Supplemental Material

Giving ecological meaning to satellite-derived fire severity metrics across North American forests in Google Earth Engine

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Sean A. Parks*, Lisa M. Holsinger, Michael J. Koontz, Luke Collins, Ellen Whitman, Marc-André Parisien, Rachel A. Loehman, Jennifer L. Barnes, Jean-François Bourdon, Jonathan Boucher, Yan Boucher, Anthony C. Caprio, Adam Collingwood, Ron J. Hall, Jane Park, Lisa B. Saperstein, Charlotte Smetanka, Rebecca J. Smith, Nick Soverel

*Aldo Leopold Wilderness Research Institute, Rocky Mountain Research Station, US Forest Service, 790 E. Beckwith Ave, Missoula, MT 59801, sean.parks@usda.gov.

Table S1. List of fires with CBI data used in this study; the source of the data is also indicated.

FireID	FireName	Number of plots	Source
117031	Burntwood	26	Ron Hall (unpublished)
117292	Thompson Lake	56	Ron Hall (unpublished)
20101080248	NA	24	Boucher et al. (2017)
20101080267	NA	5	Boucher et al. (2017)
20101080270	NA	2	Boucher et al. (2017)
20101080274	NA	18	Boucher et al. (2017)
20101080281	NA	17	Boucher et al. (2017)
20131080250	NA	48	Yan Boucher
01KO012	Mt Shanks	8	Parks Canada
04WB021	Angus Pine 1	76	Hall et al. (2008)
2003BA001	Fairholme	193	Parks Canada
2004DA030	Dawson	37	Hall et al. (2008)
2005WB11	Peace Point #1	51	Soverel et al. (2010)
2005YO001	Hoodoo Creek	22	Soverel et al. (2010)
2006JA014	Southesk	43	Soverel et al. (2010)
2007-N20789	Split Peak	58	Soverel et al. (2010)
2007WB1	Lake One	59	Soverel et al. (2010)
2007WB2	Jordin Creek	43	Soverel et al. (2010)
2008GL001	Grizzly Ridge	20	Soverel et al. (2010)
2008JA1	Henry House II	21	Soverel et al. (2010)
2008KO004	Redstreak Residences	102	Soverel et al. (2010)
2008SM-013	Sandy	100	Soverel et al. (2010)
2014SS-085	NA	3	Whitman et al. (2108)
2014SS-143	NA	10	Whitman et al. (2108)
2014WB-002	NA	9	Whitman et al. (2108)
2014ZF-017	NA	5	Whitman et al. (2108)
2014ZF-020	NA	15	Whitman et al. (2108)
2014ZF-046	NA	21	Whitman et al. (2108)
ABC002	Kenow	155	Parks Canada
AK6027615391520130627	CURRANT CREEK	43	US FWS
AK6043915096220140520	Funny River	49	US FWS
AK6104215418920130618	Kristin Creek	7	US NPS
AK6126114312320090702	Chakina	66	US NPS
AK6262114163820030716	BLACK HILL	68	US FWS
AK6347715235920050614	Highpower Creek	10	US NPS
AK6355115216620010626	Herron River	25	Key et al. (2013)
AK6369315014320130626	TOKLAT RIVER EAST	26	US NPS
AK6376715207620000623	Foraker	24	Key et al. (2013)
AK6387215071520000624	Otter Creek	10	Key et al. (2013)
AK6393915220320130622	BEAVER LOG LAKES	13	US NPS
AK6394715047720000626	Chitsia	25	Key et al. (2013)
AK6457815738420040628	Bonanza Creek	64	US FWS
AK6496614349119990612	Beverly	44	Key et al. (2013)
AK6505014121719990613	Jessica	47	Key et al. (2013)
AK6529614185119990612	Witch	32	Key et al. (2013)
AK6636814584520040707	Lower Mouth	52	US FWS

AK66559151521200407O6	CLAWANMENKA LAKE	70	US FWS
AK67063145161200406l5	winter trail	50	US FWS
AR3612609246520040310	LOWER WILD	14	Key et al. (2013)
AZ3455611124520100717	Ranger Complex	7	Sikkink et al. (2013)
AZ3532911160120100620	Schultz	21	Sikkink et al. (2013)
AZ3536511197420100616	Eagle Rock	10	Sikkink et al. (2013)
AZ3549811200420100830_1	Hobble	1	Sikkink et al. (2013)
AZ3549811200420100830_2	Hobble	3	Sikkink et al. (2013)
AZ3549811200420100830_3	Hobble	6	Sikkink et al. (2013)
AZ3549811200420100830_4	Hobble	1	Sikkink et al. (2013)
AZ3603811210020040505	LONG JIM	49	US NPS
AZ3614711195120051001	WALHALLA - CAPE ROYAL RX (ADD ON)	27	Picotte (2019)
AZ3618011199320040915	WALHALLA	47	US NPS
AZ3618111195420070719	ROOSEVELT WFU	43	Picotte (2019)
AZ3619011193720050603	ATOKO RX	13	Josh Picotte
AZ3620911198220090729	ASPEN	53	Picotte (2019)
AZ3621111211120050626	DRAGON COMPLEX WFU	54	US NPS
AZ3621211197620010715	Vista	64	Key et al. (2013)
AZ3622611207920040823	OUTLETRX	25	Picotte (2019)
AZ3623511201120071019_1	UNCLE JIM RX	23	Picotte (2019)
AZ3623511201120071019_2	UNCLE JIM RX	22	Picotte (2019)
AZ3624111202220041006	MARBLE-JIM COMPLEX (BRIGHT)	22	Picotte (2019)
AZ3624811222920010829	TOWER FIRE	35	Key et al. (2013)
AZ3625911206220121027	RANGE RX	20	Picotte (2019)
AZ3627011219120071019	SW ROOST	23	Picotte (2019)
AZ3628411223620140523	GALAHAD	26	Picotte (2019)
AZ3628611317320150624	MOUNT EMMA	37	Picotte (2019)
AZ3628811200020000510	Outlet	68	Key et al. (2013)
AZ3629911205020121101	THOMPSON RX (ADD-ON)	27	Picotte (2019)
AZ3631111220120030930	Poplar	108	Key et al. (2013)
AZ3633611232020100625	SAFFRON	61	Picotte (2019)
AZ3633811232120010817	SWAMP RDG.	33	Key et al. (2013)
AZ3634511226920071019	NORTHWEST RX	22	Picotte (2019)
AZ3659711232020130912	CASTLE FIRE FY13	12	Picotte (2019)
AZ3676111223020130912	COOPER FIRE FY13	14	Picotte (2019)
C34036	HILLYER	23	Hall et al. (2008)
CA3606711840020020721	McNally	41	Key et al. (2013)
CA3626811851120110708	LION	31	US NPS
CA3633511841320030824	KAWEAH-KERN COMPLEX (WEST KERN)	38	US NPS
CA3646511862420051006	EAST FORK HIGHBRIDGE RX	28	US NPS
CA3646711868820030625	ATWOOD	1	US NPS
CA3670911869520030728	KAWEAH-KERN COMPLEX (WILLIAMS)	40	US NPS
CA3676911865720060723	CEDAR GROVE ROARING	64	US NPS
CA3678011865020081017	CEDAR BLUFFS	24	US NPS
CA3680111861920050717	COMB COMPLEX	49	US NPS
CA3694111881120080719	TEHIPITE	34	US NPS
CA3705511853620020826	PALISADE	71	Key et al. (2013)
CA3757311966320071029	JACK	19	US NPS
CA3766311948220010710	HOOVER COMPLEX (HOOVER)	63	US NPS

CA3767611954520040701	MEADOW COMPLEX (MEADOW)	52	US NPS
CA3777011978820051012	PW-3 SEG 3	41	US NPS
CA3778911976020021003	PW-03 GIN FLAT	42	Key et al. (2013)
CA3784611972820030831	KIBBIE COMPLEX (TUOLUMNE)	22	Key et al. (2013)
CA3785511958820030731	DUNCAN COMPLEX (WHISKEY)	30	Key et al. (2013)
CA3787411965320020711_1	WOLF	34	Key et al. (2013)
CA3787411965320020711_2	WOLF	1	Key et al. (2013)
CA3789911989720080621	NORTH MOUNTAIN	44	US NPS
CA3850212028020041006	POWER	88	Jay Miller
CA4038012294620080907	Gulch	9	Sikkink et al. (2013)
CA4042112309620080620	LIME COMPLEX (TELEPHONE)	4	Sikkink et al. (2013)
CA4049512341220080620	LIME COMPLEX (LIME)	4	Sikkink et al. (2013)
CA4054612266320080621	SHU LIGHTNING COMPLEX (MOON)	70	US NPS
CA4063712326820080621	LIME COMPLEX (MINERS)	4	Sikkink et al. (2013)
CA4069812251020080622	SHU LIGHTNING COMPLEX (MOTION)	71	US NPS
CA4071412316220080621	IRON AND ALPS COMPLEXES (EAGLE)	21	Sikkink et al. (2013)
CA4074912336120080621	IRON AND ALPS COMPLEXES (CEDAR)	7	Sikkink et al. (2013)
CA4075212115820020926	CONE	59	Jay Miller
CA4082312342420080621	IRON AND ALPS COMPLEXES (IRONSIDE)	4	Sikkink et al. (2013)
CA4082612107820040722	STRAYLOR	75	Jay Miller
CA4083712326320080621	IRON AND ALPS COMPLEXES (BUCKHORN)	2	Sikkink et al. (2013)
CAFRAP-KNP-1	Highway	2	US NPS
CAFRAP-KNP-2	SHERMAN R	3	US NPS
CAFRAP-SEKI-RX1	AZALEA	8	US NPS
CAFRAP-SEKI-RX10	SILVER	50	US NPS
CAFRAP-SEKI-RX11	VALLEY VIEW	18	US NPS
CAFRAP-SEKI-RX12	Valley View	25	US NPS
CAFRAP-SEKI-RX13	Wallspring	18	US NPS
CAFRAP-SEKI-RX14	Deadwood Rx	22	US NPS
CAFRAP-SEKI-RX15	Zumwalt Rx	18	US NPS
CAFRAP-SEKI-RX2	CABIN MEADOW	33	US NPS
CAFRAP-SEKI-RX3	DAVENPORT	12	US NPS
CAFRAP-SEKI-RX4	ELLA	8	US NPS
CAFRAP-SEKI-RX5	HART	37	US NPS
CAFRAP-SEKI-RX6	HIGHWAY	2	Key et al. (2013)
CAFRAP-SEKI-RX7	HORSE TRAIL	21	US NPS
CAFRAP-SEKI-RX8	UPPER REDWOO	56	US NPS
CAFRAP-SEKI-RX9	SHERMAN R	3	Key et al. (2013)
CAFRAP-SEKI-WF1	BURNT	61	US NPS
CAFRAP-SEKI-WF2	HORSE	32	US NPS
CAFRAP-SEKI-WF3	HOTSPRINGS	30	US NPS
CAFRAP-SEKI-WF4	MOSES	13	US NPS
CAFRAP-SEKI-WF5	WILLOW	17	US NPS
CAFRAP-SEKI-WF6	Hidden Wildfire	55	US NPS
CAFRAP-WNP-1	Sunshine	32	Key et al. (2013)
CAFRAP-YNP-1	Dark	40	Key et al. (2013)
CAFRAP-YNP-2	Lost	47	Key et al. (2013)
CAFRAP-YNP-3	SNOW	6	Key et al. (2013)
CAFRAP-YNP-4	PW-17 Segs B, C & E	33	US NPS

CO3719710855820000802	Pony	10	Key et al. (2013)
CO3722510840420000720_1	Bircher	21	Key et al. (2013)
E33030	RAWHIDE	7	Hall et al. (2008)
E33035	PASTURE	12	Hall et al. (2008)
FL30263084699200612l9	UNNAMED	8	Picotte (2019)
FL3026708449620080410_1	UNNAMED	22	Picotte (2019)
FL3030308438820080317	UNNAMED	64	Picotte (2019)
FL3034508432720080716	UNNAMED	17	Picotte (2019)
FL3034708429920080619_1	UNNAMED	27	Picotte (2019)
FL3034808449020080208	UNNAMED	1	Picotte (2019)
FL3040708437320061219	UNNAMED	93	Picotte (2019)
geomac-FM4H	Dominic Point	2	Sikkink et al. (2013)
ID4382511611220100826	HARRIS COMPLEX (COTTONWOOD)	8	Sikkink et al. (2013)
ID4510511570820070706_1	EAST ZONE COMPLEX (RAINES)	97	Arkle et al. (2012)
ID4599311683120140803	BIG COUGAR	10	Picotte (2019)
KY3663708458220001030	SCHOOLHOUS	7	Key et al. (2013)
KY3716608610520090318	JIM LEE	2	US NPS
KY3717508613320100402	JOPPA CHURCH	3	US NPS
KY3720908608920100401	FLOATING MILL HOLLOW	5	US NPS
MO3688809117220060303	POLECAT HOLLOW RX	19	Picotte (2019)
MO3692509098920060304	06 CHILTON SOUTH	8	Picotte (2019)
MO3708509120120060228	06 STEGALL MTN.	6	Picotte (2019)
MO3718109115820070324	BOOMING SHOALS	22	Picotte (2019)
MT4562511330420090813	Lily Lake	10	Sikkink et al. (2013)
MT4625211385320090909	Gird End	9	Sikkink et al. (2013)
MT4628611296120090712	Bielenburg	7	Sikkink et al. (2013)
MT4654811421820090712	Kootenai Creek	15	Sikkink et al. (2013)
MT4751811328120110719	Hammer Creek	68	Sean Parks
MT4827011332819980902	Challenge	4	Key et al. (2013)
MT4839411359020030819_1	Rampage Complex (Double Mountain 2)	9	Key et al. (2013)
MT4848011378920030818	MIDDLE FORK COMPLEX (HARRISON)	15	Key et al. (2013)
MT4851311383720030818	MIDDLE FORK COMPLEX (CENTER)	10	Key et al. (2013)
MT4856111405520030723	Robert	104	Key et al. (2013)
MT4865211410120010816_1	Moose	97	Key et al. (2013)
MT4868711403819990806_1	Anaconda	32	Key et al. (2013)
MT4871911410119940812	NORTH FORK COMPLEX (ADAIR II)	68	Key et al. (2013)
MT4878011384220030718	TRAPPER CREEK FIRE (TRAPPER CREEK)	23	Key et al. (2013)
MT4890111437420030718	WEDGE CANYON	17	Key et al. (2013)
MT4899811428919940814	NORTH FORK COMPLEX (STARVATION)	49	Key et al. (2013)
NC3553008327320090427	Stony Ridge	4	US NPS
NM3314210797620100606	aspen	11	Sikkink et al. (2013)
NM3314410836920110428	Miller	103	Sean Parks
NM3322510843320030531	DRY LAKE COMPLEX (DRY LAKES)	53	Holden et al. (2009)
NM3570310559420000529	Viveash	3	Key et al. (2013)
NM3590710632420000505	Cerro Grande	22	Key et al. (2013)
OR4332411821620140714	SADDLE DRAW	7	Picotte (2019)
OR4362911838720140714	BUZZARD	2	Picotte (2019)
OR4418312154220100802	Rooster Rock	23	Sikkink et al. (2013)
OR4425512018720140717	FOX	30	Picotte (2019)

OR4454812036520140714	BAILEY BUTTE	49	Picotte (2019)
OR4496711955420140714	SUNFLOWER	30	Picotte (2019)
Picotte-SD-1	Legion Lake	37	Picotte (2019)
Picotte-TN-1	Laurel Falls 2	13	Picotte (2019)
Picotte-WA-1	South Cle Elum Ridge	39	Picotte (2019)
SD4360010346820101018	American Elk	52	US NPS
SD4362410344920000714	Highland Creek	12	Key et al. (2013)
SD4381510387820000824	Jasper	73	Key et al. (2013)
TN3552008391020060405	CHILLY SPRING KNOB	8	US NPS
TN3562008390020070520	BUCK SHANK	7	US NPS
TN3563108347820161123	CHIMNEY TOPS 2	42	US NPS
TN3577008334320161128	COBBLY NOB	3	US NPS
TN3581508319520011110	GREEN MTN.	41	Key et al. (2013)
TN3592008307120080802	OLD 15TH	4	US NPS
TN3642308472620001101	CAMPBRANCH	1	Key et al. (2013)
TN3644408481720001103	DARROW RDG	2	Key et al. (2013)
TN3657408472520090322	GOBBLERS KNOB B	10	US NPS
UT3728911292420060426_1	EAST MESA RX	5	US NPS
UT3728911292420060426_2	EAST MESA RX	12	US NPS
UT3736611298520081022	THREE FINGERS MESA	29	US NPS
UT3739611335820020714	Sequoia	10	Key et al. (2013)
UT3749411226820080822	PUMA	44	US NPS
UT3793611217320020531	Sanford	32	Key et al. (2013)
UT3918511210920090823	SAWMILL CANYON	8	Sikkink et al. (2013)
VA3810607881420130410	JARMAN GAP BROADCAST	20	US NPS
VA3827307874120060404	LEWIS MOUNTAIN	16	US NPS
VA3829107870820020621	ROCKYTOP1	3	Key et al. (2013)
VA3830007872020020703	ROCKYTOP2	18	Key et al. (2013)
VA3831407864620160416	ROCKY MTN FIRE 2016	32	US NPS
VA3851407855120020226	Fultz Run	22	Key et al. (2013)
VA3859507831020001029	PINNACLES	12	Key et al. (2013)
VA3870107836520120626	NEIGHBOR MTN FIRE	32	US NPS
VA3880807819420110219	SMITHRUNFIRE	15	US NPS
WA4715412055020140803	SNAG CANYON	13	Picotte (2019)
WA4766312029020140708	MILLS CANYON	9	Picotte (2019)
WA4769812380320150615	PARADISE	18	US NPS
WA4770812082320140715	CHIWAUKUM COMPLEX	32	Picotte (2019)
WA4782412342420160726	HAYES TWO	32	US NPS
WA4819811919920080807	COLUMBIA RIVER ROAD	33	Sikkink et al. (2013)
WA4821112010220140714	CARLTON COMPLEX	105	Picotte (2019)
WA4829512061020060726	Flick Creek	107	US NPS
WA4835412068420100729	RAINBOW BRIDGE	22	US NPS
WA4853211998720060724	TRIPOD COMPLEX (TRIPOD)	46	Prichard & Kennedy (2004)
WA4868512125620150811_4	GOODELL	31	US NPS
WA4884111998320060703	TRIPOD COMPLEX (SPUR PEAK)	51	Prichard & Kennedy (2004)
WFDSS-MTGNP-1	Sharon	5	Key et al. (2013)
WFDSS-UTZIP-1	Langston	5	Key et al. (2013)
WFDSS-WYGVW-1	Upper Slide	20	Key et al. (2013)
WFDSS-WYYNP-1	Little Joe	13	Key et al. (2013)

WFDSS-WYYNP-2	Boundary00	13	US NPS
WFDSS-WYYNP-3	Stone	11	Key et al. (2013)
WFDSS-WYYNP-4	Little	12	Key et al. (2013)
WFDSS-WYYNP-5	Frank	5	US NPS
WY4282310944220020806	DIVIDE	52	Key et al. (2013)
WY4294811046520020711_1	MULE FIRE	53	Key et al. (2013)
WY4294811046520020711_3	MULE FIRE	2	Key et al. (2013)
WY4302311068920000812	BLIND TRAIL	56	Key et al. (2013)
WY4320011076420030712	EAST TABLE	60	Key et al. (2013)
WY4332411046020000731_3	Boulder	50	Key et al. (2013)
WY4343911091120010722	GREEN KNOLL	53	Key et al. (2013)
WY4379811050520020924	WOLFF RDGE	20	Key et al. (2013)
WY4396411028120000809	TETON COMPLEX (ENOS)	79	Key et al. (2013)
WY4409911072120000815	TETON COMPLEX (GLADE)	28	Key et al. (2013)
WY4412511015320010806	FALCON	53	Key et al. (2013)
WY4420611013720020810	Phlox	28	US NPS
WY4430911072620000815	SPRUCE COMPLEX (MOOSE)	13	Key et al. (2013)
WY4446111004720010729	Arthur	18	Key et al. (2013)
WY4448711023820030811_2	EAST COMPLEX (EAST)	2	US NPS
WY4474311097820160809	Maple	27	US NPS
WY4477311032220020627	Broad	24	US NPS

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Table S2. Equations for spectral indices used in CBI model prediction. NIR = near-infrared (Band 4 for Landsat 4, 5, 7 and Band 5 for Landsat 8), SWIR1 = shortwave infrared (Band 5 for Landsat 4, 5, 7 and Band 6 for Land, 8); SWIR2 = shortwave infrared (Band 7 for Landsat 4, 5, 7, 8); Red = Red range (Band 3 for Landsat 4, 5, 7 and Band 4 for Landsat 8); Blue = Blue range (Band 1 for Landsat 4, 5, 7 and Band 2 for Landsat 8).

Variable	Equation
RBR	$\frac{[(NIR - SWIR2)/(NIR + SWIR2)]_{prefire} - [(NIR - SWIR2)/(NIR + SWIR2)]_{postfir}}{[(NIR - SWIR2)/(NIR + SWIR2)]_{prefire} + 1.01}$
dEVI	$\left[\frac{2.5 * (NIR - RED)}{NIR + (6 * RED - 7.5 * BLUE) + 1}\right]_{prefire} - \left[\frac{2.5 * (NIR - RED)}{NIR + (6 * RED - 7.5 * BLUE) + 1}\right]_{postfire}$
dNDVI	$\left[\frac{NIR - Red}{NIR + Red}\right]_{prefire} - \left[\frac{NIR - Red}{NIR + Red}\right]_{postfire}$
dNDMI	$\left[\frac{NIR - SWIR1}{NIR + SWIR1}\right]_{prefire} - \left[\frac{NIR - SWIR1}{NIR + SWIR1}\right]_{postfire}$
dMIRBI	$[10 * SWIR1 - 9.5 * SWIR2 + 2]_{prefire} - [10 * SWIR1 - 9.8 * SWIR2 + 2]_{postfire}$
post.NBR	$(NIR - SWIR2)/(NIR + SWIR2)$
post.MIRBI	$10 * SWIR1 - 9.8 * SWIR2 + 2$

Table S3. Pearson's correlation among the spectral variables we evaluated.

	RBR	dNBR	RdNBR	dEVI	dNDVI	dNDMI	dMIRBI	post-fire NBR	post-fire MIRBI
RBR	1	0.99	0.99	0.77	0.89	0.95	0.71	-0.83	-0.72
dNBR	0.99	1	0.97	0.80	0.91	0.98	0.65	-0.77	-0.68
RdNBR	0.99	0.97	1	0.76	0.88	0.93	0.72	-0.83	-0.73
dEVI	0.77	0.80	0.76	1	0.80	0.80	0.60	-0.55	-0.45
dNDVI	0.89	0.91	0.88	0.80	1	0.90	0.54	-0.68	-0.62
dNDMI	0.95	0.98	0.93	0.80	0.90	1	0.51	-0.69	-0.60
dMIRBI	0.71	0.65	0.72	0.60	0.54	0.51	1	-0.73	-0.67
post-fire NBR	-0.83	-0.77	-0.83	-0.55	-0.68	-0.69	-0.73	1	0.72
post-fire MIRBI	-0.72	-0.68	-0.73	-0.45	-0.62	-0.60	-0.67	0.72	1

Table S4. Cross-validated model skill for Random Forest models describing CBI with only one spectral variable (e.g. CBI ~ RBR).

Variable	**R^2**	**RMSE**	**MAE**
RBR	0.68	0.51	0.40
dNBR	0.67	0.51	0.41
RdNBR	0.67	0.51	0.41
dEVI	0.54	0.61	0.49
dNDVI	0.57	0.59	0.47
dNDMI	0.62	0.55	0.44
dMIRBI	0.35	0.72	0.59
post.NBR	0.42	0.68	0.55
post.MIRBI	0.36	0.72	0.58

Table S5. Cross-validated model skill (observed vs. predicted CBI [**bias-corrected**]) for states, provinces, and territories in our study.

State/Province/ Territory	Country	Number of fires	Number of plots	R^2	RMSE	MAE
Alaska	US	19	725	0.63	0.54	0.38
Arizona	US	32	977	0.83	0.42	0.31
Arkansas	US	1	14	0.11	0.52	0.44
California	US	62	1889	0.73	0.49	0.36
Colorado	US	2	31	0.74	0.53	0.30
Florida	US	7	232	0.01	0.56	0.47
Idaho	US	3	115	0.68	0.47	0.34
Kentucky	US	4	17	0.08	0.82	0.61
Missouri	US	4	55	0.03	0.54	0.46
Montana	US	20	565	0.72	0.45	0.33
New Mexico	US	5	192	0.79	0.43	0.29
North Carolina	US	1	4	0.00	0.70	0.59
Oregon	US	6	141	0.79	0.42	0.32
South Dakota	US	4	174	0.59	0.65	0.48
Tennessee	US	10	131	0.80	0.41	0.33
Utah	US	8	145	0.76	0.48	0.34
Virginia	US	9	170	0.55	0.51	0.43
Washington	US	13	538	0.64	0.54	0.40
Wyoming	US	22	671	0.67	0.56	0.43
Alberta	Canada	8	574	0.77	0.50	0.36
British Columbia	Canada	5	210	0.69	0.51	0.37
Manitoba	Canada	2	82	0.85	0.44	0.34
Northwest Territories	Canada	7	230	0.84	0.43	0.31
Québec	Canada	6	114	0.69	0.50	0.39
Saskatchewan	Canada	3	42	0.83	0.50	0.35
Yukon	Canada	1	37	0.87	0.60	0.45

Table S6. Cross-validated model skill (observed vs. predicted [**bias-corrected**]) for large geopolitical regions in our study.

Region	Number of fires	Number of plots	R^2	RMSE	MAE
NW US	67	2204	0.68	0.52	0.39
Eastern US	36	623	0.47	0.53	0.43
SW US	109	3234	0.77	0.46	0.34
Canada	32	1289	0.75	0.49	0.36

NW US: Idaho, Montana, Oregon, South Dakota, Washington, Wyoming (Alaska excluded here but shown in Table 4)
Eastern US: Arkansas, Florida, Kentucky, Missouri, North Carolina, Tennessee, Virginia
SW US: Arizona, California, Colorado, New Mexico, Utah

Table S7. Cross-validated model skill (observed vs. predicted CBI [**bias-corrected**]) for ecoregions (see Fig. 1) in our study.

Ecoregion	Number of fires	Number of plots	R^2	RMSE	MAE
Eastern Temperate Forests	36	623	0.47	0.53	0.43
Marine West Coast Forests	2	67	0.34	0.99	0.67
Mediterranean California	4	113	0.66	0.53	0.43
North American Deserts	28	565	0.81	0.45	0.34
Northern Forests	11	238	0.77	0.48	0.36
Northwestern Mountains	144	4882	0.71	0.50	0.37
Taiga	26	909	0.73	0.47	0.35
Temperate Sierras	26	678	0.83	0.40	0.29

Figure S1. Composite burn index (CBI) field sheet. This is the standard from but some users from specific geographic regions or ecosystems use a modified version (e.g. Alaska; boreal forest in Canada). Source: Key, C. H., and N. C. Benson. 2006. Landscape assessment (LA). FIREMON: Fire effects monitoring and inventory system. Gen. Tech. Rep. RMRS-GTR-164-CD, Fort Collins, CO: US Department of Agriculture, Forest Service, Rocky Mountain Research Station.

BURN SEVERITY -- COMPOSITE BURN INDEX (BI)

PD - Abridged	Examiners:		Fire Name:			
Registration Code		Project Code		Plot Number		
Field Date mmddyyyy	/ /	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	3.0	
A. SUBSTRATES								
% Pre-Fire Cover: Litter =	**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	N =
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	$\bar{X}$ =
Soil & Rock Cover/Color	Unchanged	--	10% change	--	40% change	--	>80% change	
B. HERBS, LOW SHRUBS AND TREES LESS THAN 3 FEET (1 METER):								
Pre-Fire Cover =		**% Enhanced Growth =**						∑ =
% Foliage Altered (blk-brn)	Unchanged	--	30%	--	80%	95%	100% + branch loss	
Frequency % Living	100%	--	90%	--	50%	< 20%	None	N =
Colonizers	Unchanged	--	Low	--	Moderate	High-Low	Low to None	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High change	$\bar{X}$ =
C. TALL SHRUBS AND TREES 3 to 16 FEET (1 TO 5 METERS):								
Pre-Fire Cover =		**% Enhanced Growth =**						∑ =
% Foliage Altered (blk-brn)	0%	--	20%	--	60-90%	> 95%	Signifcnt branch loss	
Frequency % Living	100%	--	90%	--	30%	< 15%	< 1%	N =
% Change in Cover	Unchanged	--	15%	--	70%	90%	100%	
Spp. Comp. - Rel. Abund.	Unchanged	--	Little change	--	Moderate change	--	High Change	$\bar{X}$ =
D. INTERMEDIATE TREES (SUBCANOPY, POLE-SIZED TREES)								
Pre-Fire % Cover =	**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	N =
% Brown (Scorch/Girdle)	None	--	5-20%	--	40-80%	< 40 or > 80%	None due to torch	
% Canopy Mortality	None	--	15%	--	60%	80%	%100	$\bar{X}$ =
Char Height	None	--	1.5 m	--	2.8 m	--	> 5 m	
Post Fire: %Girdled =		**%Felled =**		**%Tree Mortality =**				
E. BIG TREES (UPPER CANOPY, DOMINANT, CODOMNANT TREES)								
Pre-Fire % Cover =	**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	N =
% Brown (Scorch/Girdle)	None	--	5-10%	--	30-70%	< 30 or > 70%	None due to torch	
% Canopy Mortality	None	--	10%	--	50%	70%	%100	$\bar{X}$ =
Char Height	None	--	1.8 m	--	4 m	--	> 7 m	
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 m^2 1% = 1x3 m 5% = 3x5 m 10% = 5x6 m
30 m Plot: 707 m^2 1% = 1x7 m (<2x4 m) 5% = 5x7 m 10% = 7x10 m

After, Key and Benson 1999, USGS NRMSC, Glacier Field Station.
Version 4.0 8 27, 2004

Strata and Factors are defined in FIREMON Landscape Assessment, Chapter2, and on accompanying BI "cheatsheet." www.fire.org/firemon/lc.htm

Figure S2. Histograms show the distribution of observed CBI (a), predicted CBI without bias-correction (b), and bias-corrected CBI predictions (c).

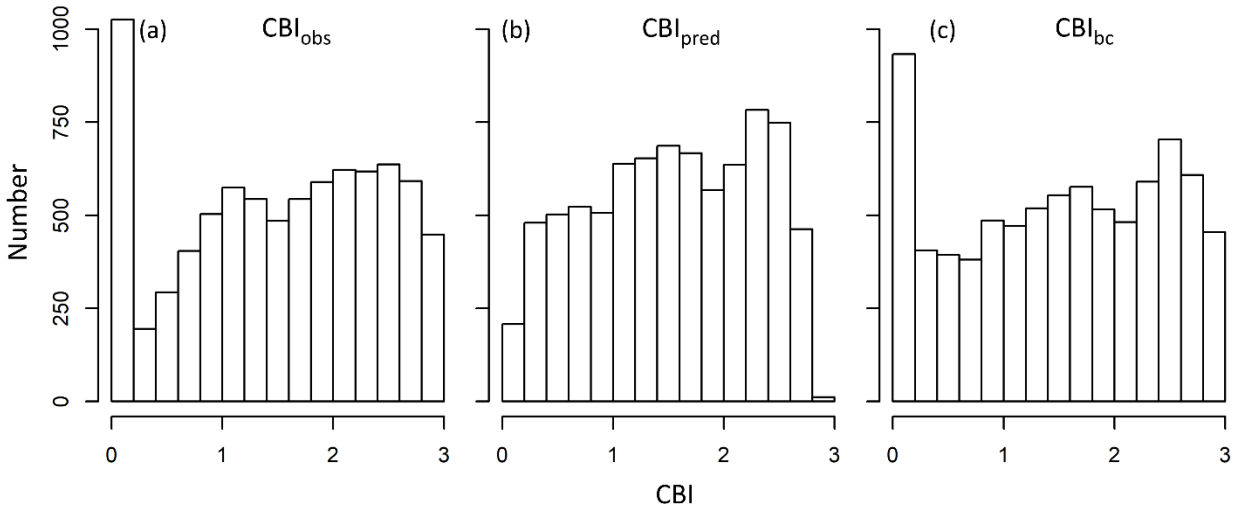

Figure S3. Observed vs. predicted CBI (**bias-corrected**) for the Random Forest model for each state, province, and territory. 1:1 line shown in red. North Carolina not shown due to the low sample size (n=4).

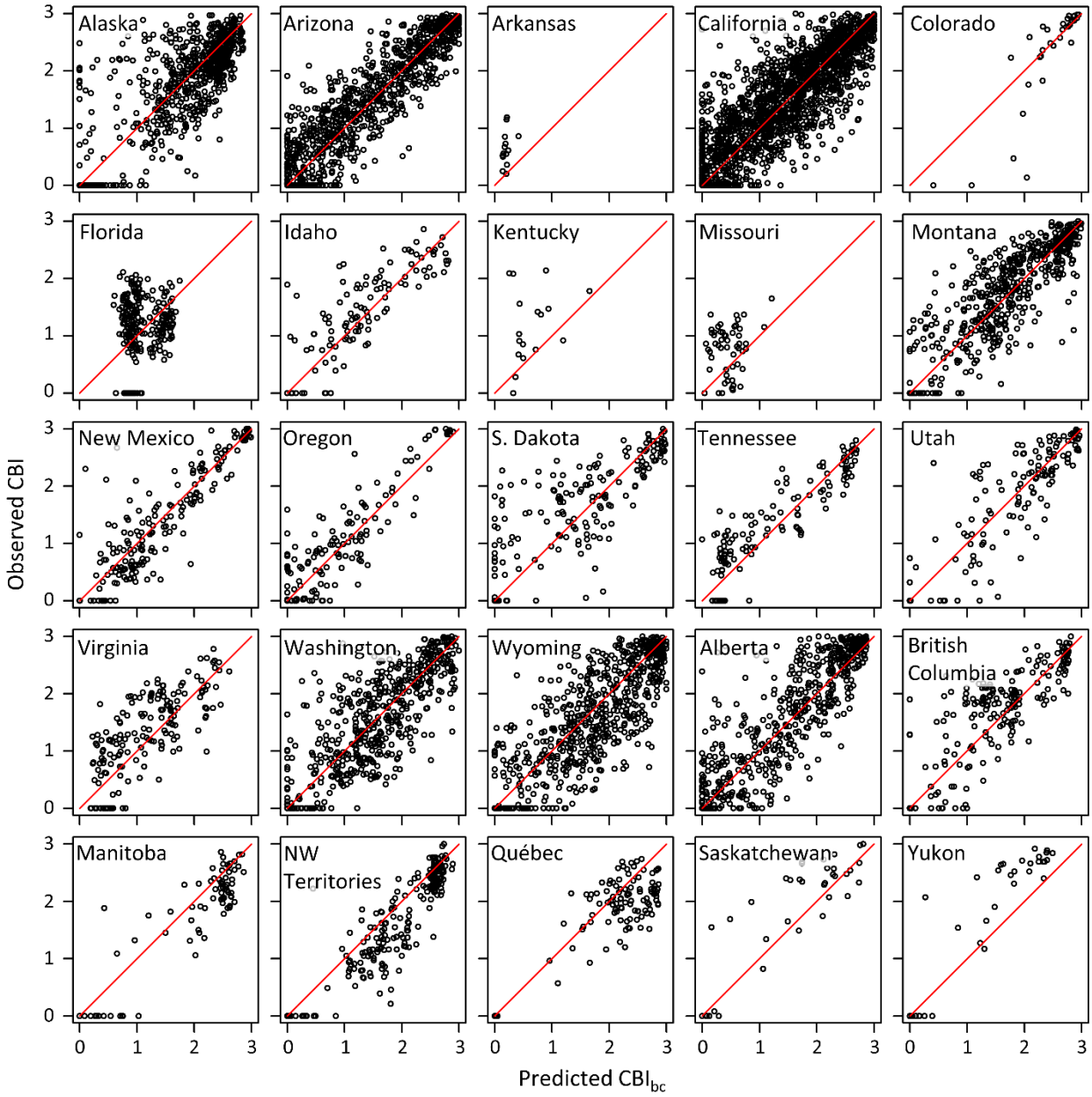

Figure S4. Observed vs. predicted CBI (**bias-corrected**) for the multi-variable Random Forest model for large geopolitical regions. 1:1 line shown in red.

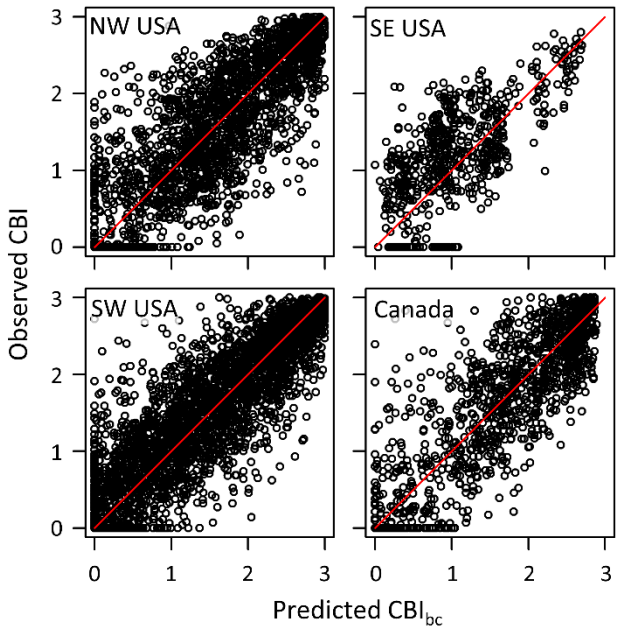

Figure S5. Observed vs. predicted CBI (**bias-corrected**) for the multi-variable Random Forest model for ecoregions. 1:1 line shown in red.