNING, OBJECTIONS TO THE APPEARANCE OF PLASTIC USED TO COVER SLASH PILES.

DAYS/HOURS OF OPERATION REDUCED BECAUSE OF NOISE I.E. EVENINGS-WEEKENDS

NEW AIR QUALITY STANDARDS PROHIBIT WOODBURNING DURING NOVEMBER-APRIL BELOW 7000 FEET-WHEN THE WINTER SNOW PACK MAKES CONTROLLED BURNING SAFE.

THE VOLUME-VALUE OF THE BYPRODUCT-FIREWOOD IS EXPECTED BY THE PROPERTY OWNER TO DEFRAY A SIGNIFICANT PORTION OF THE COST. THINNING TO CREATE A PARK-LIKE SETTING LEAVES THE BIGGEST AND BEST TREES, RESULTING IN A SMALL YIELD OF FIREWOOD. IN ADDITION THE 5 COUNTIES AROUND METRO DENVER ARE A NON-ATTAINMENT AIR QUALITY AREA AND USE OF WOOD FOR HEATING HOMES IS GREATLY RESTRICTED OR PROHIBITED, RESULTING IN A VERY WEAK MARKET FOR FIREWOOD.

MODEL 18 MACHETE CHIPPER 18 INCH DISK 2 BLADES 12 HP

LIGHT WEIGHT ONLY 300 LBS TOWABLE BY QUAD ATV OVER LAWNS, SEPTIC TANKS AND LEACH FIELDS WITHOUT DAMAGE

SMALL OVERALL SIZE IS EASY TO MOVE THROUGH SITE, AROUND STRUCTURES AND BETWEEN LEAVE TREES.

THE LOW HEIGHT OF THE SELF FEEDING HOPPER IS EASIER AND FASTER TO USE THAN THE LAWN AND GARDEN SIZE CHIPPERS RESULTING IN A GREATER VOLUME OF SLASH BEING PROCESSED.

CHIPS REMAIN AT SOURCE TO PROVIDE NUTRIENTS TO SOIL, PROVIDE SOIL COVER TO REDUCE EROSION, HOLD MOISTURE FOR LESS EVAPORATIVE LOSS, RESULTING IN A HEALTHIER STAND OF TREES.

THE SIZE AND WEIGHT OF LARGER COMMERCIAL/INDUSTRIAL CHIPPERS PRECLUDE THEIR ACCESS TO THE SITE. THE PROCESS OF MOVING THE SLASH FROM THE SITE TO THE CHIPPER IS VERY LABOR, TIME AND TRANSPORTATION INTENSIVE. IN ATTEMPTING TO BE COST EFFECTIVE, A LARGE CREW IS REQUIRED TO FEED A HUGE VOLUME OF MATERIAL IN A RELATIVELY SHORT TIME. FURTHER MORE, THE CHIPS GENERATED HAVE TO BE MOVED AGAIN TO A FINAL DISPOSITION. THE DISCIPLINE, ORGANIZATION AND PHYSICAL STAMINA NEEDED BY THIS PROCESSING METHOD IS NOT CONSISTENT WITH THE HUMAN NATURE OF VOLUNTEER EFFORTS.

THE MODEL 18 MACHETE CHIPPER HAS THE LOWEST PER HOUR COST OF ANY COMMERCIAL/INDUSTRIAL TYPE CHIPPER.

RESOLUTION

Colorado faces a serious wildfire prevention and suppression challenge. Within Lake County, the possibility exists for a devastating wildfire, particularly within our Urban-Wildland Interface areas.

BE IT RESOLVED, therefore that the Lake County Commissioners, do hereby empower the Lake County Urban-Wildland Interface Fire Committee to meet, develop recommendations, programs, and publications, engage in public education efforts and training, and implement on-the-ground efforts with the goal of preventing or reducing the loss of life, property, and natural resources during a wildfire.

The Committee shall consist of representatives of the following agencies: County Sheriff, Land Use Administrator, Emergency Preparedness, Fire Department, U.S. Forest Service and State Forest Service. Other individuals/agencies may be added by the Committee.

The Committee shall reprot to the County Commissioners a minimum of once per year as to the status of their efforts.

Approved this 17th day of December, 1990.

BOARD OF COUNTY COMMISSIONERS
LAKE COUNTY, COLORADO

Donald H. Moffett

Donald H. Moffett, Chairman

Edward J. O'Leary

Edward J. O'Leary, Commissioner

John F. Saunders, Commissioner

ATTEST:

June Ossman

June Ossman, Clerk and Recorder and
Ex-Officio Clerk to the Board of
County Commissioners, Lake County
Colorado

Wildfire **Beware & Prepare**

#630 - 1050 W. PENDER, VANCOUVER, B.C., CANADA V6E 3S7
TEL: (604) 683-0404 **FAX: (604) 683-2506**

Dear Sir/Madam

As you know, fire season is upon us! **Community safety**, particularly when dealing with forest fire, is a concern to you as it is to everyone. That's why I've sent you this important package.

You know the importance of being prepared for a wildfire disaster when it happens. Not *if* it happens.

Wildfire is not new to us either. The results of wildfire are a lasting memory to those who witness the devastation it creates. You're probably aware of tragic situations where forest, homes and fire met with tragic results. But you may not be aware of how rapidly the threat of wildfire is growing.

A key to reducing that threat of wildfire is education. Informing residents about the threat of wildfire is essential. *Preparing for wildfire* by *reducing the risk of wildfire to people and property* is an *essential* part of pro-active community planning.

The *Wildfire: Beware & Prepare* package *is a program designed to prepare you or others in your community to successfully conduct wildfire resident preparedness training.*

Beware & Prepare provides all the resources you need to easily, successfully and professionally train residents in your community. Use this package to organize an effective, high-quality, community wildfire awareness and preparedness program.

We show you how. Inside your *Wildfire: Beware & Prepare* package is a step-by-step guide to implement the program. Your presenters guide shows you how to plan, advertise and conduct meetings in your community. The guide will show you how to use the resources contained in the kit to achieve *maximum* results!

Powerful posters are provided in the kit designed for visible locations around the community; the Post Office, restaurants, groceries stores or municipal offices are all good advertising locations.

When holding a meeting, the presenter's guide has several tips for the presenter: how to prepare for a meeting, how to set up the room, how to conduct the meeting, how to stimulate discussion and check lists for meeting preparation and promotion. A 15 minute videotape provides dramatic views of wildfire's causes and consequences and gives specific steps that can be taken to reduce risk to homes and community. Information on community planning, new home construction and existing home protection is examined.

Following the videotape, discussion takes place. This is where your knowledge of local conditions is important *and your audience is ready to listen.* You or another local resource person will discuss *local* concerns about wildfire preparedness. Issues such as local history of wildfire, water supply, evacuation planning and existing home protection are a few examples of discussion topics that can be drawn from the information in the kit.

To ensure residents transform the information they have learned into actions, the attendants get a brochure provided with the kit. This brochure contains a checklist of all the key points raised in the video. The resident can take this checklist home after the meeting to use as a guide to implement what they have learned in the meeting.

As you can see, the *Wildfire: Beware & Prepare* package supplies you with a *complete* program for wildfire awareness and preparedness. When you receive your package, you will immediately be able to implement your community wildfire prevention program.

Now is the time to make sure residents in your community are ready for wildfire when it strikes. Make sure your community is prepared. Order your Wildfire: Beware & Prepare package now. Phone (604) ~~683-0404~~ 873-6677 or fax (604) 683-2506 your order now.

The threat of wildfire is real. **Beware & Prepare!**

Yours truly,

83-6677

Michael Ross

Michael Ross

Wildfire Beware & Prepare
Program Coordinator

P.S. The *Wildfire Beware & Prepare* package provides you with everything you need to *successfully* prepare your community for wildfire. It is expected to be another hot dry year. Be ready! Phone (604) ~~683-0404~~ 873-6677 or fax (604) 683-2506 to order *now*!

STRUCTURE DEFENSE

Tactics and approaches proven successful in structure defense situations may differ from some of those that work well in conventional structure firefighting operations. The situation is often poorly known and changing rapidly; Wildland fire dictates the action. Additional units will probably not be as available as they usually are. And conventional water supply cannot be depended upon. You must be ready to take independent action, rather than operating directly with assisting units in a clearly defined organization. You must be prepared to abandon some structures rather than counting on more resources to handle the problem. An engine company defending structures in tough conditions will need to be mobile, resourceful, and self-reliant.

Structure defense places exceptional demands on our fire control organizations. The sheer magnitude of the problem can be overwhelming. All the fire activity a department normally handles in months can be occurring all at once. We cannot freely choose the location of control lines, we have to take the structures where they are. Often we must work with agencies we do not see routinely, and work with them smoothly. It all places a premium on fire knowledge, coordination, and well executed action. WE'VE GOT TO BE GOOD!

In evaluating your resources do not overlook non-fire service equipment, water and personnel. There may be heavy equipment such as dozers or water tenders available from public road departments, mining or logging operations, or private construction companies. Small hose lines are usually available at a residence, and there may be larger lines as part of irrigation systems, etc. Additional people, such as residents or other civilians, can be assigned tasks where they are not at undue risk. Other agencies can provide assistance with traffic control, evacuation, first aid, or special hazards (as electrical): They include police or other peace officers, medical personnel, and employees of utilities and public work departments.

STRUCTURE TRIAGE

"Triage" originates from work meaning to divide into three parts. Basically, it amounts to this: 1) Eliminate the hopeless, 2) Ignore the unnecessary, 3) Deal with the rest. While we as firemen hesitate to write off any threatened structure, triage is necessary to prevent the futile waste of effort. Trying to save more than you realistically can might very well result in the loss of everything, including homes you could have saved. Forget the structures that are impossible to defend or too dangerous to try, leave those that are too well involved to save. Ignore, for now, the structures needing little or no protection. Concentrate on seriously threatened but savable structures.

What is feasible or not depends on the overall situation: what the fire does and what resources you get. For example, one unaided engine might avoid a problem structure in order to provide protection to another threatened, but better situated, structure. However, in the same situation if another engine is to arrive soon and can handle the second structure then the first engine might give the first house a try. You must make your triage decision based on your best guess as to how things will evolve -- you cannot avoid playing the odds to a certain extent.

EVACUATION

Evacuation may be necessary and traffic control almost surely will be. Those who are not peace officers lack the authority to order someone to evacuate, and certainly time can be better spent than arguing with someone who will not leave. We do have an obligation to inform people of the dangers and to provide them with directions on safe, helpful behavior and exit routes. Consider the magnitude of the job of evacuation and traffic control at hand. Try to use people such as police and other authorities to help you.

SAFETY

Safety is of primary importance throughout the operation and must be given consideration in formulating strategy. Make sure instructions are clear and that the situation is explained clearly to fire crews. Radiant heat is a very real threat to firefighters, especially where flames are close. Fire fighters tend to place themselves at greater risk, perhaps, in a battle to save homes than in a normal wildland fire. Direct crews to use shelter where available for themselves and their equipment. Plan common escape routes, and make sure they do not become obstructed. Remind crews to also plan their individual escape routes. Point out that building interiors are usually a good safety zone if the fire overruns your position. Even if it catches fire, the building won't burn down instantly, thus providing protection while the main fire moves through. Structure defense is, overall, a wildland fire problem, so keep in mind the common wildland fire safety guidelines. Arrange a place for regrouping engines as they move out of an area. Account for all of your units, and check on the physical condition of crews (especially after exceptionally demanding firefighting).

ACTION PLAN

In formulating the action plan, account for the factors described previously as realistically as you can. The plan of attack will fall into one of three broad categories:

1. Defensive Mode: Protect structures as the fire moves through, but make little direct effort to contain the fire. The defensive mode may be the only option. However, there is a tendency to become psychologically stuck in a defensive posture when other options are possible. Don't forget the wildland fire.

2. Offensive Mode: Control the wildland fire before it reaches the structures. Don't overlook control possibilities in the concern over structure threats. Perhaps the accumulation of resources or a helpful turn in fire behavior will allow a successful attack on the main fire.

3. Combined Mode: Mix protection and control actions. Holding a portion of the wildland fire edge may reduce the number of structures threatened. Firing out from control lines at the structure perimeter, or holding the fire at the structure or road when it hits may actually control a significant portion of the wildland fire. Then follow up with action to control the rest of the fire.

Once the plan is made communicate it. Assemble crews and describe the situation and planned operations. One good way to allocate resources initially is to give them assignments by dividing up the workload based on

your current information. Then allow them to explore, make contact at their assignment boundaries and to adjust their boundaries to better distribute the workload. Provide directions for crew actions into the future such as moving on to other areas or patrol or arrange a later meeting to do that. Point out safety considerations. Keep in mind that structure defense may be a fairly unfamiliar role to many crews and don't assume that everyone is aware of all they need to know. Request communications from individuals to keep informed on how things are progressing. Clearly define lines of communication.

In creating the action plan, you must assign resources as efficiently as possible. Take what you've got and do the most you can with it, even if you must accept some losses as inevitable. Don't assign units to tasks that are impossible to accomplish because of time limits, water limits, fire intensity, crew size, engine capability, etc., nor to tasks that are not important. Anticipate non-fire problems such as frightened residents and traffic congestion. Communicate well -- let dispatch (or your supervisor) know of the problems and needs, let your crews know about the plan and safety considerations.

STRIKE

Taking effective action requires attention to established guidelines and the use of good judgment. The following checklist will remind you of the main steps to be taken -- S T R I K E.

Set up -- place your engine and hose lines.

Take a look -- familiarize yourself with the area, locate escape routes and safe zones.

Reduce fuels & cover openings -- remove flammables, clear breaks, ready the structure.

Inform your crew -- describe the plan, advise on safety, contact nearby forces.

Knock the fire down -- stop it if you can, reduce its impact if feasible, save the structure in any case.

Extinguish and check -- make sure no lingering hot spots cause problems.

. . . and through it all <u>stay loose & conserve water</u>.

Structure defense is not a new problem. But it is one that is certain to involve more of us more than ever before as time goes on. Take advantage of the information available. Stay alert, use good judgment and your fire behavior knowledge; rely on your wildland fire control skills. Always be looking for ways to improve our ability to protect peoples homes and improvements as they are threatened by wildland fire.

COLORADO SPRINGS

WILDLAND FIRE TEAM

Prepared by

Lt. Bob Harvey
and
BN. Chief Arnie Lavelett
COLORADO SPRINGS FIRE DEPARTMENT

COLORADO SPRINGS WILDLAND FIRE TEAM

In 1989, the City of Colorado Springs established the Colorado Springs Wildland Fire Team to provide the city with improved wildland fire suppression capabilities within the city and on the Pikes Peak Watershed.

The City of Colorado Springs owns approximately 13,000 acres of land known as the Pikes Peak Watershed and is directly responsible for another 2,000 acres owned by the U.S. Forest Service. Of the 11,000 acres that are timbered. a 1987 study conducted by the Colorado State Forest Service revealed that 4,945 acres would have a high potential for wildfire. Providing 5.5 billion gallons or 29% of the water consumed by customers of the Colorado Springs Department of Utilities, the Pikes Peak Watershed is a vital regional resource.

The Colorado Springs Park and Recreation Department controls 5,000 acres of park land which remains in the natural or wildland state. The largest park is Cheyenne Canyon, a popular recreational area covered with dense scrub oak and pines on steep terrain.

Colorado Springs shares 14 miles of contiguous border with the Pike National Forest, making it one of the longest shared boundaries between National Forest and a city within the United States. While this zone of timber and brush create a highly desirable home building area on the Western boundary of the city, it has also created aa "Classic" wildland/urban interface problem that continues to grow.

The Colorado Springs Wildland Fire Team is composed of personnel and resources from the Colorado Springs Fire Department, Colorado Springs Park and Recreation Department and the Water Division of the Department of Utilities. Team members must pass the physical test required of U.S. Forest Service Firefighters to the category specified in the NIIMS Wildland Fire Qualifications Guide. Training is designed to comply with the U. S. Forest Service S-130 course "Basic Wildland Firefighter".

Colorado Springs has created a resource that will be vital to the future fire suppression needs of the local area, protecting vital resources as outside agency fire resources are deployed to major fires in the Western United States.

EXPENDITURES

Since the inception of this program, the following expenditures have been made:

WATER DEPARTMENT	1989	$17,550.00
	1990	$20,065.00
	1991	$30,000.00 (Budgeted)
FIRE DEPARTMENT	1990	$ 1,300.00
PARK & RECREATION DEPARTMENT		$ 5,000.00

These expenditures were for Wildland Fire Protective Clothing and Equipment. All personnel qualifying for "Red Card" Certification are issued protective clothing and fire packs, including fire shelters. Equipment has been purchased to provide hand tools for 200 people; 6 chain saws; portable pumps; fire tool caches at all Park and Watershed Caretaker's locations; pumps and tanks for Watershed Caretaker's and Park and Recreation Forestry crew vehicles.

TRAINING

From January 1989 to February 1991, 2622 man hours of "Red Card" training has been conducted for the three departments as follows;

WATER DEPARTMENT	464 Man Hours
FIRE DEPARTMENT	1,850 Man Hours
PARK AND RECREATION DEPARTMENT	308 Man Hours

This training has maintained a level of over 100 people certified as "Wildland Firefighters." In addition to the "Red Card" training, Initial Attack Orientation has been presented to Water and Park and Recreation employees, who are not being trained as part of the team.

Training to date has been concentrated mostly on basic firefighter training. Training for 1991 and 1992 will move into more advanced courses. In addition to the basic firefighting, Sawyer Classes for chain saw operators are currently being conducted and Crew Boss and Strike Team Leader classes are being planned.

RESPONSES

Trained wildland personnel have responded to six (6) incidents, as a team. In addition trained individuals were utilized to supplement routine operations.

On April 21, 1989, members of the team responded as a task force from the Colorado Springs Fire Department to a major wildland fire near Monument, Colorado. This response in support of the Tri-Lakes Fire Protection District and Federal Fire Suppression resources forces, upon whose jurisdiction the fire occurred. The assignment for the Colorado Springs Task Force was to protect three (3) subdivisions to the north of the fire. Some CSFD resources were used in suppression efforts directly on the fire which were successful and the fire was prevented from entering the subdivisions.

July 4, 1989, was a busy day for the fire department with 123 alarms dispatched in a 24 hour period. At 9:39 PM, an engine company was dispatched to a brush fire near the entrance of Cheyenne Canyon. Upon arrival, this company found a fire approximately two acres in size, burning in live brush on a steep slope with access limited by parked vehicles. Additional resources were requested to assist in the initial attack. Off duty "Red Card" CSFD, City Forestry and State Forest Service personnel were requested and responded to the scene. The use of the team allowed initial attack units to be reassigned to other incidents. Elements of the fire team remained at the fire until 0600 hours conducting mop up and patrol duties. Use of the task force provided needed manpower and equipment without taxing on duty fire units already answering a high volume of alarms.

Twelve members of the Wildland Team plus two management personnel responded to the Old Stage Fire in Boulder County, northwest of the City of Boulder, Colorado. The team being assigned as hand crew in conjunction with County, State and Federal resources saw action on the most intense portion of the fire line. The management personnel were assigned positions within the Colorado State Forest Service overhead team managing the fire.

These three responses are examples of how this team can be of support, both within the City of Colorado Springs and within the Region.

FIRESAFE PRACTICES

FOR YOUR HOME AND SUBDIVISION

Produced by

Lake and Chaffee County's
Urban/Wildland Interface
Wildfire Committees

Members:
Lake County Sheriff's Department
Lake County Land Use Planning Department
Leadville Fire Department
Lake County Emergency Medical Service
Chaffee County Sheriff's Department
Chaffee County Planning and Zoning Department
Chaffee County Fire Protection District
Chaffee County Emergency Prepardness
U.S. Forest Service
Colorado State Forest Service

- 1991 -

ACKNOWLEDGEMENTS

The two committees wish to acknowledge the following individuals:

Bruce Coulter - "Basic Home Fire Safety"

Chuck Dennis - "Fuelbreak Guidelines for Forested Subdivisions"

Dick Berkholz - "The Safety Zone"

Copies courtesy of 2500AD Software.

INTRODUCTION

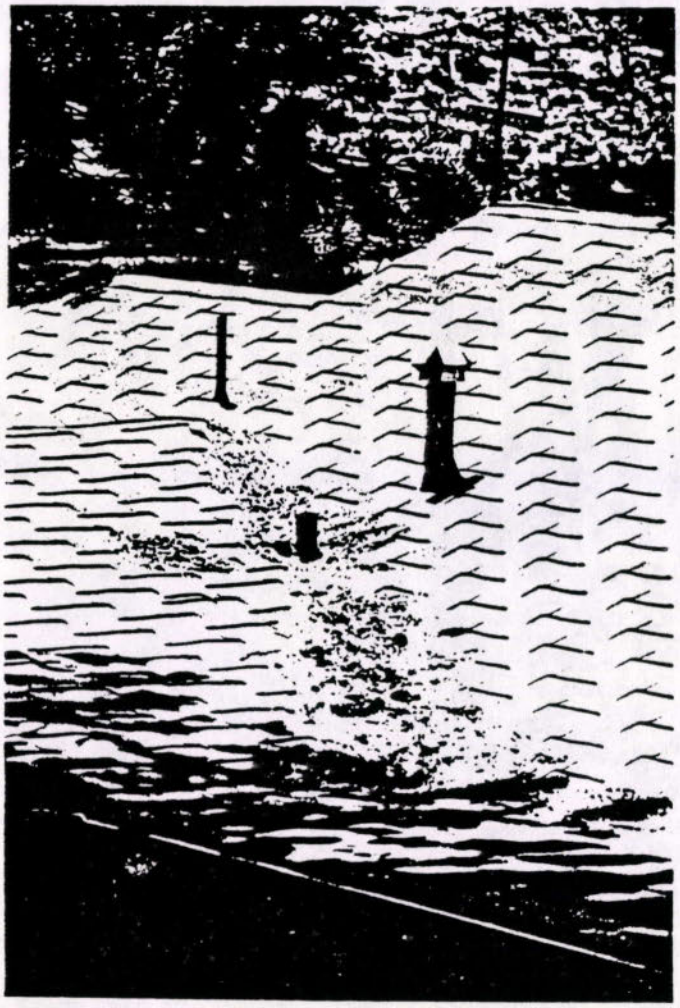
Forested areas of Colorado are rapidly being developed due to population increases and a desire to get away from urban pressures. Subdivisions and developments are providing new homesites almost daily in Colorado. As homes are constructed in rural areas, fire safety from wildfires must be an important consideration.

Homes ignite and burn during a wildfire as a result of direct flame contact, radiated heat, or ember contact. Compliance with these guidelines will not guarantee immunity from all wildfires, but will greatly decrease possibilities of losing your home in a wildfire situation. Also provided are safety tips to lessen chances of fire starting around your home.

These guidelines reflect minimum fire safety requirements. Additional information can be obtained from your local fire department or fire protection agency.

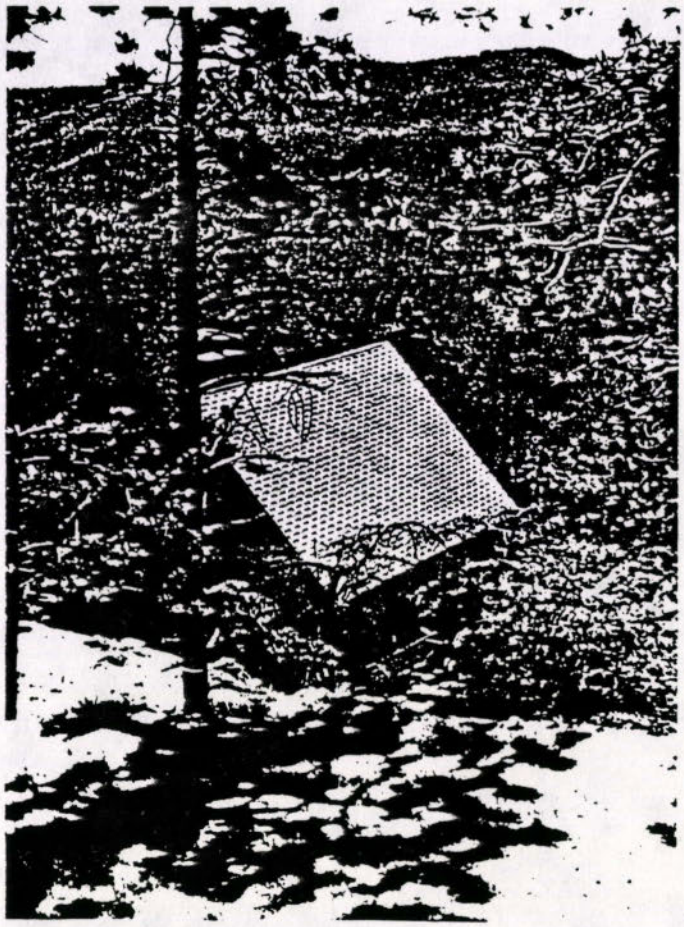
The lessons learned from inadequate fire planning are usually at the expense of lives or property.

There are several outdoor areas the homeowner should look at for fire safety. The following photos, diagrams, and checklist show what you can do to make your homesite more fire safe. Check these 12 fire safety recommendations carefully and compare with your situation. Complete this check three or four times a year and correct undesirable hazards.

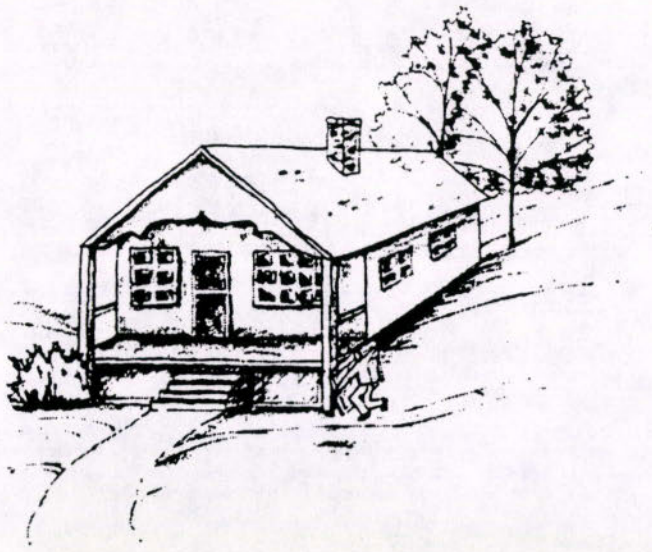


1. Avoid flat roof on homes where leaves, needles, or other flammable debris can accumulate.

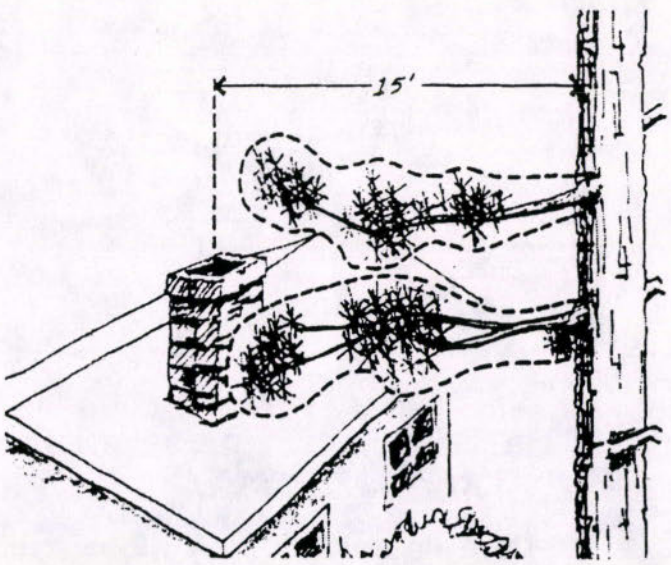
2. Keep all roofs clear of debris.



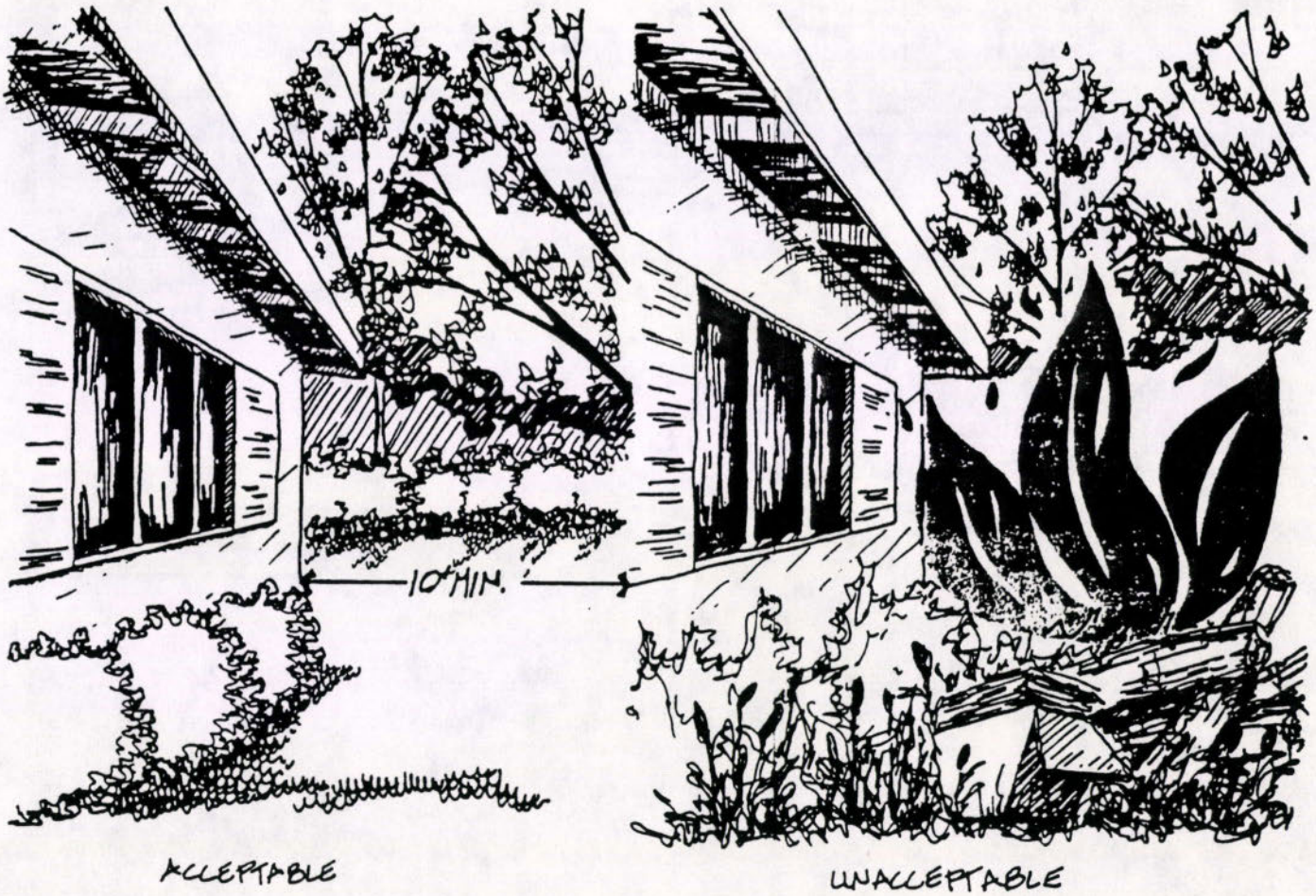
3. Roof coverings should be of a noncombustible Underwriter Laboratory approved material.



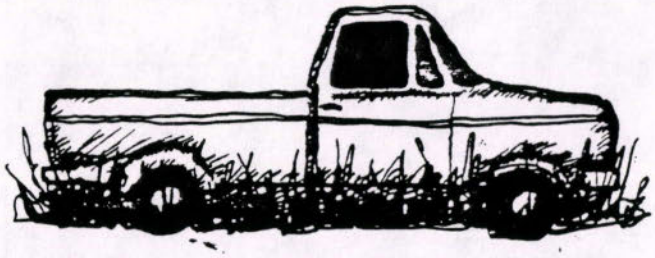
4. Enclose or screen off porch, floor, roof, or attic openings.



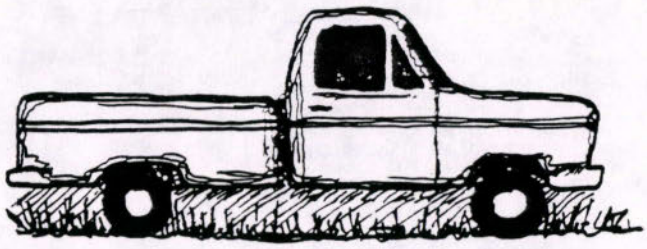
5. Tree branches hanging within 15 feet of chimneys should be removed.



6. Keep weeds and debris at least 10 feet away from the base of your home.

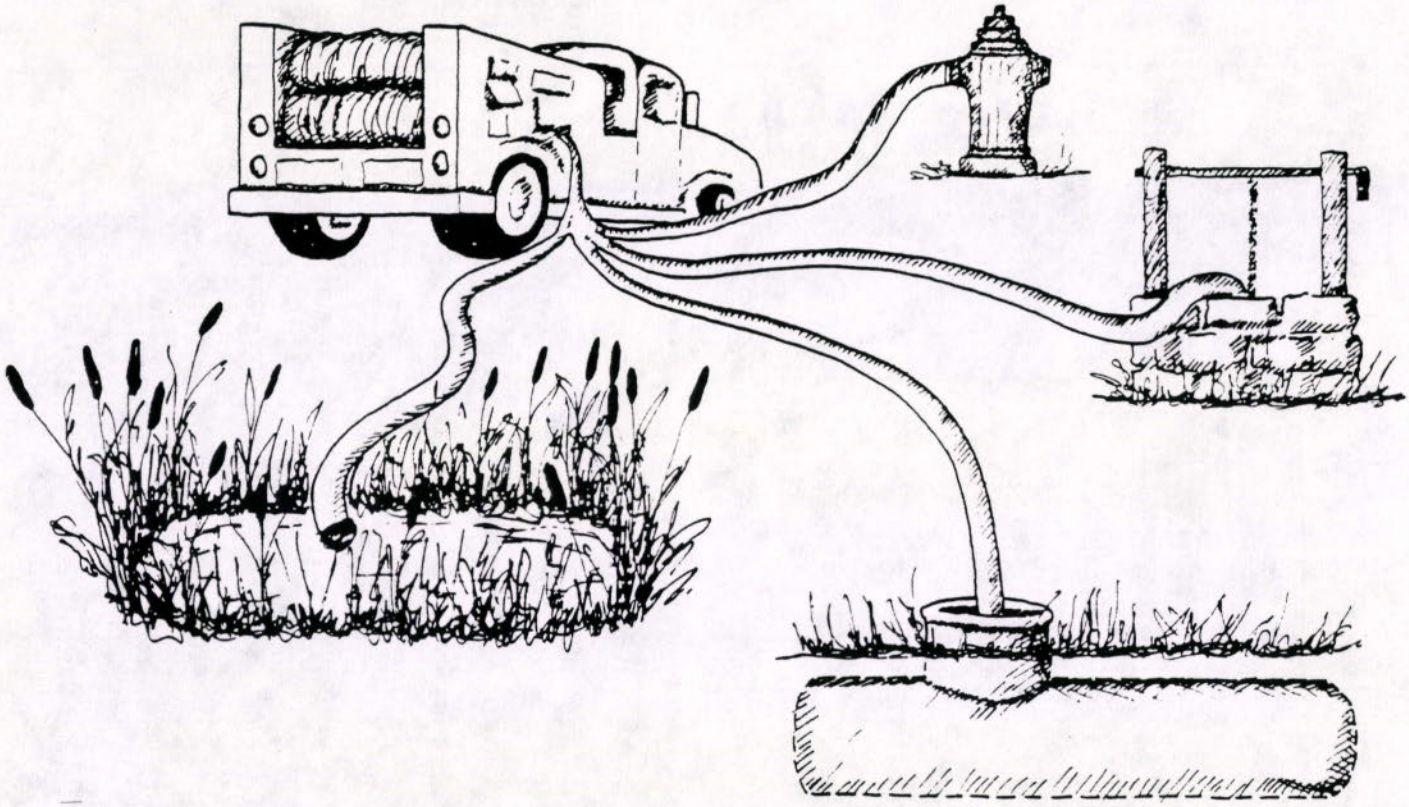


UNACCEPTABLE



ACCEPTABLE

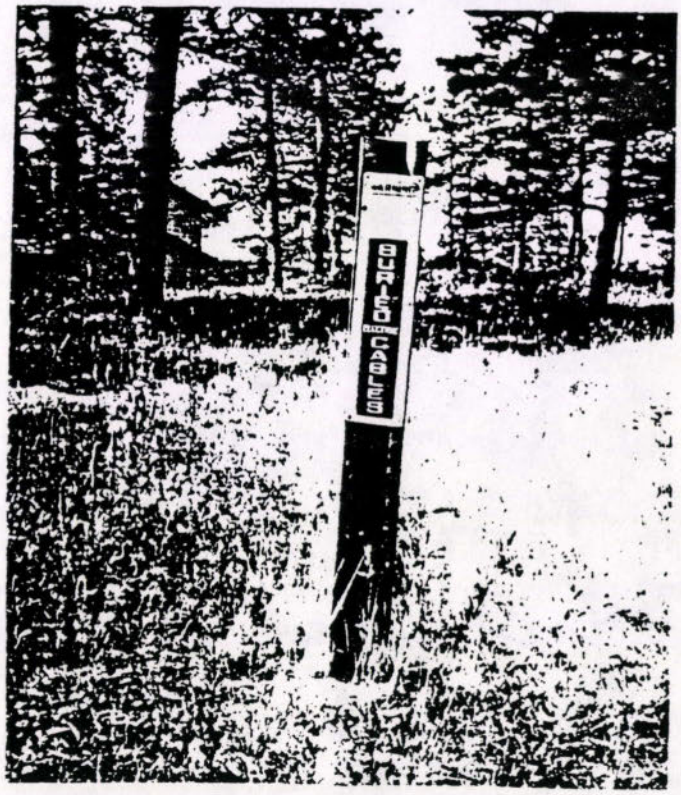
7. Do not park any motor vehicle in tall dry grass (hot muffler may start fires).



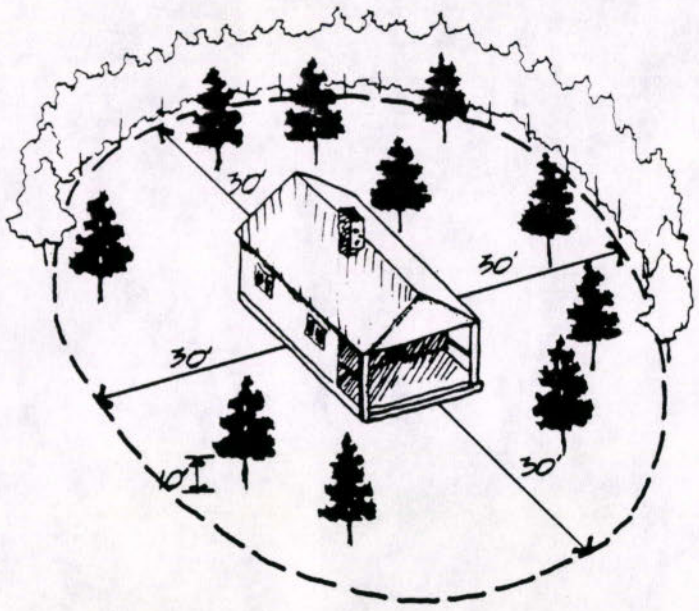
8. Develop an external water supply for firefighting. This can be a small pond, cistern, well, or hydrant.

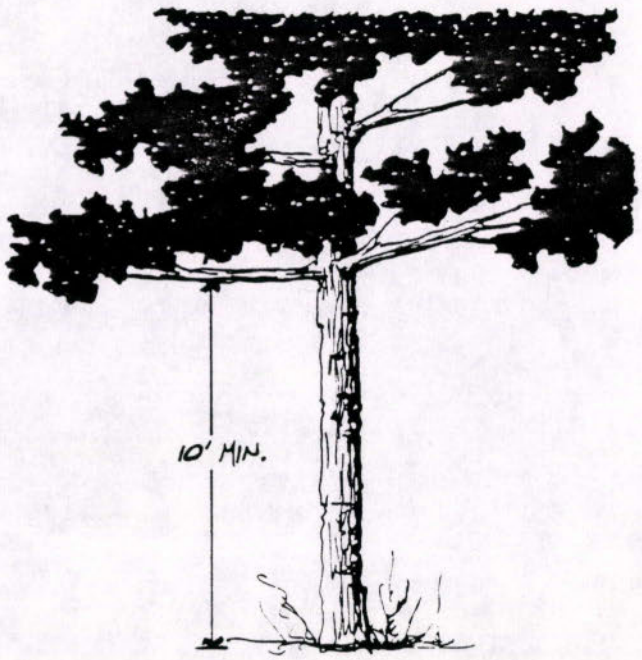
9. Stack firewood uphill or on a contour away from buildings. Keep fine fuels away from stacked wood.

10. Place at least one 10-pound ABC-class fire extinguisher in the home. A 50-foot garden hose connected to the hot water heater drain is useful in a fire emergency inside the house.



11. Have power and telephone lines installed underground. If not possible to bury lines, then keep lines clear of branches.





12. Thin trees within 30 feet of homesite if necessary. Adequate thinning is reached in the 30-foot area when tree crowns do not touch each other. Isolated clumps may be permissible under certain conditions. Following thinning, trees remaining within two tree heights of structures should be pruned of dead limbs to a height of 10 feet. Prune live branches to 10 feet from at least half the trees in this strip.

Now that you have completed your check, you may have specific questions regarding your homesite. Types of fuels around your home, potential problems, slope, fire crowning potential of trees, existing water supplies, and fire safety areas may pose special problems. The following sections discuss various situations and give general prescriptions you may complete while still maintaining a very aesthetically pleasing homesite.

COMMON FOREST FUEL CLASSES AND WHAT TO DO ABOUT THEM

The following classes describe, in general, the fuel type on your property. Most likely, you will have a combination of two or more types. Select the type that closely represents yours and follow recommendations for the Safety Zone. The Safety Zone includes a minimum of 30 feet around your home on level terrain.

BRUSH

This includes continuous, dense fuels, 1½ to 10 feet in height. Fire control is difficult because of thin, tough, and numerous stems which resist easy cutting. Strong root systems make brush difficult to clear or grub out.

Expected Fire Behavior: Medium to high intensity; may throw sparks ahead of the fire causing several small fires; fire spread is moderate to extreme; excellent ladder fuel.

Action Required: These areas are the most difficult to modify. However, thinning and removal can be accomplished. Small patches of brush are permitted in the Safety Zone (30 feet or more around your house), but not large continuous patches. Some species can be pruned and still retain aesthetic quality. No brush should be left within 10 feet of your house.

LADDER FUELS

Vegetation which may allow a fire to burn from ground level to lower tree branches is called ladder fuels. This type of fuel arrangement is very dangerous in wildfire situations but can be easily corrected by landowners.

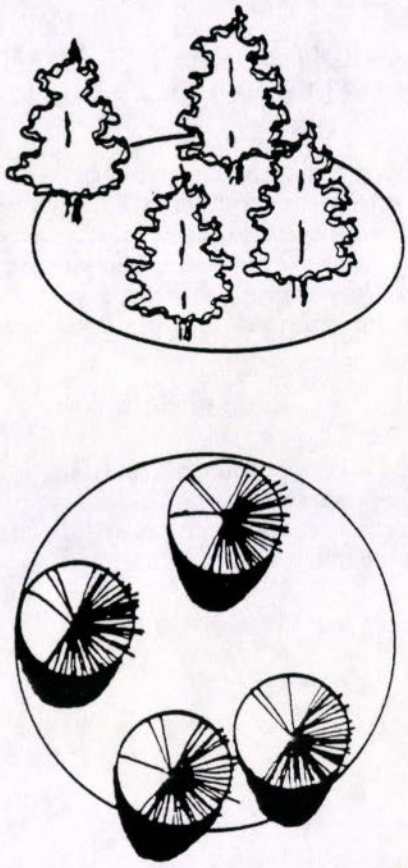
Fuels: Grass, brush, small trees, shrubs, low branches and limbs.

Expected Fire Behavior: Low to high intensity; fast spreading from ground to tree crowns.

Action Required: Reduce ground fuels, thin low fuels, remove one "step" in the "ladder" to lessen probability of flames reaching tree crowns. Prune tree branches to a height of 10 feet from ground level.

TREES — LOW DENSITY

Low density includes open conifer stand with less than 35 percent crown cover. Crown cover is the amount of ground area covered by tree crowns on a per acre basis, looking from above the trees. Area may contain grass, weeds, brush under two feet tall, aspen, cottonwoods, or willow.

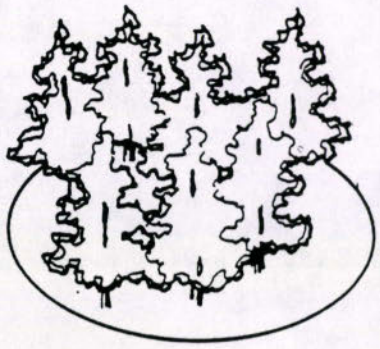


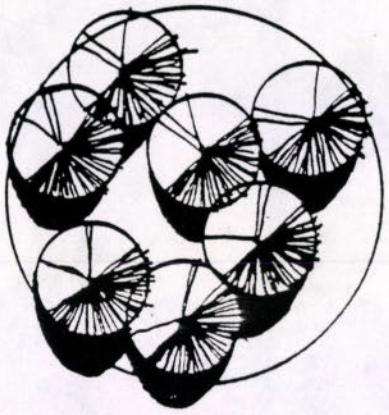
Expected Fire Behavior: Low intensity; may spread rapidly but easy to extinguish.

Action Required: If ladder fuels are present, follow action required for ladder fuels. Prune limbs up to 10 feet above ground level. Eliminate debris from area.

TREES — MEDIUM DENSITY

This classification includes trees with a crown cover of 35-55 percent of the ground area. Usually tree crowns are not touching. Herbage and litter are present with patches of small trees and deadwood.



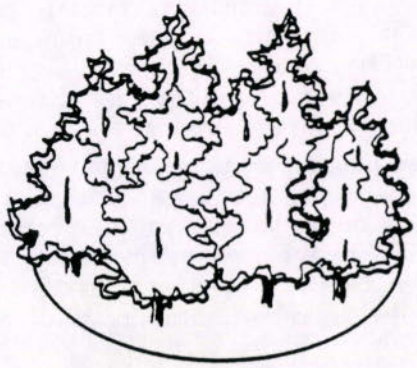


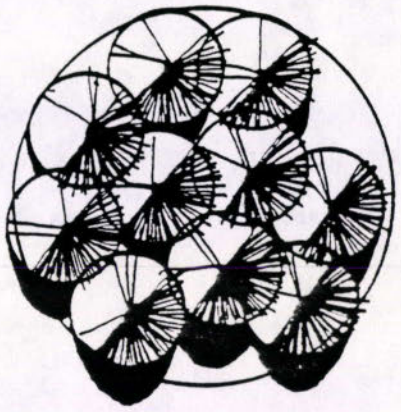
Expected Fire Behavior: Moderate intensity; flare-ups occurring to many feet above tree tops; sparks thrown ahead of main fire; fire spreads slow to fast and can produce considerable heat.

Action Required: Remove ladder fuel areas. Thin clumps of trees so that crowns do not touch. Occasional clumps may be permitted depending on location within the Safety Zone. Maintain a mixture of species if possible.

TREES — HIGH DENSITY

This includes dense conifer stands with more than 55 percent crown cover, brush understory, or ladder fuels. Crowns are usually touching.





Expected Fire Behavior: High intensity; frequent flare-ups higher than tree tops with "crown" fires possible; sparks can be thrown far in front of main fire. Fires are very hot and can spread rapidly. These fires are the most difficult to control; actual control may be impossible while fires burn in this high-density fuel.

Action Required: Thin trees in Safety Zone so that no crowns touch. Remove ladder fuels. If home is surrounded by a high-density tree stand, no clumps of trees are recommended in the treatment area. Maintain a mixture of species if possible.

WATER SUPPLIES CAN MAKE A DIFFERENCE

The most valuable resource other than fire vehicles is water and its availability. Without water, fire suppression is difficult at best. Homeowners should have a ready reserve of water to start fire suppression as soon as a blaze is detected. Water is particularly important in protecting homes from wildland or forest fires. Developing water supplies for use by local fire agencies may mean the difference between saving your home or watching it burn.

Many rural fire departments carry water on their trucks but may need more water to complete suppression work. You could use your emergency water supply while fire agencies are responding to the fire. Some fire districts or protection areas are so large that response time could be 15 or more minutes after the fire alarm.

As a mountain landowner, you should consider the following water supplies for use on your property:

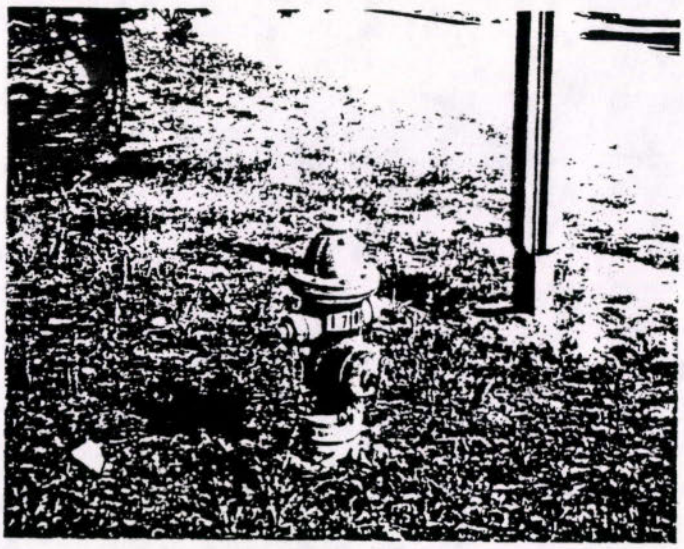
A. Water hydrant

B. Water faucet

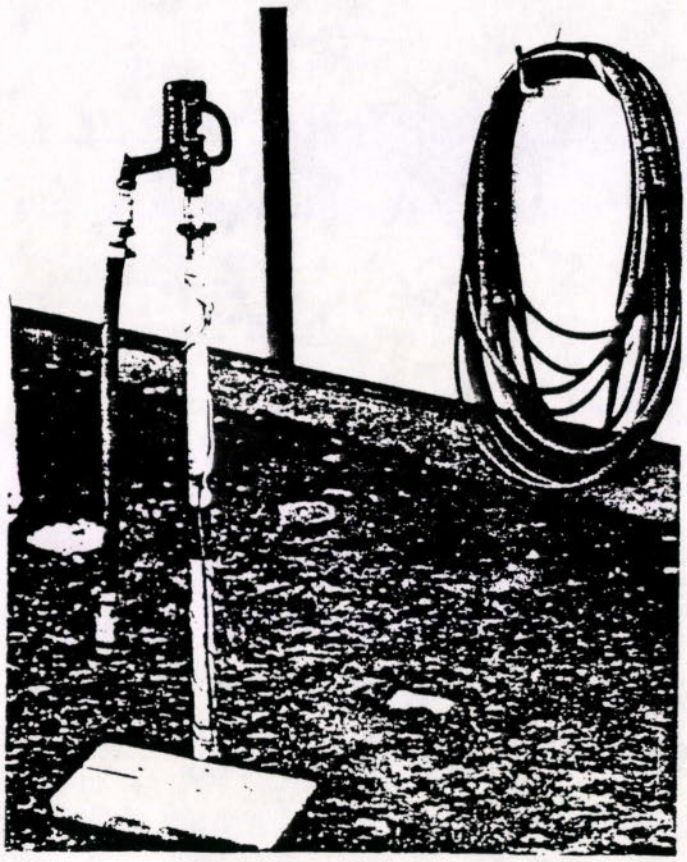
C. Cistern

D. Ponds

Some subdivisions are planned to include fire hydrants. The water source should have sufficient storage for adequate fire protection as well as meet domestic needs.

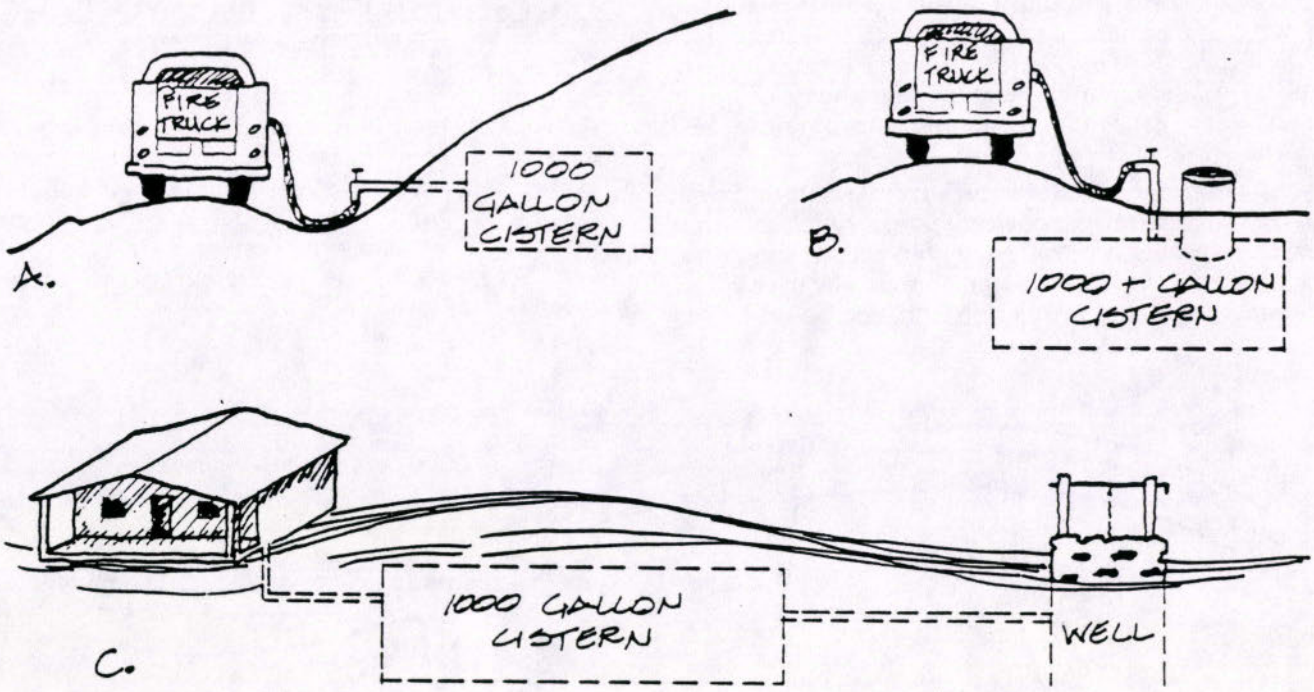


WATER HYDRANT



WATER FAUCET

These should be situated away from your home and be equipped with sufficient hose to reach all parts of your residence. This hose should have an adjustable nozzle for spray or straight stream water application.



WATER CISTERN

An underground storage tank (buried deep enough to not freeze) of 1,000 gallons or more is recommended if water hydrants are not available. Cisterns can be installed separately or as part of your domestic water storage.

PONDS

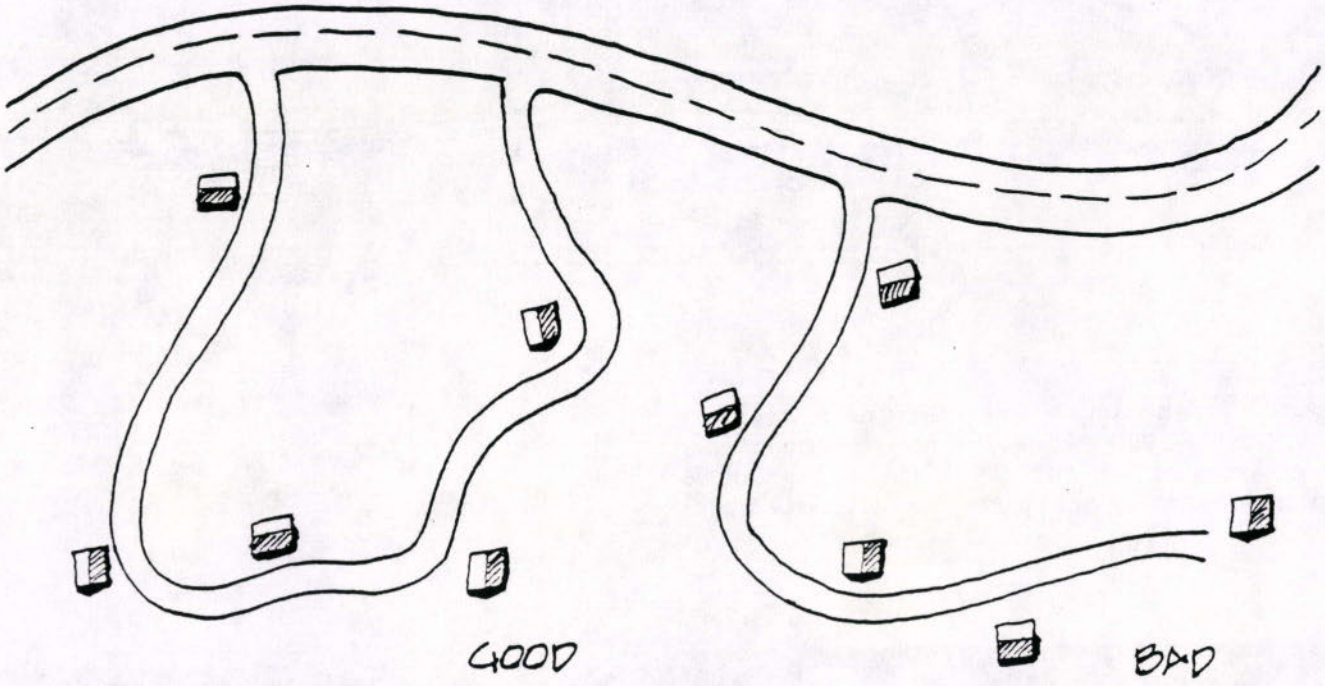
Availability of water from streams or ponds can be very useful in an emergency.

Winter freezing can limit availability of water in streams and ponds; a means to obtain water year-round is advisable. Access to these areas is very important and should be provided ahead of time. Check with your fire department to obtain access criteria.

If your emergency water comes from a cistern, pond, or stream, you must provide a means to move that water. A gasoline-powered water pump should be available for auxiliary power should electricity fail. Adequate hose and nozzles should also be on hand.

ACCESSIBILITY — CAN YOUR HOME BE PROTECTED?

A properly-maintained Safety Zone and water supply may be useless if fire vehicles cannot get to your home. Primary roadways should provide dual ingress and egress. Emergency situations may dictate one-way traffic in order for residents to leave while fire vehicles arrive. Single ingress/egress will not permit a safe traffic flow.



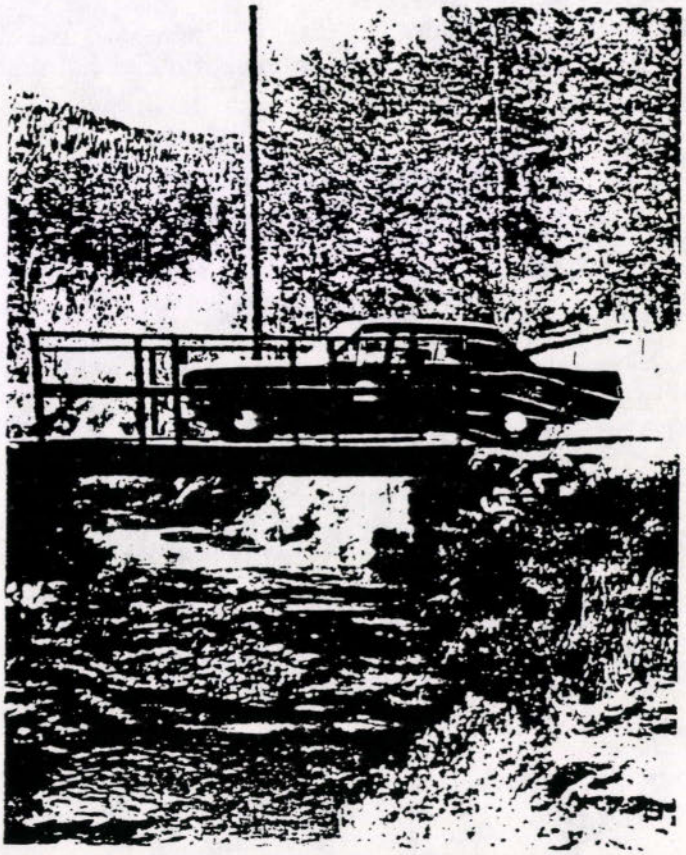
Ingress/Egress

You should also consider whether or not fire vehicles can get into your driveway and near your residence. If not, you should let your local fire agency know ahead of time and designate an emergency vehicle parking area.

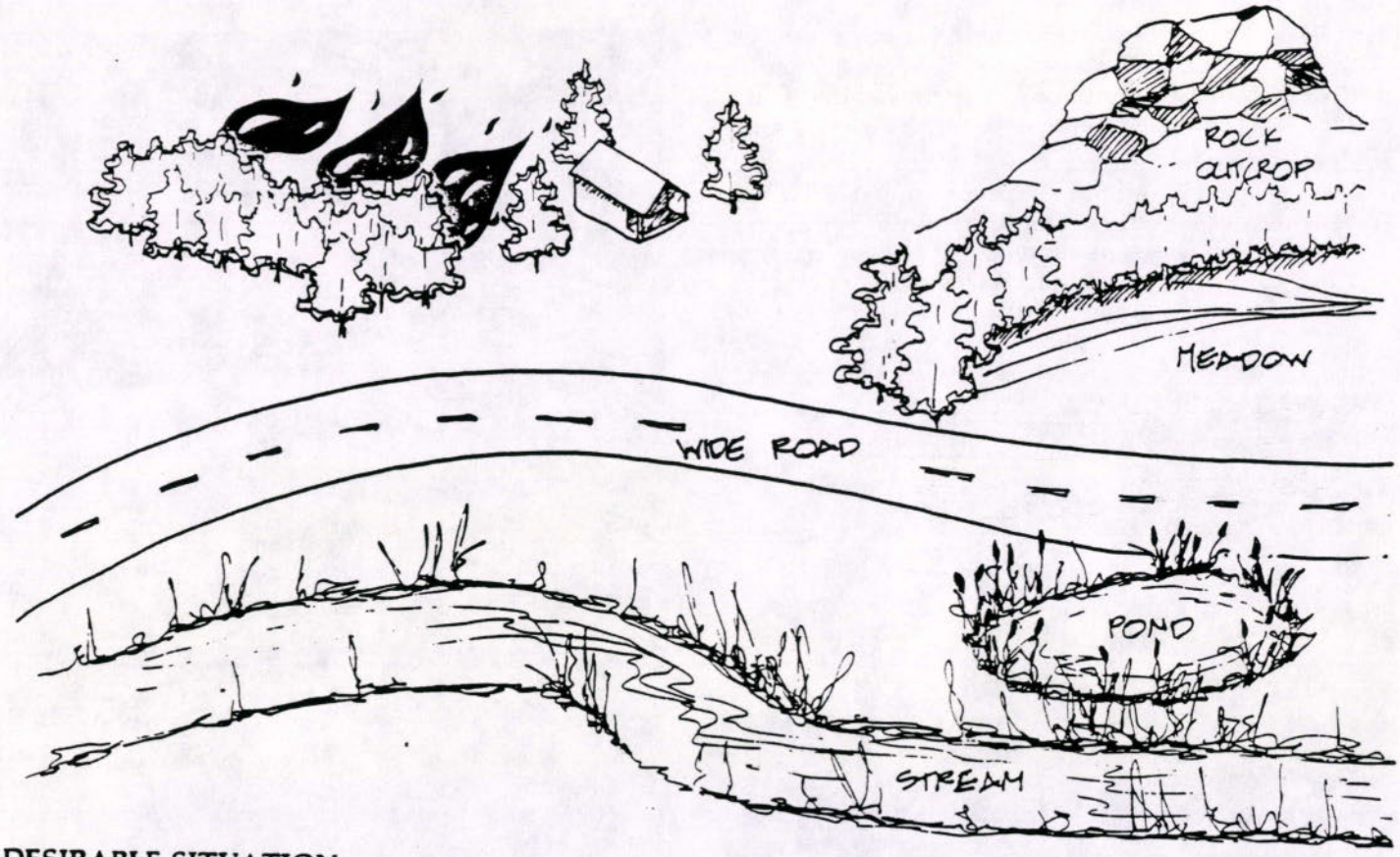
To further aid firefighters, properly-marked road signs are a must. Your name and lot number, properly displayed, will assist emergency crews in quickly locating your home. If your driveway crosses a bridge, you should post load limit signs.

Poor driveway for fire vehicles.

Name and lot number properly displayed for each identification.



Load limits should be posted for small bridges to warn drivers of weight limitations.



DESIRABLE SITUATION
Thinned stands reduce fire intensity. Meadows and rock outcrops provide escape areas while good access and adequate water supplies are provided for fire fighting equipment.

ADDITIONAL FIRE SAFETY ACTIVITIES YOU CAN DO NOW

The following should be done immediately if not already completed.

1. Have a tool storage area complete with rakes, hoes, axes, and shovels for use in case of fire.
2. Purchase an ABC-class fire extinguisher 10 pounds or heavier. Place it in a convenient, centrally-located spot. A 10-pound extinguisher has the capability of smothering flames in one room and *can* be used on small fires outside the home.
3. Develop a fire escape plan. Escape areas should be open with good visibility all around. Meadows, rock outcrops, and wide roads are good examples.
4. Stack firewood and pile debris uphill or on a contour away from your home. These areas can develop large amounts of heat if ignited and could hinder fire suppression activities if left near your home.
5. Clean debris from your roof and gutter to eliminate an ignition source for firebrands.
6. Remove trash from your Safety Zone.
7. Enclose stilt foundations to keep firebrands from lodging underneath structures or porches.
8. Obtain a checklist from your fire department for fire safety needs *inside* your home.

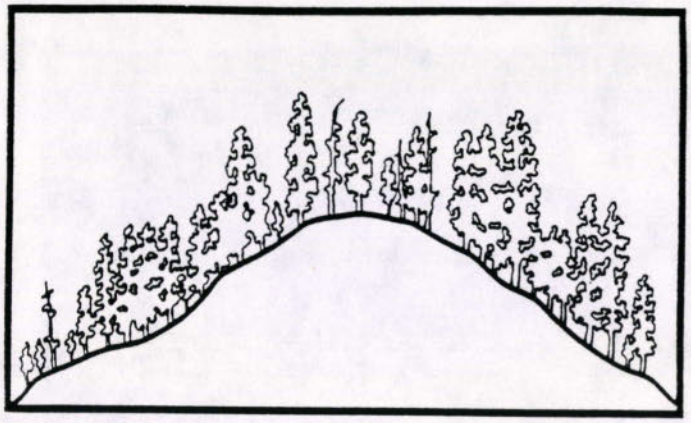
The above will get you started right away — in making you and your home more fire safe. Completion of all steps necessary within your Safety Zone is up to you. The sooner you get started, the safer you will be from wildland fires. Assistance can be obtained from local fire and/or forestry agencies. Contact them now so that you can complete your fire safety needs soon.

FUELBREAK GUIDELINES
FOR FORESTED SUBDIVISIONS

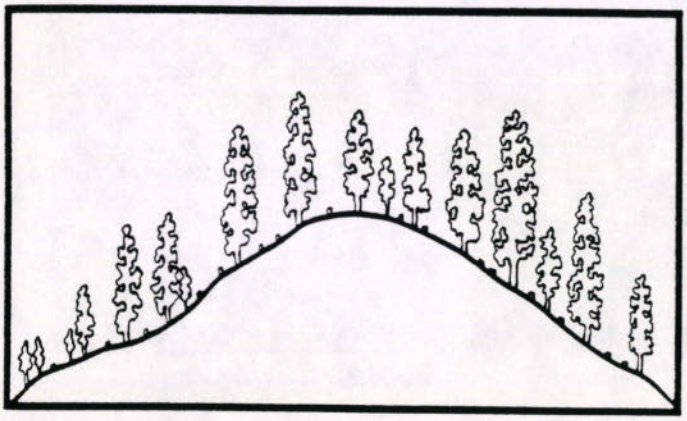
Although the term "fuelbreak" is widely used in Colorado, it is often confused with "firebreak". The two are entirely separate and aesthetically different forms of fuel modification.

A firebreak is an area, 20 to 30 feet wide (or more), in which **all** vegetation is removed down to mineral soil. It is reworked and maintained each year prior to fire season.

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.



Cross section of mixed conifer stand before fuelbreak modification.



Same view after logging and slash treatment.

Many of Colorado's timber stands are overgrown, tangled masses of fuel — waiting only for the spark of disaster.

But the same stand, after thinning, pruning, and slash removal can be made safe, as well as pleasant.

The following is a discussion of the uses, limitations and specifications of fuelbreaks in wildfire control and management.

FUELBREAK LIMITATIONS

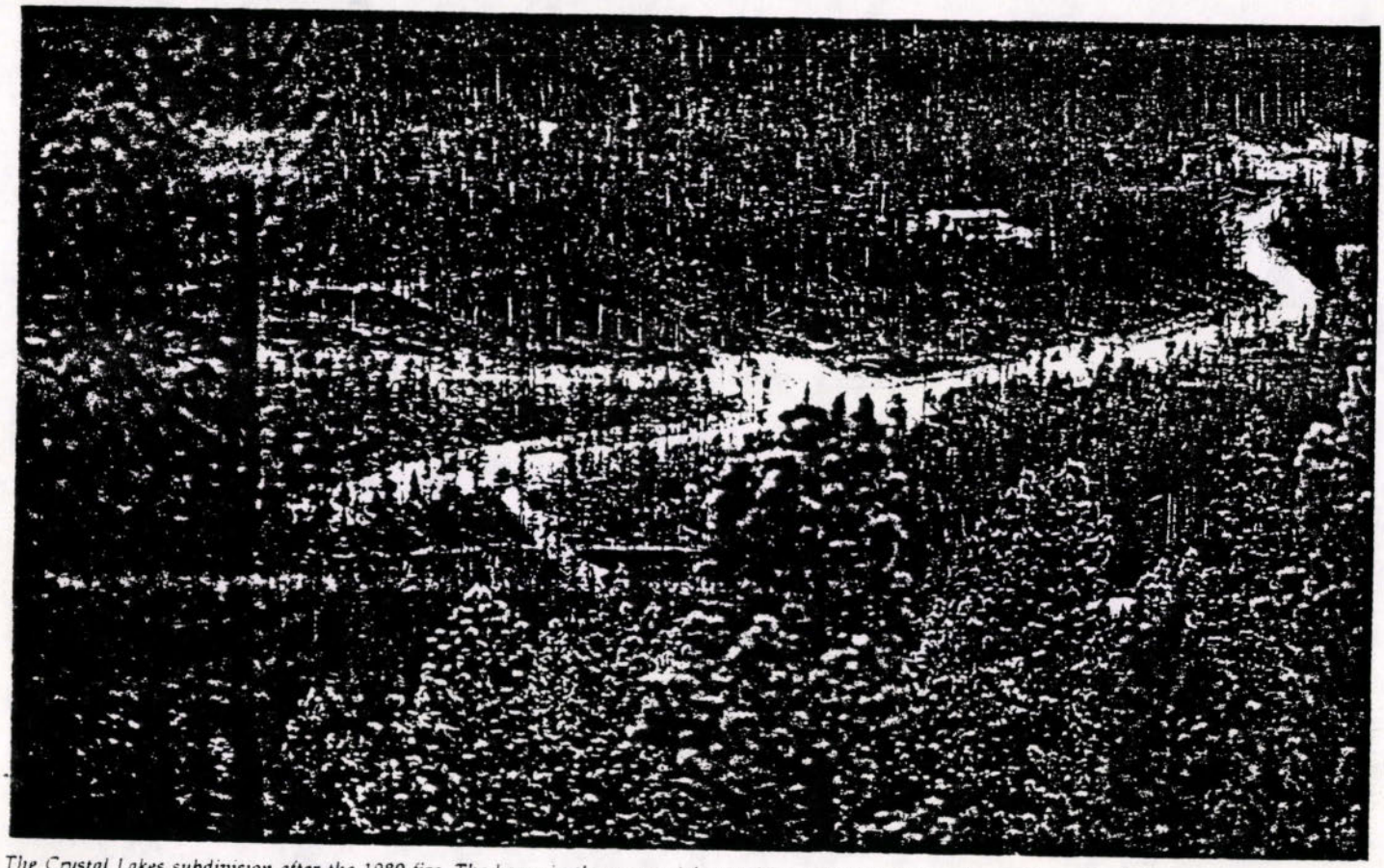
Fuelbreaks provide quick access for wildfire suppression. Control activities can be conducted safely due to low fuel volume.

Strategically located, they break up large tracts of dense timber, thus limiting uncontrolled spread of wildfire.

They can greatly aid firefighters by slowing fire spread under normal burning conditions. However, under extreme conditions, even the best fuelbreaks stand little chance of arresting a large fire, regardless of firefighting efforts. Such fires can drop firebrands 1/8 mile or more ahead of the main fire, and may continue until there is a major change in weather conditions, topography, or fuel type.

Most important: *The fuelbreak is the line of defense. The area (including developments) between it and the fire will be sacrificed.*

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 thinnings, while other areas of dense lodgepole pine burned completely.



The Crystal Lakes subdivision after the 1980 fire. The home in the upper right would certainly have been lost without the fuelbreak.

THE NEED FOR A FUELBREAK

Several factors determine the need for fuelbreaks in mountain subdivisions. They are (1) potential problem indicators, (2) wildfire hazard areas, (3) slope, (4) topography, (5) crowning potential, and (6) ignition sources. (A flow chart using these factors is found on page 9.)

POTENTIAL PROBLEM INDICATOR

The publication, "An Ecosystem Guide for Mountain Land Planning, Level I", explains potential problem indicators for various hazards and characteristics common to Colorado's ecotypes. All major timber types, except aspen, indicate a high probability of wildfire hazard.

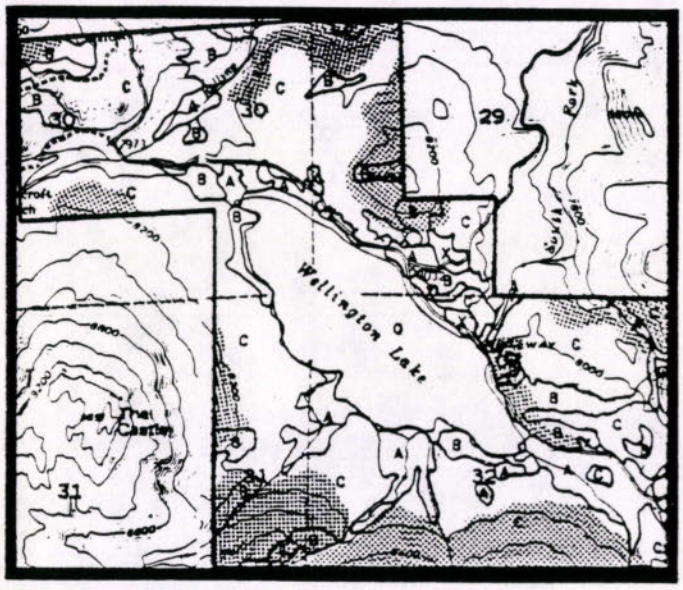
POTENTIAL PROBLEM INDICATOR

FUEL TYPE	CHARACTERISTICS			HAZARDS			
	Aesthetics	Wildlife	Soil	Wildfire	Avalanche	Flood	Climate
Aspen	2	3	3	2	4	3	2
Douglas-fir	2	2	3	5	2	2	3
Greasewood-Saltbush	4	2	5	2	1	3	3
Limber-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
Mt. Grassland	5	3	4	3	3	2	4
Mt. Shrub	3	5	4	4	2	3	2
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

WHAM MAPS

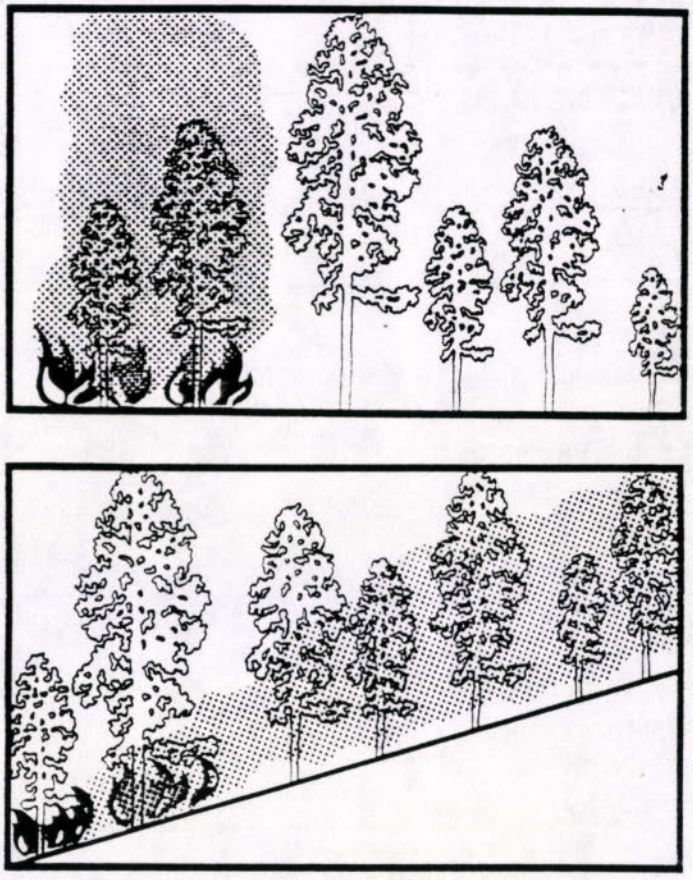
The Colorado State Forest Service (CSFS) has completed wildfire hazard area (WHAM) map sets for many privately owned lands in Colorado, particularly along the Front Range. These consist of maps which: (1) indicate areas with 30 percent or greater slope; (2) delineate ecosystem types; and (3) outline areas of varying wildfire hazard levels. The hazard levels are: no hazard ("0"), low ("A"), moderate ("B"), severe ("C"), or severe brush ("X"). Areas rated "B", "C", or "X" should be considered for fuel modification work.



Sample wildfire hazard map with hazard types and slopes greater than 30 percent.

SLOPE

The rate of fire spread increases as the slope of the land increases. Fuels are preheated by the rising smoke column, and a "ladder" effect may be created in the adjoining timber (spreading fire from the ground to tree crowns).



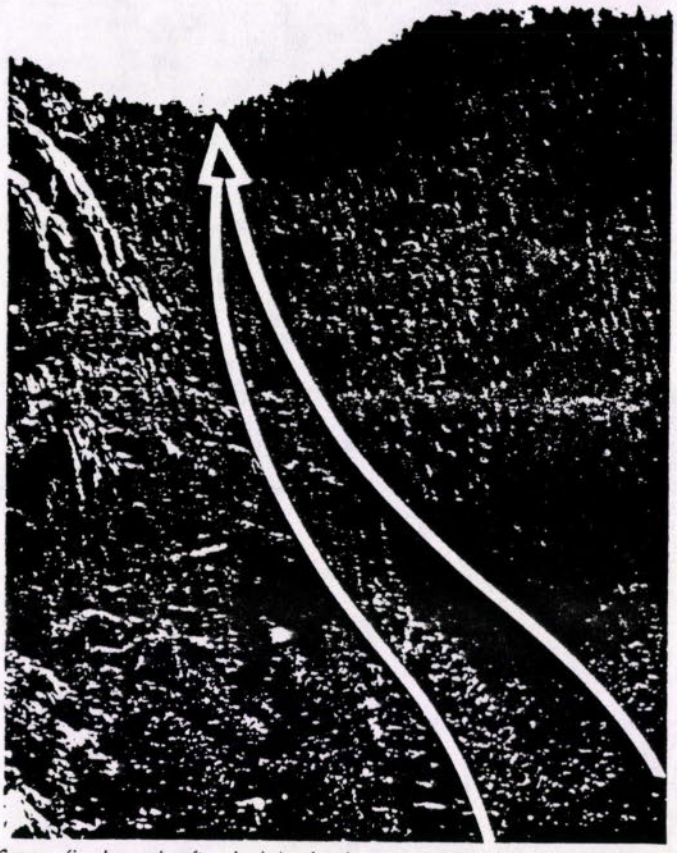
Fire effects, flat VS steep terrain. Note preheating of fuels on steep ground from passage of smoke column.

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 slope are critical and must be reviewed carefully.*

TOPOGRAPHY

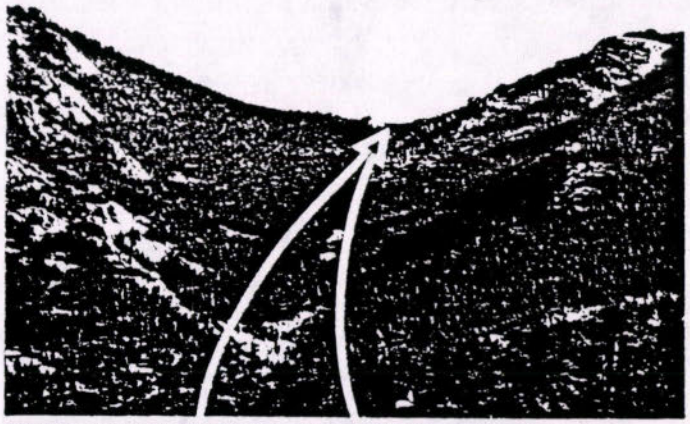
Certain topographic features influence fire spread and should be evaluated. Included are fire chimneys, saddles, and V-shaped canyons. They are usually recognized by reviewing standard U.S.G.S. quad maps.

Chimneys are densely vegetated drainages on slopes greater than 30 percent. Wind tends to funnel up the drainage, rapidly spreading fire upslope.



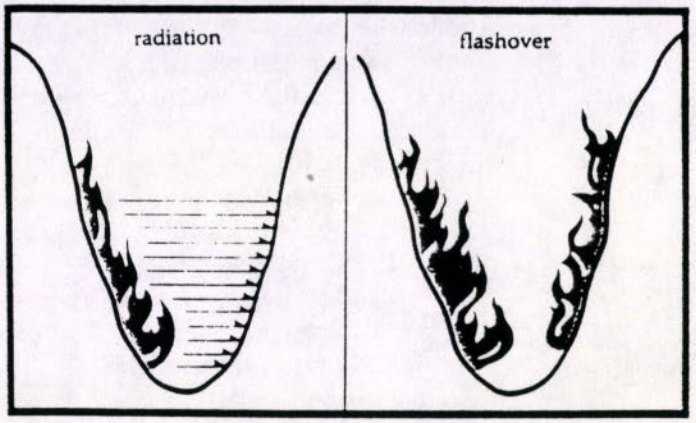
Severe fire hazards often lurk in the dense vegetation on the slope of a chimney.

Saddles are low points along a main ridge or between two hills. Like chimneys, they also funnel winds to create a natural fire path during an uphill run and act as corridors — spreading fire into adjacent valleys or drainages.



Heavily timbered saddles can act as corridors and thus help fires spread.

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



Flashover in steep, V-shaped valley.

CROWNING POTENTIAL

An on-site visit is required to assess crowning potential. A key is provided below to determine this rating.

Fuel modification is unnecessary if an area has a rating of 3 or less.

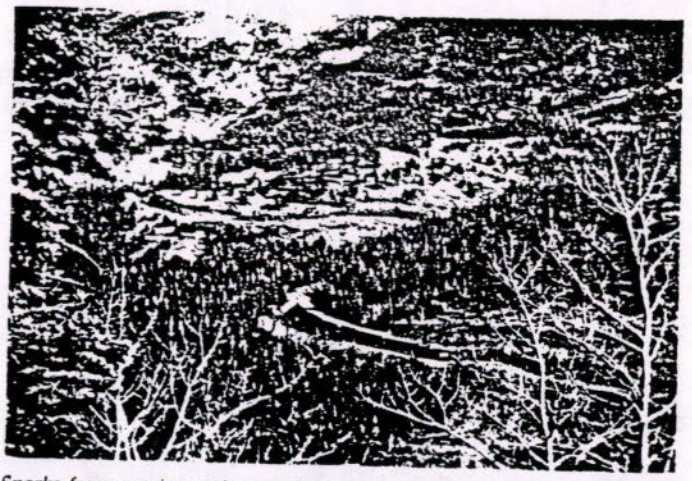
CROWNING POTENTIAL KEY

	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 less	7
FF. Ladder fuels sparse or absent — H	
H. Crown closure > 75 percent	7
HH. Crown closure less	5
EE. Foliage open — I	
I. Ladder fuel plentiful	4
II. Ladder fuels 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 less	4
KK. Ladder fuels sparse or absent — M	
M. Crown closure > 75 percent	5
MM. Crown closure less	3
JJ. Foliage open — N	
N. Ladder fuels plentiful	3
NN. Ladder fuels sparse or absent	1
BB. Foliage dead — O	

Remove all dead trees within the fuelbreak. Occasionally, dead trees 14 inches or larger in diameter 4 1/2 feet above ground level may be retained as wildlife trees. If retained, clear all ladder fuels from around the tree trunk.

IGNITION SOURCES

Possible ignition sources which may threaten the proposed development must be investigated thoroughly. Included are other developments and homes, major roads, recreation sites, and railroads. These might be distant from the proposed development, yet still able to channel fire into the area due to slope or other topographic features.

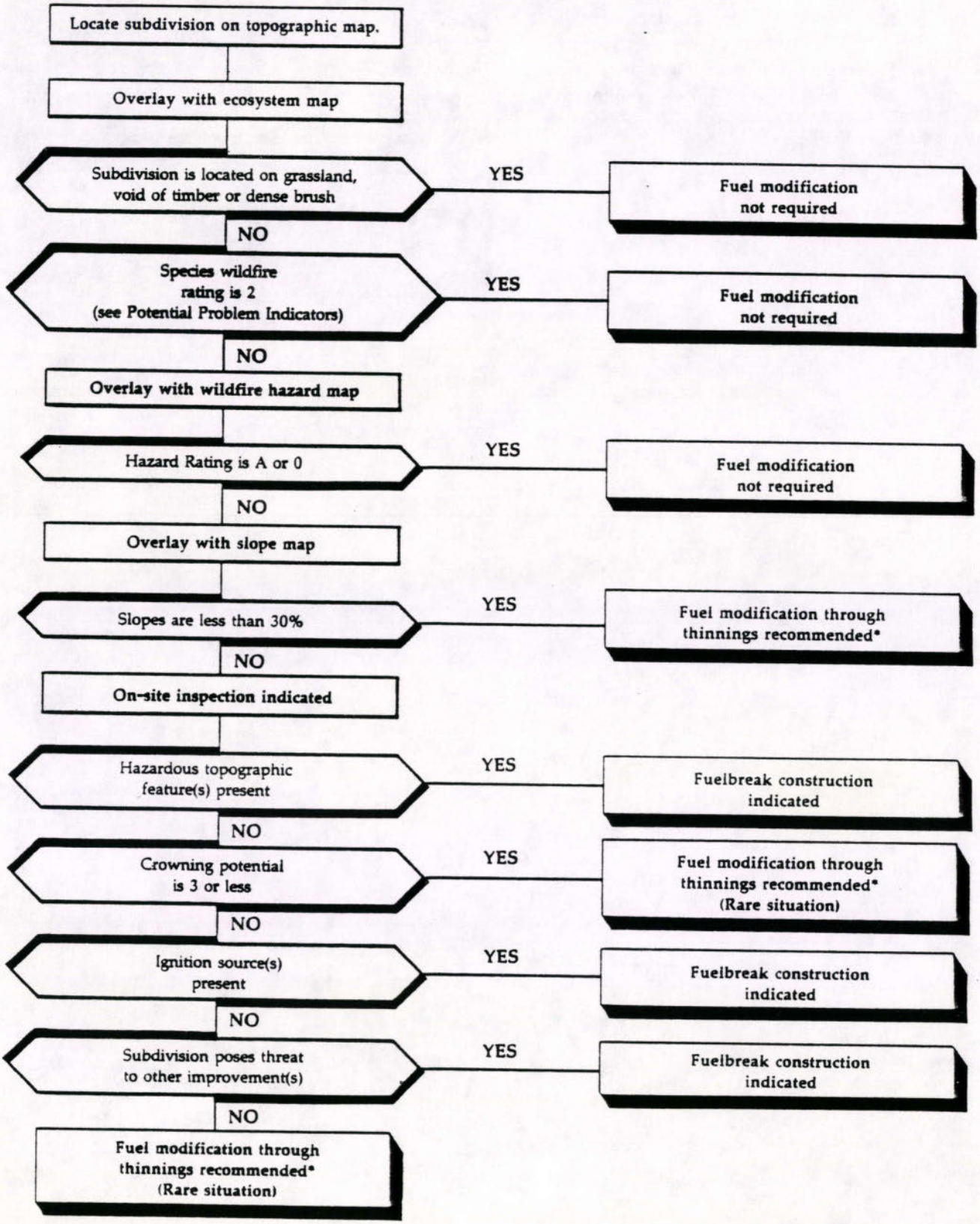


Sparks from passing trains can ignite grasses and timber.

Equally important is the possibility that the proposed development is an ignition source threat to existing homes or subdivisions.

FUELBREAK REQUIREMENT ANALYSIS

START HERE:



* *Review minimum distances required for fuel modification along roads on page 11.*

FUELBREAK LOCATIONS

An effective fireline 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.

Similarly, proper fuelbreak construction takes advantage of such barriers to eliminate "fuel bridges". (Fires often escape control lines with the aid of fuel bridges.)

Since fuelbreaks provide quick, safe 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 reduce the amount of fuel modification needed.

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** be effective when established at the base of slopes. Mid-slope fuelbreaks are least desirable, but under certain circumstances and with modifications, these too can be valuable.

Fuelbreaks are located so that the area under management is broken into small, controllable units. Thus, a fire remains small, and when it reaches modified fuels, defensive action is more easily taken. As an example, Larimer County recommends that fuelbreaks break up continuous forest fuels into units of 10 acres or less. This is an excellent plan, especially if thinning for forest management is accomplished in addition to fuelbreak construction.

When located along ridge tops, continuous length as well as width is a critical feature. Extensive long-range planning is essential in positioning this type of fuelbreak. Much of the work can be accomplished through commercial timber sales at little or no cost.

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

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

Before and after photos illustrate how a timber stand can be thinned . . .

. . . without altering the basic character of the hillside. In this way, aesthetic impacts are minimized.

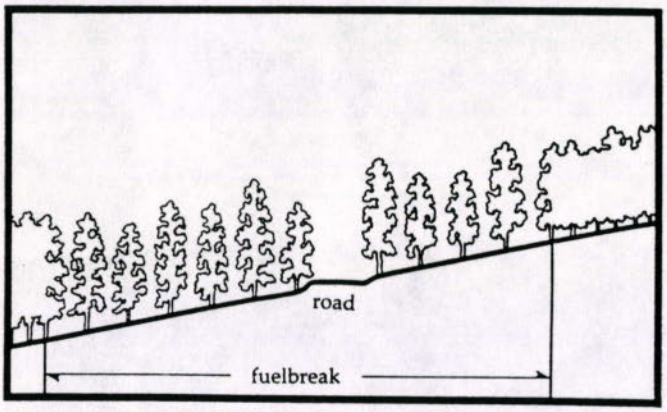
These guidelines are designed to minimize aesthetic impacts. However, some situations may require extensive thinning and thus result in a major visual change to an area.

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 cut for uphill distances.

The **minimum** recommended fuelbreak width is approximately 200 feet. Since fire activity intensifies as slope increases, the overall fuelbreak width must also increase. However, to minimize aesthetic impacts, the majority of the increases should be taken from the bottom of the fuelbreak below the road cut.



Typical cross-section of fuelbreak built in conjunction with road.

Widths are also increased when severe topographic conditions are encountered. Guidelines for fuelbreak widths on slopes greater than 30 percent are given below.

FUELBREAK WIDTH PRESCRIPTION

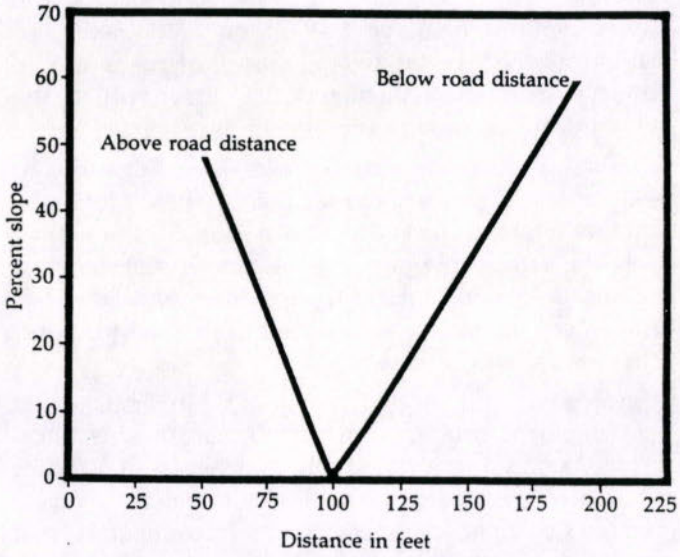
1) Below road distance:
Distance (ft.) = 100 + [(150%)(slope %)]

2) Above road distance:
Distance (ft.) = 100 - slope%

3) Fuelbreaks which pass through chimney or saddle areas should have distances increased by at least 50%.

4) Ridgetop fuelbreaks should be thinned on both sides of road based on below road distance prescription.

5) All distances are measured along slope.



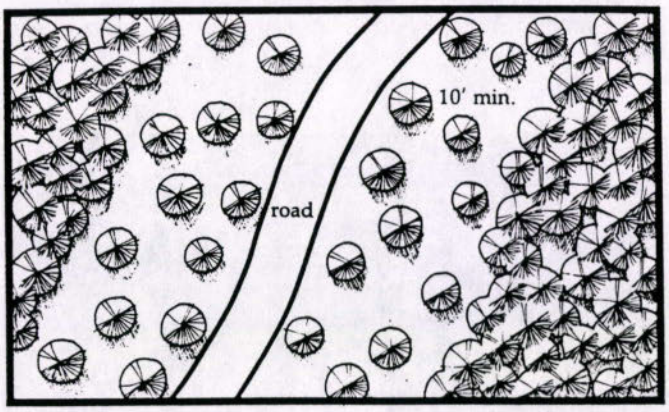
FUELBREAK WIDTH/SLOPE

Percent Slope (%)	Uphill Distance (ft)	Downhill Distance (ft)	Total Width of Modified Fuels (ft)*
0	100	100	200
10	90	115	205
20	80	130	210
30	70	145	215
40	60	160	220
50	50	175	225
60	40	190	230

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

STAND DENSITIES

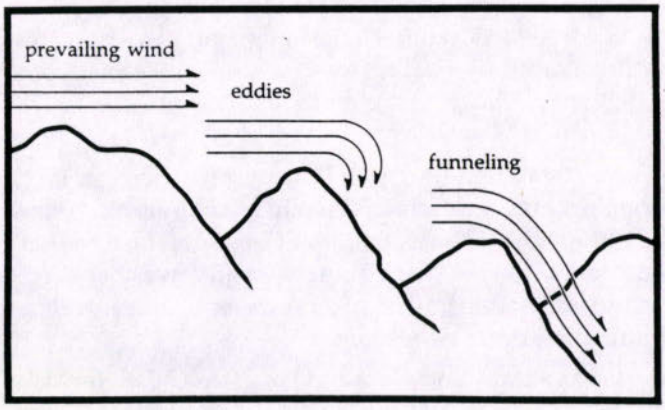
Crown separation is a more critical factor for fuelbreaks than a fixed tree density level. A minimum 10 foot spacing between the edges of tree **crowns** is desirable. Small, isolated groups of trees may be retained for visual diversity.



Plan view of fuelbreak; shows minimum distance between tree crowns.

A fuelbreak thinning is classified as a heavy "sanitation and improvement" cut from below. Trees which are suppressed, diseased, deformed, damaged, and 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 are carefully evaluated. It may be necessary to develop the fuelbreak over several years to allow the stand to "firm-up".



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

Area-wide forest thinnings are recommended for **any** subdivisions. They will not be as severe as fuelbreak thinnings, but should be completed to fuelbreak specifications along the roads (as outlined on page 11.)

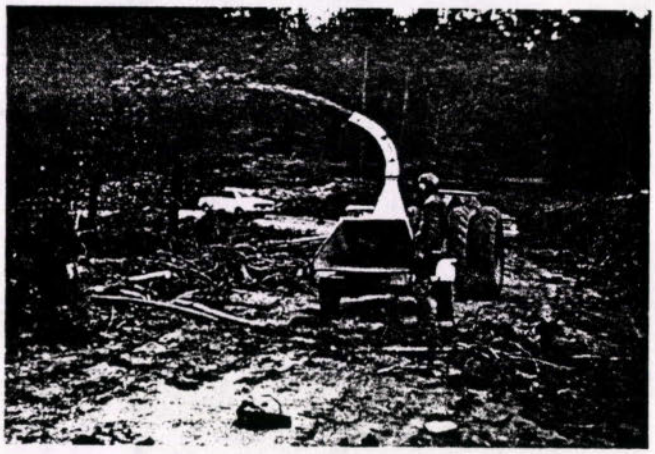
DEBRIS REMOVAL

Limbs and branches left from thinning (called slash) can add significant volumes of fuel (especially in lodgepole pine, mixed-conifer, or spruce/fir timber types). These materials can accumulate and serve as ladder fuels, or can become hot spots, increasing the difficulty of defending the fuelbreak. *Slash decomposes very slowly in Colorado and proper disposal is essential.*

Three treatment methods commonly used are: (1) lopping and scattering, (2) piling and burning, and (3) chipping. Proper treatment reduces fire hazard, improves access for humans and livestock, encourages establishment of grasses and other vegetation, and improves aesthetics.

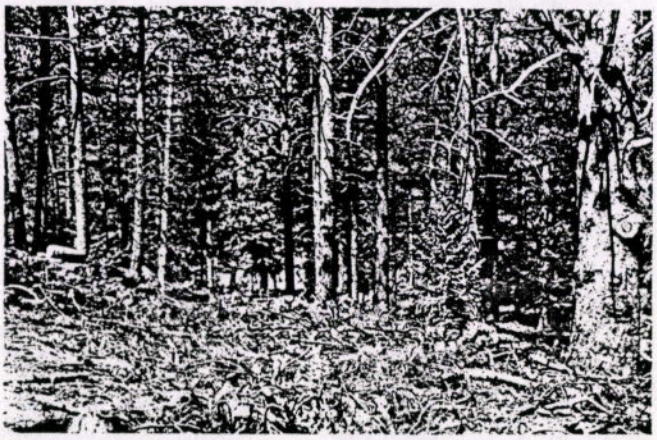
Size, amount, and location of slash dictates the method used, in addition to final appearance desired and cost. The method will also depend on how soon an effective fuelbreak is needed prior to development.

Lopping and scattering is the easiest and cheapest method of disposal, but also *the least desirable and must be used with caution.* Large branches are cut into small sections and scattered over an area. In fuelbreaks, pieces are cut small enough so that all slash is within 12 inches of the ground. (Contact with the ground increases decomposition rate.)



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

Piling and burning is a quick way to eliminate a large amount of slash at moderate cost. The material is piled for burning in open areas when snow cover is sufficient to prevent fire spread. Piles are located far from remaining trees to prevent scorching and should be compact enough to facilitate burning. The sheriff and local fire department must be notified before any burning is done. A few scattered piles may be left for wildlife use without compromising fuelbreak effectiveness.



The lop and scatter method (logs not yet removed in photo). Remaining slash should be no deeper than 12 inches above ground surface. Stand in background has not been thinned.

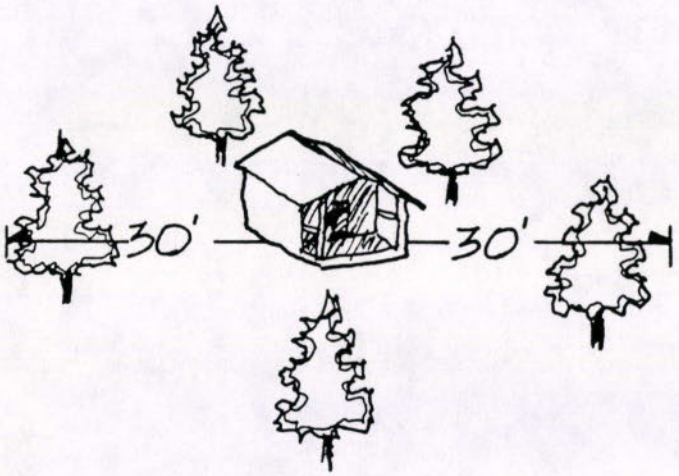
Chipping is the most expensive disposal method. Branches are fed through a machine resulting in chips approximately 3/4 inch square by 1/4 inch thick. They decompose rapidly, present little fire hazard, act as mulch to hold soil moisture, stimulate vegetative growth, prevent erosion on cut-and-fill slopes, and facilitate movement within the area. They may, however, retard vegetative growth if spread too heavily. *Chipping is highly recommended for fuelbreaks.*

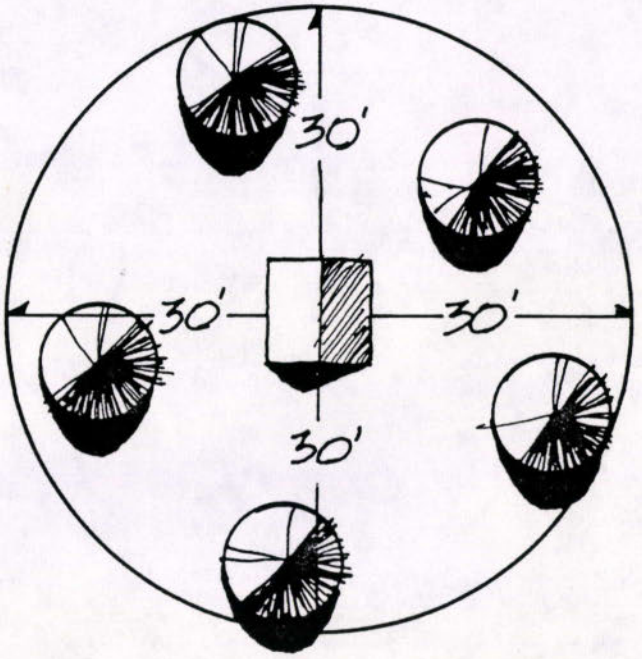
Piled slash can be burned, but only during certain conditions, such as after a snowfall.

If your home is on a slope, you need to enlarge the Safety Zone. Safety Zone size will not affect fuel modification recommendations; it will only increase the area to be completed for your safety.

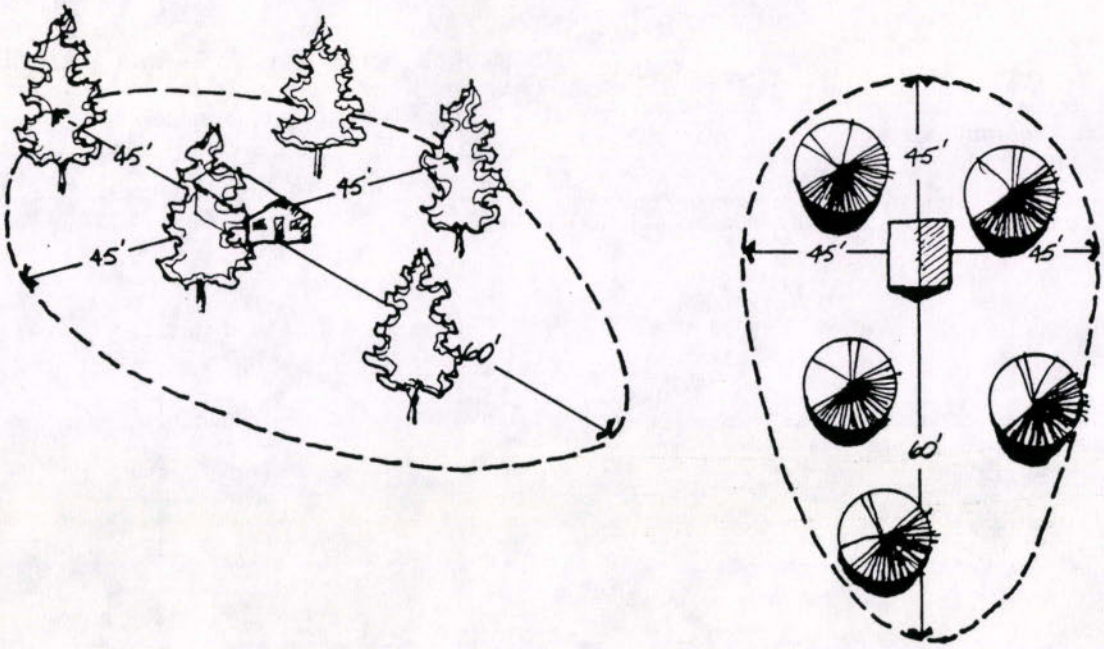
Because heat rises, fuels on slopes are preheated and will ignite faster. Consequently, wildfires will generally travel much faster upslope. To compensate for this phenomenon, Safety Zones are enlarged around homes on slopes and particularly on the downhill side. Special attention should be given to ladder fuels on all sloping terrain.

The following Safety Zone minimums are recommended for the stated slopes.

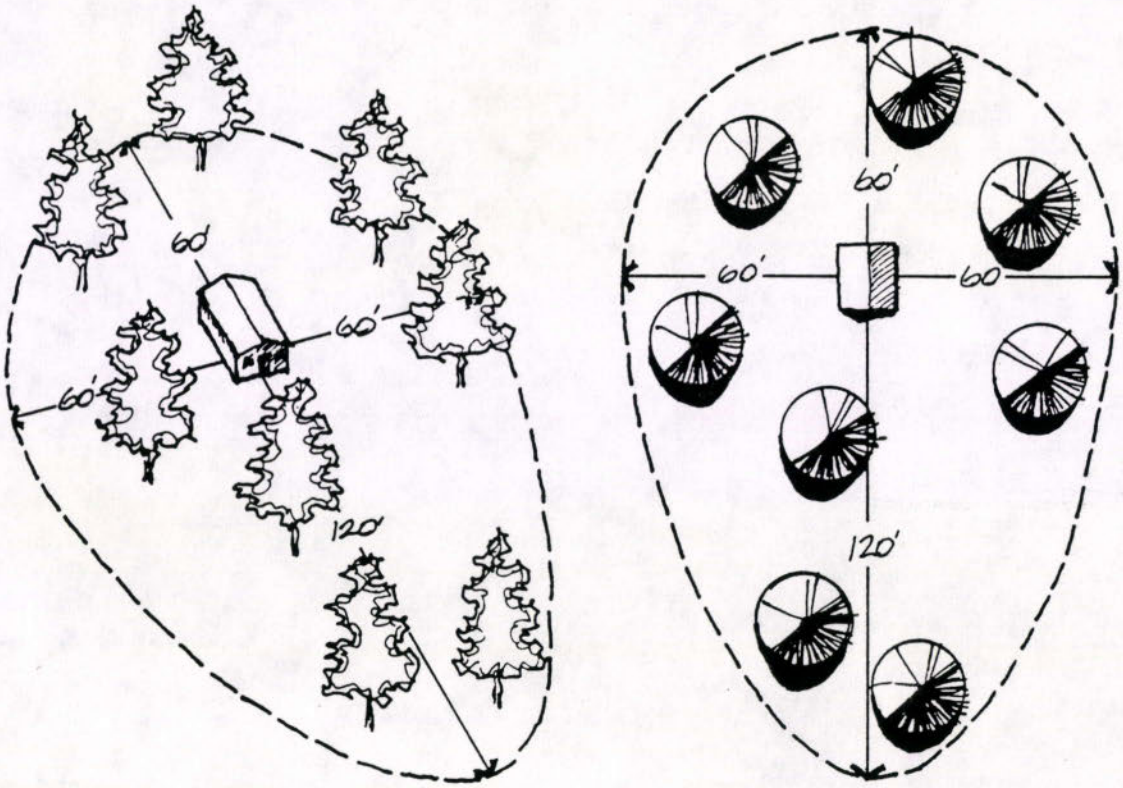




Level Terrain



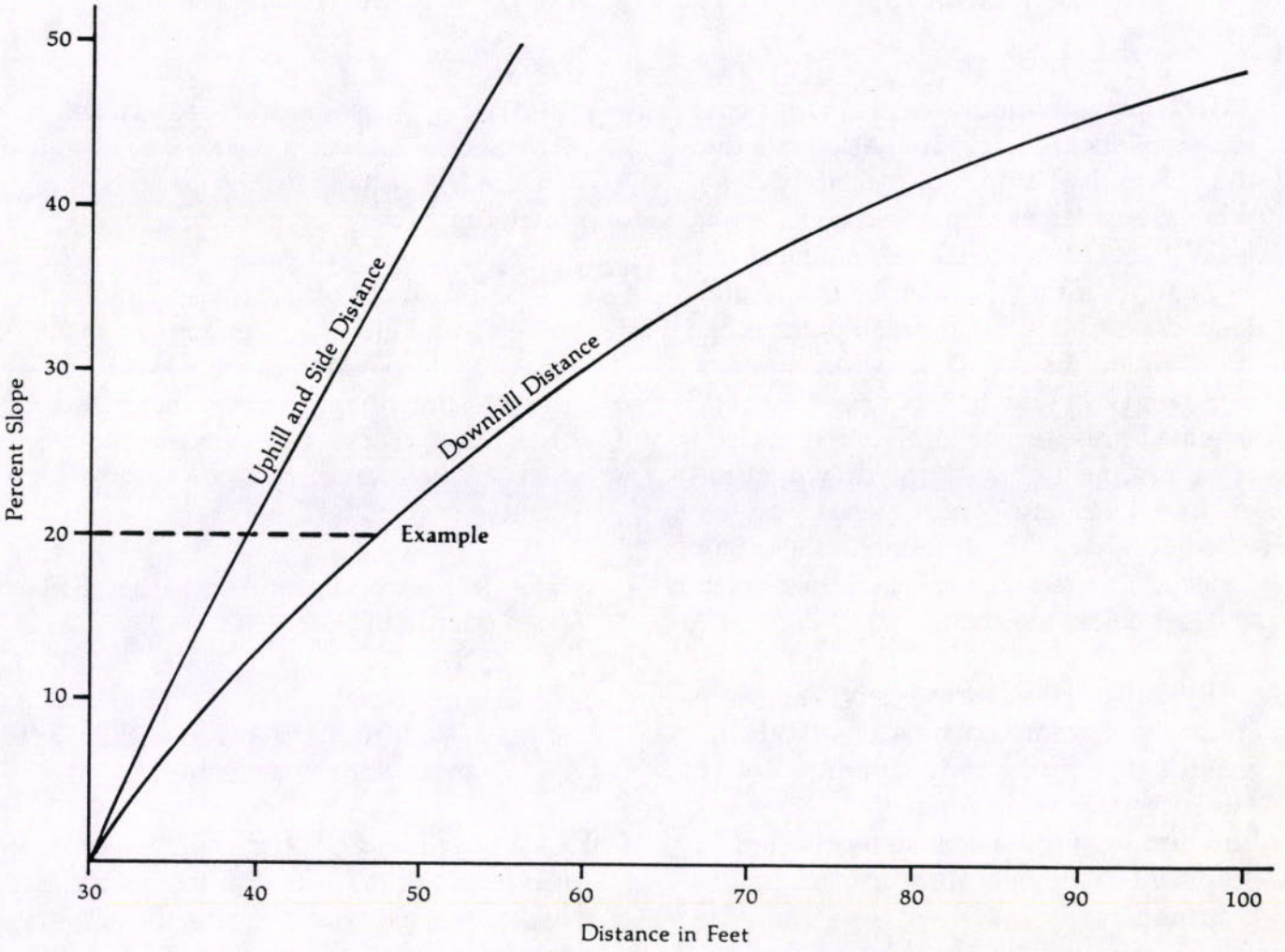
Thinned 30% Slope
Compared to level terrain, rate of fire spread increases by two.



Thinned 55 percent slope
Compared to level terrain, rate of fire spread increases by four.

DETERMINING SAFETY ZONE DIMENSIONS

The increase in Safety Zone size is based on increased rate of fire spread at the slopes listed. If you live on slopes other than those listed, use the slope chart to help determine your side and downhill dimensions.



Example: If your home is situated on a 20 percent slope, your Safety Zone dimensions would be 40 feet on the uphill and sides of your home, and 47 feet on the downhill side.

A SUBSTANTIAL WILDFIRE HAZARD EXISTS ON MOST FORESTED HOMESITES. THESE HAZARDS CAN, IN MANY CASES, BE REDUCED TO ACCEPTABLE LEVELS BY FOLLOWING THESE FIRE SAFETY GUIDELINES.

CREATE A "SAFETY ZONE" AROUND YOUR HOME

1. THIN out continuous tree and brush cover within 30 feet of homesite. Adequate thinning is reached in the 30 foot Safety Zone when the outer edge of tree crowns are at least 10 to 12 feet apart. Occasional clumps of 2 or 3 trees may be retained for natural landscape effects. Also, small patches of brush or shrubs may be left, but should be separated by at least 10 foot clear areas of irrigated grass or noncombustible material. If your home is on a slope, you will need to enlarge the Safety Zone, especially on the downhill side. If it is located at the crest of a steep hill, fuels should be thinned at least 100 feet below the crest.

2. DISPOSE of all slash and debris left from thinning. Common disposal methods include (1) lopping and scattering (to facilitate more rapid decomposition), (2) piling and burning (only when snow cover is sufficient to prevent fire spread), and (3) chipping.

3. REMOVE dead limbs, leaves, and other ground litter from within the Safety Zone.

4. MAINTAIN an irrigated greenbelt immediately around your home using grass, flower garden, or ornamental shrubbery. Another option is rock or other noncombustible material. Avoid use of bark or wood chips in this area.

5. MOW dry grasses and weeds to a height of 2 inches or less and remember to keep well watered, especially during periods of high fire danger.

6. PRUNE branches from trees within the zone to a height of 10 feet above the ground. Also remove shrubs, small trees, or other potential fuels from beneath large trees. Left in place, these create "ladder fuels" which can carry a ground fire into the tree crowns.

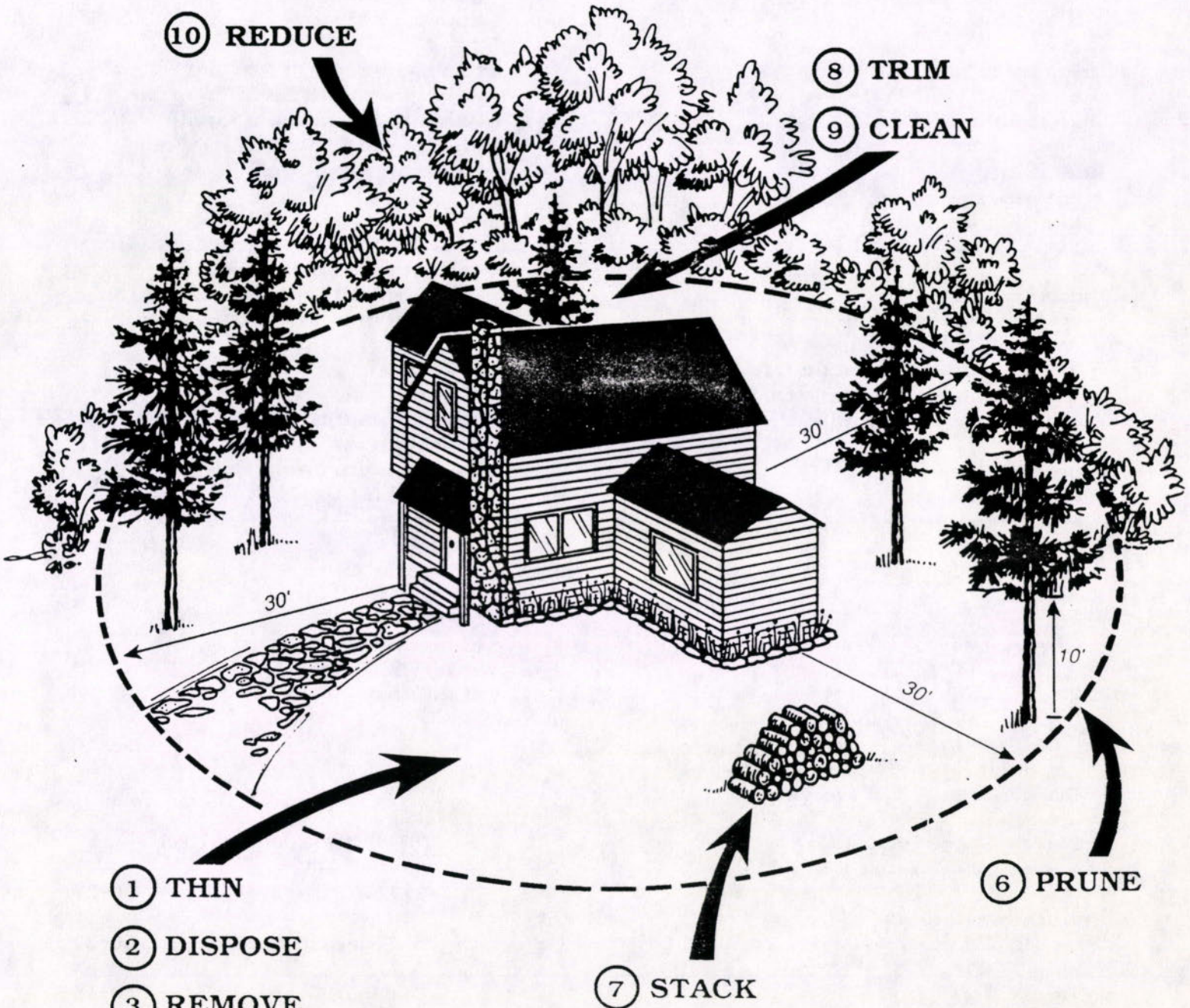
7. STACK firewood uphill and at least 15 feet from your home.

8. TRIM any branches which extend over the eaves of your roof. Branches within 15 feet of a chimney should be removed.

9. CLEAN gutter and roof of pine needles and leaves to eliminate an ignition source for firebrands, especially during the hot, dry weather of the fire season.

10. REDUCE density of surrounding forest at least 100 feet out from homesite (it is preferable to thin your entire lot). Thin trees so crowns do not touch each other. Whenever possible, harvest sawlogs, posts, poles, or firewood.

THE "SAFETY ZONE"



WILDFIRE HAZARD RATING FORM
- SUBDIVISION -

NAME OF SUBDIVISION_____ DATE_____
COUNTY_____ SIZE(AC)_____ #LOTS_____
RATING_____ COMMENTS_____

A. SUBDIVISION DESIGN

1. Ingress/Egress:
   - Two or more roads, primary routes 1___
   - One road, primary route, plus alternate 3___
   - One way in/out 5___

2. Primary Road Widths:
   - Minimum 24 ft. 1___
   - Less than 24 ft. 3___

3. Accessibility:
   - Smooth road, grade less than 5% 1___
   - Rough road, grade less than 5% 3___
   - Other 5___

4. Secondary Road Terminus:
   - Loop roads or cul-de-sacs w/turn-around radius greater than 45 ft. 1___
   - Cul-de-sac turnaround radius less than 45 ft. 2___
   - Deadend roads less than 200 ft. in length 3___
   - Deadend roads over 200 ft. in length 5___

5. Average Lot Size:
   - More than 10 acres 1___
   - Between 1 and 10 acres 3___
   - Less than 1 acre 5___

6. Street Signs:
   - Present 1___
   - Not present 5___

B. VEGETATION

1. Fuels/Density (General):
   - Grass w/scattered trees or oak brush 1___
   - "Thinned" conifers (10 ft. or more between trees) 3___
   - Sagebrush/willow 5___
   - Moderately dense conifers or oakbrush 7___
   - Dense, continuous conifers and/or thick oakbrush 10___

2. Defensible Spaces Completed:
   - More than 70% of sites 1___
   - Between 30-70% of sites 5___
   - Less than 30% of sites 10___

C. TOPOGRAPHY

1. Slope (Predominant):
   - Less than 8% 1___
   - Between 9-20% 4___
   - Between 21-30% 7___
   - Greater than 31% 10___

D. FIRE PROTECTION

1. Response Time:
   - Within 15 minutes 1___
   - Within 16-30 minutes 5___
   - Greater than 31 minutes 10___

2. Hydrants:
   - 500 gpm hydrants on less than 1000 ft. spacing 1___
   - Hydrants, but less than above or pump-site available on-site 2___
   - No hydrants or pump-site 3___

3. Draft Sources:
   (Complete only if no hydrants or pump-site available).
   - Draft sources within 20 minutes round-trip 1___
   - Draft sources within 21-45 minutes round-trip 5___
   - Draft sources greater than 46 minutes round-trip 10___

E. STRUCTURE HAZARD

1. Materials (Predominant):
   - Roof and siding materials non-wood 1___
   - Flammable siding/non-flammable roof (includes mobile home) 5___
   - Flammable roof 10___

F. UTILITIES (Gas and/or electric)

1. Placement:
   - All underground 1___
   - One underground, one aboveground 3___
   - All aboveground 5___

TOTAL FOR SUBDIVISIONS

Low Hazard	0-29
Moderate Hazard	30-39
High Hazard	40-48
Severe Hazard	49-59
Extreme Hazard	60+