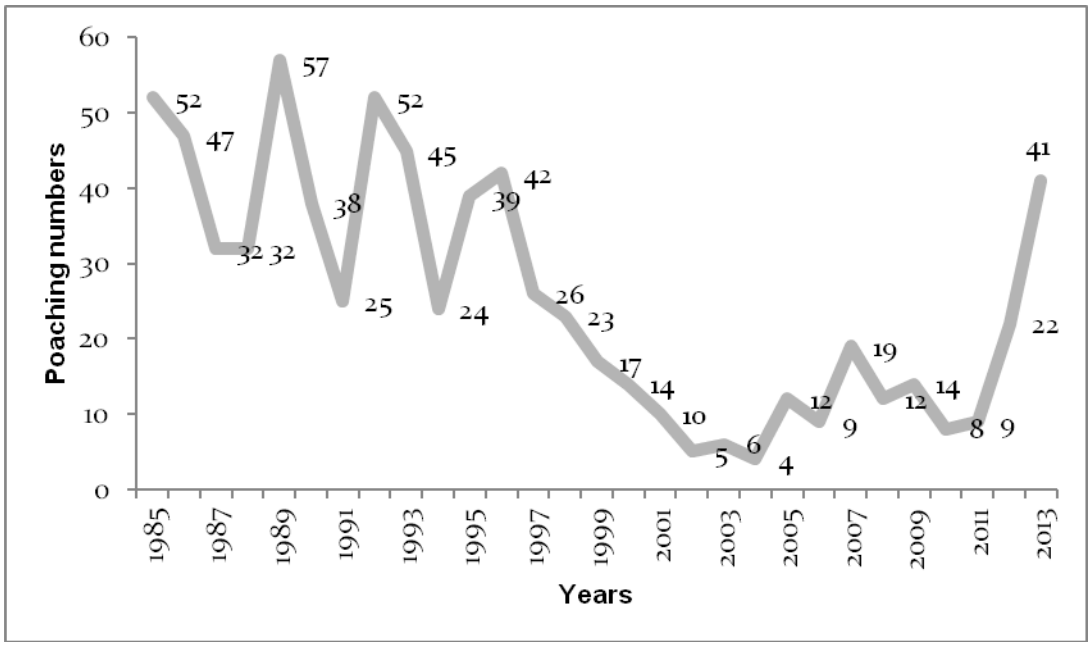


Figure 4. Rhino poaching in Assam, 1985 – 2013.

Kaziranga National Park – Mr. M.K. Yadava, IFS, Director, Kaziranga National Park

Kaziranga National Park is comprised of the original core park, and has since been expanded with six additions (Figure 5).

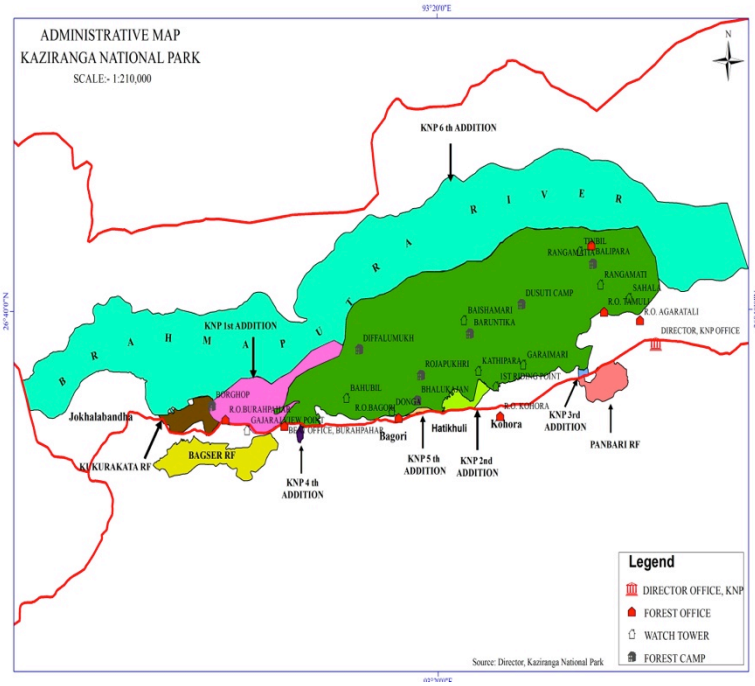


Figure 5. Map of Kaziranga National Park and additions.

Threats to Rhinos in Kaziranga

The primary threats to rhinos in Kaziranga have to do with limited carrying capacity (K). At present there is 0.18 km sq. per rhino; there could be 0.38 km sq. per rhino in the park, if the full six expansion areas could be handed over to the national park. There is great need for additional extensions of the park to accommodate the growing rhino population.

Habitat loss, including degradation and fragmentation of habitat, specifically loss along the southern riverbank is another important threat. The actual loss of land has been 165 sq. km. over a period of couple of decades. Overgrazing, loss of grasslands, issues of water in the park, woodlands taking over grasslands also pose a threat.

Poaching is a continual threat, which shows no signs of abatement. Finally, there are significant threats from unplanned economic growth all around Kaziranga. If this continues it will be difficult to reach 0.38 sq. km needed per rhino in the park.

Monitoring and Census

There is a total visual count once of the park's rhinos every 3 years. There is 100% recording of mortality. It would be useful if methods to estimate ages of animals could be developed; it would also be useful to estimate newborns each year and track them for at least a few months. A genetic evaluation of the population is also a priority.

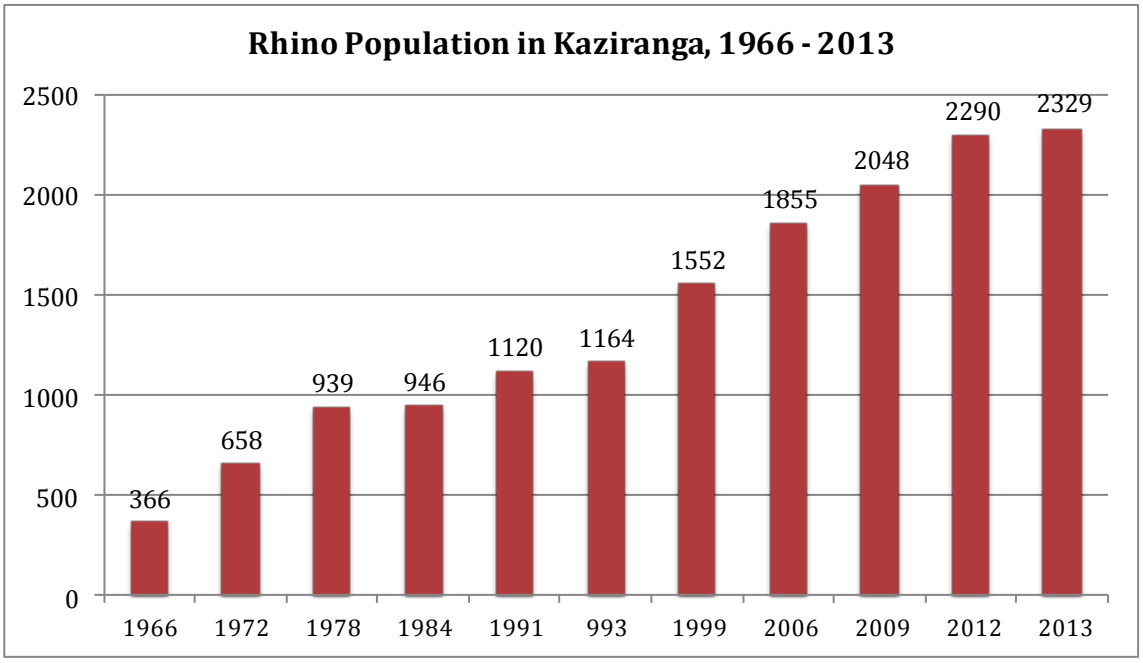


Figure 6. Rhino Population Trends in Kaziranga National Park, 1966 – 2013.

In 1996, there were 366 rhinos in Kaziranga, the most recent survey in 2013 showed 2,329 (Figure 6.) A breakdown of males and females is shown in Table 1, and females and calves in Table 2.

Table 1. Breakdown among males and females in the Kaziranga population, 2006 – 2013

Year	Observed Adult Male	Observed Adult Female	% Female in Observed Population	No. of Un-sexed adults	No. of Females in Un-sexed Adults	Total Estimates Females
2006	481	640	57.09	208	119	**759**
2009	597	710	54.32	200	109	**819**
2012	658	819	55.45	186	103	**922**
2013	645	810	55.67	267	149	**959**

Table 2. Number of females in the popualation and calves per female from 2006-2013.

Year	Total Female Population	Calf <1 yr.	Calf per Female
2006	759	105	0.1383
2009	819	100	0.1222
2012	922	172	0.1084
2013	959	135	0.1043

Figure 7 shows that the highest years poaching were in the late 1980s and early 1990s, with poaching numbers again beginning to rise in 2011. These data are similar to what has been seen for African rhinos as well, with enormous poaching mortalities in those same time frames, and a lower rate from about 1998 through 2005.

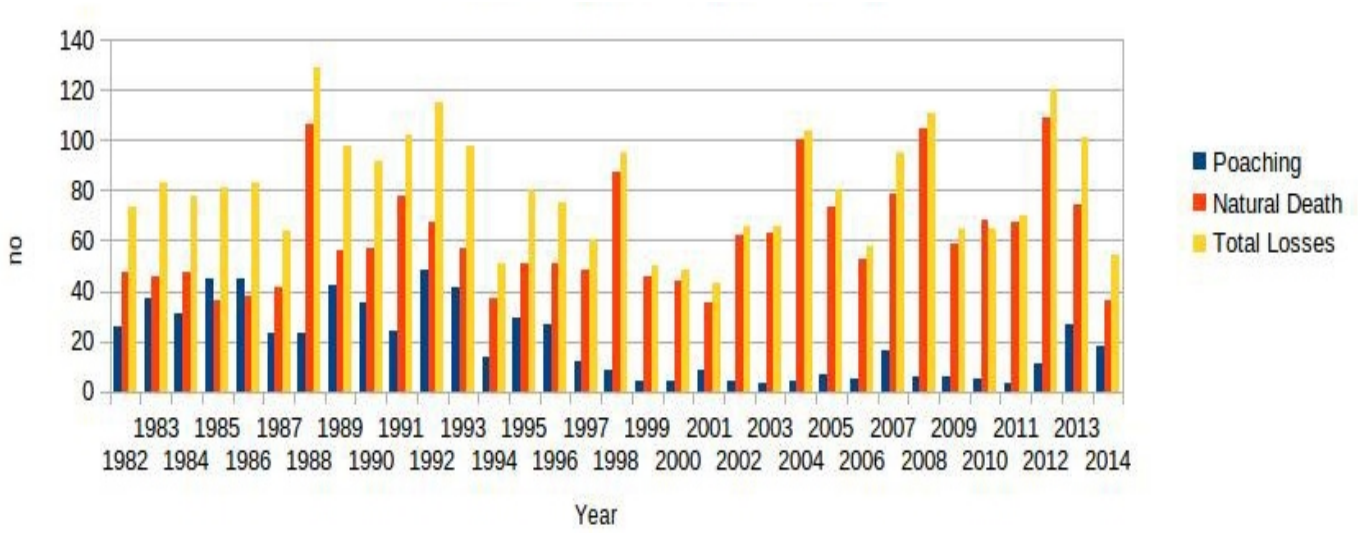


Figure 7. Losses in the Kaziranga rhino population, 1982 – 2014, broken down by poaching deaths and natural deaths.

Figure 8 below shows the percent gain and loss for Kaziranga's rhino population from 1982 through 2014. The net growth rate is 7.25%. These data merit a discussion as to whether, without expansion of the park or translocation of animals to other suitable sites, the population may at some point become unviable.

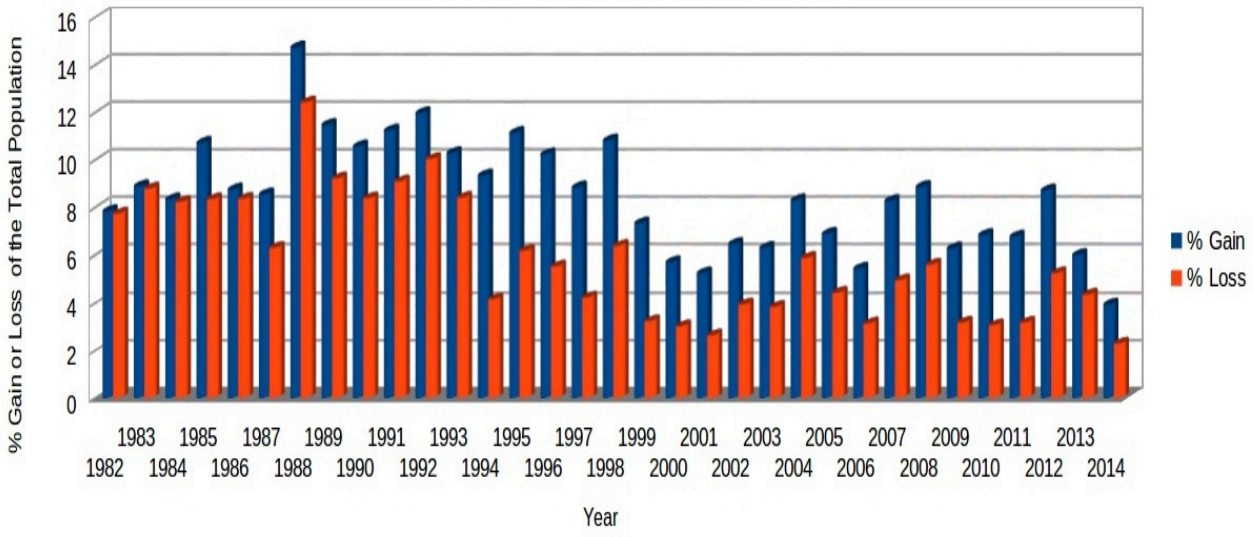


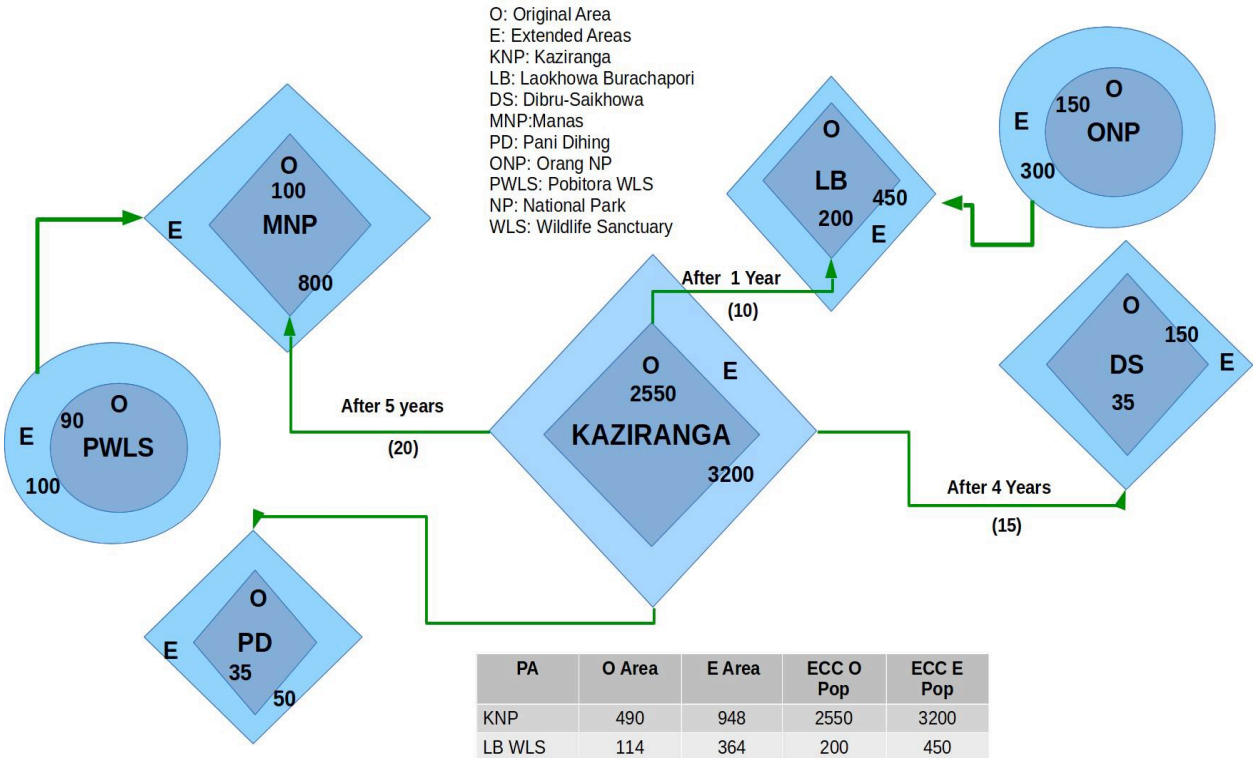
Figure 8. Kaziranga rhino population percent gain and loss figures from 1982 – 2014.

Conclusions for Kaziranga

The current population in Kaziranga is about 2,329 animals, with an average annual loss of 80 animals, with an average net gain of 39. The average number of new entrants into the population is 119. Preliminary modeling suggests that by 2020 the Kaziranga rhino population will be roughly 2,602, and by 2031 2,031. However, the park's carrying capacity (K) has been estimated to be 2,500. Therefore, at least 25 rhinos need to be translocated annually to other

sites, or additional land needs to be acquired. However, net gain cannot be allowed to dip below 2.75 meaning the net gain in Kaziranga should not be allowed to go below ~10 animals.

We need to think beyond the current plans to translocate animals, including crossing state and perhaps eventually national borders (Figure 9), creating larger populations and corridors in which rhinos can move. Many of the current rhino areas, e.g., Manas, Pabitora, and Orang, do not have room for expansion.



PA	O Area	E Area	ECC O Pop	ECC E Pop
KNP	490	948	2550	3200
LB WLS	114	364	200	450
DSNP	340	765	35	150
MNP	840	2837	100	800
PD WLS	34	50	35	50
ONP	79	220	150	300
PWLS	39	45	90	100
TOTAL	**1936**	**5229**	**3160**	**5090**

Figure 9. Conceptual figure with current and potential rhino range expansions possibilities, including (in table insert) the carrying capacity of each area.

MANAS NATIONAL PARK – Sonali Ghosh, Deputy Director, Manas Tiger Reserve

Manas currently has six national designations:

1. Tiger Reserve (1973)
2. World Heritage Site (1985)
3. Biosphere Reserve (1989)