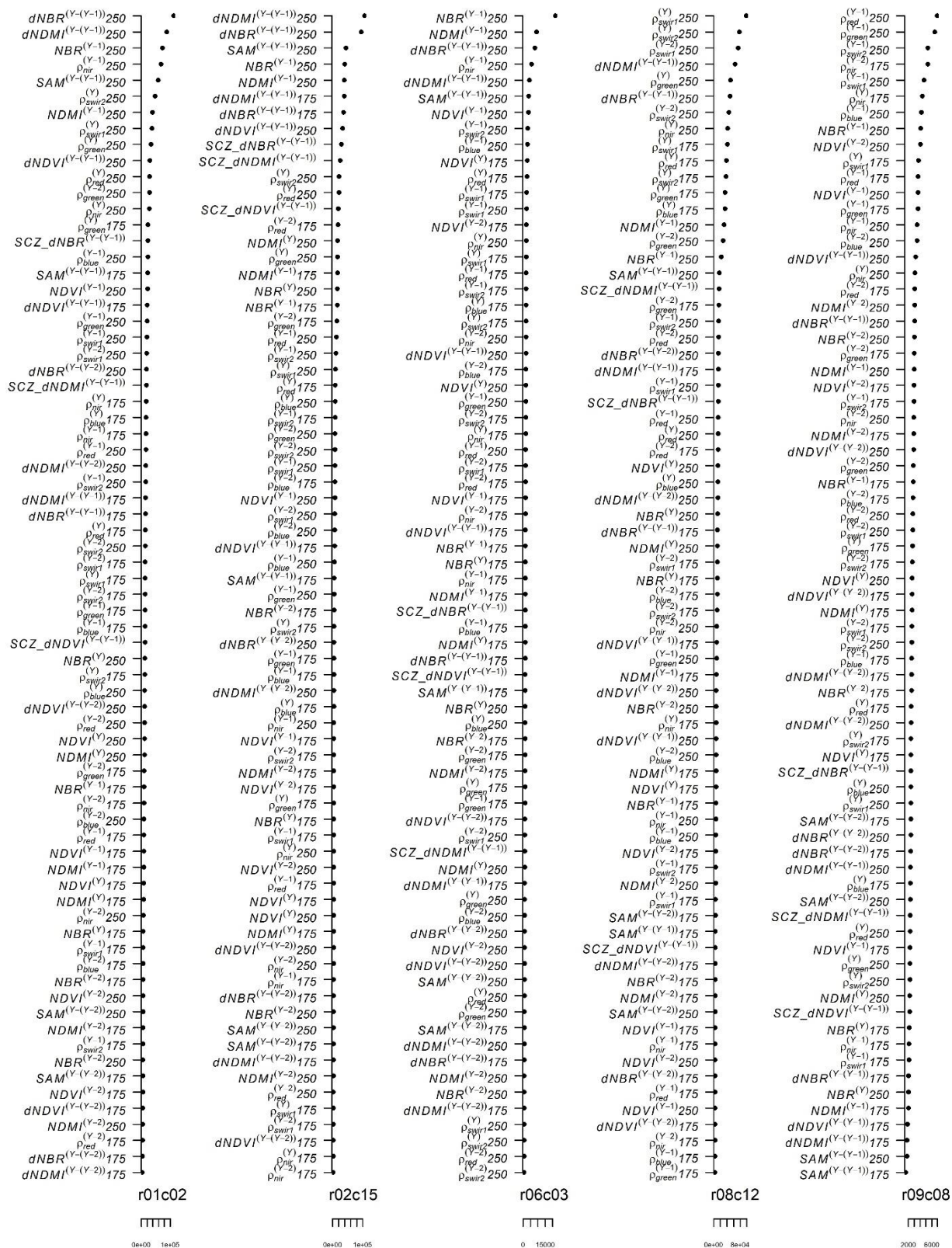**Figure S1.** Spatially explicit Landscape Fire and Resource Management Planning (LANDFIRE) tile specific growing season date ranges (see Section 2.2.1).

Figure S2. Variable importance of all 73 predictor variables inferred using Gini Impurity for the random forest model for each of the five prototyping tiles. Please refer to section 3.11 of the manuscript for variable name and their formulation.

Table S1. Data sets described in this work (refer to section 2).

Name	Resolution/format	Description	Citation/source
LF Reference Database (LFRDB)	Vector	Submitted disturbance polygons	12
Monitoring Trends in Burn Severity (MTBS)	30m	Monitoring Trends in Burn Severity	36
Burned Area Emergency Response (BAER)	30m	Burned Area Emergency Response	40
Rapid Assessment of Vegetation Condition After Wildfire (RAVG)	30m	Rapid Assessment of Vegetation Condition After Wildfire	41
USA National Phenology Network (USA NPN)	4km	USA National Phenology Network	42
National Land Cover Database (NLCD)	30m	National Landcover database	43
Dynamic Surface Water Extent (DSWE)	30m	Dynamic Surface Water Extent	44
U.S. Department of Agriculture Cropland Data Layer USDA CDL	30-56m	Cropland data layer	47

Table S2. 2016 Spatially Adaptable Filter for Error Reduction (SAFER) prototype evaluation results after inclusion to the remote sensing of landscape change (RSLC) process.

Tile	RSLC interim disturbed		RSLC interim undisturbed		SAFER disturbed		SAFER undisturbed	
	Omission	Commission	Omission	Commission	Omission	Commission	Omission	Commission
r01c02	0	88.85	3.81	0	12.99	21.5	0.11	0.06
r02c15	0	90.89	7.53	0	9.99	55.19	0.84	0.08
r06c03	0	99.06	4.5	0	80.33	20.6	0	0.03
r09c08	0	96.8	7.85	0	85.53	35.08	0.02	0.22
r08c12	0	69.82	3.47	0	6.5	27.91	0.54	0.1

Table S3. 2017 Remote Sensing of Landscape Change (SAFER) evaluation results.

	kappa		Overall accuracy [%]		SAFER accuracies [%] disturbed		undisturbed		Relative effort saved
LF tiles	interim	SAFER	Interim	SAFER	Omission	Commission	Omission	Commission	
r10c13	0.26	0.19	93.13	98.77	89.13	16.16	0.03	1.2	82.09
r10c08	0.07	0.32	85.61	98.84	57.3	73.93	0.8	0.38	91.91
r01c15	0.35	0.87	95.44	99.66	12.29	13.32	0.18	0.17	92.51
r01c02	0.38	0.86	97.56	99.79	17.73	9.73	0.07	0.14	91.54
r01c03	0.35	0.81	98.36	99.82	16.49	21.72	0.11	0.07	89.06
r01c04	0.26	0.8	97.13	99.82	28.9	8	0.03	0.15	93.62
r02c01	0.44	0.89	97.17	99.72	5.66	16.32	0.22	0.07	90
r02c10	0.08	0.69	89.08	99.64	29.73	32.66	0.19	0.17	96.68
r02c11	0.13	0.51	87.04	98.98	50.02	46.22	0.48	0.55	92.14
r02c15	0.19	0.7	91.98	99.34	22.52	35.24	0.43	0.23	91.78
r02c02	0.42	0.9	98.34	99.88	9.81	10.49	0.06	0.06	92.52
r02c03	0.5	0.91	98.49	99.87	13.01	3.8	0.03	0.1	91.52
r02c04	0.37	0.88	95.71	99.72	19.63	1.24	0.01	0.27	93.53
r02c05	0.07	0.72	91.64	99.85	43.88	0.56	0	0.14	98.26
r02c06	0.02	0.44	92.3	99.95	71.5	3.83	0	0.05	99.31
r02c07	0.02	0.26	95.56	99.95	84.4	15.36	0	0.04	98.97
r02c08	0.02	0.01	96.13	99.97	99.65	38	0	0.03	99.16
r02c09	0.06	0.38	87.3	98.75	19.09	74.73	1.16	0.09	90.16
r03c01	0.62	0.92	97.13	99.64	11.67	3.29	0.08	0.29	87.54
r03c10	0.13	0.26	88.39	98.79	78.3	64.67	0.41	0.81	89.61
r03c11	0.14	0.46	90.81	99.04	49.44	56.19	0.55	0.42	89.51
r03c12	0.12	0.6	97.38	99.8	16.98	52.56	0.17	0.03	92.28
r03c13	0.02	0.05	91.81	99.91	97.31	35.32	0	0.09	98.86
r03c14	0.05	0.63	89.91	99.82	44.43	27.39	0.06	0.12	98.23
r03c15	0.23	0.17	86.4	97.76	90.06	16.09	0.05	2.2	83.5
r03c02	0.54	0.52	98.19	99.29	64.22	2.85	0.01	0.7	60.78
r03c03	0.29	0.53	98.03	99.72	62.17	12.82	0.02	0.26	85.86
r03c04	0.08	0.3	97.68	99.89	78.25	51.84	0.02	0.08	95.41
r03c05	0.05	0.16	96.24	99.86	88.23	76.73	0.04	0.09	96.38
r03c06	0.11	0.55	88.47	99.15	34.63	52.65	0.58	0.28	92.63
r03c07	0.01	0.16	95.12	99.97	90.18	48.93	0	0.03	99.41
r03c08	0.01	0.11	91.19	99.9	80.35	92.77	0.07	0.02	98.91
r03c09	0.03	0.29	92.96	99.91	81.65	30.99	0.01	0.08	98.7
r04c01	0.17	0.79	96.12	99.83	26.23	15.82	0.06	0.11	95.66
r04c10	0.21	0.06	86.58	96.72	93.74	90.3	1.28	2.05	75.59
r04c11	0.28	0.29	95.25	98.07	56.26	76.8	1.4	0.55	59.46
r04c12	0.02	0.14	94.29	99.32	12.43	92.4	0.67	0.01	88.12
r04c13	0.06	0.48	88.5	99.71	65.46	20.35	0.03	0.25	97.51
r04c14	0.05	0.43	89.66	99.78	69.55	24.09	0.03	0.19	97.87
r04c02	0.4	0.94	97.97	99.92	9.13	2.85	0.02	0.06	95.99
r04c03	0.38	0.8	96.92	99.68	32.54	0.51	0	0.32	89.55
r04c04	0.07	0.69	95.91	99.92	39.82	19.37	0.02	0.06	98.01

r04c05	0.05	0.31	95.29	99.61	37.89	79.17	0.34	0.05	91.71
r04c06	0.03	0.48	96.28	99.94	48.11	56.1	0.04	0.03	98.28
r04c07	0.01	0.25	93.1	99.93	73.09	76.75	0.04	0.03	98.98
r04c08	0.02	0.06	91.64	98.94	49.34	96.65	1.03	0.04	87.3
r04c09	0.01	0.01	86.13	92.75	18.85	99.46	7.24	0.01	47.75
r05c01	0.19	0.86	94.53	99.83	22.6	2.79	0.02	0.16	96.86
r05c10	0.01	0.03	94.57	97.82	9.01	98.51	2.18	0	59.79
r05c11	0.06	0.47	96.86	99.91	61.06	40.15	0.03	0.06	97.27
r05c12	0.11	0.62	97.05	99.87	47.59	24.79	0.03	0.09	95.67
r05c13	0.14	0.73	94.51	99.78	35.85	15.77	0.06	0.17	95.93
r05c14	0.42	0.35	97.64	99.29	77.83	9.95	0.02	0.69	69.77
r05c02	0.27	0.62	97.98	99.79	54.26	1.66	0	0.21	89.37
r05c03	0.04	0.44	96.77	99.95	69.56	18.07	0	0.04	98.54
r05c04	0.13	0.72	95.05	99.83	43.35	2.15	0	0.17	96.49
r05c05	0.03	0.21	91.54	99.84	87.25	42.41	0.02	0.14	98.11
r05c06	0.04	0.38	94.88	99.81	46.7	70.2	0.14	0.05	96.3
r05c07	0	0.02	96.12	99.98	95.73	98.29	0.01	0.01	99.47
r05c08	0.08	0.43	96.01	99.82	60.18	52.64	0.08	0.1	95.44
r05c09	0.01	0.02	92.86	96.8	9.94	98.78	3.2	0	55.13
r06c01	0.42	0.93	97.81	99.9	11.49	0.82	0.01	0.09	95.52
r06c10	0.04	0.32	91.34	99.5	40.77	77.45	0.42	0.08	94.22
r06c11	0.06	0.47	92.28	99.54	15.79	66.94	0.42	0.04	94.04
r06c12	0.06	0.49	88.57	99.4	34.42	60.06	0.44	0.16	94.79
r06c13	0.26	0.8	94.52	99.57	17.11	23.13	0.26	0.18	92.17
r06c14	0.65	0.84	97.96	99.42	18.75	11.57	0.21	0.38	71.59
r06c02	0.13	0.77	97.29	99.92	31.82	12.44	0.02	0.07	96.87
r06c03	0.11	0.71	97.59	99.93	45.15	1.16	0	0.07	97.19
r06c04	0.08	0.58	95.74	99.88	55.89	16.74	0.02	0.1	97.24
r06c05	0.11	0.2	87.36	98.37	75.73	81.26	0.96	0.69	87.09
r06c06	0.06	0.37	94.43	99.81	67.43	56.42	0.07	0.12	96.56
r06c07	0.34	0.8	95.49	99.52	20.25	19.75	0.24	0.25	89.3
r06c08	0.17	0.3	93.27	98.41	53.69	77.12	1.19	0.41	76.31
r06c09	0.06	0.47	93.92	99.65	28.44	65.28	0.29	0.06	94.32
r07c10	0.42	0.77	97.23	99.47	14.34	30.23	0.39	0.15	80.91
r07c11	0.18	0.81	89.14	99.51	23.18	14.01	0.17	0.32	95.53
r07c12	0.33	0.82	94.12	99.44	19.72	16.33	0.25	0.31	90.54
r07c13	0.46	0.83	95.68	99.24	6.14	25.71	0.65	0.12	82.43
r07c02	0.11	0.62	98.61	99.95	52.86	8.72	0	0.05	96.42
r07c03	0.07	0.33	99.08	99.97	79.11	16.43	0	0.03	96.64
r07c04	0.23	0.69	94.64	99.6	45.16	5.77	0.03	0.38	92.44
r07c05	0.04	0.26	83.1	98.93	51.99	81.39	0.86	0.21	93.68
r07c06	0.04	0.31	94.74	99.69	35.11	79.44	0.27	0.04	94.13
r07c07	0.06	0.23	90.01	98.48	29.43	85.69	1.43	0.1	84.77
r07c08	0.04	0.3	88.39	99.22	34	80.04	0.69	0.09	93.29
r07c09	0.34	0.79	94.66	99.36	16.7	24.87	0.41	0.25	87.94
r08c10	0.49	0.85	97.63	99.67	17.68	11.05	0.12	0.21	86.18
r08c11	0.41	0.84	94.5	99.35	12.72	17.68	0.39	0.27	88.24

r08c12	0.45	0.81	95.26	99.28	24.12	12.14	0.22	0.51	84.75
r08c13	0.51	0.76	94.45	98.62	29.66	16.17	0.45	0.97	75.15
r08c06	0.01	0.14	68.32	97.12	25.69	91.88	2.81	0.09	90.9
r08c07	0.04	0.1	81.63	93.8	18	94.08	6.15	0.09	66.25
r08c08	0.05	0.1	85.32	93.93	11.58	94.14	6.05	0.05	58.65
r08c09	0.33	0.66	92.94	98.67	30.49	36.45	0.77	0.59	81.2
r09c13	0.26	0.41	93.4	98.99	72.02	22.13	0.1	0.92	84.65
r09c07	0.01	0.07	67.28	95.16	22.58	96.14	4.79	0.06	85.22
r09c08	0.06	0.3	87.24	98.66	32.99	80.33	1.2	0.15	89.52
median	**0.11**	**0.47**	**94.55**	**99.66**	**5.66**	**28.81**	**0.1**	**0.12**	**92.48**