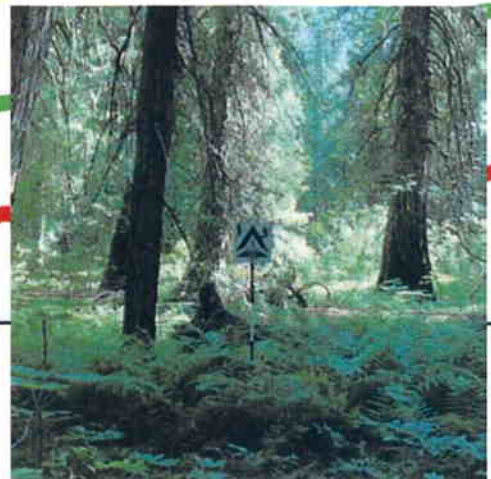
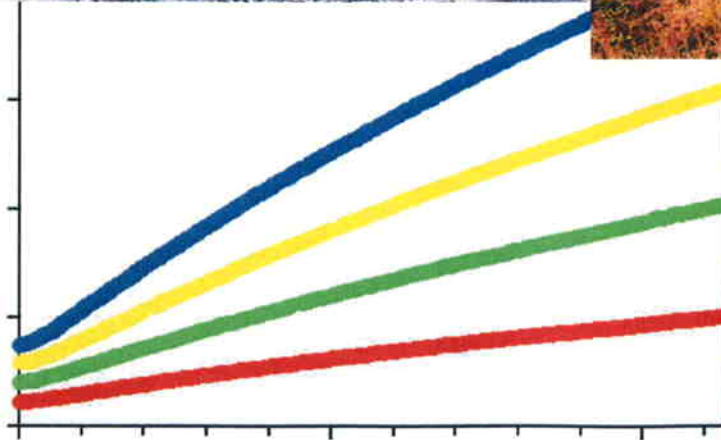




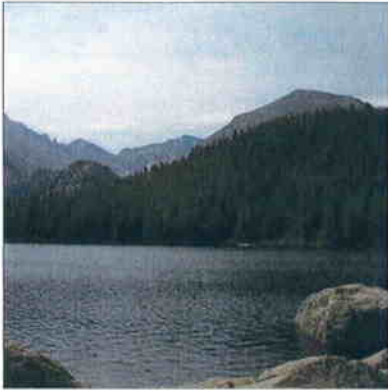
Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model

Joe H. Scott
Robert E. Burgan



NB8 (98)

Open Water



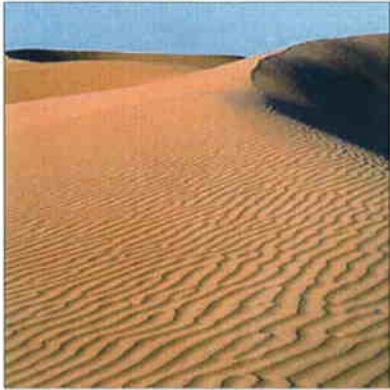
Description: Land covered by open bodies of water such as lakes, rivers and oceans comprises NB8.

Expected fire behavior:

No fire spread

NB9 (99)

Bare Ground



Description: Land devoid of enough fuel to support wildland fire spread is covered by fuel model NB9. Such areas may include gravel pits, arid deserts with little vegetation, sand dunes, rock outcroppings, beaches, and so forth.

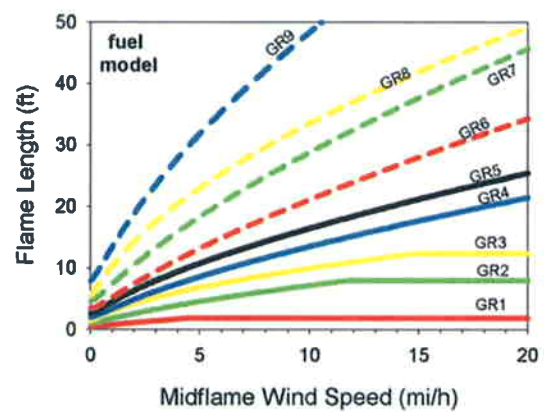
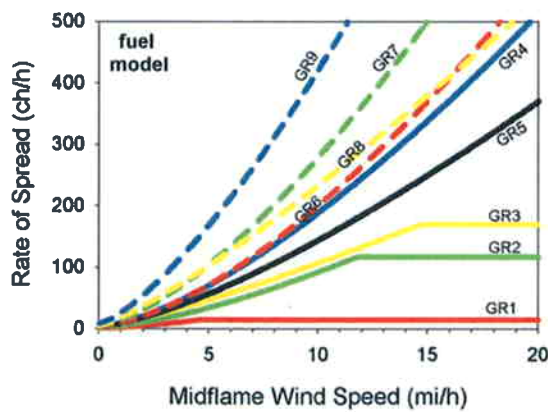
Expected fire behavior:

No fire spread

Grass Fuel Type Models (GR)

The primary carrier of fire in the GR fuel models is grass. Grass fuels can vary from heavily grazed grass stubble or sparse natural grass to dense grass more than 6 feet tall. Fire behavior varies from moderate spread rate and low flame length in the sparse grass to extreme spread rate and flame length in the tall grass models.

All GR fuel models are dynamic, meaning that their live herbaceous fuel load shifts from live to dead as a function of live herbaceous moisture content. The effect of live herbaceous moisture content on spread rate and intensity is strong.



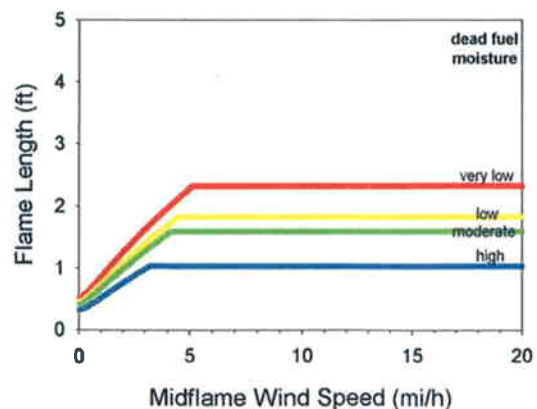
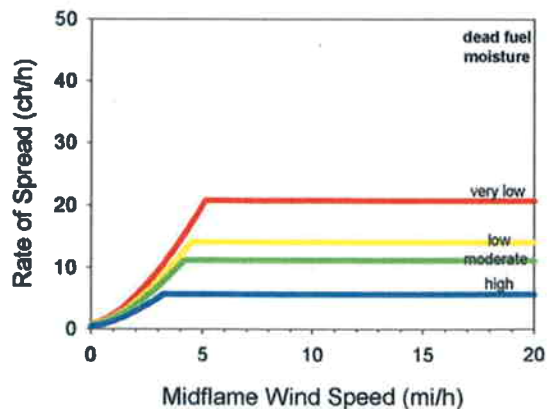
GR1 (101)

Short, Sparse Dry Climate Grass (Dynamic)



Description: The primary carrier of fire in GR1 is sparse grass, though small amounts of fine dead fuel may be present. The grass in GR1 is generally short, either naturally or by grazing, and may be sparse or discontinuous. The moisture of extinction of GR1 is indicative of a dry climate fuelbed, but GR1 may also be applied in high-extinction moisture fuelbeds because in both cases predicted spread rate and flame length are low compared to other GR models.

Fine fuel load (t/ac)	0.40
Characteristic SAV (ft-1)	2054
Packing ratio (dimensionless)	0.00143
Extinction moisture content (percent)	15



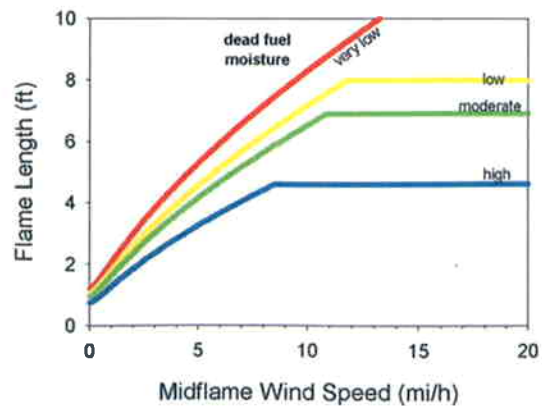
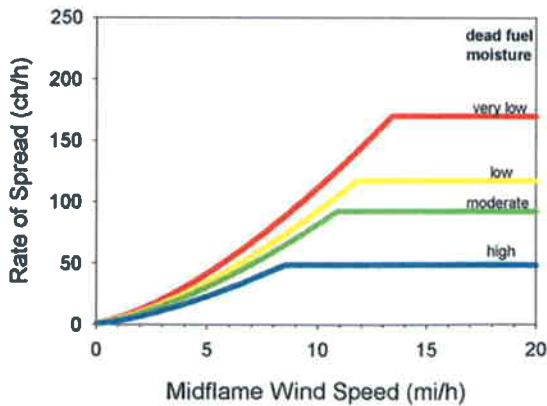
GR2 (102)

Low Load, Dry Climate Grass (Dynamic)



Description: The primary carrier of fire in GR2 is grass, though small amounts of fine dead fuel may be present. Load is greater than GR1, and fuelbed may be more continuous. Shrubs, if present, do not affect fire behavior.

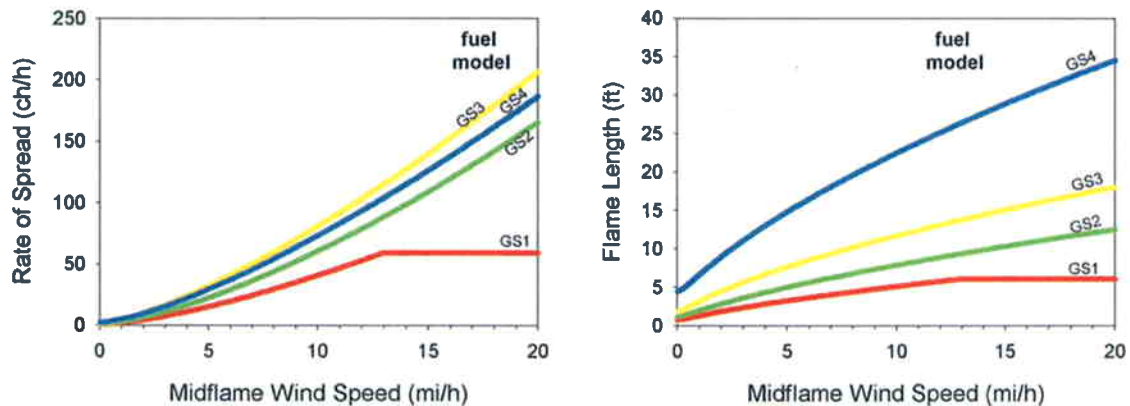
Fine fuel load (t/ac)	1.10
Characteristic SAV (ft-1)	1820
Packing ratio (dimensionless)	0.00158
Extinction moisture content (percent)	15



Grass-Shrub Fuel Type Models (GS)

The primary carrier of fire in the GS fuel models is grass and shrubs combined; both components are important in determining fire behavior.

All GS fuel models are dynamic, meaning that their live herbaceous fuel load shifts from live to dead as a function of live herbaceous moisture content. The effect of live herbaceous moisture content on spread rate and intensity is strong and depends on the relative amount of grass and shrub load in the fuel model.



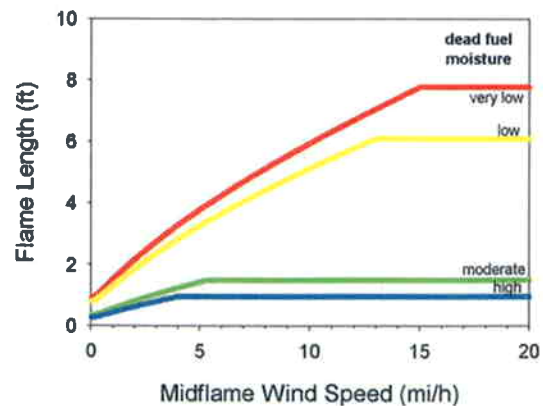
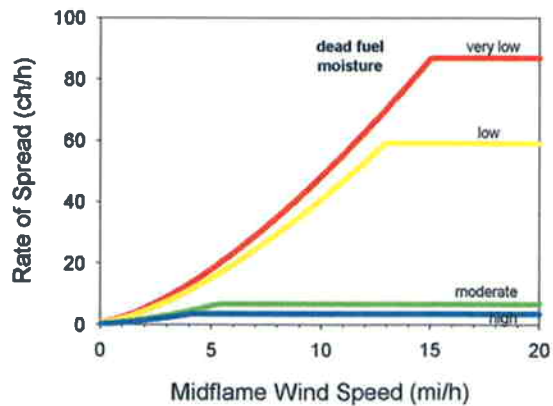
GS1 (121)

Low Load, Dry Climate Grass-Shrub (Dynamic)



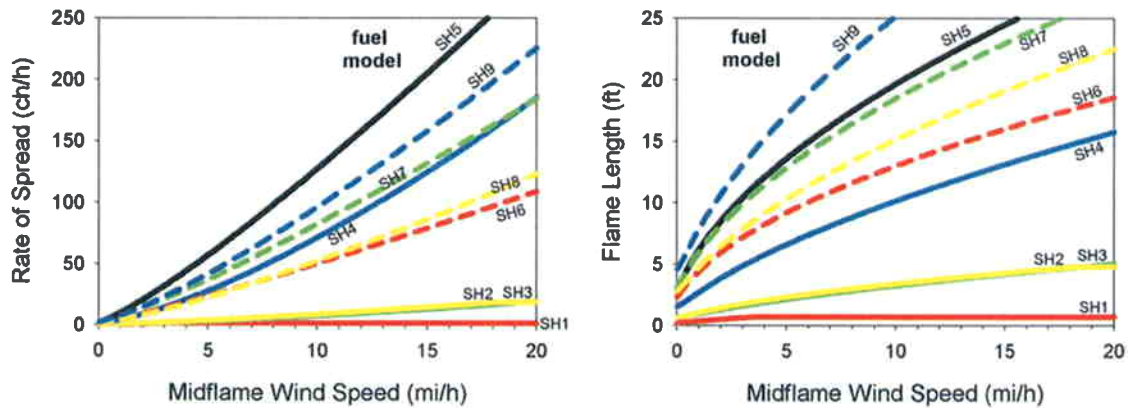
Description: The primary carrier of fire in GS1 is grass and shrubs combined. Shrubs are about 1 foot high, grass load is low. Spread rate is moderate; flame length low. Moisture of extinction is low.

Fine fuel load (t/ac)	1.35
Characteristic SAV (ft-1)	1832
Packing ratio (dimensionless)	0.00215
Extinction moisture content (percent)	15



Shrub Fuel Type Models (SH)

The primary carrier of fire in the SH fuel models is live and dead shrub twigs and foliage in combination with dead and down shrub litter. A small amount of herbaceous fuel may be present, especially in SH1 and SH9, which are dynamic models (their live herbaceous fuel load shifts from live to dead as a function of live herbaceous moisture content). The effect of live herbaceous moisture content on spread rate and flame length can be strong in those dynamic SH models.



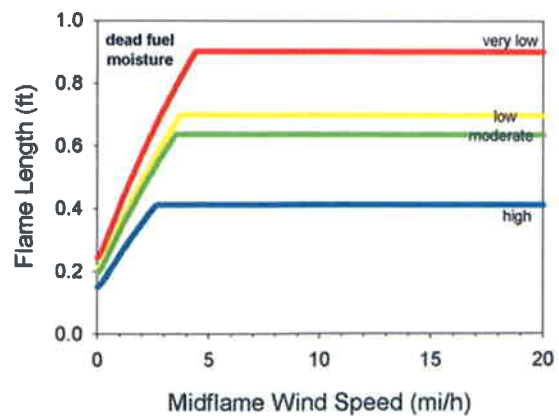
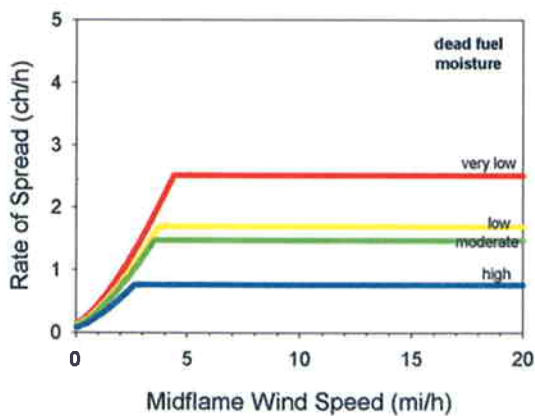
SH1 (141)

Low Load Dry Climate Shrub (Dynamic)



Description: The primary carrier of fire in SH1 is woody shrubs and shrub litter. Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate is very low; flame length very low.

Fine fuel load (t/ac)	1.7
Characteristic SAV (ft-1)	1674
Packing ratio (dimensionless)	0.00280
Extinction moisture content (percent)	15



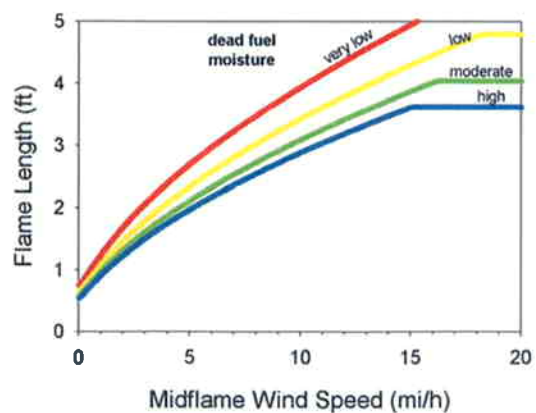
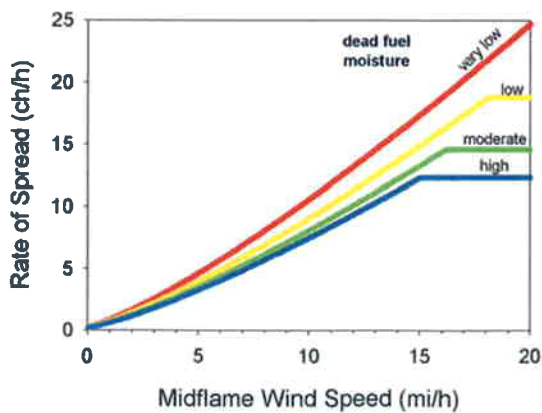
SH3 (143)

Moderate Load, Humid Climate Shrub



Description: The primary carrier of fire in SH3 is woody shrubs and shrub litter. Moderate shrub load, possibly with pine overstory or herbaceous fuel, fuel bed depth 2 to 3 feet. Spread rate is low; flame length low.

Fine fuel load (t/ac)	6.65
Characteristic SAV (ft-1)	1371
Packing ratio (dimensionless)	0.00577
Extinction moisture content (percent)	40



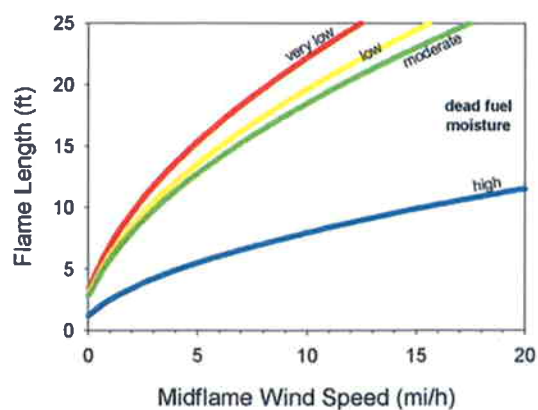
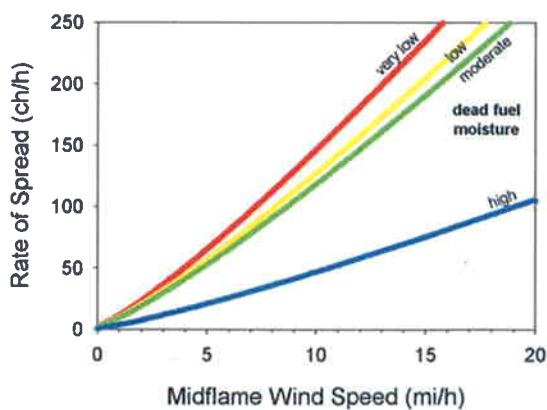
SH5 (145)

High Load, Dry Climate Shrub



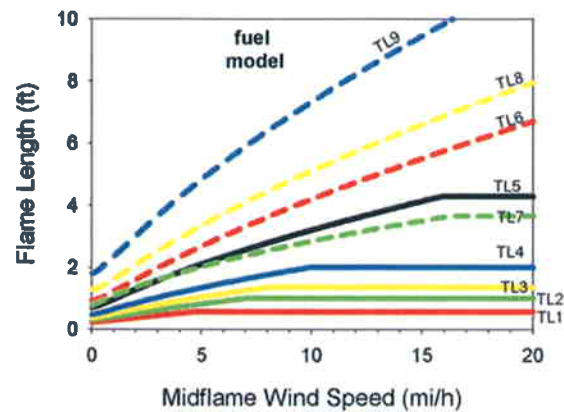
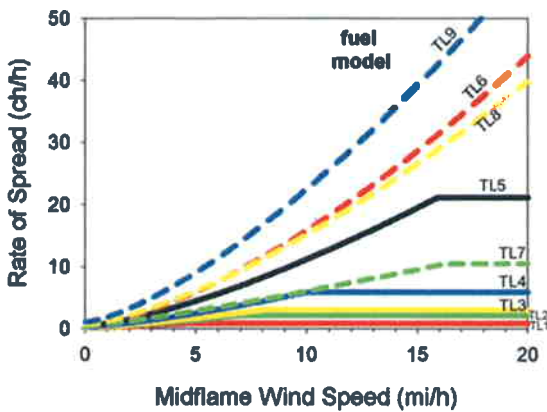
Description: The primary carrier of fire in SH5 is woody shrubs and shrub litter. Heavy shrub load, depth 4-6 feet. Spread rate very high; flame length very high. Moisture of extinction is high.

Fine fuel load (t/ac)	6.5
Characteristic SAV (ft-1)	1252
Packing ratio (dimensionless)	0.00206
Extinction moisture content (percent)	15



Timber Litter Fuel Type Models (TL)

The primary carrier of fire in the TL fuel models is dead and down woody fuel. Live fuel, if present, has little effect on fire behavior.



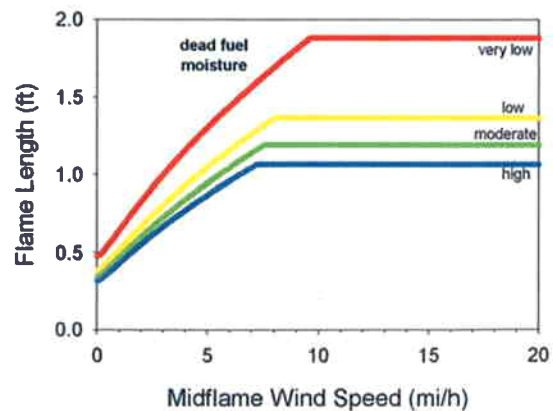
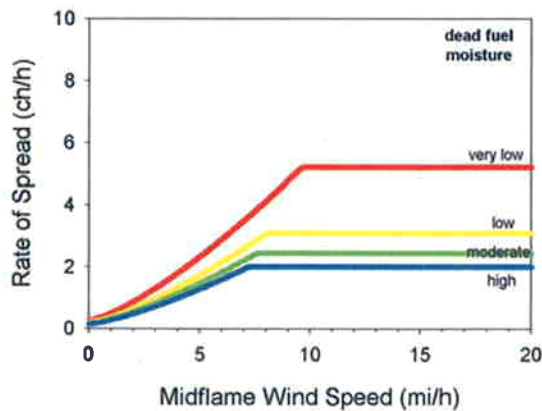
TL3 (183)

Moderate Load Conifer Litter



Description: The primary carrier of fire in TL3 is moderate load conifer litter, light load of coarse fuels. Spread rate is very low; flame length low.

Fine fuel load (t/ac)	0.50
Characteristic SAV (ft-1)	1532
Packing ratio (dimensionless)	0.02630
Extinction moisture content (percent)	20



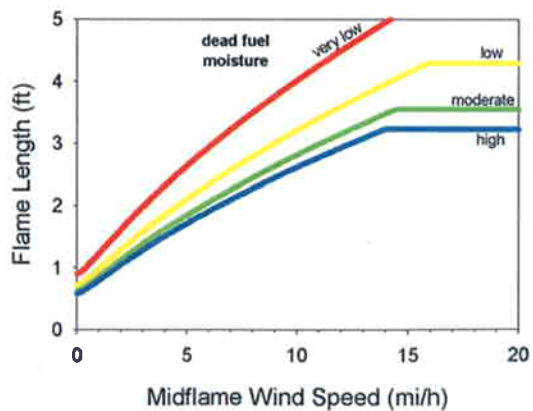
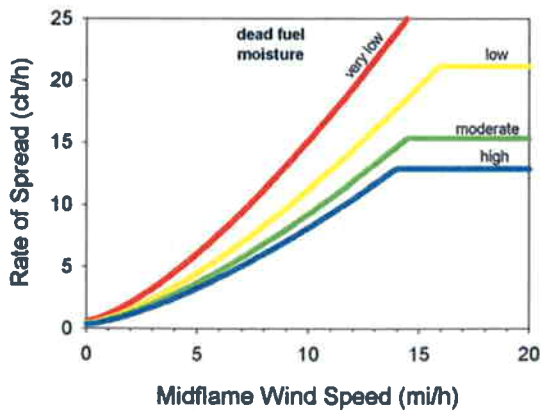
TL5 (185)

High Load Conifer Litter



Description: The primary carrier of fire in TL5 is high load conifer litter; light slash or mortality fuel. Spread rate is low; flame length low.

Fine fuel load (t/ac)	1.15
Characteristic SAV (ft-1)	1713
Packing ratio (dimensionless)	0.01925
Extinction moisture content (percent)	25



TL7 (187)

Large Downed Logs



Description: The primary carrier of fire in TL7 is heavy load forest litter, includes larger diameter downed logs. Spread rate low; flame length low.

Fine fuel load (t/ac)	0.30
Characteristic SAV (ft-1)	1229
Packing ratio (dimensionless)	0.03515
Extinction moisture content (percent)	25

