

**FIREMON CBI Cheat Sheet V4, June 2004**

Revised AK 6/8/2005

**STRATA:**

**Substrates** - Inert surface materials of soil, duff, litter, and downed woody fuels. **Herbs, Low Shrubs, Trees < 1 m** – All grasses + forbs, mosses + lichens, and shrubs + small trees <1 m. **Tall Shrub and Trees 1-2 m** - Shrubs and small trees 1-5 m tall. **Intermediate Trees (pole-size, subcanopy) 2-8 m**- Trees between tall shrubs and upper canopy, approx. 10-25 cm diameter, and 2-8 m tall. May be stratified heights and extend to upper canopy, but crowns receive little direct sunlight. Size is relative to upper canopy and varies by community. If this size is upper canopy, count as intermediate trees. **Big Trees (dominant and co-dominant, upper canopy)** – Larger than intermediate trees, occupy upper canopy, receive direct sunlight above; tallest may extend above average big-tree level. **Understory** - Substrates, herbs/low shrubs/tiny trees, tall shrubs/small trees. **Overstory** - Intermediate and big trees. **Total Plot, or Overall** - All strata of the plot combined.

**GENERAL:**

**Pre-fire exposed soil/rock** is considered unburned if there is no sign of overlying substrates or vegetation that burned. Avoid sites with >50% exposed pre-fire soil/rock, see guidelines. **Rehab Site** - mulch or other does not count, estimate as if that was not present. Planted, growing vegetation can be tallied where appropriate, but not as new colonizers. **A specific factor may not be rated** if is not relevant, shows inconsequential presence or insignificant indication of severity (not applicable N/A), or when effects are unclear and cannot be reasonably judged (uncertain UC).

**% Plot Area Burned** – Enter % of 30 m plot area (and 20 m plot if used) exhibiting *any sign* of burning.

**Pre-Fire Variables** – Report cover (% area), depth (inches) and density (number of trees) plot-wide as if before fire. Consider burned evidence + unburned areas within plot or nearby. Estimate non-burnable area within the plot (e.g. pre-fire soil and rock). Pre-fire conditions are particularly relevant to all understory ratings. Develop reasonable approximation of pre-fire conditions. If too difficult to estimate, write in UC for uncertain, or N/A for not applicable.

**SUBSTRATE RATING FACTORS: Do not count litter or fuels built up after fire.**

**Litter/Light Fuel** - Relative amount consumed of leaves, needles, and < 3" dia woody debris that were on the ground at time of fire. Not new litter-fall. Count litter/light fuels even if it occurs under living plants. Note: if less than 15% cover pre-fire, do not score.

**Duff condition** - Relative amount consumed and charring of decomposed organic material lying below the litter, includes moss layer. Not fine root mass. Count even if it occurs under living plants.

**Medium Fuel or Tussock Basal Area**- Consumption of down woody fuel between 3-8" diameter (7.6-20.3 cm) or tussock basal stock consumption. Do not score if no medium fuels or tussocks pre-fire.

**Large Fuel** – Loss and charcoal from down woody fuel >8" dia (20.3 cm). Base both classes on change to fuel load. Omit or join as one if either fuel class < 5% plot cover, see text. Include stumps in appropriate size class, if relevant.

**Exposed Mineral Soil Cover** - New exposed soil and color change; lightening at mod to high, ~10% red at high severity - overlook ash. Consider soil or rock surface *not* covered by litter, duff or low herbaceous cover less than about 30 cm. If such occurs under taller shrubs and trees, count it.

**HERBS, LOW SHRUBS AND TREES LESS THAN 1 METER RATING FACTORS:**

**Moss/Lichen Cover** – The percent change in spatial cover of pre-fire mosses and lichens affected (killed or consumed) by fire.

**% Foliage Altered** – Only low shrub/small trees, pre-fire live-or-dead cover that's newly brown, black or consumed. Ignore post-fire resprout - it does not mitigate against pre-fire foliage altered.

**Frequency % Living/Resprouting** – % of all pre-fire *perennials*, that are unburned plus burned but viable, based on number plot-wide. Survivorship, not cover, not new seedlings. Include all perennial plants plus examine growth points for viability if needed. Do not include new plants from seed or suckers.

**Colonizers** - Potential dominance 2-3 years post fire of new plants from seed (native or exotic), including: non-vasculars, herbs, shrubs and tree seedlings. Include aspen suckering and fireweed or equisetum that have proliferated vegetatively. Rate only if spp response to fire is known.

**Species Composition Relative Abundance** – Change in spp and/or relative abundance of spp anticipated 2-3 years post fire. How much does post-fire spp composition resemble pre-fire stratum? Consider presence of new or absence of old spp, plus how dominance is spread across spp.

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**TALL SHRUB AND TREES 1-2 METERS RATING FACTORS:**

**% Foliage Altered** - % pre-fire live-or-dead crown volume (leaves, stems) newly brown, black or consumed. Ignore new resprout - it does *not* lessen the amount of pre-fire foliage altered.

**Frequency % Living** - % of pre-fire tall shrubs/trees 1-2 m, unburned plus burned but viable, based on number of shrubs & trees plot-wide. Survivorship frequency, not cover, not new seedlings. Include all green in stratum plus examine growth points for viability if needed. Consider within 2 yrs post fire.

**% Change in Cover** – Plot-wide % decrease in cover for up to 2 yrs post-fire, relative to area covered pre-fire. Resprout plus unburned cover count to lessen the amount of change in cover.

**Species Composition Relative Abundance** – Change in spp composition and/or relative abundance anticipated 2-3 years post fire. Include larger trees resprouting from the base. How much does post-fire spp composition resemble pre-fire stratum? Consider presence of new or absence of old spp, plus how dominance is spread across spp.

**INTERMEDIATE AND BIG TREE RATING FACTORS (COMBINED):**

**% Unaltered (green)** – % pre-fire live-or-dead crown volume unaltered by fire. Include new resprout from burned crowns, not from bases.

**% Black (torch)** - % pre-fire live-or-dead crown volume that actually caught fire (black or consumed stems, leaves). May or may not be viable post-fire; resprout from black crowns does not lessen % black. At high severity, consumption of fine branching is evident. Include deciduous blackened crowns.

**% Brown (scorch)** – % pre-fire live crown volume affected by scorch or girdle without direct flame contact. Brown is due to proximal heating, where foliage did not catch fire. Includes delayed mortality, insect damage, and brown foliage that has fallen to ground.

**% Canopy Mortality** - % pre-fire live canopy volume made up by trees killed directly or indirectly by fire w/in 1-2 yrs. Proportion of a plot's total once-living canopy lost to dead trees (incl. insect/disease kill) in relation to total pre-fire canopy volume.

**Char Height** - Mean char height from ground flames averaged over all trees. The mean is halfway between upper and lower heights on a tree. Include unburned (char height=0) and burned trees *only* when char height is discernable. Do *not* include black from crown fire; enter N/A for most crown fire burns.

**Record For Each Overstory Stratum, but Do Not Count in CBI Scores:**

**% Girdled (at root or lower bole)** - % of trees effectively killed by heat through the lower bark, sufficient to kill cambium around lower boles or buttress roots. Include trees either dead or likely to die within 1-2 years. Do not include trees killed by torch or scorch to crown. May show char through bark or loose sloughing bark in 1-2 years.

**% Felled (downed)** - % live-or-dead trees, that were standing before fire but now are on the ground. Usually from wind throw after fire, they exhibit fresh up-turned root masses, and different charring patterns than trees that were down when fire occurred.

**% Tree Mortality** - % of once living trees on the plot that were killed by the fire, based on number of trees. Suspected insect and disease effects also may be included, if such contributed to killing whole trees relatively soon after fire, e.g. within 1-2 years.

## BURN SEVERITY -- COMPOSITE BURN INDEX (BI) -- Modified for ALASKA 6/8/2005

<b>Plot Description</b>	Examiners:			Fire Name:		
Registration Code		Project Code		Plot Number		
Field Date mmddyyyy	/ /	Fire Date mmyyyy	/			
Plot Aspect		Plot % Slope		Elevation (m)		
Plot Radius Overstory	10 meters	Latitude plot center		GPS Datum		
Plot Radius Understory	10 meters	Longitude plot center		GPS Error (m)		
Number of Plot Photos		Plot Photo IDs and Time				

<b>BI - Long Form</b>	% Burned 20 m Plot =	% Burned 30 m Plot =	Fuel Photo Series =				
<b>STRATA RATING FACTORS</b>	<b>BURN SEVERITY SCALE</b>						<b>FACTOR SCORES</b>
	No Effect	Low		Moderate		High	
	0.0	0.5	1.0	1.5	2.0	2.5	

### A. SUBSTRATES

<b>% Pre-Fire Cover:</b> Litter =      Duff =      Soil/Rock =      Tussocks =								
<b>Pre-Fire Depth (cm):</b> Litter =      Duff =      Fuel Bed =								
Litter/ Light Fuels: W. Debris <3" Diam. Fuel Consumed	Nochange	--	50% litter	--	100% litter	>80% light fuel	98% Light Fuel	
Duff	Nochange	--	Light char	--	50% loss deep char	--	Consumed	
Medium Fuel, 3-8 in. or Tussocks basal area	Nochange	--	20% consumed	--	40% consumed	--	>60% loss, deep ch	
Heavy Fuel, > 8 in.	Nochange	--	10% loss	--	25% loss, deep char	--	>40% loss, deep ch	
Exposed Mineral Soil Cover	Nochange	--	10%	--	40%	--	>80%	

Σ =  
N =  
X̄ =

### B. HERBS, LOW SHRUBS AND TREES LESS THAN 1 METER:

<b>Pre-Fire Cover:</b> Herbaceous/Graminoids =      Moss/Lichen =      Shrubs < 1m =								
Moss/lichens Cover	Unchanged	--	30%	--	80%	95%	100%	
% Foliage Altered (blk-brn) - shrubs	Unchanged	--	30%	--	80%	95%	100% + branch loss	
Freq % Living/Resprouting	100%	--	90%	--	50%	< 20%	None	
Colonizers - Seed/Spores	Unchanged	--	Low	--	Moderate	High	Low to None	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High change	

Σ =  
N =  
X̄ =

### C. TALL SHRUBS AND TREES 1 TO 2 METERS:

<b>Pre-Fire Cover =</b>								
% Foliage Altered (blk-brn)	0%	--	20%	--	60-90%	> 95%	Signifcnt branch loss	
Freq % Living/Resprouting	100%	--	90%	--	30%	< 15%	< 1%	
% Change in Cover	Unchanged	--	15%	--	70%	90%	100%	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High Change	

Σ =  
N =  
X̄ =

### D. INTERMEDIATE TREES (SUBCANOPY, POLE-SIZED TREES) 2-8 meters

<b>Pre-Fire % Cover =      Pre-Fire Number Living =      Pre-Fire Number Dead =</b>								
% Green (Unaltered)	100%	--	80%	--	40%	< 10%	None	
% Black (Torch)	None	--	5-20%	--	60%	> 85%	100% + branch loss	
% Brown (Scorch)	None	--	5-20%	--	40-80%	< 40 or > 80%	None, due to torch	
% Canopy Mortality	None	--	15%	--	60%	80%	% 100	
Char Height	None	--	1.5 m	--	2.8 m	--	> 5 m	

Σ =  
N =  
X̄ =

**Post Fire: %Felled =      %Tree Mortality =**

### E. BIG TREES (UPPER CANOPY, DOMINANT, CODOMINANT TREES) >8 meters

<b>Pre-Fire % Cover =      Pre-Fire Number Living =      Pre-Fire Number Dead =</b>								
% Green (Unaltered)	100%	--	95%	--	50%	< 10%	None	
% Black (Torch)	None	--	5-10%	--	50%	> 80%	100% + branch loss	
% Brown (Scorch)	None	--	5-10%	--	30-70%	< 30 or > 70%	None, due to torch	
% Canopy Mortality	None	--	10%	--	50%	70%	% 100	
Char Height	None	--	1.8 m	--	4 m	--	> 7 m	

Σ =  
N =  
X̄ =

**Post Fire: %Felled =      %Tree Mortality =**

<b>Community Notes/Comments:</b>	<b>CBI = Sum of Scores / N Rated:</b>	<b>Sum of Scores</b>	<b>N Rated</b>	<b>CBI</b>
	<b>Understory (A+B+C)</b>			
	<b>Overstory (D+E)</b>			
	<b>Total Plot (A+B+C+D+E)</b>			

% Estimators: **20 m Plot:** 314 m<sup>2</sup> 1% = 1x3 m      5% = 3x5 m      10% = 5x6 m      *After, Key and Benson 1999, USGS NRMSC, Glacier Field Station.*  
**30 m Plot:** 707 m<sup>2</sup> 1% = 1x7 m (<2x4 m)      5% = 5x7 m      10% = 7x10 m      *AK Revised: Version 4.0 June 8, 2005*  
 Strata and Factors are defined in FIREMON Landscape Assessment, Chapter 2, and on accompanying BI "cheat sheet". [www.fire.org/firemon/lc.htm](http://www.fire.org/firemon/lc.htm)