

FIREBREAK (FEET)

CODE 394

MONTANA TECHNICAL GUIDE

SECTION IV

DEFINITION

A strip of bare land or fire-retarding vegetation.

PURPOSES

To protect soil, water, air, plant, animal, and human resources by reducing or preventing damage from fire.

CONDITIONS WHERE PRACTICE APPLIES

All land uses where protection from wildfire is needed or prescribed burning is applied.

PLANNING CRITERIA

Firebreaks may be temporary or permanent and shall consist of fire-resistant vegetation, non-flammable materials, bare ground, or a combination.

Firebreaks will be of sufficient width and length to contain the fire.

Firebreaks shall be located to minimize risk to the resources being protected.

Species selection will be based on their attributes in retarding fire and ease of maintenance.

Erosion control measures shall control water erosion and prevent sediment from leaving the site.

Comply with applicable laws and regulations, including the state's Best Management Practices (BMP's).

For open area firebreaks (grasslands, pasturelands, cropland, etc.) the minimum width for a firebreak is 5 feet and the maximum width will not exceed 30 feet.

Expose mineral soil for a width of at least five (5) times the height of the uncut vegetation along the windward side of the firebreak. Wide firebreaks can be established by creating and maintaining two parallel strips of bare soil and then burning the area between the strips each year.

In forested areas, the minimum width of a firebreak will be 12 feet. A greater width will be needed depending on fuel, aspect, and topography. Increase the width anytime the forest understory height exceeds 30 inches. Determine the proper width by multiplying the height in feet of the dominant understory vegetation by five (5). Clear snags, saplings, and larger trees upwind from the edge of the firebreak for a distance equal to the height of the trees.

Where opportunities exist for establishing fire retarding vegetation, plant an adapted species of grasses or other vegetation which produces low volumes of herbage. (SEE TABLE 2) When using fire retarding vegetation, tree overstory and snags must be cleared as indicated above. Mowing or grazing can be used to avoid a build-up of dead litter.

High elevation forested sites provide fire retarding vegetation where understory vegetation production is low and soil moisture is rarely deficient, and vegetation remains succulent. Upper Subalpine and Timberline Habitat Types would qualify as high elevation forested sites.^{1/}

Where bare soil firebreaks are used, adequate erosion control structures or practices must be designed and maintained.

Keep grades low enough and slope length short enough to avoid rill and gully erosion. Roll grades, outslope, and install water bars where necessary to keep slope length as short as possible.

^{1/} See Pfister et. al., Forest Habitat Types of Montana

NOTE: This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

On long grades where runoff water cannot be disposed of by rolling the grade or outsloping the firebreaks, waterbars will be installed based on the steepness and length of grade. Use TABLE 1 to determine the soil erosion index.

Where a bare ground firebreak is used in conjunction with a prescribed burn and there is no need to maintain the firebreak in future years, all disturbed areas must be reseeded using either Field Office Technical Guide (FOTG), Section IV, Practice Standards 342–Critical Area Planting, 550–Pasture and Hayland Planting.

PLANNING CRITERIA ON IDLED CROPLANDS (CRP) ONLY

Firebreaks in idle cropland fields, is used, will be located along major travel corridors or adjacent to farm facilities, communities, or other structures needing protection.

Specifically for firebreaks in idle cropland fields the Farm Services Agency (FSA) county committee will be contacted for appropriate policies and procedures for including firebreaks in existing contracts.

Firebreaks in idle croplands will be installed as a single bare ground strip or a combination of one or two bare ground strips and a mowed area. If two bare ground strips are used, the mowed area will separate the two bare strips. If one bare ground strip and a mowed area are used, the mowed area will be located between the bare ground strip and the remainder of the idle cropland field.

The width of a single bare ground strip—with no mowed strip—will be a minimum of 50 feet and a maximum of 200 feet. The width of any one of the two bare ground strips, when used with a mowed strip, will be a minimum of 50 feet and a maximum of 200 feet.

The width of the mowed strip will be a minimum of 100 feet and a maximum of 150 feet. The vegetation will be mowed using a flail, conventional mower with a sickle bar or a swather with the canvas removed. The vegetation is to be laid flat. The vegetation is not to be mowed in such a way that a windrow will be created.

Idle cropland fields need wider firebreak widths than for open area firebreaks—grassland, pasturelands, croplands, etc.—due to the build up and height of the vegetative matter (fuel).

The width of the firebreak in the idle cropland fields that are immediately adjacent to structures—homes, barns, buildings, etc.—will be approximately 250 feet. This to better prepare a defense for those structures.

In idle cropland fields where wind erosion is a problem and the "I" factor for the soil is greater than "86," a barrier of unmowed vegetation at least five (5) feet wide must be retained on the windward side(s) of each bare ground strip. This will help to reduce soil loss from wind erosion.

MAINTENANCE

Firebreaks will be maintained throughout the summer and fall. The following maintenance will be performed as needed.

- 1) Following the initial mowing of the mowed strip, the strip will be reclipped if the vegetation regrows and achieves more than approximately eight (8) inches in height.
- 2) The bare strips will be maintained by tilling to kill any volunteer or regrowing vegetation. The tillage can be done by any implement which will remove herbaceous material from the soil surface.

PLANNING CONSIDERATIONS

Using existing barriers such as streams, lakes, ponds, rock cliffs, roads, drainage canals, railroads, utility right-of-way, and cultivated land as natural firebreaks.

Where slopes exceed six (6) percent, locate firebreaks on the contour when possible to minimize risk of water soil erosion.

Select plant species that are short, fire-retarding, and provide wildlife habitat.

PLANNING CONSIDERATION FOR WATER

QUANTITY

- 1) Effects on the components of the water budget.

QUALITY

- 1) Effects on the erosion and the movement of sediment and soluble and sediment attached substances that would possibly be carried by runoff.

- 2) Effects on the movement of dissolved substances to ground water.

The need for a firebreak is dependent upon the value of the resource to be protected. The cost of installation should be weighed against the loss of the resource should a wild fire occur.

Proper functioning of a firebreak is dependent upon establishing an adequate width of bare soil or fire retarding vegetation and locating the firebreak to take advantage of favorable existing landscape features, i.e., ridges, streams, roads, and other areas of reduced fuels.

Firebreaks may be installed by plowing, burning, chemical burn back, grazing, mowing or clipping, or through establishment of vegetation which produces low volumes of herbage or which remains succulent throughout most of the growing season.

Species selected for planting fire-retarding firebreaks should be adapted to the site conditions. Vegetation should provide for some greater level of erosion control than would occur on a bare soil firebreak.

Adequate firebreak width is strongly dependent on the height of the surrounding vegetation.

Topography can be used to improve firebreak effectiveness. In general, locate firebreaks on ridge crests or valley bottoms. However, if prevailing wind direction is predictable, firebreaks should be located on the leeward side of ridge crests. In remove areas every effort should be made to follow grades and topography that will allow the use of firebreaks for equipment travel.

A weed control program should be planned. Disturbed areas that are not cultivated as part of a bare soil firebreak may serve as sites for weed establishment. Follow-up treatment will be needed to control problem weeds.

Disturbed areas created during firebreak establishment that are not part of the firebreak and eroded areas, should be reseeded using either FOTG, Section IV, Practice Standards and Specifications, 342–Critical Area Planting, 550–Range Planting, or 512–Pasture and Hayland Planting.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

PLANNING CONSIDERATIONS FOR IDLE CROPLANDS ONLY

Idled cropland fields often contain several years of accumulated growth. These materials are fine fuels which readily burn once ignited. A certain level of protection can be provided to an existing field, to farm facilities, or to other structures by the use of a firebreak. However, it must be recognized that under some conditions, it cannot be assumed a firebreak of any dimension will halt the advance of a fire. For an idea of the changes in fire intensity and spotting distances with changes in fire intensity and spotting distances with changes in wind speed and fuel type. (REFER TO ATTACHMENT A)

The intent of these planning considerations are to provide guidance in installation of firebreaks which will reduce the potential of a fire getting started in idle cropland fields or will create a fuel situation which will sufficiently reduce flame length and slow the rate of advance of a wildfire to allow a suppression crew to attack the fire.

Planning criteria to be considered include the location of idle cropland fields in relation to the facilities to be protected, prevailing wind direction, and the "I" factor of the soils which will be exposed through clean tillage.

Any variance from these specifications require the approval of the state conservationist.

Other measures to consider to reduce fire hazard around farmsteads include:

- 1) Clipping tall-growing, dry vegetation;
- 2) Maintaining a strip of green vegetation between the idle cropland fields and the buildings; and,
- 3) Setting up a sprinkler system in the mowed strip which can be turned on in event of a fire.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specifications sheets, job sheets, narrative statements in the consideration plan, or other acceptable documentation.

(REFER TO ATTACHMENT B)

TABLE 1. EROSION INDEXES

USCS SYMBOL	SOIL DESCRIPTION	EROSION INDEX
g	Gravels.	100
s	Sands.	80-90
ls, sl	Loamy sands and sandy loams.	10-20
scl	Sandy clay loam.	50
sc	Sandy clay.	40
sil, si	Silt loam and silt.	10-20
l, cl	Loam and clay loam.	40
sicl	Silty clay loam.	30-40
c, sic	Clay, silty clay.	50-60

INITIAL SPACING REQUIREMENTS FOR INSTALLATION OF WATERBARS CAN BE ESTIMATED USING THE FOLLOWING FORMULAS:

FOR EROSION INDEXES OF 10-40	- SPACING (FEET) =	$\frac{1000}{\% \text{ SLOPE } ^{1/}}$
FOR EROSION INDEXES OF 40-90	- SPACING (FEET) =	$\frac{2000}{\% \text{ SLOPE } ^{1/}}$
FOR EROSION INDEXES OF 90-100	- SPACING (FEET) =	$\frac{4000}{\% \text{ SLOPE } ^{1/}}$

EXACT LOCATION OF WATER BARS MUST BE DETERMINED ON SITE. USE THE ABOVE SLOPE AND SELECTION OF AREAS WHERE WATER CAN BE DIVERTED WITHOUT CAUSING SEVERE EROSION PROBLEMS.

^{1/} % Slope is expressed as a whole number.

TABLE 2. SELECTED SPECIES FOR ESTABLISHING FIRE-RETARDING VEGETATIVE FIREBREAKS.

SPECIES ^{1/}	CULTIVER	SEEDING RATE ^{3/} PURE LIVE SEED / ACRE		SEEDS PER POUND	PRECIPITATION REQUIREMENTS (INCHES)
		BROADCAST ^{4/} (POUNDS)	DRILLED ^{4/} (POUNDS)		
Sheep Fescue	<i>Covar</i>	5	3	680,000	6-14
Hard Fescue	<i>Durar</i>	6	3	565,000	14-20
Canada Bluegrass ^{2/}	<i>Rueben</i>	3	3	2,500,000	12-22
Common White Clover		4	3	800,000	16 +
Red Clover	<i>Kenland/Lakeland</i>	13	6.5	272,000	16 +
Birdsfoot Trefoil	<i>Empire/Leo</i>	8	4	418,000	14 +
Orchardgrass ^{2/}	<i>Potomac/Latar</i>	7	3.5	464,000	16 +
Alfalfa		15	7.5	225,000	16 +
Tall Fescue	<i>Alta</i>	14	7	242,000	16 +
Forage Kochia ^{5/}	<i>'Immigrant'</i>	9	4.5	395,000	12 +
Russian Wildrye	<i>'Bozoisky'</i>	26	13	134,000	10 +

^{1/} See FOTG 512–Pasture and Hayland Planting standards and specifications for additional information on soil, site, and climatic adaptation for each species, as well as recommended cultivars.

^{2/} Recommended for high elevation forest sites only.

^{3/} Recommended rate about 80 seeds/square feet for broadcast–40 seeds/square feet for drilled.

^{4/} Minimum rate at 3 lbs. seed/acre due to equipment and seed physics.

^{5/} Seed planted within 6 months of harvest.

**ATTACHMENT A MONTANA STATE DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
FIRE INTENSITY AND SPOTTING DISTANCES**

FUEL BEHAVIOR MODELS

CONDITION	VEGETATIVE MATTER			
1. GRASS	-	1.0 foot tall	=	0.74 tons/acre
2. GRASS	-	2.5 feet tall	=	3.0 tons/acre
3. BRUSH	-	6.0 feet tall	=	13.0 tons/acre

ADVANCEMENT SPEED AND FLAME LENGTH

CONDITION		WIND = MPH		
		10	20	40 ^{1/}
1.	ADVANCEMENT SPEED IN MPH	3.8	3.8	3.8
	FLAME LENGTH IN FEET	7.9	8.0	8.0
2.	ADVANCEMENT SPEED IN MPH	3.9	9.6	17.2
	FLAME LENGTH IN FEET	21.0	32.0	42.0
3.	ADVANCEMENT SPEED IN MPH	3.1	8.3	22.0
	FLAME LENGTH IN FEET	35.0	54.0	85.0

^{1/} Models at 40+ MPH and higher tonnages may not be accurate.
These are computer models and rates are extrapolated from lower MPH information.

ADVANCEMENT SPEED →

SPOTTING DISTANCE—MAXIMUM/MILE

CONDITION	WIND = MPH		
	10	20	40
1.	.25 MI.	.40 MI.	.60 MI.
2.	.55 MI.	1.10 MI.	1.90 MI.
3.	.63 MI.	1.30 MI.	2.55 MI.

CONTROL SCENARIOS

FLAME LENGTH	FIRE CONTROL METHOD
< 4 FEET	- GENERALLY CAN FIGHT WITH HAND TOOLS
4 FEET TO 8 FEET	- LARGE EQUIPMENT REQUIRED
> 8 FEET	- INDIRECT—FLANKING [CANNOT CATCH FIRE]

UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

FIREBREAK (FEET)
CODE 394

MONTANA CONSERVATION PRACTICE SPECIFICATION WORKSHEET

ATTACHMENT B

PRODUCER

DATE

LOCATION, FIELD NO., TRACT, OR CTU

DEFINITION: A strip of bare land or fire-retarding vegetation.

SCOPE: This specification provides direction for the construction and maintenance of a barrier to protect various land uses from uncontrolled fires.

FIREBREAK SPECIFICATIONS: Bare area firebreaks must be completely free of vegetation. Wind and water erosion is controlled.

Burned, grazed, and mowed/clipped strips will be reclipped if the vegetation regrows and achieves more than approximately eight (8) inches in height.

Where a bare ground firebreak is used in conjunction with a prescribed burn and there is no need to maintain the firebreak in future years, all disturbed areas must be seeded down using specifications satisfying either the 342–Critical Area Planting, 550–Range Planting, or 512–Pasture and Hayland Planting standards.

FIREBREAK: _____ TEMPORARY (FOR _____ MONTHS) _____ PERMANENT

TYPE: _____ BARE MINERAL SOIL *
_____ CHEMICAL BURNBACK
_____ MOWING/CLIPPING
_____ OTHER: _____
_____ BURNED VEGETATION
_____ GRAZING
_____ LOW VEGETATION

* See ADDITIONAL SPECIFICATIONS for water erosion control practices.

1. OPEN AREA FIREBREAKS (GRASSLAND–CROPLAND–ETC.)

LAND COVER TYPE:

_____ CROPLAND
_____ PASTURELANDS
_____ GRASSLAND WITH SHRUBS
_____ GRASSLAND WITHOUT SHRUBS

HEIGHT OF UN CUT VEGETATION ON WINDWARD SIDE:

_____ FEET

X 5

FIREBREAK WIDTH:
(5 FEET MINIMUM)

_____ FEET

For areas where wind erosion is a problem, a barrier of unmowed vegetation at least five (5) feet wide may be retained on the windward side(s) of each bare ground strip.

2. IDLE CROPLAND FIREBREAKS (CRP)

TYPE: _____ ONE BARE GROUND STRIP AND A MOWED AREA
 _____ TWO BARE GROUND STRIPS AND A MOWED AREA
 _____ SINGLE BARE BROUND STRIP

BARE GROUND STRIP WIDTH _____ FEET
 (WITH A MOWED AREA) (MINIMUM 50 FEET/MAXIMUM 200 FEET)

MOWED STRIP WIDTH _____ FEET
 (MINIMUM 100 FEET/MAXIMUM 150 FEET)

SINGLE BARE GROUND STRIP WIDTH _____ FEET
 (MINIMUM 50 FEET/MAXIMUM 200 FEET)

If two bare ground strips are used, then the mowed area will separate the two bare strips.

If one bare ground strip is used, then the mowed area will be located between the bare ground strip and the field.

For areas where wind erosion is a problem, a barrier of unmowed vegetation at least five (5) feet wide may be retained on the windward side(s) of each bare ground strip.

3. FORESTED AREA FIREBREAKS (SHRUB AND FORESTLANDS)

FOREST HABITAT TYPE (Pfister): _____

DOMINANT UNDERSTORY FUEL TYPE:

_____ LOW GRASS _____ HIGH GRASS _____ MEDIUM TO TALL SHRUB

DOMINANT ASPECT: N E S W

SLOPE: _____ PERCENT (%)

DOMINANT HEIGHT OF UNDERSTORY VEGETATION: _____ FEET

 X 5

FIREBREAK WIDTH: _____ FEET
 (12 FEET MINIMUM)

Firebreaks must be cleared of flammable materials. Clear snags, saplings, downed logs, other woody debris, and some larger trees upwind from the edge of the firebreak a distance equal to the height of the trees.

OPERATIONS AND MAINTENANCE:

- Noxious weeds, by state law, must be controlled.
- Inspect and maintain erosion control practices annually to insure proper functioning.
- Inspect firebreaks periodically to insure that vegetation is controlled at the most opportune time.
- Mow or graze vegetative firebreaks to avoid a build-up of dead litter and to control weeds.
- Inspect for and remove weedy materials such as dead limbs and blown down trees from the firebreak.
- Access by vehicles or people will be controlled to prevent damage to the firebreak.
- Bare ground firebreaks which are no longer needed will be stabilized or reseeded to control weeds and erosion.

ATTACHMENT B JOB SPECIFICATION for 394–FIREBREAK (FEET) CONTINUED

ADDITIONAL SPECIFICATIONS:

A. Water Bars

<u>LOCATION</u>	<u>SOIL TEXTURE</u>	<u>EROSION INDEX</u>	<u>SLOPE</u>	<u>SPACING</u>
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B. Vegetative Seedings

<u>LOCATION</u>	<u>SPECIES</u>	<u>SEEDING RATE (PLS)</u>	<u>ACRES</u>	<u>TOTAL SEED</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

C. Other Specifications:

D. See Attachment ()

NRCS APPROVAL:

NRCS TECHNICIAN

DATE