

MANAGEMENT

Wildlife and warfare: a case study of pachyderms in Garamba National Park, DRC

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Abstract

Wildlife conservation planning, funding and implementation often takes account of and sets priorities on the basis of wildlife numbers, biodiversity and species habitat, protected area status and their value in the bigger landscape picture, practicality and the chances of success—which reflect well on the funding body. Armed conflict is almost always seen as a negative factor and in the case of it arising, many organisations pull out. The Democratic Republic of Congo has been affected by several such conflicts but has also benefitted from the first project aimed specifically at maintaining biodiversity conservation during armed conflict. This paper takes Garamba National Park, DRC as a case study, presents population data of the main large mammals from 40 years of systematic aerial survey and relates trends to the specific effects of eight conflict crises and times of peace and the presence or absence of international support between 1960 and 2016. It draws lessons learned from first hand experience of the mechanisms and secondary effects of armed conflict and the approaches to maintaining conservation during such periods.

Résumé

La planification, le financement et la mise en œuvre de la conservation de la faune prennent souvent en compte et fixent les priorités en fonction du nombre d'espèces sauvages, de la biodiversité et de l'habitat de l'espèce, du statut des aires protégées et de leur valeur dans le cadre plus grand du paysage, la praticabilité et les possibilités de succès qui rehaussent l'image de l'organisme de financement. Les conflits armés sont presque toujours considérés comme un facteur négatif et, dans le cas où ils surviennent, de nombreuses organisations se retirent. La République Démocratique du Congo a été affectée par plusieurs de ces conflits mais elle a également bénéficié du premier projet visant spécifiquement à maintenir la conservation de la biodiversité durant les conflits armés. Cet article présente le Parc national de la Garamba en RDC comme une étude de cas, présente les données démographiques des principaux grands mammifères à partir de 40 années de recensements aériens systématiques et relie les tendances aux effets spécifiques de huit crises de conflit et périodes de paix et la présence ou l'absence de soutien international entre 1960 et 2016. Il tire des enseignements appris de l'expérience de première main des mécanismes et des effets secondaires des conflits armés et des approches visant à maintenir la conservation pendant ces périodes.

Introduction

Over the last seven decades, civil war and armed conflict has taken place in some of the world's most biodiverse areas. (Daskin and Pringle 2018). Between 1950 and 2000 more than 80% of wars overlapped with biodiversity hotspots (Gaynor et al. 2016). Since 2011 the number of armed conflicts in the Sahara Sahel region has risen by 565% and resulted in 12 species of vertebrate becoming extinct or close to extinction (Brito et al. 2018). The broad based analysis by Daskin and Pringle has shown that frequency of armed conflict is directly correlated with occurrence and severity of population declines of large wild herbivores in African protected areas. This demonstrates the importance of considering the possible occurrence of armed conflict as a factor in conservation planning, not as a reason to abnegate support. Examining mechanisms of the effects of armed conflict may further help to guide such conservation planning.

An assessment by WWF in the early 1990s of the factors affecting rhino conservation, found that border areas are more vulnerable and therefore a greater risk to conservation investment. However, border areas are often the most spectacular, diverse and valuable areas to conserve, with sparser human populations. Early national boundary setting often used natural geophysical features, such as mountains, escarpments, rivers, watersheds and other water bodies, and these factors may have also influenced earlier population distributions and the development of cultural differences. Virunga, Garamba and Kahuzi Biega National Parks in DRC, Bwindi and Queen Elizabeth in Uganda and Volcanoes and Akagera National Parks in Rwanda are clear examples. Garamba National Park (GNP), on the north-eastern border of the DRC adjacent to South Sudan, with the northern boundary being the watershed between the Nile and Congo Rivers, is used here as a case study.

GNP was established to conserve an ecosystem containing significant rhino, elephant, giraffe and other key herbivore populations in an area over 4,900 km² of the core protected area (National Park status in 1938), plus a further 7,527km of surrounding reserves. GNP has 40 years of systematic aerial survey and other monitoring data covering periods both with and

without international support and with and without armed conflict (Table 1). There have been no less than eight different armed conflict situations affecting GNP over the past 50 years. The author was working directly for the Park authorities for over half that time. The different periods of conflict and peace affecting GNP are tabulated in Figure 2 with the impacts and consequences. They cover pre-Independence 1960 to the post-Independence Simba Rebellion (1964). This was followed by a period of gradual re-development of conservation in the country and by the effects of external support received from UNDP/FAO between 1974-8. When the UNDP/FAO project closed prematurely there was a period of intensive poaching exacerbated by the availability of arms from the chronic civil war in adjacent Sudan. From 1984 when the Garamba National Park Project began to 1997 there was a time of relative peace. Despite pressures from Sudan and an influx of refugees, with the support of the GNP Project wildlife trends were extremely positive. The Liberation war reached GNP in February 1997, rangers and guards were disarmed and anti-poaching stopped for three months leading to a massive increase in poaching. As the first war ended a new phase of rehabilitation and greater collaboration ensued, which although brief enhanced a major collaboration to develop the UN Foundation/Unesco programme when the second, longer war began in August 1998. Personnel, both from the Congolese Institute for the Conservation of Nature (ICCN) and from the long standing NGOs from all five World Heritage Sites worked together to maintain conservation during armed conflict.

With the official cease fire there was a disruption from the after effects of the worst war-induced attitudes however, this temporary cease fire in Sudan and the removal of the Sudan People's Liberation Army (SPLA) buffer area allowed penetration into the Park by the northern *mbororo* horsemen with devastating consequences on both rhinos and elephants. A proposal to temporarily rescue up to five of the remaining rhinos and hold them in a secure protected area outside the DRC for later return was politicized and led to a temporary halt on international funding before African Parks entered an agreement with ICCN in late 2005. Since then the Ugandan guerrilla group, the Lords Resistance Army (LRA 1998-2008) have camped in the Reserves adjacent to the Park effectively using it as a larder and source of finance, and there have also been frequent returns of the *mbororo* horsemen who specifically target elephants for ivory. GNP leadership

and the support of partner projects has been key in managing the ongoing challenge of protecting the Park.

Methodology

Aerial survey using the Systematic Reconnaissance Flight (SRF) method (Norton Griffiths 1978; Hillman Smith et al. 1995, Watkin and Hillman Smith 1999, Chase et al. 2016), has been used with standard, comparable methods at GNP) from 1976 to 2004. From 2005 onwards counts were generally total counts of part of the area, except for the Great Elephant Census (Chase et al. 2016) which also used the SRF method. The 2005 survey (de Merode et al. 2005) also counted carcasses but later counts did not. The whole of the Park was surveyed from 1976 to 2004, as well as all or part of the surrounding *Domaines de Chasse* from 1983, which are effectively buffer zone Reserves. During times when civil war affected the transport of fuel, surveys had to be limited to the Park only. Other block photographic count methods were tested for elephants and buffalos in 1986 and 1989 and a total count of hippos along water-courses in 1988, to compare with the SRF method. Northern White Rhinos were counted by the SRF surveys but more accurately were regularly counted on total aerial block counts and ground patrols, using individual recognition; the annual figures are given in the Table 1. Other observations of the effects of armed conflict are based on personal experience with both the Garamba Project and as Coordinator of the UNESCO/UNF/ICCN Project for Conservation of World Heritage Biodiversity in regions of Armed Conflict.

Results

Wildlife numbers

A time series of aerial survey results over 38 years for elephants and rhinos plus other indicative species, buffalo (*Synceros caffer brachyceros*), the Congo Giraffe (then *Giraffa camelopardalis congoensis*, now classified with *G. C. antiquorum* and hippos (*Hippopotamus amphibius*) is shown in Table 1 (Hillman Smith et al. 2014).

The graphs show how numbers of rhinos and

elephants, the more economically valuable species in the Illegal Wildlife Trade (IWT), were rapidly depleted during periods of armed conflict and exploitation due to political unrest, and how well they recovered with periods of international support and at least relative calm. The graph of buffalo numbers shows a steady drop throughout the period and a less dramatic response to periods of war. This is because the very heavy poaching for ivory and rhino horn between 1978 and 1983 eliminated virtually all rhinos and elephants from the north and central sectors of the park, which were further from the park head quarters and closer to the uncontrolled border with Sudan. By the start of the Garamba Rehabilitation Project in 1984 the remaining rhinos and elephants were concentrated in the south, which became an Intensive Protection and Monitoring Zone; while the poaching, which continued in the north and centre of the park, was mainly for bushmeat, with buffalo as favoured prey. Anti-poaching during this period focused on limiting this and preventing poaching penetrating the southern sector. Rhinos and elephants increased during this time, with numbers doubling in eight years. Only when warfare and armed conflict disrupted anti-poaching and poachers were able to penetrate the southern sectors did they switch to selecting rhinos and elephants, which provided both valuable trophies and meat, once again.

Giraffe have been included in this table because they are endemic and were one of the justifications for GNP obtaining its World Heritage status. They were badly affected by poaching in late 1970s but then the giraffe population remained relatively stable, with some protection from local Azande taboos against killing them—until the arrival of the northern Muslim Sudanese, who sought giraffe tails for their dowries.

Hippos were reduced by 78% during the Liberation War when armed poachers from the Sudanese militants were able to penetrate the southern sector. Hippos are easy targets to potshot, but difficult to recover in crocodile infested waters and far more were killed and left to rot in the water than were eaten. A similar slaughter had happened in Virunga by Congolese government military sent to control the refugees from Rwanda (de Merode pers.com).

Table 1. Population estimates of key large mammal species at Garamba National Park and reserves, from systematic aerial survey 1976-2012, Northern White Rhinos (*Ceratotherium simum cottoni*), Elephants (*Loxodonta Africana*), Giraffes (*Giraffa camelopardalis congoensis/antiquorum*), Buffaloes (*Synceros caffer brachyceros*), Hippopotamus (*Hippopotamus amphibius*). Total rhino numbers are based on continuous monitoring using individual recognition.

SPECIES/ YEAR	RHINO Tot *	DEAD RHI Tot found**	ELE ±95%CL ***	BUFF ±95%CL	GIR ±95%CL	HIPP ±95%CL	DEAD ELE ±95%CL	DEAD OTHER ±95%CL	POACH CAMP OCC	POACH CAMP REC	POACH CAMP OLD
1976	490 ±270	0	22,670 ±11,790	53,000 ±42,360	350 ±250	1,700	0	0			
1983	15	10 ±16	7,742 ±3,690	53,312 ±16,960	175 ±163	1,290 ±1,781	938 ±228	0	10	20	
1984	15	0	3,300 ±509	48,284 ±5,982	237 ±144	448 ±442	142	109	0	38	60
1986	19	0	4,169 ±2,497	29,293 ±7,756	153 ±140	2,874 ±1,668	60	160	0	10	0
1988	22					2,851					
1989	26		4,500								
1991	30	0	7,385 ±2,921	33,910 ±9,474	346 ±203	2,205 ±963		0	0	0	0
1993	31	0	8,768 ±1,584	30,555 ±18,798	347 ±119	1,023 ±817		0	0	0	0
1995	31	2	11,175 ±3,660	11,175 ±3,660	178 ±210	3,601 ±2,368	13 ±13	70	0	0	0
1998	29	2	5,872 ±1,339	5,872 ±1,339	144 ±73	786 ±207	304 ±74	0	0	0	0
2000	30	0	6,022 ±1,046	6,022 ±1,046	118 ±64	953 ±487	156 ±46	19 ±11	0	53 ±40	108 ±46
2002	30	0	5,983 ±1,184	5,983 ±1,184	62 ±13	948 ±787	22 ±13	13 ±19	18 ±24	22 ±21	58 ±35
2003	30	0	6,948 ±1,995	6,948 ±1,995	62 ±75	3,036 ±1,191	57 ±30	0	20	10	130
2004	15P2DC Jul 4P4DC Dec	8	6,354 ±2,081	6,354 ±2,081	185 ±152	2,321 ±1,083	385 ±101	70 ±33	10	10	
2005	4	0	1,202	1,202	48		28		0	13	
2006	2	0	3,214	3,214	70	2,393	8		4	20	
2007		0	3,457	3,457	82	2,293	1				12
2012			1,668	1,668	11	2,863					4 ±9

*1976 are figures from a Systematic sample count (SRF). All other rhino numbers are from annual totals based on counts using individual recognition.

**1983 figures are population estimate of dead rhino from the SRF count. Others are cumulative annual totals found.

***Population estimates for elephants are based on the same method of SRF count throughout until 2004, except the figure for 1989 was based on a block sample count done to test the method against the SRF. From 2005 figures are based on total counts, sometimes only of the southern sector.

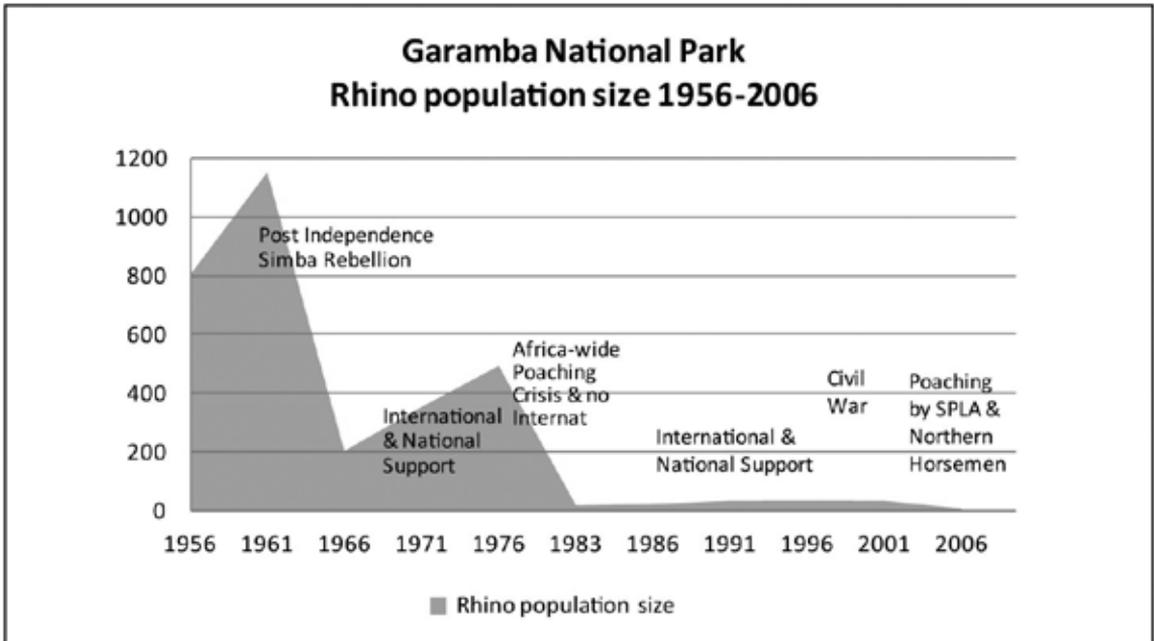


Figure 1. NW Rhino numbers in GNP from 1960 to 2005, annotated with periods of armed conflict.

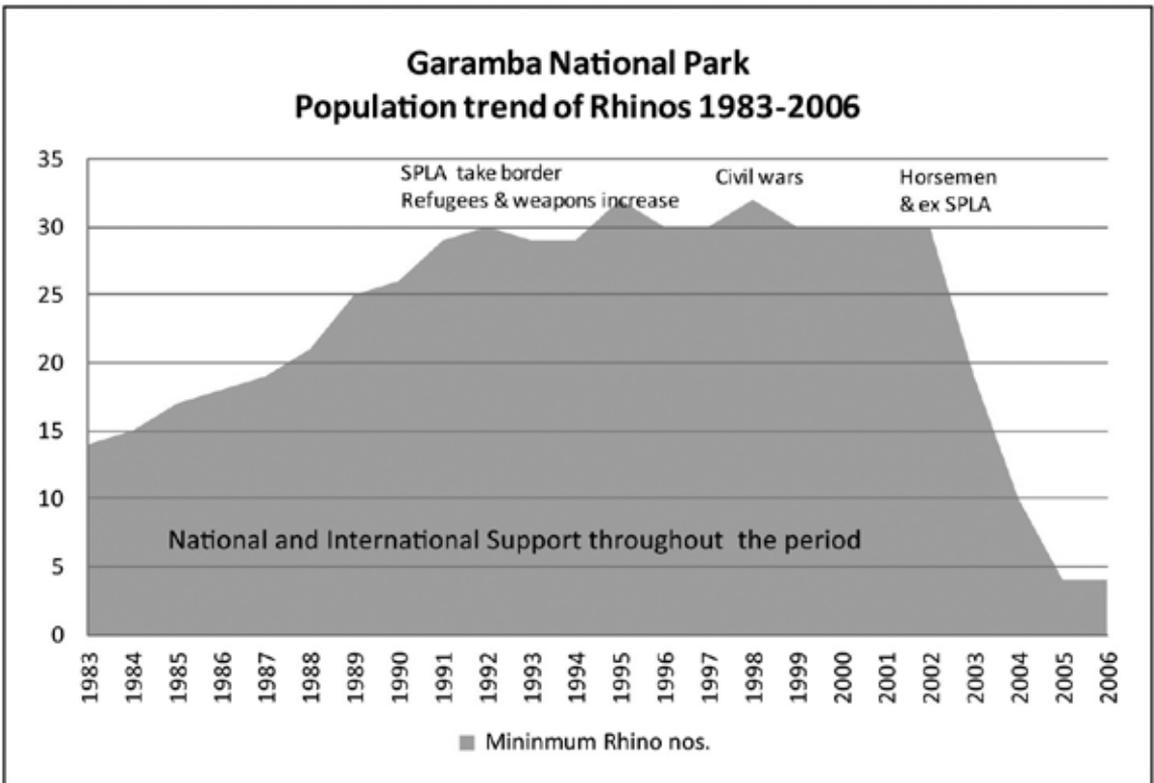


Figure 2. At a different scale, the above graph shows them from the start of the Garamba Project in 1984 to 2005.

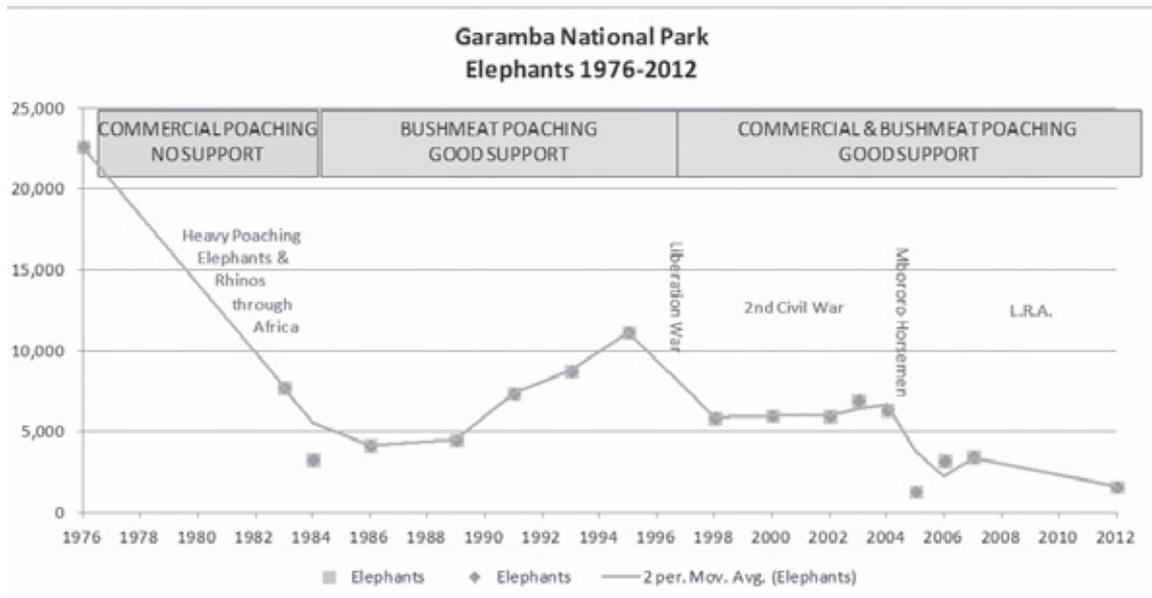


Figure 3. Elephant numbers at GNP and Reserves 1976-2012.

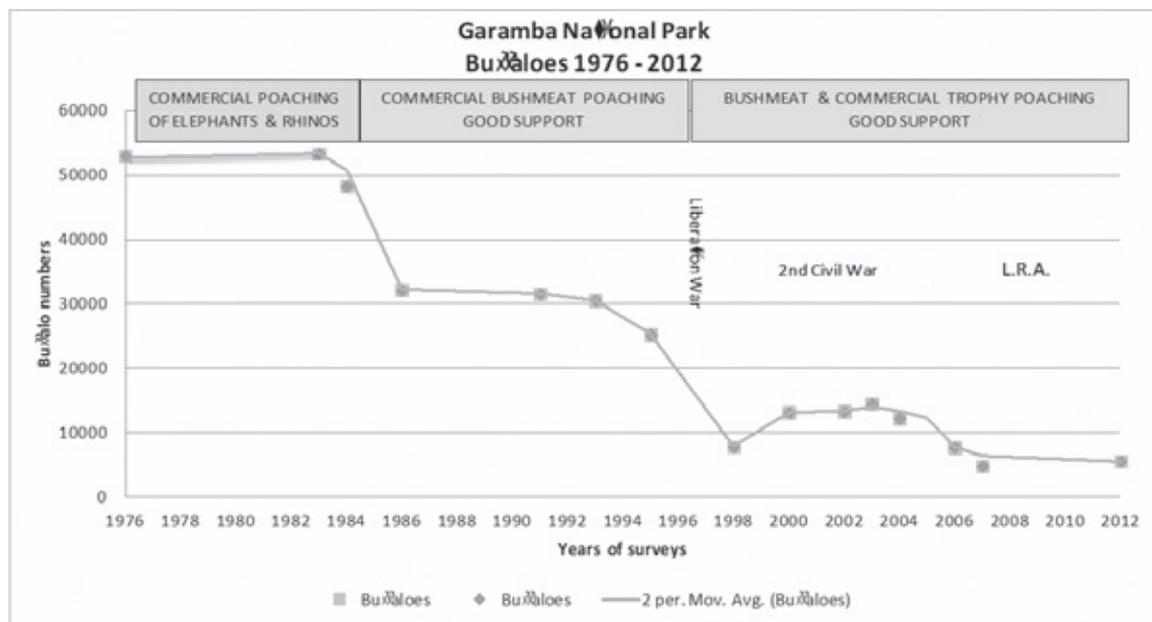


Figure 4. Buffaloes, which were the main target for bushmeat poaching.

Conflicts and their effects

Table 2. Outline of periods of relative peace, instability and armed conflict and presence or absence of investment in conservation and their effects on the ecosystem of the protected area.

Dates	Conflict	Conservation support	Effects on conservation
1960-63	Post-Independence political insecurity. Sudan civil war across border 1955-1972	No International technical or financial conservation support.	Probable changing attitudes and exploitation. Arms and ammunition readily available in region. Rhino estimates pre-Independence numbered 1,000-1,300; no record of specific losses during this period. 
1964	Simba rebellion and atrocities on civilians	No International support. Mercenaries also hunted wildlife to supplement diets for protein and for sport.	Decimation of rhinos and elephants. By the end 1964 Lindahl estimated c.100 rhinos remaining. Hillman Smith calculated closer to 200 (Hillman Smith et al 2014). 
1965-77	No national conflict Sudan war 1955-72	Development of national conservation agency IZCN, organisation by Verschuren and in 1970s support from FAO project.	Conservation control re-established and re-equipped. Rhino numbers increased up to 490 ±270 in 1976, elephants 22,670 ±11,790 (Savage et al. 1976). 
1978-84	Heavy poaching in East and Central Africa. 2nd civil war in S. Sudan 1983-2005	No international support; weapons and ammunition from civil war in Sudan readily available.	Rhinos decreased from 490 to 15, Elephants from c.22,670 to 3,300±509 (1984 end wet season count so visibility restricted, numbers minimal). 
1984-1996	Civil war in S. Sudan but no major effect until 1991; Maridi taken by SPLA, refugees and military crossed border, est. 80,000 by 1993. SPLA establish camps in Sudan close to border with GNP. Zaire military stationed near border	Technical and financial support of Garamba Project Collection of weapons from refugees and movement of camps out of Reserves.	Anti-poaching active and effective and modifications of strategies as needed. Rhinos increased to ≥31, elephants to 11,175±3660 in park plus 577 in Reserves. Rates of increase slowed after 1991. Used military in training exercises twice but also found their involvement in ivory poaching. Military associates (female) powerful in bushmeat trade (de Merode 2014 in Hillman Smith 2014). 
1997 Feb-June	Liberation War in Zaire/DRC. Nagero occupied by mercenaries for two months then Alliance of Democratic Forces for the Liberation of Congo occupation. Looting and destruction	Project continued with support at distance and in GNP when possible. Rangers disarmed and for three months anti poaching activities stopped.	Looting and destruction of equipment, theft of vehicles, loss of weapons and supplies. Poaching originating 70-80% from Sudan increased to 19-38 armed conflicts between rangers and poachers per 100 patrol days over period of AFDL occupation. Elephants down to 5,872 1399 in park, rhinos to 29. Attempts to develop a rapid response unit for protected areas under UN or Game Rangers Association did not succeed. 
June 1997-Aug 1998	Stable in DRC; civil war in Sudan on-going	Project re-equipping and re-assessing. Presentation of case for conservation jointly to new government by long term NGO personnel from World Heritage Sites and negotiation of emergency training support for GNP.	Rhino population stable as births continue @9.5% pa but some loss of peripheral rhinos. 

<p>Aug.1998- July 2003</p>	<p>Second Congo War; DRC occupied and divided, with different areas controlled by Uganda and Rwanda. Kinshasa 3,400 km away also tried to control GNP, with different warlords and border crossing regulations between them</p>	<p>Project continued despite WWF pulling out due to war and IRF increasing support. All 5 World Heritage sites worked together to develop UNF/UNESCO/ICCN Project to Conserve WHS Biodiversity during Armed Conflict, the first project of its kind specifically aimed at maintaining conservation during warfare. Some joint operations with SPLA to control trans-border poaching worked well at first, then were internally mis-used and allowed establishment of SPLA and deserters well south in DCs with easy access to southern sector of park. International peace keeping forces MONUC/MONUSCU in place but effectiveness and collaboration for conservation areas very limited.</p>	<p>UNF/UNESCO/ICCN project very successful operating through committed NGOs, minimising losses, maintaining salaries and field operations, high level training and providing UN umbrella for cohesive management of conservation areas in divided country; new spirit and mechanisms of collaboration in country. In GNP elephant and rhino populations stable or increasing.</p> 
<p>2003-4</p>	<p>Cease Fire in Sudan led to power shift – Northern <i>Mbororo</i> horsemen invade park</p>	<p>Increase in international support and emergency strategies, but internal conflicts of power politics, warlord attitudes and negative effects of new level of poachers.</p>	<p>From 30 in April 2003 rhinos drastically decreased to minimum four in park and four in <i>Domaines de Chasse</i> in Dec. 2004. Proposal to move and temporarily hold up to five NW Rhinos in security till park under control accepted by all including President but not Minister of Environment, and agreement withdrawn under misinformed public pressure and pre-election politics.</p> 
<p>2005</p>	<p><i>Mbororo</i> seasonally</p>	<p>Donor/ICCN Planning meeting for support to park stopped and donors jointly put stop on support until ICCN sorted out internal problems and many meetings held to negotiate re-establishment. African Parks began negotiations in Kinshasa for Public Private Partnership.</p>	<p>Elephants and rhinos continued to decline. Aerial survey in 2005 indicated elephants down from 6,354±2,081 to 1,202 but figures not strictly comparable as total count of southern sector only.</p> 
<p>2006 - present</p>	<p><i>Mbororo</i> seasonally and Lords Resistance Army in DCs with terror tactics on civilian populations and attack on Nagero January 2009</p>	<p>African Parks Network with EU support and far greater resources, but several staff changes and new focus on infrastructure construction at Nagero HQ. Since 2015 priority has been on conservation of GNP and wildlife as well as relations with local populations.</p>	<p>No rhinos observed in park since 2006 and in DCs since 2012. Elephants declining until 2015, now gradual increase.</p> 
<p>2018</p>	<p>African Parks</p>	<p>Largest ranger force of any one NGO across Africa—with over 850 on its staff.</p>	<p>Elephants:  Giraffe:  Hippo:  Rhino: 0</p>

Discussion

Effects of armed conflicts on conservation

It is clear from the above that proximity and intensity of armed conflict has a negative effect on wildlife, but that the mechanisms of that effect vary and different factors need consideration in countering it. The most severe wildlife declines occurred in the absence of international technical and/or financial support allowing exploitation of a conflict situation or breakdown of law and order, as summarised in Figure 5 (Hillman Smith et al 2014).

Armed conflict is generally focused on its own objectives, such as political power and resource exploitation—as has been the case in both Sudan and Zaire/DRC. (Bashige in Hillman Smith et al 2014, pers. obs). But the presence of armed combatants led to their direct or indirect involvement in illegal killing of wildlife for bushmeat both for commerce and feeding troops and for the commercial value of rhino horn and ivory to support the war effort, or personal gain (de Merode in Hillman Smith et al 2014). Furthermore, the increased availability of arms and ammunition in areas of armed conflict facilitated waves of poaching, not directly linked to warfare, motivated by middlemen profiting from the illegal trade in ivory and rhino horn. Shifting power bases with shifting effects of war changed trade routes and pressures (Bradley Martin, in Hillman Smith et al 2014). The SPLA presence on the border was an easier enemy to counter than the fearsome *mbororo* horsemen linked to northern Sudan, who could move south with the cease-fire in Sudan.

We observed that protected areas (PAs) are often selected for militants to hide out in and for easy access of natural resources, as in the Reserves around Garamba on both sides of the national border, Ituri Forest and Kahuzi Biega.

The military presence aimed at controlling conflict also had both positive and negative effects. At times local military were used in training exercises, or in joint operations, but this often back-fired with their easy access to PAs and available weapons tempting them to kill, as was the case with Congolese military entering the southern sector and poaching elephant for ivory. Joint operations with Sudanese, where participants did not want to adhere to agreed time limits, led to their long term presence in the south of the *domaines de chasse*, displacing civilians and having easy access to the wildlife concentration areas. In more recent years it was suspected that military helicopters sent to counter LRA gunned down entire herds of elephant.

Post war effects were often more difficult to deal with. Clear cut warlords could actually be negotiated with, while the loss of a direct power base led severally to incitement of underlying tensions, as with the Hema-Lendu massacres and the internal rebellions from within ICCN. The armed power of the “warlord mentality” can be addictive and can affect several levels of personnel (pers.obs). Terror tactics that were used for instance by the LRA to attack civilians and in ambushes on park rangers, have a very demoralising effect on the staff of PAs, and of course leadership is crucial.

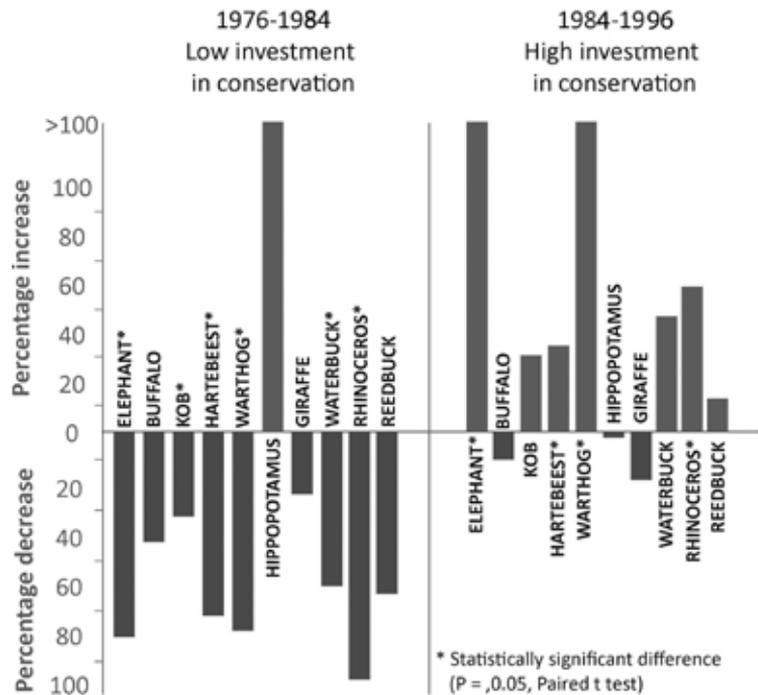


Figure 5. Population change in periods of low and high investments in conservation (Fig percentage change population-green investment).

Finally, the successes of the UNF/UNESCO support programme demonstrated the value of the greater flexibility of committed neutral NGO personnel in maintaining support to field staff. The UN umbrella enabled negotiations between different political factions in the conflict within DRC. (Debonnet, Hillman Smith and Lanjouw in Hillman Smith 2014).

Conclusion

The current and future occurrence or proximity of armed conflict effects on PAs in Africa is relatively likely and sustaining of conservation as far as possible under these circumstances should be considered and factored into conservation planning. Certain factors were found to be important: flexibility and donor commitment is essential as well as rapid well-supported crisis and post-crisis strategies and action. Maintenance of support to field staff and strengthening capacity is crucial. High level political or neutral support is crucial. Local communities and traditional leadership may be influential in situations of breakdown of law and order and good relationships are worth developing with mutual benefit. As elsewhere in Africa human population numbers are rising, these days 200,000 people live in areas surrounding GNP. The long-term protection can only be successful in tandem with community engagement, education and job creation. Cooperation with military is sometimes necessary but should be under controlled agreed circumstances. The GNP is currently being managed under African Parks who have recently put in place the largest ranger force of any one NGO across Africa—with over 850 on its staff, the trends while tenuous are positive.

Acknowledgements

I am extremely grateful to the Institut Zairois/Congolais pour la Conservation de la Nature for very many wonderful and challenging years living and working in Garamba National Park and to all the colleagues and friends who shared that work, at times at personal risk, especially my husband Fraser Smith. Very many thanks to the organisations that supported the conservation work: New York Zoological Society/Wildlife Conservation Society, World Wildlife Fund,

Frankfurt Zoological Society, IUCN, International Rhino Foundation and Save the Rhino International, US Fish and Wildlife Service and more recent support from the African Parks Network making it possible to write: *Garamba—Conservation in Peace and War*, (together with Jose Kalpers and Luis Arranz), as well as their on-going support for the Garamba National Park.

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