

FFI -- BURN SEVERITY -- COMPOSITE BURN INDEX

PD - Abridged		Examiners:		Fire Name:	
Administrative Unit		Project Unit		Macro Plot	
Field Date mmdyyy	/ /	Fire Date mmyyyy	/		
Plot Aspect		Plot % Slope		UTM Zone	
Plot Diameter Overstory		UTM E plot center		GPS Datum	
Plot Diameter Understory		UTM N plot center		GPS Error (m)	
Number of Plot Photos		Plot Photo IDs			

BI - Long Form	% Burned 100 feet (30 m) diameter from center of plot =	Fuel Photo Series =					
STRATA RATING FACTORS	BURN SEVERITY SCALE						FACTOR SCORES
	No Effect	Low		Moderate		High	
	0.0	0.5	1.0	1.5	2.0	2.5	

A. SUBSTRATES

% Pre-Fire Cover: Litter =								Σ =
Duff =		Soil/Rock =		Pre-Fire Depth (inches): Litter =		Duff =		
Fuel Bed =								
Litter/Light Fuel Consumed	Unchanged	--	50% litter	--	100% litter	>80% light fuel	98% Light Fuel	
Duff	Unchanged	--	Light char	--	50% loss deep char	--	Consumed	
Medium Fuel, 3-8 in.	Unchanged	--	20% consumed	--	40% consumed	--	>60% loss, deep ch	
Heavy Fuel, > 8 in.	Unchanged	--	10% loss	--	25% loss, deep char	--	>40% loss, deep ch	
Soil & Rock Cover/Color	Unchanged	--	10% change	--	40% change	--	>80% change	
CBI_1								

B. HERBS, LOW SHRUBS AND TREES LESS THAN 3 FEET (1 METER):

%Pre-Fire Cover =								Σ =
% Enhanced Growth =								
% Foliage Altered (blk-brn)	Unchanged	--	30%	--	80%	95%	100% + branch loss	
Frequency % Living	100%	--	90%	--	50%	< 20%	None	
Colonizers	Unchanged	--	Low	--	Moderate	High-Low	Low to None	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High change	
CBI_1								

C. TALL SHRUBS AND TREES 3 to 16 FEET (1 TO 5 METERS):

%Pre-Fire Cover =								Σ =
% Enhanced Growth =								
% Foliage Altered (blk-brn)	0%	--	20%	--	60-90%	> 95%	Signifcent branch loss	
Frequency % Living	100%	--	90%	--	30%	< 15%	< 1%	
% Change in Cover	Unchanged	--	15%	--	70%	90%	100%	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High Change	
CBI_1								

D. INTERMEDIATE TREES (SUBCANOPY, POLE-SIZED TREES)

%Pre-Fire Cover =								Σ =
Pre-Fire Number Living =				Pre-Fire Number Dead =				
% Green (Unaltered)	100%	--	80%	--	40%	< 10%	None	
% Black (Torch)	None	--	5-20%	--	60%	> 85%	100% + branch loss	
% Brown (Scorch/Girdle)	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	
CBI_1								

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

E. BIG TREES (UPPER CANOPY, DOMINANT, CODOMNANT TREES)

%Pre-Fire Cover =								Σ =
Pre-Fire Number Living =				Pre-Fire Number Dead =				
% Green (Unaltered)	100%	--	95%	--	50%	< 10%	None	
% Black (Torch)	None	--	5-10%	--	50%	> 80%	100% + branch loss	
% Brown (Scorch/Girdle)	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	
CBI_1								

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

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

% Estimators: **20 m Plot:** 314 m² 1% = 1x3 m 5% = 3x5 m 10% = 5x6 m *After, Key and Benson 1999, USGS NRMSC, Glacier Field Station.*
30 m Plot: 707 m² 1% = 1x7 m (<2x4 m) 5% = 5x7 m 10% = 7x10 m *Version 4.0 8 27, 2004 (updated 11/26/07 for FFI)*

Strata and Factors are defined on the reverse side of this form. See the FIREMON Landscape Assessment, Chapter 2, available at <http://frames.nbio.gov/firemon>, for more information.

STRATA

Substrates—Inert surface materials of soil, duff, litter, and downed woody fuels. **Herbs, Low Shrubs and Trees**—All grasses + forbs, and shrubs + small trees <3 ft (<1 m). **Tall Shrub and Trees**—Shrubs and trees 3–16 ft (1–5 m) tall. **Intermediate Trees (pole-size, subcanopy)**—Trees between tall shrubs/trees and upper canopy, approximately 4–10 inches (10–25 cm) diameter, and 25–65 ft (8–20 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 (mature, dominant and co-dominant, upper canopy)**—Larger than intermediate trees, occupy upper canopy, receive direct sunlight; tallest may extend above average big-tree level. **Understory**—Substrates, herbs/low shrubs+trees, tall shrubs+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 (write in N/A for not applicable), or when effects are unclear and cannot be reasonably judged (write in UC for uncertain). **Percent Plot Area Burned**—Record the percent surface area (burned substrates and low-growing plants) showing any impact from fire for the 98-ft (30-m) diameter plot, and for the nested 66-ft (20-m) plot, if that is used for the understory. **Prefire Variables**—Report cover (percent area), depth (inches) and density (number of trees) plot-wide as if before fire. Consider burned evidence + unburned areas within plot or nearby; reasonable approximation of prefire conditions. If too difficult to estimate, write in UC for uncertain. **Enhanced Growth Factors**—100 percent + percent productivity above that, judged to be fire-enhanced; regard amount of green biomass in terms of cover, volume and density. If plots show about the same or less productivity than before fire, then enter as not applicable (N/A). If plot shows enhanced growth, then enter the percent productivity that is augmented by fire, with 100 percent being the same postfire productivity as prefire (for example, 200 percent represents double the estimated prefire productivity); write in UC if uncertain.

SUBSTRATE RATING FACTORS (Do not count litter or fuels built up after fire.)

Litter/Light Fuel—Relative amount consumed of leaves, needles, and < 3-inches (<7.6-cm) diameter wood on the ground at time of fire. Not new litter-fall. Count litter/light fuel even if it occurs under living plants. **Duff condition**—Relative amount consumed and charring of decomposed organic material lying below the litter. Not fine root mass. Count duff even if it occurs under living plants. **Medium Fuel**—Consumption of down woody fuel between 3–8 inches (7.6–20.3 cm). **Large Fuel**—Loss and charcoal from down woody fuel >8-inch diameter (20.3 cm). Base both classes on change to fuel load. Omit or join as one if either fuel class < 5 percent plot cover, see text. Include stumps in appropriate size class, if relevant. **Soil Cover/Color**—New exposed soil and color change; lightening at moderate to high, ~10 percent 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 3 FEET (1 METER) RATING FACTORS

Percent Foliage Altered—Only low shrubs and trees (<3 ft), prefire live or dead cover that are newly brown, black or consumed. Ignore resprout. **Frequency Percent Living**—Percent of prefire vegetation that is still alive after fire, based on number plot-wide; survivorship, not cover, not new seedlings. Include unburned as well as burned, resprouting perennial herbs, low shrubs and trees (<3 ft) pot-wide. Include all green vegetation as well as burned plants that have not had enough time to resprout but remain viable. Burned plants may need to be examined for viable growth points. Do not include new plants from seed or suckers. **Colonizers**—Potential dominance 2–3 years postfire of new (native or exotic) plants from seed; includes herbs and tree seedlings, plus aspen or other tree-to-shrub suckers, and nonvascular plants (for example, thistle, fireweed, pokeweed, ferns, moss, fungi, seedlings of lodgepole pine, slash pine, western larch, many weedy spp.). 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 postfire. How much does postfire spp. composition resemble prefire stratum? Consider presence of new or absence of old spp., plus how dominance is spread across spp.

TALL SHRUBS AND TREES 3 TO 16 FEET (1 TO 5 METERS) RATING FACTORS

Percent Foliage Altered—Percent prefire live-or-dead crown volume (leaves, stems) newly brown, black or consumed. Ignore new resprout; it does *not* lessen the amount of prefire foliage altered. **Frequency Percent Living**—Percent of prefire tall shrubs/trees that are still alive after fire. This is a measure of survivorship based on numbers of individuals. Include unburned as well as burned but viable tall shrubs/trees 3–6 ft (1–5 m) tall plot wide; examine growth points for viability if needed. Do not include new plants from seed or suckers. Account for potential mortality that could occur up to 2 years postfire. **Percent Change in Cover**—Overall *decrease* in cover of tall shrubs/trees between 3 and 16 ft tall (1 and 5 m), relative to the area occupied by those plants before fire. Count resprouting from plants that burned, plus the unburned plants as cover that lessens the amount of decrease in cover. Do not include suckers or plants newly germinating from seeds. **Species Composition/Relative Abundance** Change in spp. composition and/or relative abundance of spp. Anticipated 2 to 3 years postfire.

INTERMEDIATE AND BIG TREE RATING FACTORS (COMBINED)

Percent Unaltered (green)—Percent prefire live-or-dead crown volume unaltered by fire. Include new resprout from burned mcrowns, not from bases. **Percent Black (torch)**—Percent prefire live-or-dead crown volume that actually caught fire (black or consumed stems, leaves). May or may not be viable postfire; resprout from black crowns does not lessen percent black. At high severity, consumption of fine branching is evident. Include deciduous blackened crowns. **Percent Brown (scorch)**—Percent prefire 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. **Percent Canopy Mortality**—Percent prefire live canopy volume made up by trees killed directly or indirectly by fire within 1–2 years. Proportion of a plot's total once-living canopy lost to dead trees (include insect/disease kill) in relation to total prefire 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

Percent Girdled (at root or lower bole)—Percent 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 or may not char through bark and into the wood; may have loose sloughing bark in 1–2 years. **Percent Felled (downed)**—Percent 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. **Percent Tree Mortality**—Percent 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 (for example, within 1–2 years).

RATING ADVICE

Factors that are not applicable or cannot be resolved in a plot are not rated; they are omitted from that plot's composite ratings. Moreover, if there is much uncertainty about how a specific factor should be rated, or whether it is even relevant to the plot, then that factor should be left unranked. Only the number of rated factors is used to compute averages. If a factor is not rated, enter not applicable (N/A) or uncertain (UC) on the CBI data form. Do not just leave the field blank; such factors are not part of the CBI average, but one wants to know whether these factors were actually assessed and it was decided not to rate them, or just accidentally overlooked and skipped. Zeros, on the other hand, are valid entries and do get averaged into composite scores. Zeros should be used when a rating factor is applicable and exhibits an unburned condition. A zero represents no detected change in an observable factor.