



Eastern Black Rhino EEP

(Diceros bicornis michaeli)

Annual Studbook Report 2013

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CHESTER ZOO

Eastern Black Rhino EEP

Diceros bicornis michaeli

Annual Studbook Report 2013

(Data current as of December 31, 2013)

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Latest studbook version published: 2012

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Cover Photo: Black rhino Nabila born at Krefeld during 2013 ©Hella Hallmann

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1. Introduction

Vision and target for the Black Rhino EEP population:

- 1) Ensure a healthy and sustainable EAZA population to fulfil the needs of EAZA zoos.
- 2) Manage the population to achieve a >5% growth rate per year.
- 3) Work closely with the African Rhino Specialist Group (AfRSG) and Governments to make Eastern Black Rhino available for return to Africa to supplement populations where needed.

All participants must follow the EAZA EEP rules. Especially that all animals and their offspring are available to the EEP. The receiving institution will normally be responsible for the costs of the transfer, unless a pre agreed local arrangement is made between the institutions. It is the responsibility of the sending institution to ensure that the facilities and level of husbandry at the receiving institution are appropriate. Please note that there is currently no restriction on breeding unrelated animals (if you are not sure whether your pairings are related please contact me).

Although this EEP focuses on the Eastern subspecies *Diceros bicornis michaeli*, a pair of the Southern African subspecies, *D.b.minor* at Frankfurt Zoo is included within the studbook listings. It should be noted that these two animals are maintained and managed separately to the *D.b.michaeli*.

This studbook report gives an overview of the Black Rhino EEP for 2013, including current population, demographic and genetic overviews. It also provides recommendations for all collections and for transfers.

All data and figures used in this report are produced by, or taken from, PMx Version 1.0 and SPARKS Version 1.65.

2. EEP Annual Report 2013

2.1 Status and Development Table

Institution	Status (2013-01-01)			Births			DNS			Transfer EAZA in			Transfer EAZA out			Transfer Non-EAZA in			Transfer Non-EAZA out			Deaths			Status (2013-31-12)					
	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U	M	F	U			
Berlin Zoo, Germany	2	6	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	0
Chester Zoo, UK	2	6	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	0
Ebeltoft Safari Park, Denmark	2	1	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	2	1	0
Doue le Fontaine, France	1	2	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	1	2	0
Frankfurt Zoo, Germany	1	1	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	1	1	0
Hannover Zoo, Germany	1	2	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0
Howletts Wild Animal Park, UK	1	2	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0
Cologne Zoo, Germany	1	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	1	0	0
Krefeld Zoo, Germany	1	2	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0
Leipzig Zoo, Germany	1	3	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0
Magdeburg Zoo, Germany	1	4	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0
Paignton Zoo, UK	1	1	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	1	1	0
Pont Scorff Zoo, France	1	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	1	0	0
Port Lympne Wild Animal Park, UK	4	11	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	3	10	0
Zurich Zoo, Switzerland	1	2	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	1	2	0
Rotterdam Zoo, Netherlands	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Tallinn Zoo, Estonia	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	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
	21	43	0	1	3	0	0	0	0	5	4	0	5	4	0	0	0	0	0	0	0	0	2	0				Total		
																												22	44	0
																												Cross-check		
																												22	44	0

NB. Frankfurt Zoo holds 1.1 *Diceros bicornis minor*

3. Population Overview

3.1 Current Status

As of 31.12.2013 there were 22.44 (66) animals within the EEP, held in 17 collections. 1.1 of these are of the southern subspecies *Diceros bicornis minor* and are held at Frankfurt Zoo. These are included in the demographic, but not genetic analysis of this report.

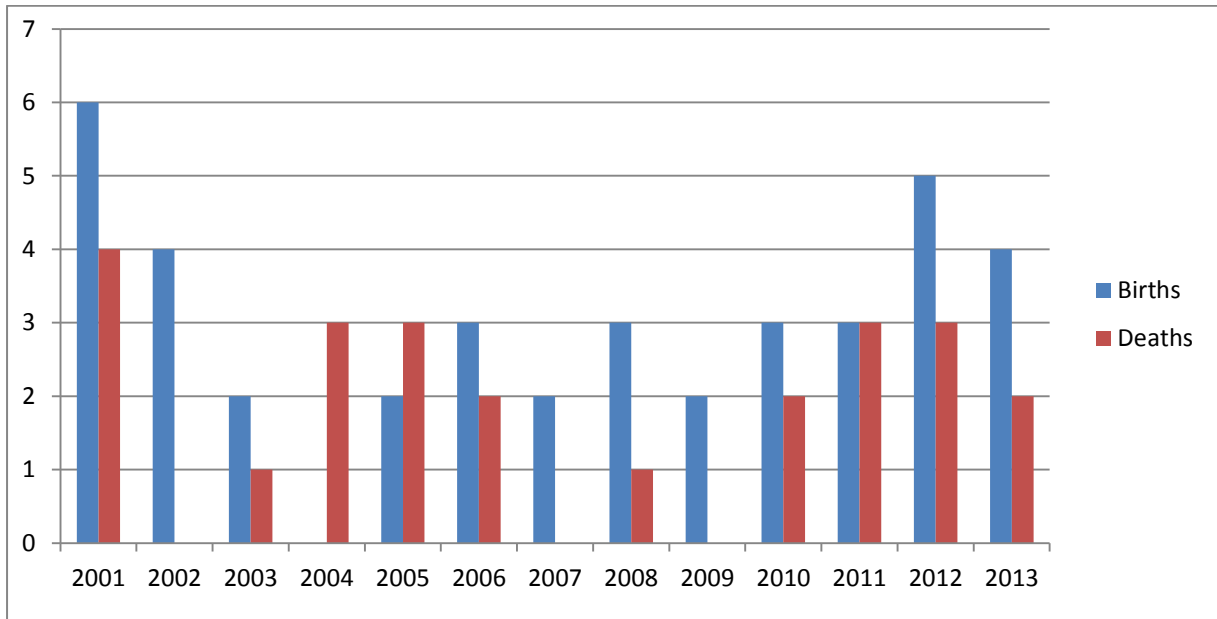
3.2 Events During 2013

Births - 1.3 births (3 EAZA collections)	
Chester Zoo	1.1
Krefeld Zoo	0.1
Leipzig Zoo	0.1

Deaths - 0.2 deaths (2 EAZA collections)		
Port Lympne Wild Animal Park	0.1	23 years old
Magdeburg Zoo	0.1	47 years old

See Graph 1 for how these rates compare to previous years.

Graph 1: Number of births and deaths per year 2001 – 2013 within the Black rhino EEP.



The following transfers also took place during 2013:

Transfers - 5.4 transfers (6 EAZA collections)	
Port Lympne Wild Animal Park to Howletts Wild Animal Park	1.1
Hannover Zoo to Magdeburg Zoo	1.0
Magdeburg Zoo to Hannover Zoo	1.0
Howletts Wild Animal Park to Port Lympne Wild Animal Park	0.1
Howletts Wild Animal Park to Rotterdam Zoo	1.0
Leipzig Zoo to Rotterdam Zoo	0.1
Berlin Zoo to Tallinn Zoo	1.0
Krefeld Zoo to Tallinn Zoo	0.1

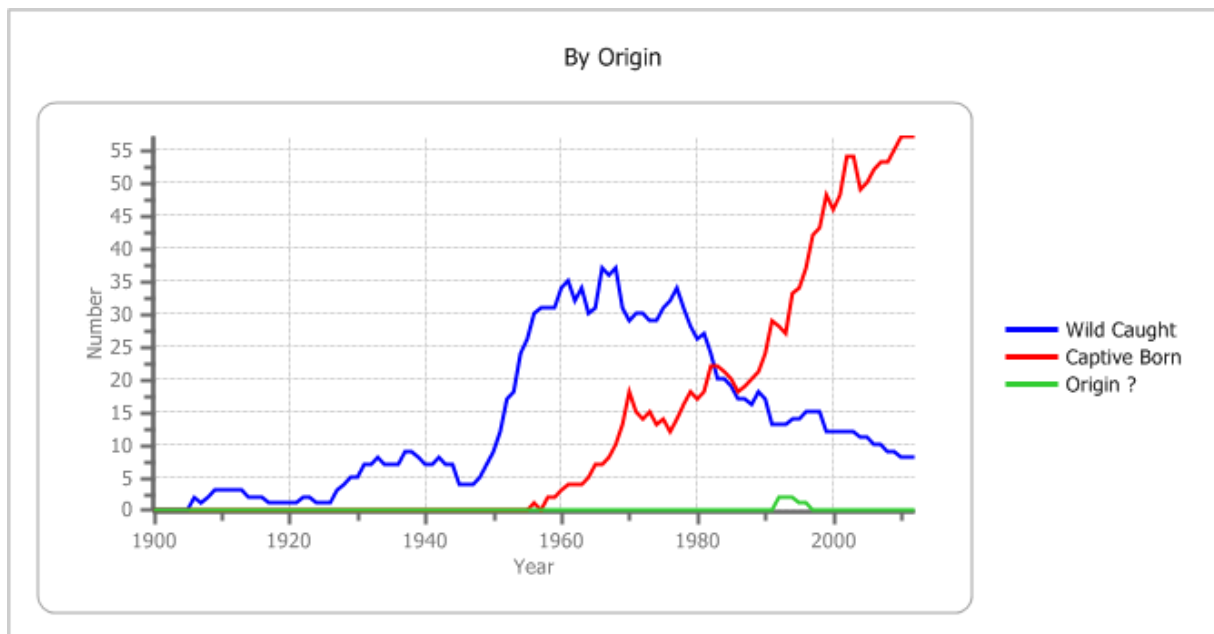
4. Demographic Overview

4.1 Census Graphs

When doing demographic analysis on the Black rhino EEP, we select all animals that were present in the population between 1960 and 2014. This is done using a date filter in SPARKS before exporting data to PMx. Prior to 1960 (shown in Graph 2) the captive population was reliant on wild imports, so the demographic data does not represent what we would expect from a self-sustaining population with natural fluctuation caused by birth and death rates. Indeed, it was not until 1956 that the first Black rhino was born in captivity.

Although 1960 was the very beginning of the captive population shifting towards self-sustainability, and there have been huge advances in captive management since 1960 that may well have affected the population's demographics, we need to select this date as early as possible. It is recommended that the selected time period spans at least twice the life span of an individual, so for such a long lived species the time span selected (54 years) is a minimum of what we need to create demographic projections and predictions.

Graph 1: Census graph of captive *Diceros bicornis* since 1900 split by origin type – it is not until 1956 that animals are bred in captivity.



The lambda value (representing the proportional change in population size from one year to the next based on the life table calculations averaged for males and females) is 0.961. This shows a declining population.

The R0 value of 0.618 is the net reproductive rate which is the rate of change per generation (the average number of offspring that an individual will produce in its lifetime averaged for males and females) and again represents a declining population as is <1.

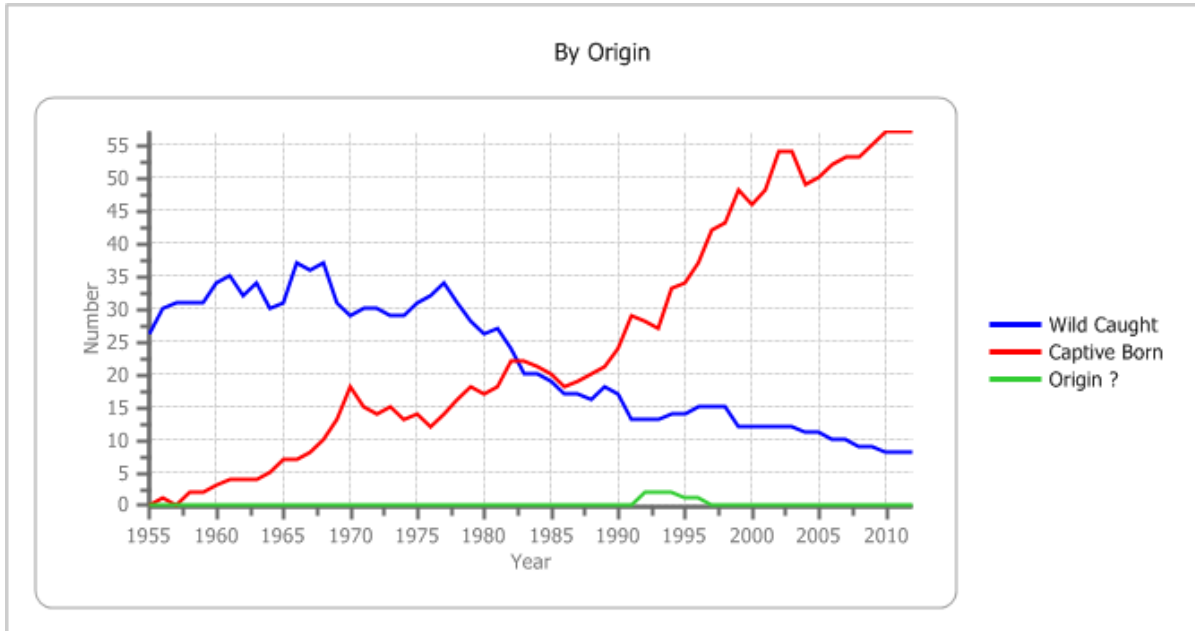
A full Demographic Summary is shown below:

Demographic Summary	
Size	22.44.0 = 66
Life Expectancy	14.9
30 day mortality	0.15 (N=114)
25% live to	24.8
10% live to	33.1
5% live to	36.9
1% live to	41.8
Oldest living	43.7 (ID:195)
λ	0.934 <> 0.961 <> 0.983
r	-0.068 <> -0.040 <> -0.017
R0	0.618
T	16.3 years

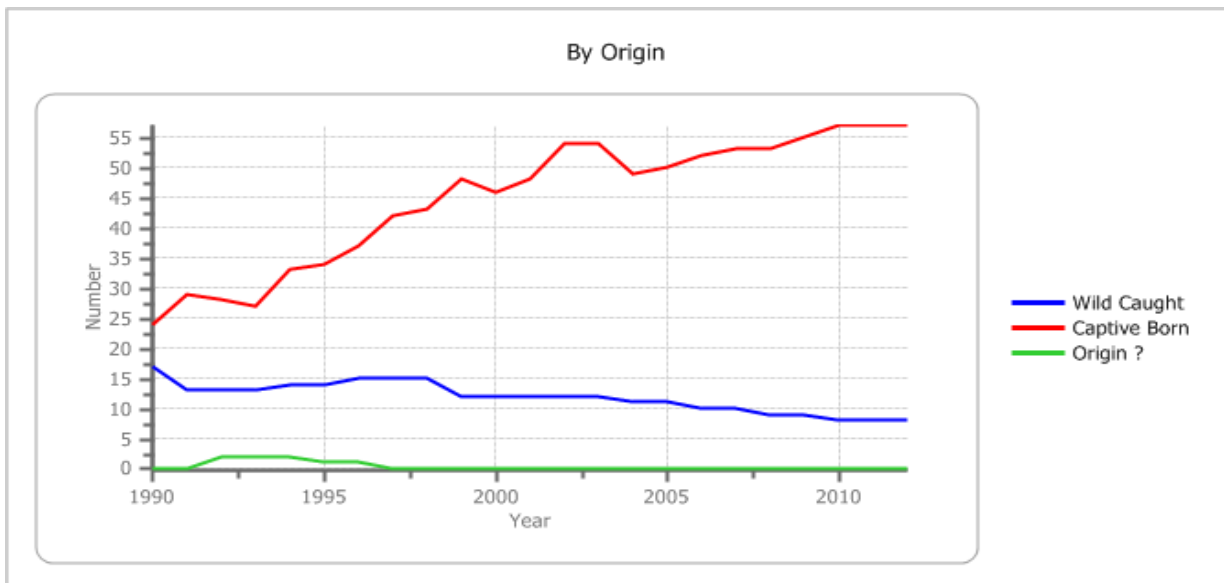
However, when we look at the census graphs from 1960 until today (Graph 2) we see a steady increase in the captive born population, and a decrease in the wild caught animals that die and are not replaced.

We can see that the increase in the captive born animals has been quite drastic since 1990 in Graph 3, in fact over doubling in size from 25 to over 56.

Graph 2: There has been a steady increase in the *Diceros bicornis* captive population since 1955. Census graph here is split by animal origin.

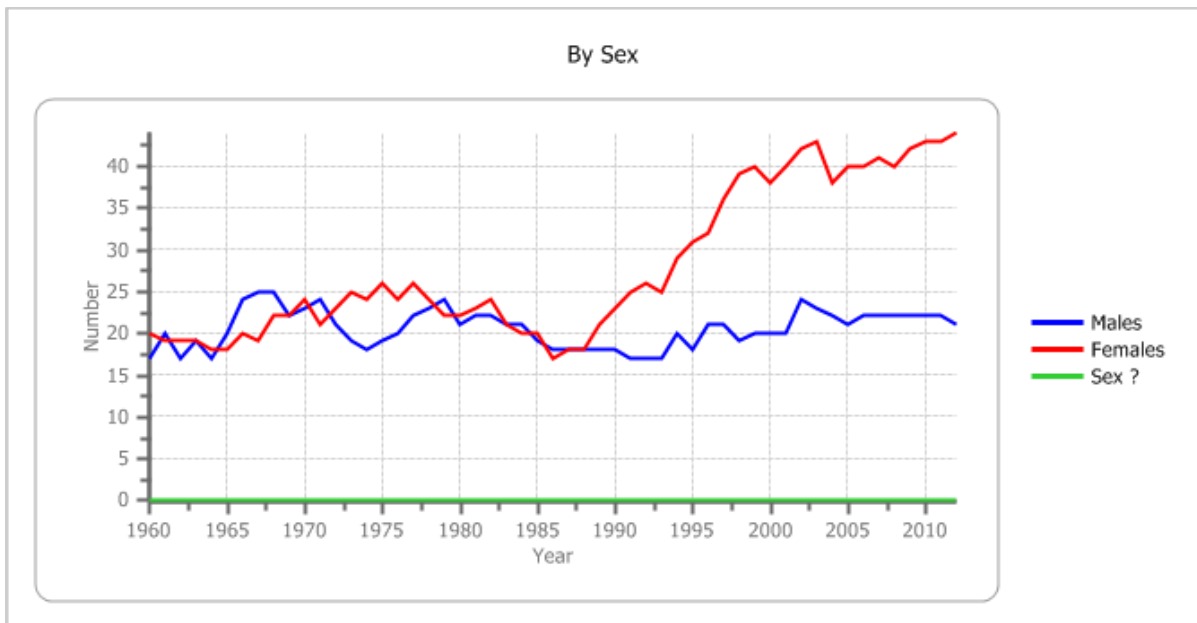


Graph 3: Census graph of *Diceros bicornis* since 1990 split by origin.

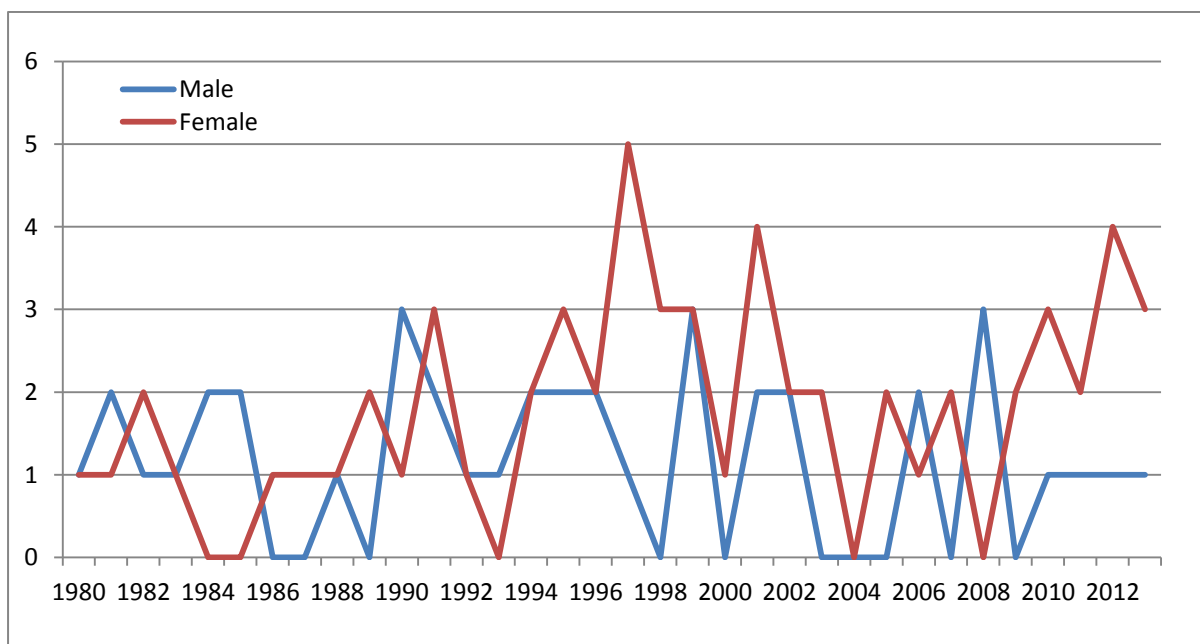


It appears that since 1987 there has been a skew in the sex ratio, with far more females than male within the population (Graph 4). This could either be to more female births, or a greater number wild caught female than males living longer. When we look at how many males and female born each year since 1980 (Graph 5) we do see a slight trend of more females being born, with a total of 61 females born over the last 34 years, but just 40 males. Averages show since 1980 1.2 males were born per year compared to 1.8 females.

Graph 4: Census graph of *Diceros bicornis* split by sex.

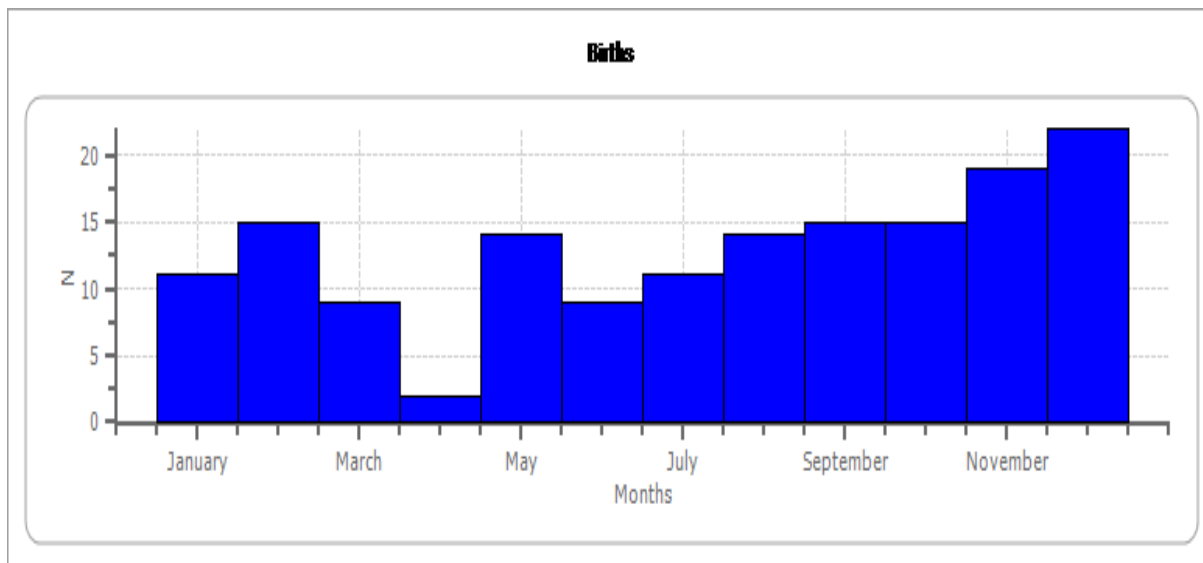


Graph 5: Number of male and female Black rhinos born in EAZA collections between 1980 – 2013.



There does not appear to be any seasonal patterns in those captive births (Graph 6).

Graph 6: seasonality of births of Black rhinos with EAZA collections.



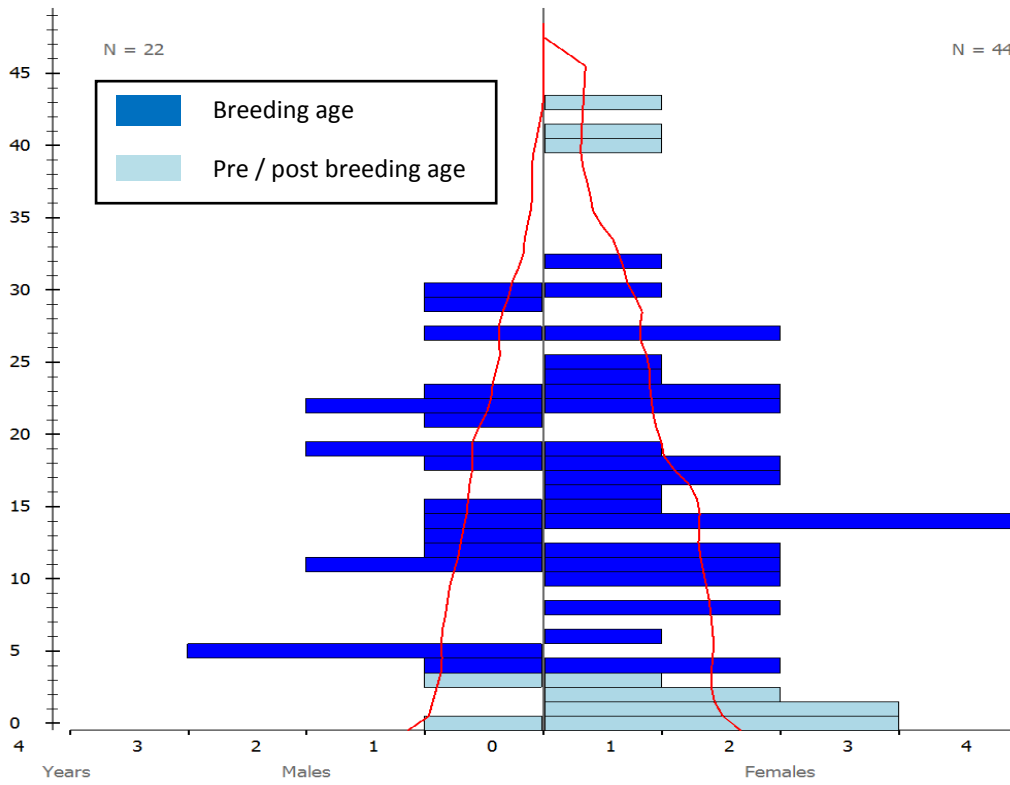
4.2 Age Pyramids

There are 66 black rhinos in the EEP (22.44). The oldest currently living female is 43 years and male is 30 years. The oldest ever recorded female was Kenia who died at Magdeburg in 2013, who had an estimated birth date of 1966. The oldest ever male reached the age of 41 years.

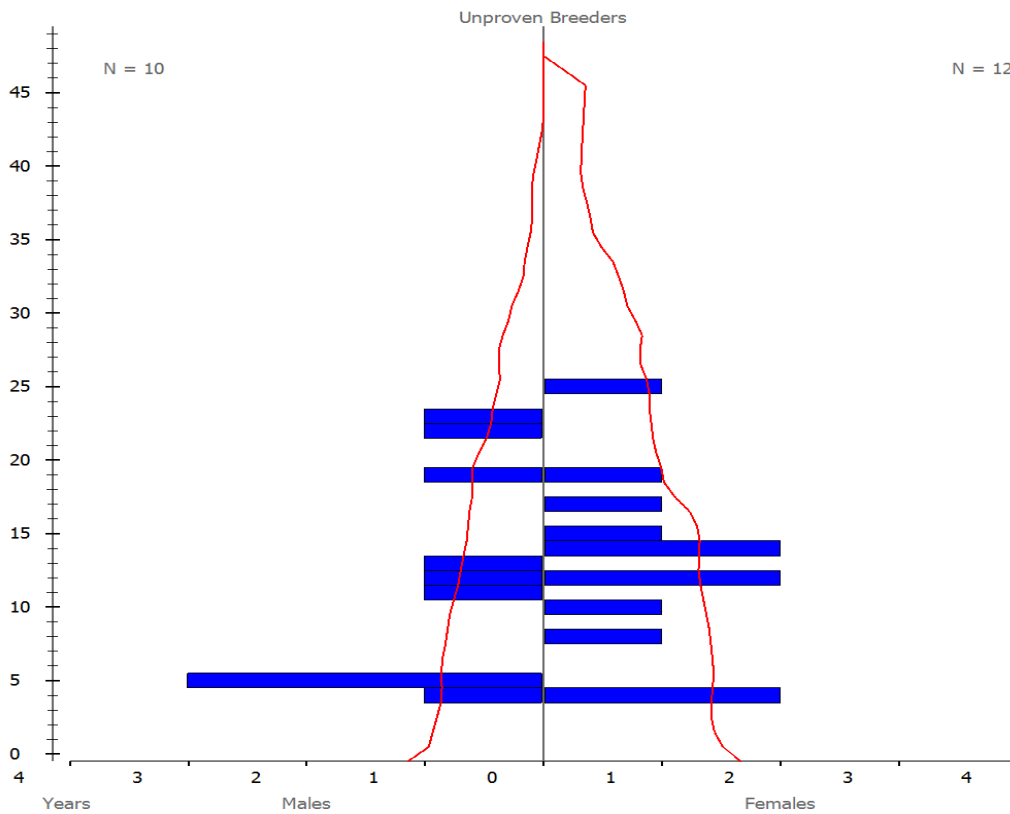
Of the 66 Black rhinos, of breeding age we have 20 males and 32 females. We have 9 pre-reproductive females but just 2 pre-reproductive males. The generation time (time taken from birth to reproduction) for males is 17.1 years and for females is slightly shorter at 16.5 years.

Currently out of the full 66 only 32 are proven breeders (10 proven breeding males, 23 proven breeding females). Graph 8 shows the rhinos yet to breed within the population.

Graph 7: Census graph for the Black rhino population.



Graph 8: Census graph for the Black rhino population showing unproven breeders.



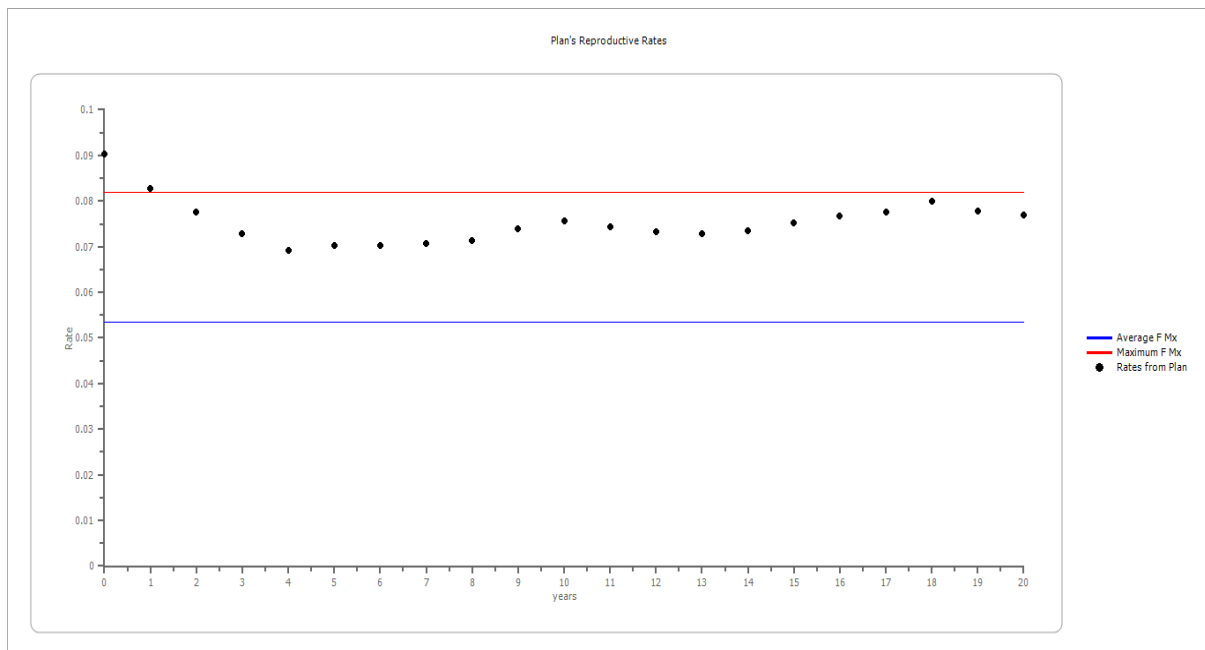
4.3 Population Growth and Goals

An annual goal has been set at a population growth rate of 5%. This is the figure used by the Kenyan Wildlife Service (KWS) for managing free ranging populations in Africa, so was thought to be an optimum of what is achievable in captivity. However, this has not been reached in previous years, and was not reached in 2013. In fact the lambda value for the EEP population in 2013 was 0.961. This is negative, showing an annual population decrease.

Looking only at demography (not at maintaining genetic diversity of more than 90% for over 100 years) we need 6 births (5.7) during 2014. If we refer back to Graph 1 we see that since 2001 this rate of reproduction has only been reached once (2001) and the average births per year have been 3 births per year (since 2001).

The reproductive rate necessary for this is represented on Graph 9 below by the black dots - far greater than the average reproductive rate of females ever reached, and in some years higher than the maximum reproductive rate of females ever reached.

Graph 9: Reproductive rates that must be achieved to maintain a stable population of Black rhino within the EEP.



5. Genetic Overview

For genetic analysis, individuals who offer no potential genetic contribution to the future population are removed. This includes three females over the age of 40, as last ever recorded reproduction for male or female was 32 years old (Rukwa 43, Kilaguni 40 and Mzima 41); one female who is infertile (Manyara at Chester Zoo); and the two individuals at Frankfurt that are of the sub species *Diceros bicornis minor*. This reduces our managed population to 60 living individuals.

The current living population was founded by 40 animals. These are founders as recorded by SPARKS as those with WILD/WILD parents. This does not include other founders to the EEP population who have been transferred into the EEP from outside Europe and are therefore not related to any other rhinos apart from their offspring. For example Sammy (SB number 750) who came from Osaka, Japan in 1999. Of these 40 founders 5 are still alive:

Studbook #	Location	Sex	Age	Descendants	Local ID	House name
195	Lympne	Female	43	10.0	P73003	Rukwa
240	Berlin	Female	41	9.0	770025	Mzima
220	Berlin	Female	40	9.0	750016	Kilaguni
558	Lympne	Female	22	3.0	P95039	Vuyu
653	Hannover	Male	21	5.0	400007	Madiba

Within our captive population 100% of the ancestry is certain (the percentage of the living population's pedigree that can be traced to known founders). The gene diversity of the EEP population (the probability that two alleles from the same locus sampled at random from the population are not identical by descent from a common ancestor) is 0.96. The gene value (gene diversity of the living individuals weighted for the reproductive value of individuals) is 0.96. The mean inbreeding is 0.01. A full genetic summary is shown below:

Genetic Summary	
Founders	40
Potential (additional) Founders	0
Living Animals	60
Living Descendants	58.00
% Ancestry Known	100%
% Ancestry Certain	100%
Gene Diversity	0.9634
Population Mean Kinship	0.0366
Gene Value	0.9597
Founder Genome Equivalent	13.65
Founder Genomes Surviving	19.65
Potential Gene Diversity	0.9749
Mean Inbreeding	0.0097
Ne/N	0.3820

The table below gives us genetic values for each of the 60 individuals included in the genetic analysis, ordered by location. It includes:

- Mean kinship (MK) - the mean kinship coefficient between an individual and all individuals in the living population.
- Mean kinship rank (MK Rank) - a rank of all the mean kinships in the population
- Inbreeding coefficient (F) - the probability that the two alleles at a genetic locus are identical by descent from an ancestor common to both parents.

The most important animals to breed are those with the lowest mean kinship value (MK) or the highest mean kinship rank (MK Rank). Ideally the inbreeding coefficients (F) should be 0.

We must also consider age; the oldest animals with the lowest mean kinships are genetically the most important due to their reduced time left for breeding.

Eastern Black Rhinoceros, *Diceros bicornis michaeli*, EEP Studbook Report 2013

SB #	Location	Local ID and Name	Sex	Birth Date	Sire	Dam	F	MK	MK Rank	Age (years)	Living Offspring	Last Reprod
762	BEKESBRNE	H20448 Salome	F	2000-01-25	283	282	0.0000	0.0353	17F	14	0	--
903	BEKESBRNE	H21286 Zambezi II	M	2002-12-31	534	408	0.0000	0.0337	10M	11	1	2012-07-01
950	BEKESBRNE	H21285 Damara	F	2005-12-18	302	558	0.0000	0.0234	3F	8	0	--

366	BERLINZOO	860038 Ine	F	1986-10-06	219	220	0.0000	0.0358	20F	27	4	2012-08-06
450	BERLINZOO	990324 Jasper	M	1991-09-13	268	175	0.0000	0.0606	21M	22	7	2012-08-06
546	BERLINZOO	950206 Kumi	F	1995-06-14	347	366	0.1250	0.0356	18F	18	1	2006-12-20
886	BERLINZOO	B317-A Maburi	F	2002-08-03	653	295	0.0000	0.0323	11F	11	1	2010-02-07
993	BERLINZOO	Akili	F	2012-08-06	450	366	0.0000	0.0525	36F	1	0	--

680	CHESTER	28489 Kitani	F	1997-06-16	430	422	0.1250	0.0327	13F	16	1	2012-07-06
714	CHESTER	C05265 Magadi	M	1999-02-09	534	194	0.0000	0.0404	15M	15	4	2013-06-29
750	CHESTER	CZ54 Sammy	M	1999-11-11	346	183	0.0000	0.0129	1M	14	1	2012-07-06
883	CHESTER	C11443 Zuri	F	2007-03-05	341	428	0.0000	0.0385	25F	6	1	2013-06-29
898	CHESTER	C0593 Ema Elsa	F	2002-11-02	283	619	0.0000	0.0373	23F	11	2	2012-10-03
947	CHESTER	CO8583 Malindi	F	2005-11-03	653	295	0.0000	0.0323	11F	8	1	2013-03-07
998	CHESTER	C12686 Chanua	F	2012-10-03	714	898	0.0000	0.0432	29F	1	0	--
1049	CHESTER	C1363 Dakima	F	2013-03-07	714	947	0.0000	0.0407	28F	0	0	--
1051	CHESTER	C13429 Embu	M	2013-06-29	714	883	0.0000	0.0438	17M	0	0	--

483	DVURKRALV	058053 Baringo II	M	1992-12-03	142	195	0.0000	0.0237	---	21	2	2012-12-22
927	EBELTOFT	DIB001 Thabo	M	2008-05-06	528	437	0.0000	0.0395	14M	5	0	--
928	EBELTOFT	DIB002 Kito	M	2008-04-03	450	366	0.0000	0.0525	20M	5	0	--
956	EBELTOFT	DIB003 Bashira	F	2009-05-15	714	898	0.0000	0.0432	29F	4	0	--

453	FONTAINE	2DB90 Katakata	M	1990-10-18	18	19	0.0000	0.0162	2M	23	0	--
532	FONTAINE	4DB94 Tisa	F	1994-05-20	347	220	0.0000	0.0300	8F	19	0	--
910	FONTAINE	3DB03 Binti	F	2003-11-02	450	366	0.0000	0.0525	36F	10	0	--

Eastern Black Rhinoceros, *Diceros bicornis michaeli*, EEP Studbook Report 2013

SB #	Location	Local ID and Name	Sex	Birth Date	Sire	Dam	F	MK	MK Rank	Age (years)	Living Offspring	Last Reprod
349	HANNOVER	IV207 Kifaru II	M	1984-10-21	171	150	0.0000	0.0210	4M	29	2	2001-03-03
417	HANNOVER	IV206 Sany	F	1989-10-01	268	282	0.0000	0.0436	32F	24	2	2001-03-03
436	HANNOVER	IV311 Sabah	F	1991-02-07	166	220	0.0000	0.0329	14F	23	1	2000-01-10

533	KOLN	2251 Taco	M	1995-02-06	349	417	0.0000	0.0366	13M	19	0	--
437	KREFELD	740 Nane	F	1991-04-04	166	240	0.0000	0.0356	18F	22	4	2013-07-13
528	KREFELD	1572 Usoni	M	1994-07-01	252	217	0.0000	0.0348	11M	19	4	2013-07-13
1050	KREFELD	739 Nabila	F	2013-07-13	528	437	0.0000	0.0395	26F	0	0	--

610	LEIPZIG	M03019 Ndugu	M	1996-02-18	9	240	0.0000	0.0323	9M	18	2	2013-09-14
743	LEIPZIG	M02619 Nandi	F	1999-05-07	450	481	0.0625	0.0539	39F	14	1	2013-09-14
767	LEIPZIG	M02731 Sarafine	F	2000-01-10	450	436	0.0000	0.0532	38F	14	1	2011-12-10
1052	LEIPZIG	M10148 Samia	F	2013-09-14	610	743	0.0000	0.0473	35F	0	0	--

341	LYMPNE	P83001 Kingo	M	1983-10-02	142	195	0.0000	0.0356	12M	30	3	2010-11-04
342	LYMPNE	P83002 Arusha	F	1983-11-11	142	194	0.0000	0.0318	10F	30	2	2003-09-16
384	LYMPNE	P21138 Rosie	F	1988-11-24	18	19	0.0000	0.0162	2F	25	0	--
558	LYMPNE	P95039 Vuyu	F	1991-07-01	WILD	WILD	0.0000	0.0129	1F	22	3	2009-12-25
663	LYMPNE	P96046 Ruaha	F	1996-12-21	318	195	0.0000	0.0248	5F	17	2	2011-01-22
754	LYMPNE	P99052 Rufiji	F	1999-06-21	534	342	0.0000	0.0364	21F	14	0	--
888	LYMPNE	P21025 Solio	F	2001-07-30	534	195	0.0000	0.0334	15F	12	0	--
911	LYMPNE	P20331 Nyasa	F	2003-09-16	391	342	0.0000	0.0446	33F	10	1	2012-07-01
955	LYMPNE	P21244 Asani	M	2008-10-29	750	680	0.0000	0.0269	5M	5	0	--
968	LYMPNE	P20978 Nyota	F	2009-12-25	341	558	0.0000	0.0286	6F	4	0	--
973	LYMPNE	P21104 Nkosi	M	2011-01-22	430	663	0.0000	0.0314	8M	3	0	--
992	LYMPNE	P21233 Kissima	F	2012-07-01	903	911	0.0000	0.0434	31F	1	0	--

Eastern Black Rhinoceros, *Diceros bicornis michaeli*, EEP Studbook Report 2013

SB #	Location	Local ID and Name	Sex	Birth Date	Sire	Dam	F	MK	MK Rank	Age (years)	Living Offspring	Last Reprod
295	MAGDEBURG	400004 Mana	F	1981-09-15	9	153	0.0000	0.0345	16F	32	4	2011-12-24
559	MAGDEBURG	400006 Maleika	F	1995-12-23	386	295	0.0000	0.0374	24F	18	0	2012-07-15
653	MAGDEBURG	400007 Madiba	M	1992-07-01	WILD	WILD	0.0000	0.0172	3M	21	3	2012-07-15
975	MAGDEBURG	400010 Mala	F	2011-12-24	653	295	0.0000	0.0302	9F	2	0	--

428	PAIGNTON	4741 Sita	F	1990-10-12	166	298	0.0000	0.0286	6F	23	1	2007-03-05
892	PAIGNTON	8372 Manyara	M	2002-09-18	534	456	0.0000	0.0311	7M	11	0	--
438	PONTSCORF	100324 Jakob	M	1991-06-23	386	387	0.1250	0.0429	16M	22	0	--

890	ROTTERDAM	Z13328 Vungu	M	2001-11-08	341	558	0.0000	0.0286	6M	12	0	--
974	ROTTERDAM	Z13343 Naima	F	2011-12-10	610	767	0.0000	0.0471	34F	2	0	--

969	TALLIN	19153 Kigoma	M	2010-02-07	450	886	0.0000	0.0508	19M	4	0	--
971	TALLIN	19154 Kibibi	F	2010-07-04	528	437	0.0000	0.0395	26F	3	0	--

662	ZURICH	960005 Wanda	F	1996-07-03	252	150	0.0000	0.0242	4F	17	0	--
857	ZURICH	B00007 Jeremy	M	2000-12-21	283	387	0.1250	0.0451	18M	13	0	--
861	ZURICH	A10031 Samira	F	2001-03-03	349	417	0.0000	0.0366	22F	12	0	--

6. SPARKS Reports

6.1 Current Living

Stud#	Sex	Birth Date	Sire	Dam	Location	Date	LocalID	Event	Name
BEKESBRNE - Howletts Wild Animal Park, Hythe, Kent, England (UK)									
762	F	25 Jan 2000	283	282	DVURKRALV	25 Jan 2000	058040	Birth	SALOME
					LYMPNE	27 Nov 2001	P21047	Transfer	
					BEKESBRNE	18 Oct 2004	H20448	Transfer	
903	M	31 Dec 2002	534	408	LYMPNE	31 Dec 2002	P22060	Birth	ZAMBEZI II
					BEKESBRNE	11 Sep 2013	H21286	Transfer	
950	F	18 Dec 2005	302	558	LYMPNE	18 Dec 2005	P20578	Birth	DAMARA
					BEKESBRNE	10 Sep 2013	H21285	Transfer	
Totals: 1.2.0 (3)									
BERLINZOO - Zoologischer Garten Berlin Ag, Berlin, Germany									
220	F	~ 1974	WILD	WILD	TANA RIV	~ 1974	NONE	Capture	KILAGUNI
					DEMME	28 Nov 1974		Transfer	
					DE GARDA	1 Dec 1974		Transfer	
					BERLINZOO	19 Oct 1975	0053	Transfer	
						19 Oct 1975	750016	Transfer	
240	F	~ 1973	WILD	WILD	TANA RIV	~ 1973	NONE	Capture	MZIMA
					DEMME	28 Mar 1975		Transfer	
					DE GARDA	1 Jun 1975		Transfer	
					BERLINZOO	6 May 1977	770025	Transfer	
366	F	6 Oct 1986	219	220	BERLINZOO	6 Oct 1986	0087	Birth	INE
						6 Oct 1986	860038	Transfer	
450	M	13 Sep 1991	268	175	DVURKRALV	13 Sep 1991	058025	Birth	JASPER
					LEIPZIG	6 Oct 1993	M01312	Transfer	
					BERLINZOO	5 Nov 1999	990324	Loan to	
546	F	14 Jun 1995	347	366	BERLINZOO	14 Jun 1995	950206	Birth	KUMI
886	F	3 Aug 2002	653	295	MAGDEBURG	3 Aug 2002	400008	Birth	MABURI
					BERLINZOO	7 Jul 2004	B317-A	Transfer	
993	F	6 Aug 2012	450	366	BERLINZOO	6 Aug 2012	AKILI	Birth	AKILI
Totals: 1.6.0 (7)									
CHESTER - North of England Zoological Society, Upton-by-Chester, Cheshire, England (UK)									
680	F	16 Jun 1997	430	422	CHESTER	16 Jun 1997	28489	Birth	KITANI
					FRANKFURT	16 Jun 1997	38492	Ownership	
696	neutF	15 Aug 1998	430	312	CHESTER	15 Aug 1998	26055	Birth	MANYARA
714	M	9 Feb 1999	534	194	LYMPNE	9 Feb 1999	P99015	Birth	MAGADI
					CHESTER	24 May 2005	C05265	Loan to	
750	M	11 Nov 1999	346	183	OSAKA	11 Nov 1999	401	Birth	SAMMY
					CHESTER	10 Apr 2002	CZ54	Loan to	
883	F	5 Mar 2007	341	428	PAIGNTON	5 Mar 2007	8052	Birth	ZURI
					CHESTER	14 Jun 2011	C11443	Transfer	
898	F	2 Nov 2002	283	619	DVURKRALV	2 Nov 2002	058044	Birth	EMA ELSA
					CHESTER	13 Apr 2005	C0593	Loan to	
947	F	3 Nov 2005	653	295	MAGDEBURG	3 Nov 2005	400009	Birth	MALINDI
					CHESTER	25 Sep 2008	C08583	Transfer	
998	F	3 Oct 2012	714	898	CHESTER	3 Oct 2012	C12686	Birth	CHANUA
1049	F	7 Mar 2013	714	947	CHESTER	7 Mar 2013	C1363	Birth	DAKIMA

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1051 M 29 Jun 2013 714 883 CHESTER 29 Jun 2013 C13429 Birth EMBU
 Totals: 3.7.0 (10)

EBELTOFT - Ree Park - Ebeltoft Safari, Ebeltoft, Arhus, Denmark

927 M 6 May 2008 528 437 KREFELD 6 May 2008 1884 Birth THABO
 EBELTOFT 21 May 2010 DIB001 Transfer

928 M 3 Apr 2008 450 366 BERLINZOO 3 Apr 2008 _____ Birth KITO
 EBELTOFT 6 Oct 2011 DIB002 Loan to

956 F 15 May 2009 714 898 CHESTER 15 May 2009 C09219 Birth BASHIRA
 EBELTOFT 22 Jun 2012 DIB003 Loan to

Totals: 2.1.0 (3)

FONTAINE - BioParc De Doué, Doué-la-Fontaine, Maine-et-Loire, France

453 M 18 Oct 1990 18 19 LYMPNE 18 Oct 1990 P90002 Birth KATAKATA
 LONDON RP 18 Oct 1990 A1259 Ownership
 WHIPSNADE 22 Oct 1993 L2166 Transfer
 CHESTER 22 Jul 1998 26044 Loan to
 FONTAINE 9 Jun 2005 2DB90 Transfer

532 F 20 May 1994 347 220 BERLINZOO 20 May 1994 940061 Birth TISA
 KOLN 2 Jun 1997 2250 Loan to
 FONTAINE 4 Aug 2008 4DB94 Loan to

910 F 2 Nov 2003 450 366 BERLINZOO 2 Nov 2003 M21482 Birth BINTI
 FONTAINE 11 May 2006 3DB03 Loan to

Totals: 1.2.0 (3)

FRANKFURT - Zoologischer Garten Frankfurt, Frankfurt Am Main, Hesse, Germany

393 F ~ 1986 WILD WILD MANAPOOL ~ 1986 NONE Capture TSORORO
 RHODES WD 10 Jan 1989 _____ Transfer
 FRANKFURT 17 Jul 1989 22109 Transfer

394 M ~ 1986 WILD WILD ZIMBABWE ~ 1986 NONE Capture KALUSHO
 RHODES WD 10 Jan 1989 _____ Transfer
 FRANKFURT 17 Jul 1989 22108 Transfer

Totals: 1.1.0 (2)

HANNOVER - Zoo Hannover GmbH, Hannover, Lower Saxony, Germany

349 M 21 Oct 1984 171 150 ZURICH 21 Oct 1984 840011 Birth KIFARU II
 FRANKFURT 27 Jul 1987 399 Loan to
 HANNOVER 27 Sep 1991 IV207 Loan to
 MAGDEBURG 18 Apr 2012 400011 Transfer
 HANNOVER 28 Oct 2013 IV207 Transfer

417 F 1 Oct 1989 268 282 DVURKRALV 1 Oct 1989 058022 Birth SANY
 HANNOVER 4 Sep 1991 IV206 Transfer

436 F 7 Feb 1991 166 220 BERLINZOO 7 Feb 1991 910034 Birth SABAH
 7 Feb 1991 M00447 Loan to
 LEIPZIG 23 Sep 1993 M00447 Transfer
 HANNOVER 14 Oct 2003 IV311 Loan to

Totals: 1.2.0 (3)

KOLN - Cologne Zoo, Koeln, N Rhine-Westph, Germany

533 M 6 Feb 1995 349 417 HANNOVER 6 Feb 1995 IV220 Birth TACO
 ZURICH 6 Feb 1995 950008 Ownership
 KOLN 10 Jun 1997 2251 Loan to

Totals: 1.0.0 (1)

KREFELD - Zoo Krefeld GmbH, Krefeld, N Rhine-Westph, Germany

437 F 4 Apr 1991 166 240 BERLINZOO 4 Apr 1991 910035 Birth NANE
 DVURKRALV 1 Oct 1993 058034 Loan to
 KREFELD 26 May 1994 740 Transfer

528 M 1 Jul 1994 252 217 ZURICH 1 Jul 1994 940006 Birth USONI
 DORTMUND 27 Nov 1996 081004 Loan to

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					KREFELD	30 Oct 2003	1572	Loan to	
1050	F	13 Jul 2013	528	437	KREFELD	13 Jul 2013	739	Birth	NABILA
Totals: 1.2.0 (3)									

LEIPZIG - Zoologischer Garten Leipzig, Leipzig, Sachsen, Germany

610	M	18 Feb 1996	9	240	BERLINZOO	18 Feb 1996	960019	Birth	NDUGU
					LEIPZIG	4 Jul 2001	M03019	Loan to	
						1 Jan 2002	M03019	Transfer	
743	F	7 May 1999	450	481	LEIPZIG	7 May 1999	M02619	Birth	NANDI
767	F	10 Jan 2000	450	436	LEIPZIG	10 Jan 2000	M02731	Birth	SARAFINE
1052	F	14 Sep 2013	610	743	LEIPZIG	14 Sep 2013	M10148	Birth	SAMIA
Totals: 1.3.0 (4)									

LYMPNE - Port Lympne Wild Animal Park, Hythe, Kent, England (UK)

195	F	~ 1970	WILD	WILD	E.AFRICA	~ 1970	NONE	Capture	RUKWA
					DEMME	15 Sep 1971		Transfer	
					BEKESBRNE	20 Oct 1971	H71007	Transfer	
					LYMPNE	26 Jan 1973	P73003	Transfer	
341	M	2 Oct 1983	142	195	LYMPNE	2 Oct 1983	P83001	Birth	KINGO
					CHESTER	21 Jul 1995	25165	Loan to	
					LYMPNE	9 Jul 1996	P83001	Transfer	
					PAIGNTON	16 Jan 2003	4937	Loan to	
					LYMPNE	8 May 2008	P83001	Transfer	
342	F	11 Nov 1983	142	194	LYMPNE	11 Nov 1983	P83002	Birth	ARUSHA
384	F	24 Nov 1988	18	19	LONDON RP	24 Nov 1988	A797	Birth	ROSIE
					CHESTER	10 Aug 1999	M00116	Transfer	
					LYMPNE	13 Jun 2011	P21138	Transfer	
408	F	30 Oct 1989	18	195	LYMPNE	30 Oct 1989	P89001	Birth	N'AKURU
						22 Nov 2013		Death	
558	F	~ 1991	WILD	WILD	ADDO NP	~ 1991	NONE	Capture	VUYU
					NZP-WASH	2 May 1995		Transfer	
					LYMPNE	6 Aug 1995	P95039	Loan to	
663	F	21 Dec 1996	318	195	LYMPNE	21 Dec 1996	P96046	Birth	RUAHA
754	F	21 Jun 1999	534	342	LYMPNE	21 Jun 1999	P99052	Birth	RUFIJI
					BEKESBRNE	18 Oct 2004	H20447	Transfer	
					LYMPNE	10 Sep 2013	P99052	Transfer	
888	F	30 Jul 2001	534	195	LYMPNE	30 Jul 2001	P21025	Birth	SOLIO
911	F	16 Sep 2003	391	342	LYMPNE	16 Sep 2003	P20331	Birth	NYASA
955	M	29 Oct 2008	750	680	CHESTER	29 Oct 2008	C08640	Birth	ASANI
					LYMPNE	3 Oct 2012	P21244	Loan to	
968	F	25 Dec 2009	341	558	LYMPNE	25 Dec 2009	P20978	Birth	NYOTA
973	M	22 Jan 2011	430	663	LYMPNE	22 Jan 2011	P21104	Birth	NKOSI
992	F	1 Jul 2012	903	911	LYMPNE	1 Jul 2012	P21233	Birth	KISSIMA
Totals: 3.11.0 (14)									

MAGDEBURG - Zoologischer Garten Magdeburg, Magdeburg, Sachsen-Anhalt, Germany

153	F	~ 1966	WILD	WILD	E.AFRICA	~ 1966	NONE	Capture	KENIA
					L RUHE	22 Jun 1970		Transfer	
					MAGDEBURG	30 Aug 1970	400002	Transfer	
						1 Oct 2013		Death	
295	F	15 Sep 1981	9	153	MAGDEBURG	15 Sep 1981	400004	Birth	MANA
559	F	23 Dec 1995	386	295	MAGDEBURG	23 Dec 1995	400006	Birth	MALEIKA
653	M	~ 1992	WILD	WILD	ADDO NP	~ 1992	NONE	Capture	MADIBA
					MAGDEBURG	25 Sep 1996	400007	Transfer	

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					HANNOVER	18 Apr 2012	IV484	Transfer	
					MAGDEBURG	28 Oct 2013	400007	Transfer	
975	F	24 Dec 2011	653	295	MAGDEBURG	24 Dec 2011	400010	Birth	Mala
Totals: 1.4.0 (5)									

PAIGNTON - Paignton Zoo Environmental Park, Paignton, Devonshire, England (UK)									
428	F	12 Oct 1990	166	298	BERLINZOO	12 Oct 1990	900044	Birth	SITA
					PAIGNTON	19 Sep 2002	4741	Loan to	
892	M	18 Sep 2002	534	456	LYMPNE	18 Sep 2002	P22032	Birth	MANYARA
					PAIGNTON	17 Jun 2010	8372	Transfer	
Totals: 1.1.0 (2)									

PONTSCORF - Zoo De Pont-Scorff, Pont-Scorff, Morbihan, France									
438	M	23 Jun 1991	386	387	DVURKRALV	23 Jun 1991	058024	Birth	JAKOB
					KREFELD	24 May 1994	739	Transfer	
					PONTSCORF	13 Nov 2002	100324	Loan to	
Totals: 1.0.0 (1)									

ROTTERDAM - Rotterdam Zoo, Rotterdam, South Holland, The Netherlands									
890	M	8 Nov 2001	341	558	LYMPNE	8 Nov 2001	P21034	Birth	VUNGU
					BEKESBRNE	14 Oct 2004	H20444	Transfer	
					ROTTERDAM	2 Sep 2013	Z13328	Transfer	
974	F	10 Dec 2011	610	767	LEIPZIG	10 Dec 2011	M09769	Birth	NAIMA
					ROTTERDAM	2 Sep 2013	Z13343	Transfer	
Totals: 1.1.0 (2)									

TALLIN - Tallinn Zoo, Tallinn, Estonia									
969	M	7 Feb 2010	450	886	BERLINZOO	7 Feb 2010		Birth	KIGOMA
					TALLIN	27 Apr 2013	19153	Transfer	
971	F	4 Jul 2010	528	437	KREFELD	4 Jul 2010	2030	Birth	KIBIBI
					TALLIN	27 Apr 2013	19154	Transfer	
Totals: 1.1.0 (2)									

ZURICH - Zoo Zürich, Zürich, Switzerland									
662	F	3 Jul 1996	252	150	ZURICH	3 Jul 1996	960005	Birth	WANDA
						3 Jul 1996	960005	Loan to	
857	M	21 Dec 2000	283	387	DVURKRALV	21 Dec 2000	058041	Birth	JEREMY
					CHESTER	13 Apr 2005	C0594	Loan to	
					FONTAINE	9 Jun 2005	1DB00	Loan to	
					ZURICH	12 Jan 2010	B00007	Transfer	
861	F	3 Mar 2001	349	417	HANNOVER	3 Mar 2001	IV281	Birth	SAMIRA
					ZURICH	28 Jun 2004	A10031	Transfer	
Totals: 1.2.0 (3)									

TOTALS: 22.46.0 (68)									
17 Institutions									

7.2 Births

Stud#	Sex	Birth Date	Sire	Dam	Location	Date	LocalID	Event	Name
Zoologischer Garten Leipzig, Leipzig, Sachsen, Germany									
1052	F	14 Sep 2013	610	743	LEIPZIG	14 Sep 2013	M10148	Birth	SAMIA
Totals: 0.1.0 (1)									
Zoo Krefeld GmbH, Krefeld, N Rhine-Westph, Germany									
1050	F	13 Jul 2013	528	437	KREFELD	13 Jul 2013	739	Birth	NABILA
Totals: 0.1.0 (1)									
North of England Zoological Society, Upton-by-Chester, Cheshire, England (UK)									
1049	F	7 Mar 2013	714	947	CHESTER	7 Mar 2013	C1363	Birth	DAKIMA
1051	M	29 Jun 2013	714	883	CHESTER	29 Jun 2013	C13429	Birth	EMBU
Totals: 1.1.0 (2)									
TOTALS: 1.3.0 (4)									
3 Institutions									

7.3 Deaths

Stud#	Sex	Birth Date	Sire	Dam	Location	Date	LocalID	Event	Name
LYMPNE - Port Lympne Wild Animal Park, Hythe, Kent, England (UK)									
408	F	30 Oct 1989	18	195	LYMPNE	30 Oct 1989	P89001	Birth	N'AKURU
						22 Nov 2013		Death	
Totals: 0.1.0 (1)									
MAGDEBURG - Zoologischer Garten Magdeburg, Magdeburg, Sachsen-Anhalt, Germany									
153	F	~ 1966	WILD	WILD	E.AFRICA	~ 1966	NONE	Capture	KENIA
					L RUHE	22 Jun 1970		Transfer	
					MAGDEBURG	30 Aug 1970	400002	Transfer	
						1 Oct 2013		Death	
[Death by: Unknown means]									
Totals: 0.1.0 (1)									
TOTALS: 0.2.0 (2)									
2 Institutions									

7.4 Transfers

Stud#	Sex	Birth Date	Sire	Dam	Location	Date	LocalID	Event	Name
BEKESBRNE - Howletts Wild Animal Park, Hythe, Kent, England (UK)									
903	M	31 Dec 2002	534	408	LYMPNE	31 Dec 2002	P22060	Birth	ZAMBEZI II
					BEKESBRNE	11 Sep 2013	H21286	Transfer	
950	F	18 Dec 2005	302	558	LYMPNE	18 Dec 2005	P20578	Birth	DAMARA
					BEKESBRNE	10 Sep 2013	H21285	Transfer	
Totals: 1.1.0 (2)									
HANNOVER - Zoo Hannover GmbH, Hannover, Lower Saxony, Germany									
349	M	21 Oct 1984	171	150	ZURICH	21 Oct 1984	840011	Birth	KIFARU II
					FRANKFURT	27 Jul 1987	399	Loan to	
					HANNOVER	27 Sep 1991	IV207	Loan to	
					MAGDEBURG	18 Apr 2012	400011	Transfer	
					HANNOVER	28 Oct 2013	IV207	Transfer	
Totals: 1.0.0 (1)									
LYMPNE - Port Lympne Wild Animal Park, Hythe, Kent, England (UK)									
754	F	21 Jun 1999	534	342	LYMPNE	21 Jun 1999	P99052	Birth	RUFIJI
					BEKESBRNE	18 Oct 2004	H20447	Transfer	
					LYMPNE	10 Sep 2013	P99052	Transfer	
Totals: 0.1.0 (1)									
MAGDEBURG - Zoologischer Garten Magdeburg, Magdeburg, Sachsen-Anhalt, Germany									
653	M	~ 1992	WILD	WILD	ADDO NP	~ 1992	NONE	Capture	MADIBA
					MAGDEBURG	25 Sep 1996	400007	Transfer	
					HANNOVER	18 Apr 2012	IV484	Transfer	
					MAGDEBURG	28 Oct 2013	400007	Transfer	
Totals: 1.0.0 (1)									
ROTTERDAM - Rotterdam Zoo, Rotterdam, South Holland, The Netherlands									
890	M	8 Nov 2001	341	558	LYMPNE	8 Nov 2001	P21034	Birth	VUNGU
					BEKESBRNE	14 Oct 2004	H20444	Transfer	
					ROTTERDAM	2 Sep 2013	Z13328	Transfer	
974	F	10 Dec 2011	610	767	LEIPZIG	10 Dec 2011	M09769	Birth	NAIMA
					ROTTERDAM	2 Sep 2013	Z13343	Transfer	
Totals: 1.1.0 (2)									
TALLIN - Tallinn Zoo, Tallinn, Estonia									
969	M	7 Feb 2010	450	886	BERLINZOO	7 Feb 2010		Birth	KIGOMA
					TALLIN	27 Apr 2013	19153	Transfer	
971	F	4 Jul 2010	528	437	KREFELD	4 Jul 2010	2030	Birth	KIBIBI
					TALLIN	27 Apr 2013	19154	Transfer	
Totals: 1.1.0 (2)									
TOTALS: 5.4.0 (9)									
6 Institutions									

Compiled by: Rebecca Biddle thru North of England Zool. Society
 Data current thru: 31.01.2013 European regional
 Printed on 26.02.2014 using Sparks v1.65