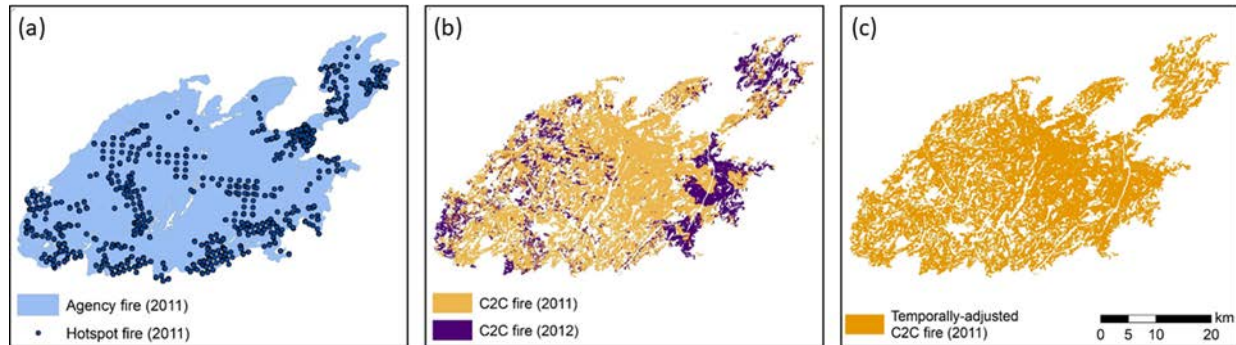
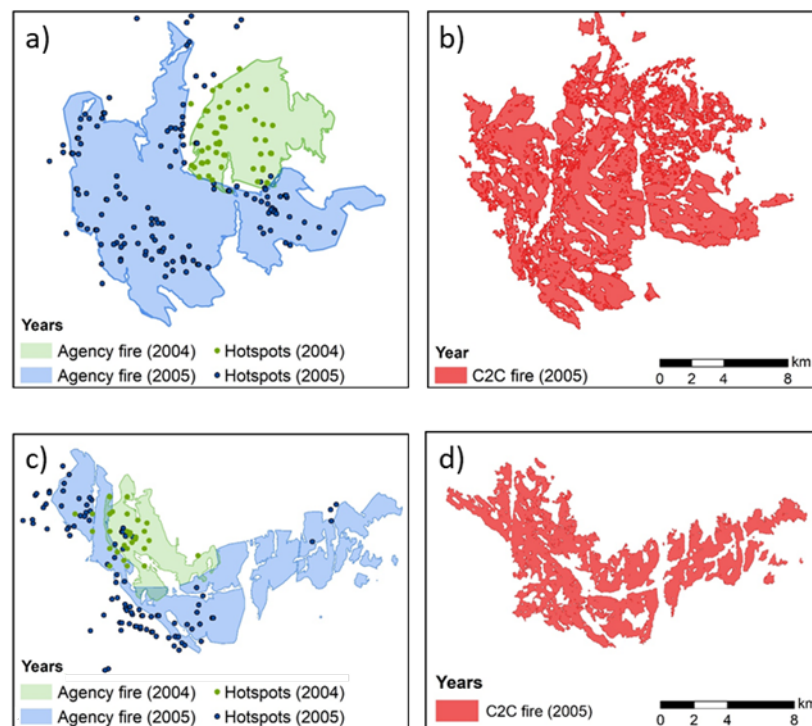


Supplementary Information (additional figures and tables) for the manuscript entitled  
 “Extending the National Burned Area Composite time series of wildfires in Canada”

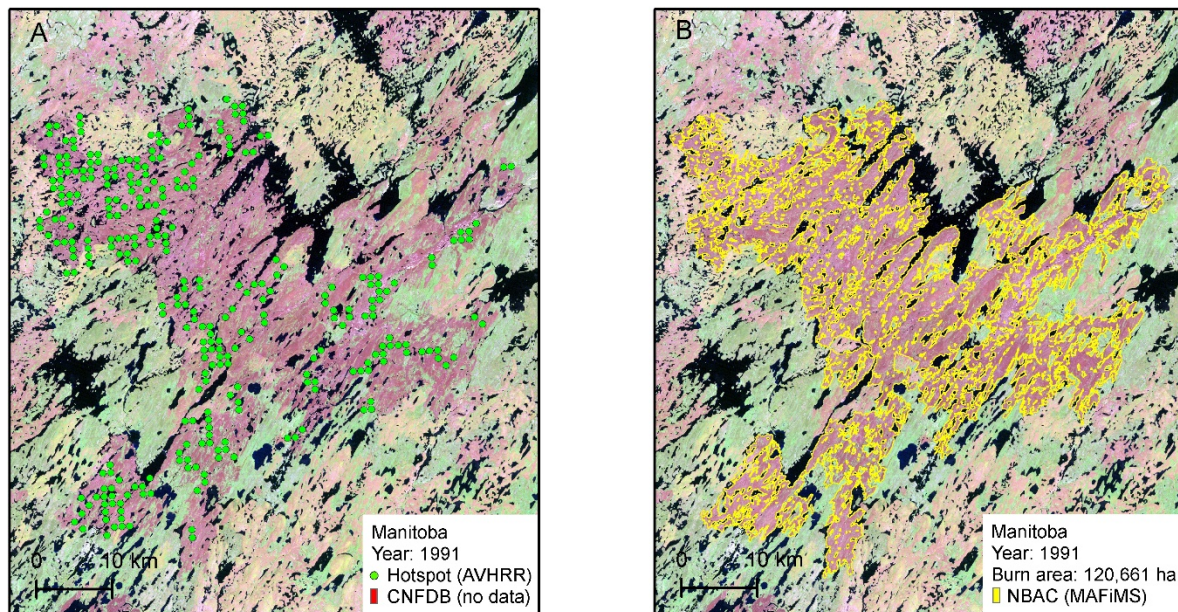


**Figure S1.** C2C “splitting” is where a fire event appears split in C2C into two or more events occurring over two consecutive years. In this example, a 2011 fire event is mapped by an agency polygon and hotspot points (a). C2C mapped the fire as occurring in 2011 and 2012 (b). A temporal adjustment to the 2012 portion of the C2C event corrected the year of the burn to 2011 (c). C2C = National Terrestrial Ecosystem Monitoring System Composite to Change.

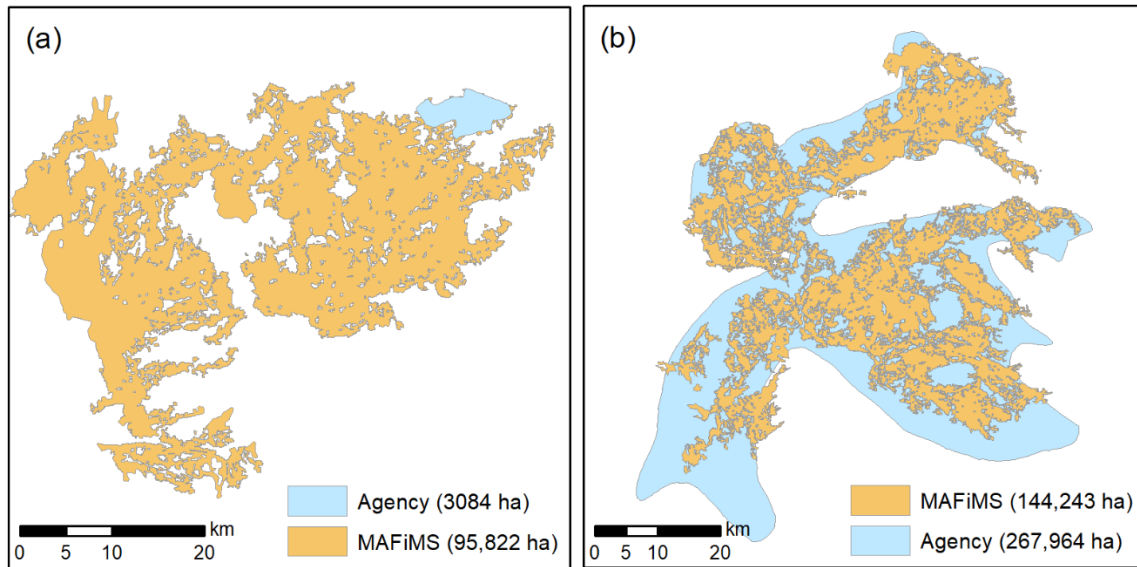


**Figure S2.** Two unrelated examples of C2C “lumping”, where two nearby fire events that occurred in consecutive years appear as a single fire event in C2C. Each row shows a 2004 fire event adjacent to a separate fire event in 2005, both assigned to the correct year by the fire agency as corroborated by

satellite hotspots (a, c). In contrast, C2C mapped the two events in each location as a single fire occurring in 2005 (b, d), which could not be temporally corrected in this study or used in NBAC. C2C = National Terrestrial Ecosystem Monitoring System Composite to Change. NBAC = National Burned Area Composite.



**Figure S3.** A fire event in Manitoba for year 1991 was detected using fire hotspots (green dots) from the AVHRR satellite, but was missed by the agency and not recorded in the CNFDB polygon or point data (A). In NBAC, this fire event was mapped with Landsat imagery (figure backdrop) using MAFiMS, resulting in 120,661 ha of previously unreported burned area (B). NBAC = National Burned Area Composite. AVHRR = Advanced Very High Resolution Radiometer; CNFDB = Canadian National Fire Database; MAFiMS = Multi-Acquisition Fire Mapping System.



**Figure S4.** Examples of agency fire sketch maps that significantly underestimate (a) and overestimate (b) the area burned compared to delineations derived from MAFiMS in NBAC.

**Table S1.** Regional trends by ecozone of annual burned area according to NBAC and CNFDB for the period 1986 to 2020. Only those ecozones with significant trends ( $p < 0.1$ ) are shown. Ecozones map available from [https://en.wikipedia.org/wiki/Ecozones\\_of\\_Canada](https://en.wikipedia.org/wiki/Ecozones_of_Canada).

Ecozone	Slope (NBAC ; CNFDB) ha/year	<i>p</i> -value (NBAC ; CNFDB)
Atlantic Maritime	-25.3 ; -12.1	0.09 ; 0.21
Boreal Plains	2796.5 ; 2051.4	< 0.001 ; 0.27
Hudson Plains	-1193.1 ; -1168.3	0.08 ; 0.08
Mixedwood Plains	1.3 ; 1.1	0.02 ; 0.01
Montane Cordillera	483.8 ; 553.2	0.03 ; 0.03

**Table S2.** Annual statistics of fires in Canada 1986-2020 according to NBAC, including the estimated 95% confidence intervals lower and upper limits, and absolute and relative width.

YEAR	# Fires	NBAC (ha)	Low (ha)	High (ha)	Width (ha)	PWidth (± %)
1986	351	819,980	800,905	1,049,788	248,884	15.2
1987	533	884,694	849,420	1,246,246	396,826	22.4
1988	535	1,215,607	1,193,470	1,449,308	255,838	10.5
1989	1164	6,655,378	6,620,997	7,053,446	432,449	3.2
1990	507	857,772	833,173	1,099,190	266,017	15.5
1991	563	1,530,079	1,478,315	2,027,401	549,086	17.9
1992	327	863,984	844,656	994,206	149,550	8.7
1993	365	1,961,358	1,927,924	2,194,934	267,010	6.8
1994	700	5,025,823	4,945,497	5,559,770	614,273	6.1
1995	783	5,898,298	5,726,314	6,851,048	1,124,734	9.5
1996	801	1,761,957	1,687,578	2,281,611	594,033	16.9
1997	369	730,870	682,669	904,645	221,976	15.2
1998	1234	4,149,820	4,087,848	4,633,127	545,279	6.6
1999	889	1,650,995	1,580,731	2,195,789	615,058	18.6
2000	754	614,484	589,768	812,477	222,710	18.1
2001	798	540,578	504,086	850,811	346,725	32.1
2002	846	2,676,595	2,602,726	3,089,917	487,191	9.1
2003	1149	1,800,320	1,729,199	2,422,237	693,037	19.2
2004	874	2,854,128	2,757,655	3,144,301	386,646	6.8
2005	1128	1,628,412	1,585,856	1,776,610	190,754	5.9
2006	1538	1,879,308	1,856,685	2,081,365	224,680	6.0
2007	1180	1,548,225	1,520,659	1,921,298	400,639	12.9
2008	1246	1,392,034	1,368,136	1,470,845	102,709	3.7
2009	1172	754,800	738,881	828,275	89,394	5.9
2010	1601	2,884,729	2,847,473	2,963,308	115,835	2.0
2011	820	1,927,794	1,884,824	2,006,173	121,349	3.1
2012	1410	1,675,271	1,653,285	1,779,633	126,348	3.8
2013	1571	4,145,201	4,004,209	4,295,464	291,255	3.5
2014	1387	3,859,507	3,817,481	3,983,601	166,120	2.2
2015	1944	3,354,634	3,271,550	3,437,770	166,220	2.5
2016	924	1,219,799	1,175,731	1,276,518	100,788	4.1
2017	1398	3,047,985	2,964,817	3,150,332	185,515	3.0
2018	1574	1,862,402	1,811,956	1,979,666	167,710	4.5
2019	819	1,603,879	1,550,394	1,755,362	204,968	6.4
2020	554	215,797	202,117	246,111	43,994	10.2
<b>Mean</b>	966	2,156,928	2,105,628	2,423,217	317,589	9.7
<b>Min</b>	327	215,797	202,117	246,111	43,994	2.0
<b>Max</b>	1944	6,655,378	6,620,997	7,053,446	1,124,734	32.1

**Table S3.** Annual statistics of fires in Canada 1986-2020 according to CNFDB, including the estimated 95% confidence intervals (CIs) lower and upper limits, and absolute and relative width. PWidth size ratio indicates how many times the CIs in CNFDB are wider than those in NBAC.

YEAR	# Fires	CNFDB (ha)	Low (ha)	High (ha)	Width (ha)	PWidth (± %)	PWidth (± %) size ratio*
1986	263	961,208	775,793	1,910,357	1,134,564	59.0	3.9
1987	398	1,072,656	904,813	2,050,286	1,145,474	53.4	2.4
1988	327	1,341,818	1,103,457	2,320,552	1,217,095	45.4	4.3
1989	818	7,838,368	6,675,091	9,744,208	3,069,117	19.6	6.1
1990	321	913,745	761,779	1,839,423	1,077,644	59.0	3.8
1991	378	1,548,979	1,287,096	2,624,494	1,337,398	43.2	2.4
1992	214	908,867	726,702	1,848,123	1,121,421	61.7	7.1
1993	254	1,964,479	1,581,817	3,004,768	1,422,951	36.2	5.3
1994	503	6,050,261	5,032,357	7,569,527	2,537,170	21.0	3.4
1995	490	6,715,664	5,627,662	8,068,611	2,440,950	18.2	1.9
1996	547	1,650,135	1,425,399	2,522,482	1,097,083	33.2	2.0
1997	217	561,593	455,344	1,103,203	647,858	57.7	3.8
1998	969	4,338,104	3,780,783	5,944,254	2,163,471	24.9	3.8
1999	647	1,671,472	1,386,291	2,532,777	1,146,487	34.3	1.8
2000	602	508,654	422,134	1,266,403	844,268	83.0	4.6
2001	669	534,682	466,181	1,188,019	721,839	67.5	2.1
2002	666	2,463,799	2,141,362	3,321,849	1,180,487	24.0	2.6
2003	967	1,976,162	1,695,652	3,126,834	1,431,182	36.2	1.9
2004	713	2,898,798	2,528,521	3,722,843	1,194,322	20.6	3.0
2005	939	1,717,607	1,466,869	2,776,196	1,309,327	38.1	6.5
2006	1382	1,784,726	1,516,138	2,467,855	951,717	26.7	4.5
2007	1055	1,560,329	1,329,252	2,433,553	1,104,301	35.4	2.7
2008	1152	1,668,764	1,386,999	2,369,268	982,269	29.4	7.9
2009	1107	718,214	633,389	881,829	248,440	17.3	2.9
2010	1581	2,880,326	2,467,878	3,659,728	1,191,851	20.7	10.4
2011	785	2,252,037	1,990,250	3,214,094	1,223,843	27.2	8.8
2012	1291	1,697,082	1,501,429	2,196,234	694,804	20.5	5.4
2013	1440	3,933,991	3,576,692	4,388,778	812,086	10.3	2.9
2014	1310	4,371,450	3,752,879	4,364,945	612,066	7.0	3.2
2015	1941	3,649,382	3,231,252	3,804,860	573,608	7.9	3.2
2016	923	1,292,155	1,153,623	1,487,531	333,908	12.9	3.1
2017	1383	3,208,732	2,719,460	3,560,748	841,288	13.1	4.4
2018	1521	1,977,211	1,668,570	2,794,323	1,125,753	28.5	6.3
2019	735	1,262,356	1,155,019	2,070,112	915,093	36.2	5.7
2020	534	159,307	139,513	199,279	59,766	18.8	1.8
<b>Mean</b>	830	2,287,232	1,956,213	3,096,524	1,140,311	32.8	3.4
<b>Min</b>	214	159,307	139,513	199,279	59,766	7.0	1.8

<b>Max</b>	1941	7,838,368	6,675,091	9,744,208	3,069,117	83.0	10.4
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\* PWidth size ratio = CNFDB PWidth (± %) / NBAC PWidth (± %)