



LEWA-BORANA LANDSCAPE WILDLIFE COUNT REPORT
FEBRUARY 2022

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1.0 Introduction

The Lewa-Borana Landscape (LBL) is a combined conservation landscape made up of Lewa Wildlife Conservancy and Borana Wildlife Conservancy (BWC). Annual wildlife counts using aerial and ground counting methods have been conducted in these conservancies for many years before the fence separating the two properties was removed. Lewa's counts dates back to 1977 while that of Borana started in 1991. We conducted the first joint wildlife count in 2016 and this has been repeated annually.

The main objectives of the annual wildlife count are to:

1. Determine species abundance.
2. Derive and compare past and current species population trends.
3. Propose conservation priorities.

2.0 Methodology

We used combined aerial and ground counts during the exercise. The count was conducted from 7:00 am to 12:00 pm on 23rd February 2022. The Landscape was divided into eight ground counting blocks and eight aerial counting blocks excluding Ngare Ndare Forest because of very high vegetation density (Figure 1). The blocks were delineated by either roads or other geographical features, primarily rivers, valleys, and hills. On each ground counting block, wildlife species were counted by a minimum of two observers in an open vehicle driven through the block counting all animals sighted. Hills were also used as observation points by the ground counting team. All the wildlife sightings were recorded using a Cybertracker¹. In addition to this, hand-written data sheets were used to record the sightings which acted as a back-up for the Cybertracker data.

The blocks that were counted from the air have generally poor accessibility and reduced visibility from the ground. The aerial counting blocks were counted using two PA-18 Super cubs, one covering block 9a-e and another one block 9f-h, flown at an average height of 300 feet above the ground level. The speed of the aircrafts varied from 70 – 90 knots. Transects were maintained at 500metres on either side of the aircraft and followed an east-west or north-south direction depending on the terrain, and direction of the wind and the sun. The aerial counting team used a

¹ Cybertracker is a software that uses a geographic positioning system (GPS) enabled personal digital assistant (PDA) such as smartphones to collect GPS and wildlife observations data in a single unit.

Dictaphone to record observations and GPS units to record geolocation data. The voice data was then downloaded onto a computer and transcribed onto a Microsoft Excel spreadsheet as shown in Table 1. Data from the GPS unit were downloaded and combined with that from Cybertracker for mapping. Data from the aerial and ground counting blocks was combined to summarize the results (Table 1). Maps of wildlife count patrol effort (Figure 2), distribution (Figure 3), wildlife trends and distribution of selected species (Figure 4 & Figure 5a&b), were also produced.

The figure below shows the delineation for both ground and aerial counting blocks:

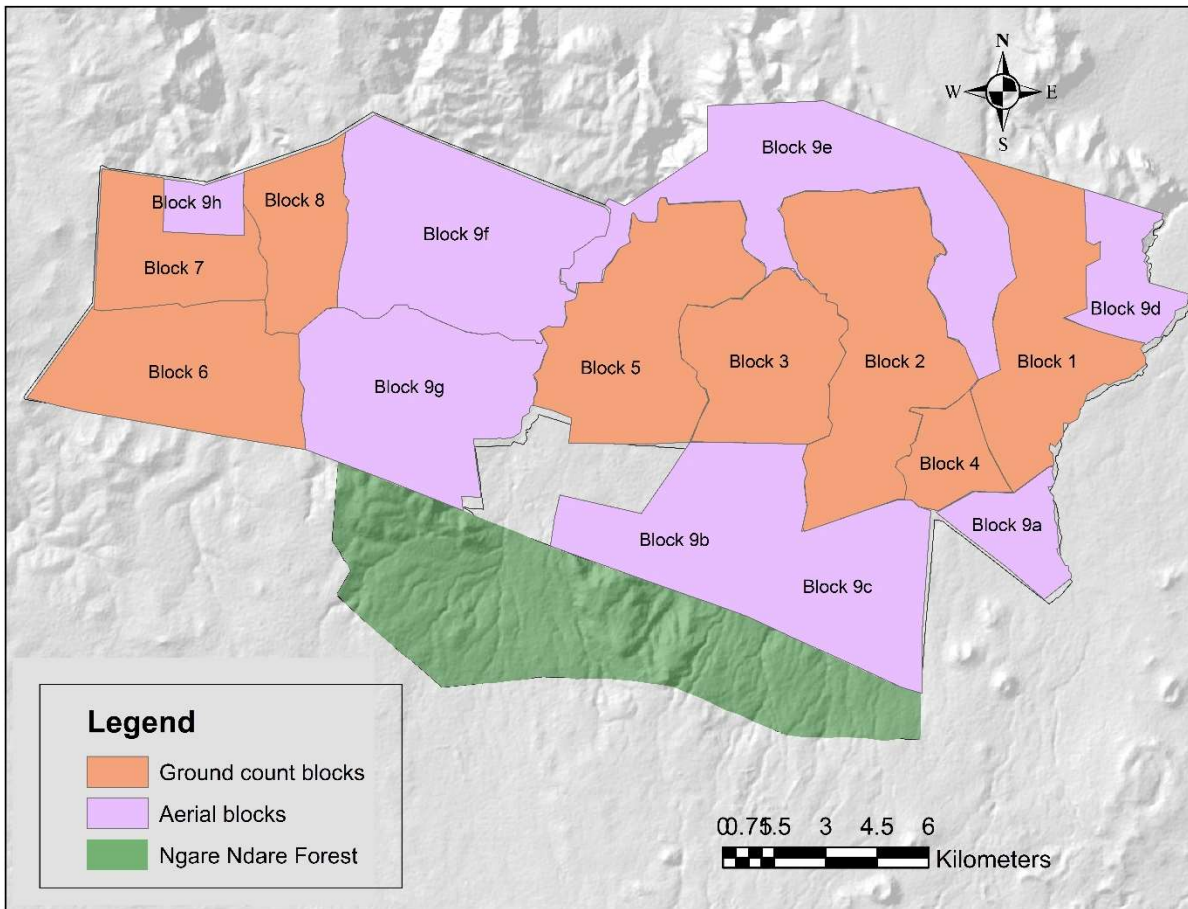


Figure 1: Map of the LBL showing the ground and aerial wildlife counting blocks, February 2022.

We also map both the aerial and foot patrol routes during the counting exercise as shown in the map below:

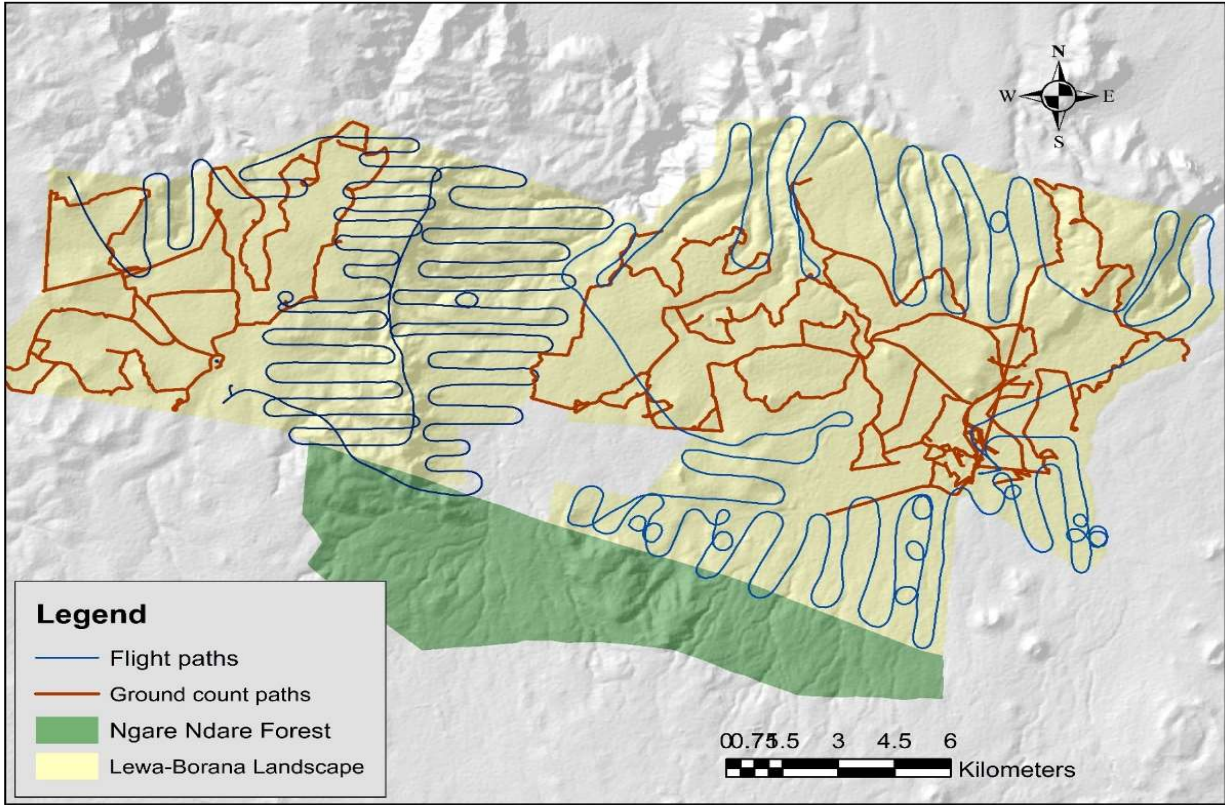


Figure 2: Patrol effort map/track logs during the wildlife count, February 2022

The table below shows the numbers of wildlife counted on Lewa-Borana landscape since 2016 to 2022:

Table 1: Wildlife numbers counted on Lewa–Borana Landscape, 2016 – 2022

Lewa - Borana Landscape Game Count							
Dates: 2016 - 2022							
SPECIES	2016	2017	2018	2019	2020	2021	2022
Beisa Oryx	179	220	178	227	307	239	247
Buffalo	1220	1391	1623	1753	2086	2153	1901
Bush buck	15	17	16	15	15	15	5
Cheetah	8	1	4	5	6	7	8
Eland	280	192	322	291	245	358	331
Elephant	416	509	250	253	727	516	425
Gerenuk	10	10	11	10	10	11	16
Gazelle, Grants	348	443	415	718	1101	1145	1135
Gazelle, Thompsons	27	4	7	10	16	16	26
Giraffe	273	251	127	167	178	172	119
Greater kudu	28	35	22	32	32	32	32
Hippo	2	2	2	2	2	2	2
Hartebeest	30	62	64	64	93	91	92
Hyena, spotted	0	0	122	133	136	134	144
Hyena, striped	-	-	-	-	-	-	14
Impala	1113	1096	1763	1817	1505	1568	1285
Jackal (Silver backed)	9	12	6	7	14	22	6
Klipsringer	8	8	8	8	8	15	15
Leopard	7	8	9	9	9	9	14
Lion	17	44	45	47	53	61	57
Ostrich	51	44	41	52	65	83	61
Rhino, black	81	82	88	101	109	117	132
Rhino, white	70	75	80	87	97	107	118
Sitatunga	0	0	0	0	0	0	0
Warthog	68	85	140	161	168	162	151
Waterbuck	136	168	152	180	167	100	158
Zebra, Burchell	1262	1236	1228	1484	1599	1561	1557
Zebra, Grevy's	299	292	308	313	331	322	310

In this exercise, we also mapped sightings of wildlife on the landscape in order to decide and design species-specific interventions like patrols, observations, data collection and take other landscape based actions towards protection of wildlife and humans.

The figure below shows the general distribution of wildlife based on sightings as per the game count of February 2022:

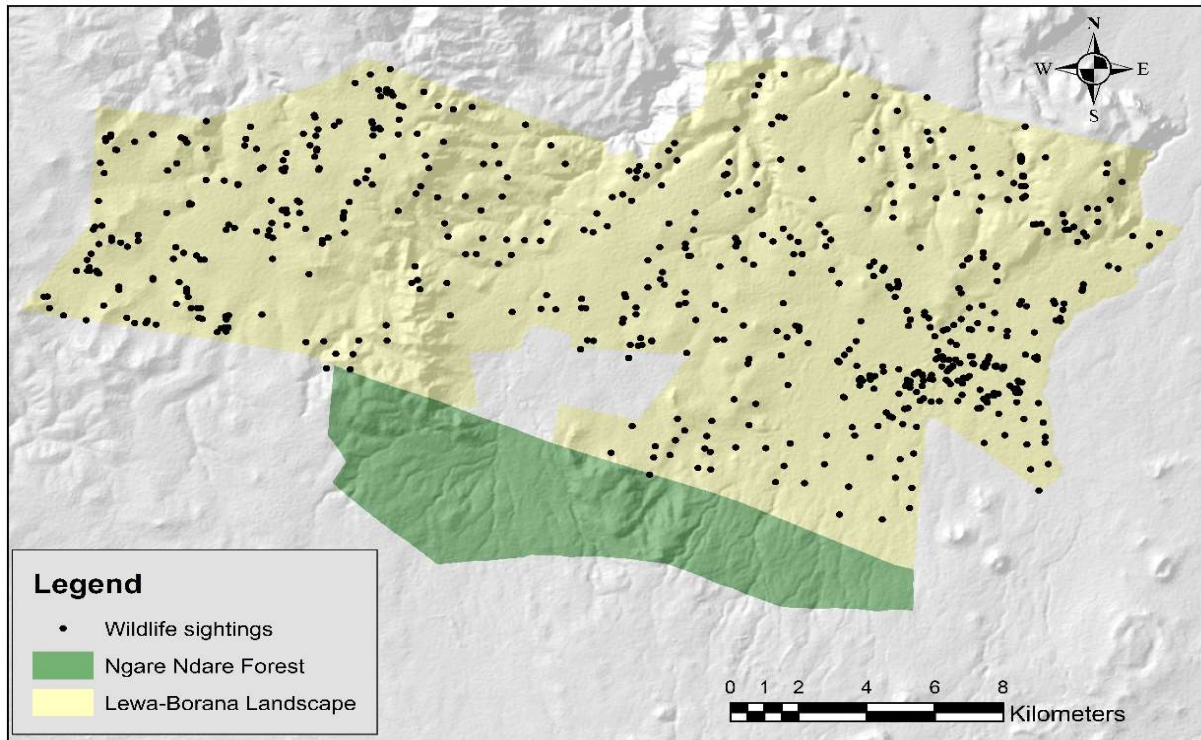
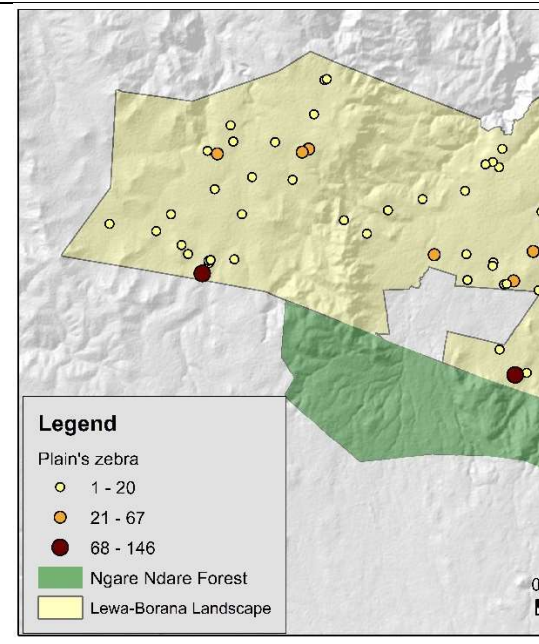
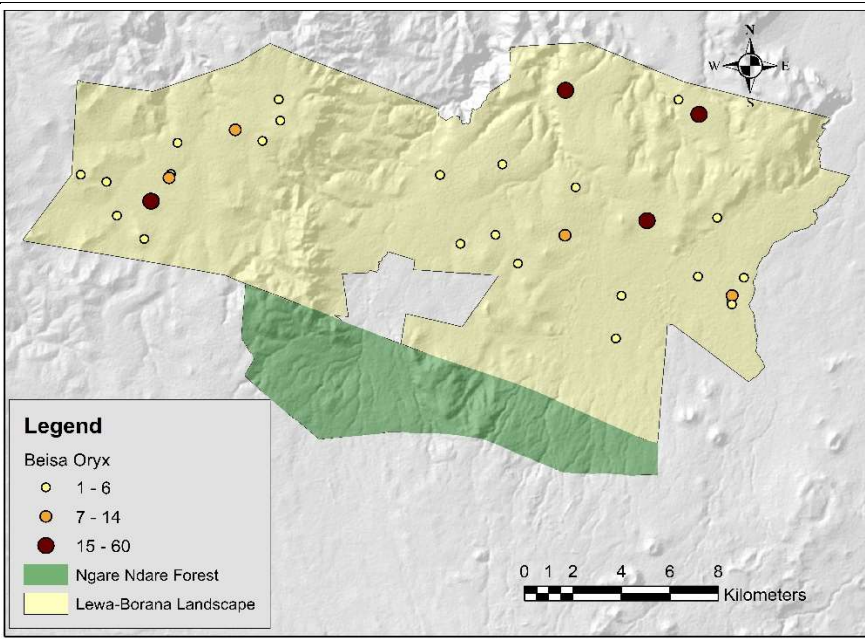
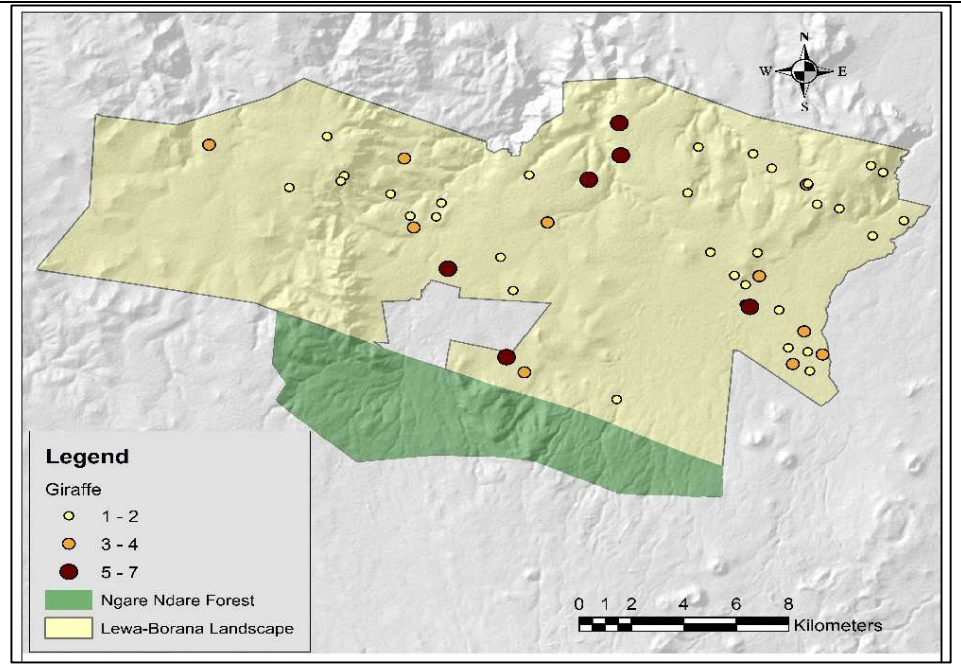
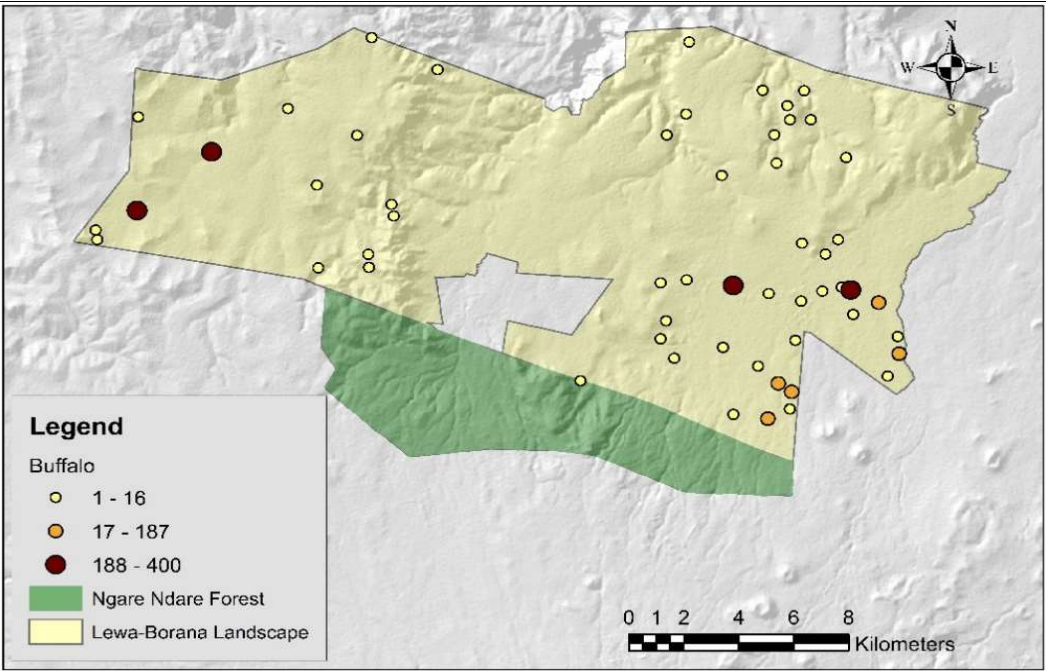


Figure 3: Combined distribution map of all wildlife sightings, February 2022

We also counted and mapped different wildlife species based on their roaming range on the counting day. The figure show spatial distribution of selected species on the landscape:





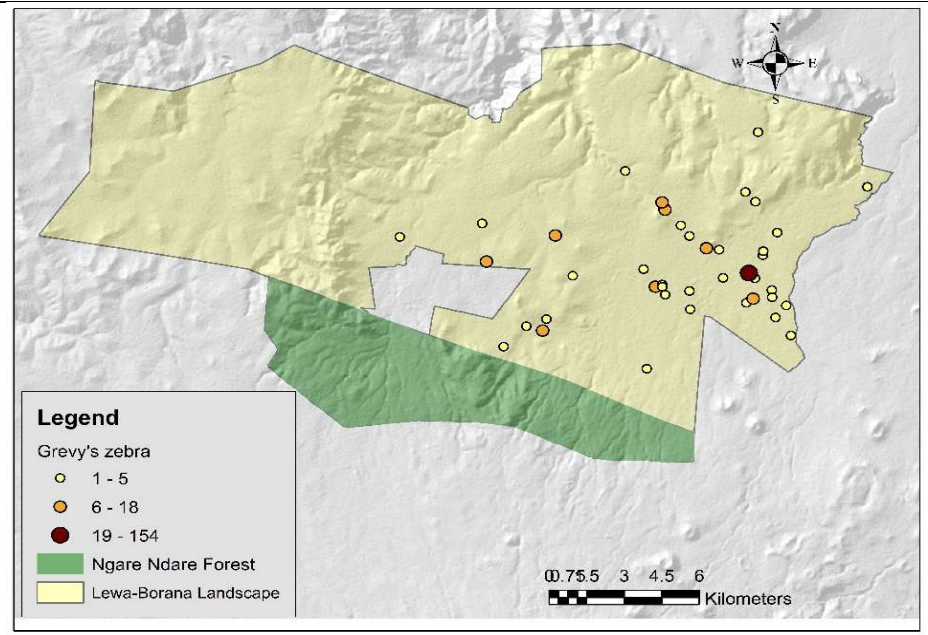
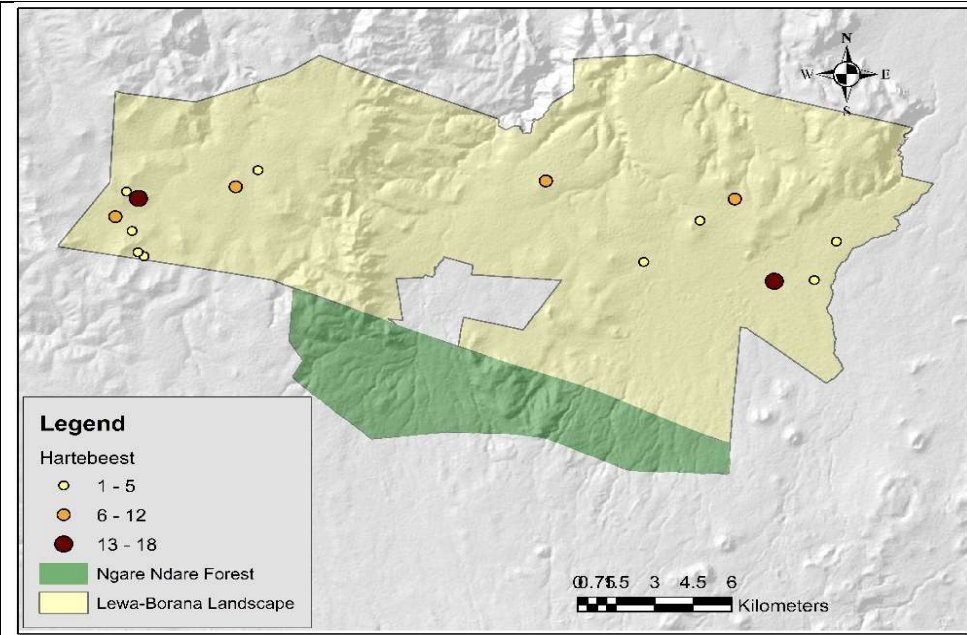
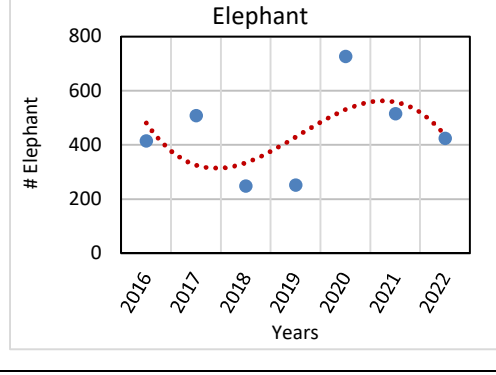
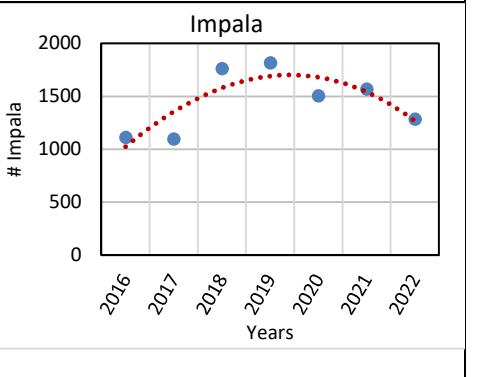
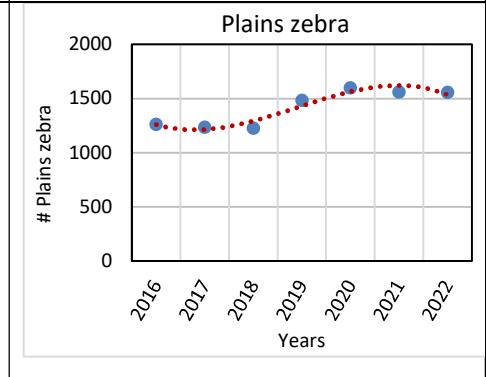
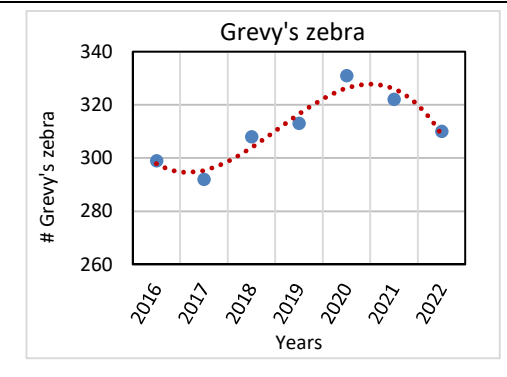
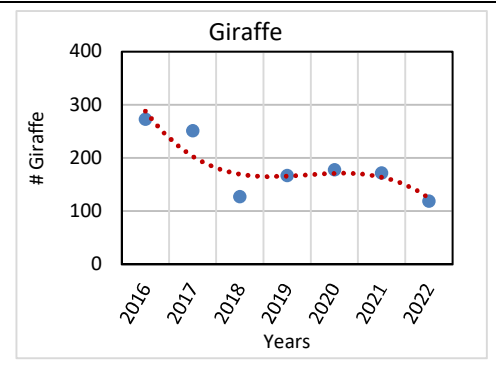
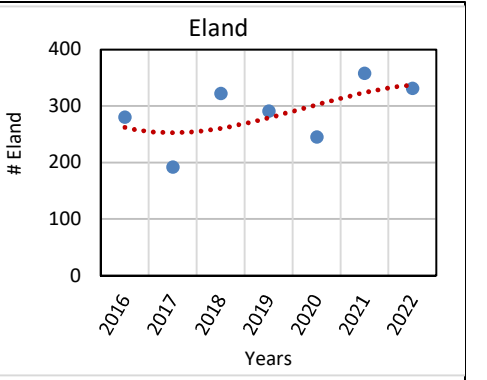
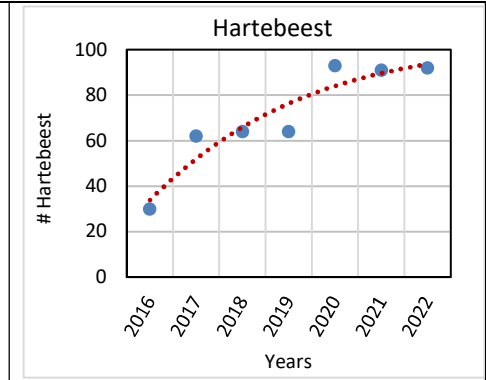
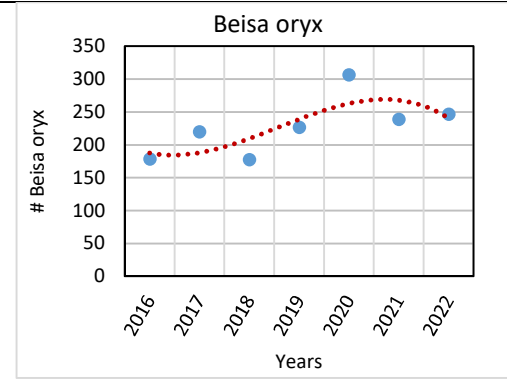
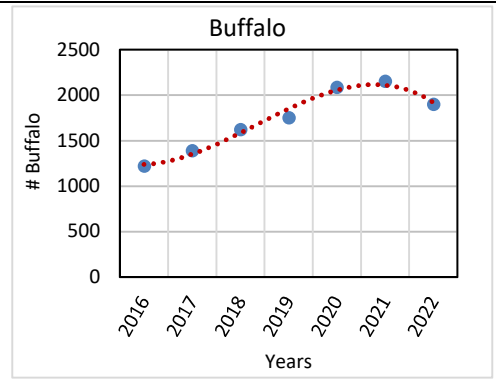


Figure 4a & b: Wildlife distribution maps of selected species on LBL - 2022

We also show the trends of selected wildlife species on the landscape over time based on annual counts since 2016 as shown on the figure 5 below:



3.0 Results and discussion

The general trend from 2016 to date shows a decreasing trend for buffalo ($\chi^2 = 416.68$, $df = 6$, $p = 0.0001$), giraffe ($\chi^2 = 110.7$, $df = 6$, $p = 0.0001$), elephant ($\chi^2 = 372.47$, $df = 6$, $p = 0.0001$), Beisa oryx ($\chi^2 = 51.235$, $df = 6$, $p = 0.0001$), impala ($\chi^2 = 355.77$, $df = 6$, $p = 0.0001$), and Grevy's zebra ($\chi^2 = 3.3453$, $df = 6$, $p = 0.7644$). Hartebeest ($\chi^2 = 44.948$, $df = 6$, $p = 0.0001$) and eland ($\chi^2 = 66.019$, $df = 6$, $p = 0.0001$) indicates an increasing trend. Plains zebra ($\chi^2 = 120.19$, $df = 6$, $p = 0.0001$) is relatively stable.

Most species indicate a decreasing trend probably due to low rains received in 2016, 2017 and 2021.

4.0 Conclusion and recommendations

It is important to determine the ecological carrying capacity for mega-herbivores so that we can have a known benchmark to inform management actions.

Appendix 1: Wildlife count figures on Lewa Wildlife Conservancy: 1977 – 2022

SPECIES	Aug-77	May-90	Apr-91	May-92	Feb-93	Jun-94	Feb-95	Mar-96	May-97	Mar-98	Feb-99	Feb-00	Jan-01	Jan-02	Feb-03	Feb-04	Feb-05	Mar-06	Mar-07	Mar-08	Feb-09	Feb-10	Mar-11	Mar-12	Mar-13	2014	Feb-15	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20	Mar-21	Feb-22				
Beisa Oryx	7	68	80	68	74	57	100	65	165	127	141	126	84	86	62	85	49	69	91	115	65	76	72	76	74	102	140	138	138	101	122	174	147	180				
Buffalo	78	71	128	197	37	74	113	203	236	159	245	238	125	161	203	233	255	339	343	349	402	403	332	269	547	695	707	941	1046	1262	1363	1459	1774	1353				
Bush buck	0	0	0	17	7	10	3	6	3	0	6	0	0	0	>20	>20	>20	>20	>20	>20	>20	>20	>20	20	20	15	15	15	15	15	15	15	15	0				
Cheetah	4	0	1	0	2	0	0	4	7	7	10	4	21	10	7	8	8	8	5	6	6	5	11	12	7	12	5	8	1	4	5	2	1	3				
Eland	94	260	274	135	435	128	190	146	273	227	299	228	151	121	108	137	214	169	248	255	218	165	123	95	162	204	207	173	134	231	250	205	330	254				
Elephant	62	102	10	220	149	15	199	178	110	247	170	193	150	28	157	216	297	392	256	177	211	207	184	297	166	151	150	187	186	162	131	399	276	207				
Gerenuk	24	31	36	77	35	37	42	50	55	5	16	4	17	15	11	7	11	11	~10	~10	~10	~10	9	7	6	7	12	10	10	10	10	10	11	16				
Gazelle, Grants	174	322	332	274	583	174	159	133	327	181	176	132	162	192	167	261	258	320	362	452	376	371	378	386	292	337	288	322	315	259	537	648	842	784				
Gazelle, Thompson	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Giraffe	190	440	367	388	361	229	334	196	202	186	240	237	236	245	215	177	173	147	189	243	293	252	243	241	158	163	182	199	157	102	112	127	136	92				
Greater kudu	24	14	40	34	25	27	19	30	53	22	30	13	38	37	33	36	>20	>20	>20	12	17	16	24	3	8	28	26	21	22	20	20	20	20	31				
Hippo	0	0	0	0	0	0	0	0	0	0	0	0	1**	2**	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
Hartebeest	25	63	106	45	40	46	60	35	50	58	45	28	9	7	4	2	2	2	2	2	24	5	7	5	10	12	11	20	18	22	27	38	47	44				
Hyena, spotted	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Hyena, striped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Impala	231	379	501	475	486	729	594	508	821	698	825	733	627	749	760	679	836	739	829	922	1029	1227	953	895	563	1021	814	880	777	1078	1294	952	1134	908				
Jackal (Silver backed)	0	0	0	0	0	2	2	2	0	8	0	0	0	0	>15	>12	>12	>12	>12	>12	>12	>12	>12	8	3	9	9	9	10	4	6	4	12	2				
Klipspringer	0	0	0	0	0	0	0	0	12	4	8	>8	>8	>8	>8	>8	>8	>8	>8	>8	>8	>8	>10	2	6	8	8	8	8	8	8	8	10	0				
Leopard	0	0	0	0	0	3	0	0	1	1	10	0	1	7	>8	>8	8	8	>8	8	8	8	8	10	12	6	8	7	7	8	9	9	9	14				
Lion	4	0	0	0	2	0	5	0	7	2	11	0	8	20	18	28	24	16	12	12	16	19	17	21	23	22	26	17	23	23	23	19	22	22				
Ostrich	16	40	34	38	48	37	73	45	75	66	85	84	119	98	65	68	48	36	48	74	44	50	20	41	26	37	43	51	42	41	44	60	67	43				
Rhino, black	0	17	14	15	19	21	21	21	20	25	26	29	29	32	36	40	48	53	55	64	65	62	71	69	67	72	61	60	63	73	80	78	89					
Rhino, white	0	0	0	5	11	0	19	23	23	25	28	32	30	31	32	32	39	36*	36	38	45	46	53	58	56	63	65	70	72	80	85	91	101	110				
Sitatunga	0	0	0	0	0	0	0	10	11	11	12	12	21	21	16	16	14	14	<10	<10	<10	<10	2	1	0	0	0	0	0	0	0	0	0	0	0			
Warthog	15	124	142	230	310	110	213	147	272	233	367	304	88	194	136	129	170	140	163	277	160	162	114	50	31	59	48	68	33	69	82	55	87	80				
Waterbuck	39	147	326	223	408	171	104	226	300	242	220	474	149	170	64*	52	116	134	93	173	175	96	171	102	96	98	92	117	101	117	133	97	68	120				
Zebra, burchell	241	1291	1452	1375	1302	1372	1387	1428	1647	1552	1756	1467	1264	1039*	1025	1102	1094	970	1098	1184	1288	1164***	908	1151	946	956	836	991	653	694	985	725	1050	1152				
Zebra, Grevy's	106	287	259	380	262	236	140	387	470	517	632	497	556	487	462*	435	448	399	430	370	364**	343***	371****	378	296	284	325	299	286	308	313	331	321	308				
*	Census after individuals translocated out of Lewa																																					
**	Excludes 56 GZ counted in LMD and Il Ngwesi area on 28/2/09																																					
***	Excludes 51 GZ & 102 PZ counted in LMD & IL Ngwesi on 21/03/2010																																					
****	Does not include count from LMD area, 16/03/2011																																					

Appendix 2: Wildlife count figures on Borana Wildlife Conservancy: 1977 – 2022

SPECIES	Aug-77	May-90	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Aerial count	Total aerial & ground count	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20	Mar-21	Feb-22
Beisa oryx	-	-	38	112	-	-	47	101.5	88	111	-	-	-	-	-	-	-	70	-	-	-	30	25	19	26	29	33	41	82	77	105	133	92	67		
Buffalo	-	-	78	66	-	-	127	196.5	222	165	-	-	-	-	-	-	-	380	-	-	-	122	133	141	190	229	228	279	345	361	390	627	379	548		
Bushbuck	-	-	20	18	-	-	6	8	0	0	-	-	-	-	-	-	-	0	-	-	-	0	1	1	0	1	3	0	2	1	0	-	-	5		
Cheetah	-	-	0	0	-	-	1	2	0	0	-	-	-	-	-	-	-	3	-	-	-	0	0	1	0	0	0	0	0	0	4	6	5			
Eland	-	-	105	257	-	-	176	203.5	185	372	-	-	-	-	-	-	-	104	-	-	-	37	34	51	53	60	59	107	58	91	41	40	28	77		
Elephant	-	-	0	35	-	-	27	91.5	9	29	-	-	-	-	-	-	-	67	-	-	-	60	59	105	85	106	94	229	323	88	122	328	240	218		
Gerenuk	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	1	1	1	0	1	2	0	0	1	0	0	0	0		
Gazelle, Grants	-	-	88	140	-	-	94	93.5	109	55	-	-	-	-	-	-	-	74	-	-	-	12	14	16	30	30	26	26	128	156	181	453	303	351		
Gazelle, Thompsons	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	2	1	0	0	0	27	4	7	10	16	16	26		
Giraffe	-	-	77	120	-	-	102	166.5	153	151	-	-	-	-	-	-	-	105	-	-	-	60	61	63	78	56	63	74	94	25	55	51	36	27		
Greater kudu	-	-	48	36	-	-	32	40	32	1	-	-	-	-	-	-	-	18	-	-	-	5	5	8	9	9	11	7	13	2	12	12	12	1		
Hippo	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hartebeest	-	-	18	43	-	-	22	23	27	43	-	-	-	-	-	-	-	11	-	-	-	4	6	5	8	10	12	10	44	42	37	55	44	48		
Hyena, spotted	-	-	3	13	-	-	10	5	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	3	0	2	2	0		
Hyena, striped	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	
Impala	-	-	77	217	-	-	206	176	415	166	-	-	-	-	-	-	-	311	-	-	-	115	161	198	190	165	174	233	319	685	523	553	434	377		
Jackal (Silver backed)	-	-	11	7	-	-	18	8	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	2	2	1	10	10	4		
Klipspringer	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	5	0		
Leopard	-	-	4	7	-	-	5	6	0	0	-	-	-	-	-	-	-	6	-	-	-	0	0	0	0	9	0	0	0	0	0	-	0	0		
Lion	-	-	0	6	-	-	5	7.5	5	0	-	-	-	-	-	-	-	20	-	-	-	2	10	8	3	3	2	0	21	22	24	34	39	35		
Ostrich	-	-	0	0	-	-	0	0	14	14	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	2	0	8	5	16	18		
Rhino, black	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	21	21	20	20	22	25	28	29	39	43	
Rhino, white	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	2	0	3	0	2	6	6	8		
Sitatunga	-	-	0	0	-	-	0	0	0	0	-	-	-	-	-	-	-	0	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Warthog	-	-	0	0	-	-	19	30	25	51	-	-	-	-	-	-	-	6	-	-	-	6	7	6	9	9	7	0	52	71	79	113	75	71		
Waterbuck	-	-	149	110	-	-	50	139.5	150	116	-	-	-	-	-	-	-	51	-	-	-	17	26	25	37	45	43	19	67	35	47	70	32	38		
Zebra, burchell	-	-	524	1036	-	-	867	831	675	714	-	-	-	-	-	-	-	635	-	-	-	276	265	241	271	297	284	271	583	534	499	874	511	405		
Zebra, Grevys	-	-	0	0	-	-	0	1	2	0	-	-	-	-	-	-	-	1	-	-	-	0	0	0	0	0	0	0	6	0	0	0	1	2		