

Supplementary material

Population regulation of African buffalo in the Mara–Serengeti ecosystem

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The following supporting information is available for this article online.

Table S1. The estimated total population size of buffalo in the Masai Mara from 1958 to 2010 based on aerial counts for the dry season (July–October) and the wet season (November–June)

Only the wet season counts were analysed in this study. The wet season counts for 1958–74 were only used to examine temporal trends in Fig. 7 in the text. The periods before (1984–93) and after (1994–2010) the 1993 drought are identified by the entries A and B, respectively, in the variable called ‘break’. The total rainfall in the dry and wet seasons and the annual rainfall (November–October) lagged by 1 to 5 years are also provided. Numeric suffixes in rainfall component names denote the number of years by which the component was lagged. Only population growth rates for the period 1984–2003 were related to rainfall because rainfall records stopped in 2003. Bold entries denote population sizes estimated by the trend model.

Species	Year	Time	Population size in dry season	Population size in wet season	Break	Dry1	Wet1	Annual1	Dry2	Wet2	Annual2	Dry3	Wet3	Annual3	Dry4	Wet4	Annual4	Dry5	Wet5	Annual5
Buffalo	1958			4000																
Buffalo	1961			5934																
Buffalo	1970			11981																
Buffalo	1974			10882																

Buffalo	1984	1	9559	13988	A	290	863.9	1153.9	152.7	500.7	653.4	151.1	883.8	1034.9	189.5	951.6	1141.1	113.2	900.8	1014
Buffalo	1985	2		9816	A	205.4	561.9	767.3	290	863.9	1153.9	152.7	500.7	653.4	151.1	883.8	1034.9	189.5	951.6	1141.1
Buffalo	1986	3		11523	A	146.5	727.8	874.3	205.4	561.9	767.3	290	863.9	1153.9	152.7	500.7	653.4	151.1	883.8	1034.9
Buffalo	1987	4	11126	12643	A	128.7	762.9	891.6	146.5	727.8	874.3	205.4	561.9	767.3	290	863.9	1153.9	152.7	500.7	653.4
Buffalo	1988	5	10033	11244	A	162.1	898.3	1060.4	128.7	762.9	891.6	146.5	727.8	874.3	205.4	561.9	767.3	290	863.9	1153.9
Buffalo	1989	6	11077	11284	A	278.7	1021	1299.8	162.1	898.3	1060.4	128.7	762.9	891.6	146.5	727.8	874.3	205.4	561.9	767.3
Buffalo	1990	7	11499	11786	A	191.4	822.3	1040.7	278.7	1021.1	1299.8	162.1	898.3	1060.4	128.7	762.9	891.6	146.5	727.8	874.3
Buffalo	1991	8	12809	11643	A	209.93	877.2	1079.5	191.4	822.3	1040.7	278.7	1021.1	1299.8	162.1	898.3	1060.4	128.7	762.9	891.6
Buffalo	1992	9	12363	12320	A	208.5	753	958.492	209.93	877.24	1079.5	191.4	822.3	1040.7	278.7	1021.1	1299.8	162.1	898.3	1060.4
Buffalo	1993	10	6590	12895	A	249.37	744	1001.11	208.5	753.02	958.49	209.93	877.24	1079.5	191.4	822.3	1040.7	278.7	1021	1299.8
Buffalo	1994	11		3210	B	95.447	667.5	762.92	249.37	743.97	1001.1	208.5	753.02	958.49	209.93	877.24	1079.5	191.4	822.3	1040.7
Buffalo	1995	12		2453	B	185.2	747.7	927.023	95.447	667.47	762.92	249.37	743.97	1001.1	208.5	753.02	958.49	209.9	877.2	1079.5
Buffalo	1996	13		1885	B	184.04	863.7	1047.73	185.2	747.68	927.02	95.447	667.47	762.92	249.37	743.97	1001.1	208.5	753	958.49
Buffalo	1997	14	2472	2536	B	345.76	588.1	950.5	184.04	863.69	1047.7	185.2	747.68	927.02	95.447	667.47	762.92	249.4	744	1001.1
Buffalo	1998	15	3079	2583	B	149.16	612.4	757.261	345.76	588.14	950.5	184.04	863.69	1047.7	185.2	747.68	927.02	95.45	667.5	762.92
Buffalo	1999	16	3172	2979	B	266.27	1099	1382.91	149.16	612.44	757.26	345.76	588.14	950.5	184.04	863.69	1047.7	185.2	747.7	927.02
Buffalo	2000	17	2674	2799	B	178.09	553.5	731.636	266.27	1098.7	1382.9	149.16	612.44	757.26	345.76	588.14	950.5	184	863.7	1047.7
Buffalo	2001	18	3693	2607	B	178.09	596	723	178.09	553.55	731.64	266.27	1098.7	1382.9	149.16	612.44	757.26	345.8	588.1	950.5
Buffalo	2002	19		3480	B	296	955.3	1391	178.09	596	723	178.09	553.55	731.64	266.27	1098.7	1382.9	149.2	612.4	757.26
Buffalo	2003	20		3450	B															
Buffalo	2006	21		3264	B															
Buffalo	2007	22		4524	B															
Buffalo	2010	23		4649	B															

Table S2. The estimated total number of buffalo inside and outside the Masai Mara region and in a small strip in northern Serengeti in Tanzania, including the Lamai Wedge, from 1984 to 2010

Year	Inside	Outside	Lamai Wedge	Total
	Mara reserve	Mara reserve	Northern Tanzania	
1984	11 671	2082	235	13 988
1985	6684	3130	2	9816
1986	8956	2507	60	11 523
1987	8899	3493	251	12 643
1988				
1989	10 010	1272	2	11 284
1990	9579	2124	83	11 786
1991	9381	1739	523	11 643
1992	9943	2142	235	12 320
1993	10 640	2241	14	12 895
1994	2408	728	74	3210
1995	2023	430	102	2555
1996	1127	758	0	1885
1997				
1998				
1999	2078	901	0	2979
2000				
2001	2290	151	166	2607
2002	2882	318	280	3480
2003				
2004				
2005				
2006	2366	151	747	3264
2007	3683	397	444	4524
2008				
2009				
2010	2879	1645	215	4649