

Peace Parks? Trans-Frontier Conservation Areas and Conflict in Africa

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Abstract: In this paper, we research the relationship between Trans-Frontier Conservation Areas (TFCAs) and conflict in Africa. Using a large conflict data set covering the period 1997-2012, we find that conflicts produce fewer combat fatalities in TFCAs than elsewhere, possibly because of remoteness but also somewhat idiosyncratically as a function of the geographical displacement of some conflicts over time. Yet, we find more civilian fatalities from conflict in TFCA areas, an effect which correlates with even greater civilian deaths in border areas in general. In both instances of battle and civilian deaths, the so called “peace parks” of Southern Africa perform better. Looking at the relationship between TFCAs and border arbitrariness, we observe that the creation of TFCAs is more likely in areas of lower partition of ethnic groups across borders. Looking only at borders with conflicts, however, we find a greater proportion of partitioned people among TFCAs but fewer casualties altogether. By and large, a theme that emerges from our still very preliminary findings is that the more peaceful the context, the more likely CFTAs are to develop, as opposed to CFTA themselves leading to peaceful environments.

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Introduction

Africa south of the Sahara counts 46 “trans-frontier conservation areas” (TFCAs), that is, wildlife parks, forests, or reserves which either straddle or are adjacent to international borders (on one or both sides).¹ There is relatively little research on these parks beyond the study of specific cases from the point of view of biodiversity conservation. Some sources make tentative claims as to their potential benefits for the political relations among member countries (see literature review below), but there is no evidence for such claims. Nor is there any significant evidence on the effects of TFCAs on local populations, their security, and the role of the international borders in their lives. In this paper, we attempt to address some of these shortcomings and to offer new aggregate analysis and evidence on several dimensions of TFCAs. We focus first on providing broad descriptive information on these parks and suggesting some variables that correlate with their creation, location and characteristics. We then move on to their relationship with conflict and security: are parks in more conflict-prone areas? How do they compare to non-park border zones? Are there geo-spatial variations with respect to TFCAs and conflict? Finally, we look specifically at the issue of people belonging to ethnic groups partitioned by post-colonial boundaries and who now live in or near TFCAs. Are TFCAs more or less likely in such areas? Do they mitigate the impact of borders? Does the presence of partitioned population affect the degree of conflict in these TFCAs? We conclude by suggesting areas for further research.

Definitions and Methods

It is important to first clarify the concept of Trans-Frontier Conservation Area, also known as Trans-Boundary Protected Area (TBPA), as these come in many shapes. A TBPA or TFCA is “an area of land and/or sea that straddles one or more borders between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limit of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means.”² The broadness of this definition lead to the inclusion of rather different zones among TFCAs. Some TFCAs are known

¹ www.tbpa.net, accessed August 2013.

² www.tbpa.net/page.php?ndx=83, accessed August 2013.

as “peace parks” (sponsored by the Peace Park Foundation, a Non-Governmental Organization based in South Africa). They are established by treaty and dedicated to wildlife protection, and typically have genuine transnational management. The peace parks are largely a Southern African affair, with 18 of them in the region and no fewer than 6 in South Africa itself (Darnell 2008:7). There are then multiple categories of “protected areas” with different degrees of protection, which might be continuous to international frontiers with different degrees of collaboration and not necessarily a clear date of establishment. Some of them are entirely on one side of the border, some straddle it, others yet are at some distance from it but form a homogeneous or integrated zone. They include what tbpa.net calls “Transboundary Conservation and Development Areas” (that form a “matrix” of parks across boundaries) and “Transboundary Migratory Corridors” whose parts do not have to be contiguous but are both necessary to migratory patterns and subject to cross-country collaboration.

Not only do parks have different goals and legal status, but they do also differ in their degrees of effective implementation. Some are fully fledged parks with integrated management and institutional existence (mostly the peace parks). Others are largely at a conceptual stage. Most are somewhere in between, existing first and foremost as national parks with some collaboration with parks across the border, or at least some understanding that they form together a homogeneous whole from the point of view of nature preservation. Sometimes, their classification as TFCA seems to be more the work of outsiders than of local authorities. For example, the Sine Saloum, Delta du Saloum region of Gambia and Senegal is listed as a TFCA by www.tbpa.net but is actually constituted of two distinct national parks (the Delta du Saloum National park in Senegal and Niomi National Park in Gambia) with their own specific administrations. It is true, however, that they together constitute one large “protected” area on both sides of a border.

In this paper, we include all 46 TFCAs identified in Africa by www.tbpa.net. Two advantages of doing so are the maximization of observations and the delegation to other neutral observers of their selection. One possible drawback, however, is that the different degrees of effectiveness of these parks prevent us from testing theories on the effects of TFCAs on conflict to the extent that little can be expected from structures that are still largely hypothetical. Roberts (n.d.), for example, ranks the Tri-National Sangha Park (Cameroon, Central African Republic and republic of Congo) a 4 and the “W” Park (Benin, Burkina, Niger and Togo) a 1 in terms of

cross-country collaboration. We do, however, run part of our analysis distinguishing bona fide peace parks—which are usually more effective—from other parks.

In order to observe conflict patterns in border areas and TFCAs, we used the Armed Conflict Location and Event Dataset (ACLED) for Africa, which contains information on the dates and locations of political violence from 1997-2012, as separated into eight categories. Each instance of conflict includes the actors involved and their allies, the type of event, the number of fatalities, and the exact location. In our study we used all instances of conflict from 1997, 2000, 2003, 2006, 2009 and 2012. We proceeded to map the latitude and longitude coordinates of each event, identifying if the location was within five miles of a TFCA, as classified by www.tbpa.net, or within five miles of a border. If it was within 20 miles of a border or a TFCA, we categorized it as “near” a border of TFCA. In our data analysis, however, we only considered events within five miles for more accurate and fitting results.

We also included a data set consisting only of the 46 parks as observations and of all the characteristics we could compile on them, which we mostly used for descriptive purposes, and a data set with all 104 bilateral African borders (Englebert, Tarango and Carter 2003), coding them for the presence of TFCAs in order to note how the characteristics of border areas with and without TFCAs might differ. This data set has information on the length and nature of the border, the proportion of ethnic groups partitioned by the border, the degree of state capacity of states on both sides, estimates of population density at the border, etc.³

Literature Review and Research Questions

The establishment of TFCAs can have multiple objectives. The main ones deal of course with nature and biodiversity conservation. Related is the goal of “promotion of local and regional economic development through ecotourism” (Schoon 2008: 8). There is also the goal of promoting “international goodwill and peace” (Schoon 2008:8). The assumption is that collaboration on TFCAs signals friendliness and facilitates broader cooperation among countries. The “line of reasoning” is ‘functionalist,’ writes Schoon (2008:21). Officials from the countries concerned “resolve differences on an issue of relatively low political importance” which should then facilitate further collaboration, as they become “friends and colleagues.” Budowski (2003) makes a similar argument. Schoon (2008:22) cites Odegaards (1990), who makes a distinction

³ Once the paper is finalized, the data sets will be available at www.politics.pomona.edu/penglebert.

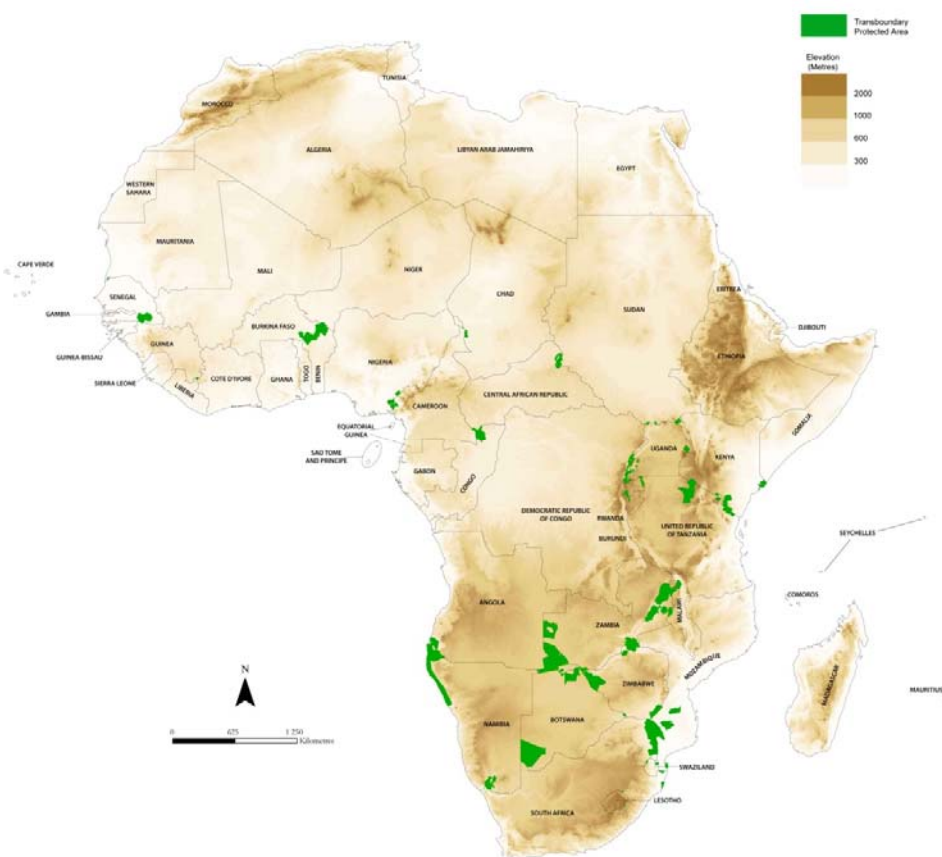
between “peace parks” that celebrate existing peace; those that help by and large already friendly countries with strained relations; those that ease border disputes after a war or that generally help out build trust after a war; and those that can foster peace in a warlike situation (e.g., DMZ between the Koreans).

Furthermore, organizers and contributors of TFCAs, such as the Peace Parks foundation, argue that transboundary conservation initiatives will reunite communities split by colonial demarcations. However, “in some TFCAs in the region borders demarcation is still required” (Tamar 2007:26) and “most TFCAs in the SADC region have been established through a top-down approach, with communities being the ‘recipients’” (Tamar 2007:21). Thus, TFCAs may instead result in the marginalization of local communities. Ramutsindela (2003:113) writes that the organization of TFCAs “weakens the position of local residents who are central to the discourse of TFCAs while, at the same time, allowing the local elite, governments and NGOs to participate in the scaling process.” Another concern among local communities is that weaker border security puts the area at risk for higher crime and violence (Tamar 2007:21). These concerns led Muchapondwa and Ngwaru (2010) to ask what conditions may lead local communities to be involved with and cooperate with transfrontier park management. With a conservation focus, they concluded, “local communities will cooperate with transfrontier conservation efforts only if they derive greater benefit flows from transfrontier park-based wildlife conservation than from anti-conservation activities such as wildlife poaching” (3).

In this paper, we do not focus on conservation, nor do we investigate the broad effects of peace parks on bilateral relations, as there are too few fully-fledged parks to test such hypotheses and too many intervening variables in bilateral relations to sort things out in the relatively small population of 46 TFCAs. Instead, our interest lies in local security. We seek to investigate the relationship between TFCAs, border politics, and human security. We wonder whether TFCAs might help bring together communities torn by artificial boundaries and thus reduce conflict between and within countries. To some extent, therefore, the questions we ask deal with whether local populations derive any security benefit from parks, whether parks themselves tend to develop in regions of conflict or away from them, whether the transformation of border areas into TFCAs limits or exacerbates their potential for insecurity, and whether TFCAs limit or mitigate the arbitrariness of postcolonial borders for populations living astride these borders.

Characteristics of African TFCA

Not surprisingly, given the region's comparative advantage in wildlife tourism, TFCA are disproportionately located in Southern Africa. There are also a significant amount of them in the DRC-Rwanda-Burundi and Kenya-Uganda-Tanzania clusters, and a few scattered throughout the West Africa and Sahel regions, from Senegal all the way to the Central African Republic. There are none in North Africa, in the Horn or on the Atlantic Coast of Central Africa (see Map 1).



Map 1⁴

Their average size is 20,027 square kilometers (about a quarter the size of Austria), with a minimum of 122 km² (Mafuga Hills in Malawi, adjacent to Zambia) and a maximum of 244,567 km² (the combined area of Victoria Falls, Kazuma, Caprivi and adjacent parks in

⁴ Source: <http://www.zonu.com/images/0X0/2009-11-07-10916/Protected-natural-areas-in-Africa.jpg>

Zambia, Zimbabwe, Namibia, Angola and Botswana). This latter TFCA is an outlier, however. More than 70% of parks are smaller than 25,000 square kilometers, as illustrated in Figure 1..

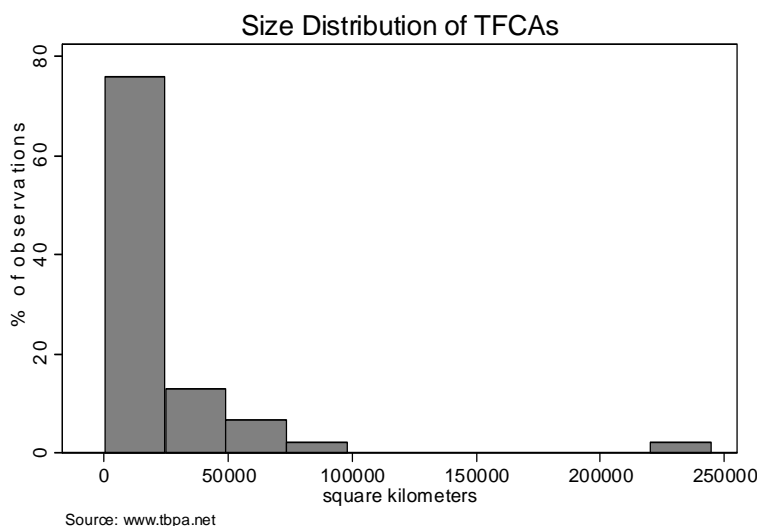


Figure 1.

Thirteen of these TFCAs are peace parks, almost all of which are located in Southern Africa. Peace parks tend to have a more developed trans-frontier institutional set ups than other parks.⁵ Although few people live in parks, there are human communities in and around them. We loosely estimate the average population density in the vicinity of TFCAs to be about 23 inhabitants per km², with a range of 0 to 100. In comparison, the average population density for the continent, south of the Sahara, is about 36. It is not surprising that wildlife areas would get lower density than countries on average. As a matter of fact, if we exclude the two TFCAs in Burundi, Eastern DRC and Rwanda (regions of high density), the average for the remaining TFCAs is 19.8, thus a little more than half the continent's average population density (as we will see later, these TFCAs are outlier in other ways too).

Excluding borders within North Africa and the border between Sudan and South Sudan, which did not exist during most of the time period included in our data, there are 98 bilateral borders in Africa. Of these, 52 host at least one TFCA (there are more borders with TFCAs than TFCAs because several straddle more than one border). In terms of state capacity, the countries that collaborate on TFCAs are broadly similar to the rest of the continent. Their average “state failure” index (from 0—non-failed—to 120—completely failed) is 90, while it is 93 for other

⁵ Need data on TFCA effectiveness scores.

pairs of countries, 88 for sub-Saharan Africa as a whole, and 66 for the entire world (Englebert and Dunn 2013). This is a statistically significant difference but not a substantial one. The proportion of countries collaborating on TFCA that were colonized by the same country (30%) is about the same as it is for the continent as a whole (33%). Thus the establishment of such parks is not particularly a matter of historical affinity. There are, however, some more pronounced differences between the two groups. As Table 1 indicates, TFCA borders are somewhat less likely to be the object of disputes among neighboring countries, fewer of them contain straight lines (a sign of arbitrariness), they are less likely to have at least one side having been colonized by the French (which probably proxies for the fact that a plurality are in Southern Africa where there were no French colonies), and their demarcation are usually of better quality (which might also relate to the Southern African bias). All in all, these patterns suggest that the borders that host TFCAs are generally less controversial than the others, which probably facilitates collaboration on the creation of parks.

Table 1. Characteristics of Bilateral Borders with and without TFCAs

	Non-TFCA	TFCAs	P-value (1 tail)
Average state failure (0-120)	93	89.5	0.05*
Same colonizer (%)	32	31	0.42
Dispute (mean intensity, scale 1-4)	1.1	0.8	0.16
Contains straight line (%)	41	21	0.02*
At least one side colonized by France (%)	63	44	0.03*
Quality of demarcation (scale 1-5)	2.5	3.2	0.00*

Note: Observations are 46 for non-TFCAs and 52 for TFCAs, except for state failure (38 TFCAs) and demarcation (45). Source: Authors' data set; Englebert, Tarango and Carter (2003).

What is the Relationship between TFCAs and Conflict?

Before analyzing patterns, it is important to stress the difficulties of causal analysis on the effects of TFCAs on conflict because (1) the creation of most TFCAs is rather recent; (2) there are multiple TFCAs that are little more than conceptual categorization or attempted unified parks with little or no realization on the ground, (3) many parks are created in areas of conflict and thus one cannot extricate their specific effects on those.

It is, however, possible to identify patterns of political violence in TFCAs, and compare them to similar patterns in border areas in general or in non border areas. The point is to see whether there is any relationship between TFCAs and their features, and several types of

violence, and to derive insights from this on the challenges ahead for TFCAs. This is tentative and preliminary work, however, but we hope it might lead to more workable hypotheses.

In order to address these questions, we focus principally on two dependent variables: the number of fatalities from conflicts involving battles between government and rebels or between rebels, militias, etc.; and the number of fatalities resulting from violence against civilians (whoever the perpetrators are). Starting with the former, Table 2 shows for Africa in general, a steep decline after 1997. By 2012, the continent-wide number of battle fatalities was about one quarter of what it was in 1997. This trend corresponds to occasional claims that Africa has moved since the turn of the century towards a post-conflict situation. While this decline stabilizes for Africa in general after 2000, it is more pronounced in TFCAs than elsewhere. There, 2012 fatalities averaged one tenth of those in 1997. This decline parallels the emergence of most TFCAs and “Peace Parks” around 2000. No causality should be inferred from this observation, but it is quite possible that areas that become more peaceful lend themselves better to the creation of parks in general.

Table 2. Average number of fatalities in battles (# of observations in parentheses)

	All Africa	Border areas	TFCAs
1997	13.4 (1098)	11.5 (218)	17.2 (72)
2000	7.1 (1831)	4.0 (241)	6.6 (141)
2003	6.4 (1396)	7.7 (73)	5.7 (80)
2006	4.2 (1036)	7.8 (104)	1.4 (125)
2009	6.9 (1386)	6.7 (57)	3.2 (139)
2012	3.3 (2848)	2.5 (146)	1.8 (214)
Total	6.3 (9595)	6.7 (839)	4.7 (771)



Note: in this table, border areas include TFCAs that are right on the border, and TFCA areas include parts of parks not coded as right on the border.

On average, TFCAs end up significantly less violent than Africa in general. A t test comparing the mean number of fatalities for non-TFCAs (6.3) to the number for TFCAs (4.7) indicates a statistically meaningful difference at the 10% level in one tail. This is not true of border areas in general whose average is very similar to the whole continent, so this is not a “border effect.” What might explain the fewer fatalities in TFCAs? As Map 2 illustrates, the main areas of combat in Africa since 1997 have been (West to East) Sierra Leone-Liberia-Côte d’Ivoire, Nigeria, Angola, the Great Lakes cluster, Sudan, and the Horn. Looking at the areas of conflict over time can help us make sense of the trends in Table 2. The year 1997 had high

levels of violence mainly because of the conflict in Angola, Burundi, the DRC, Rwanda, Sierra Leone, and Sudan. The fact that a big part of Eastern Congo and Rwanda is on TFCAs (mostly the Virunga National Park and the Parc des Volcans) accounts for the higher value for TFCAs in 1997. After that, battle fatalities in TFCAs are significantly lower than for Africa as a whole. Variations in the Great Lakes cluster account to a large extent for this. The period 2003-2006 sees a considerable drop in combat because of Congo's democratic transition. Things pick up again a bit in 2009 as the CNDP rebel group operates in the region. For non-TFCA regions, there is also a decline in battle-related violence but it stays higher because of regions of Nigeria, Uganda, Sudan (Darfur), Somalia and the Horn, Mali, where considerable violence continued to fester through these years. Of course, the occurrence of conflicts and their violent development in specific locations is unlikely to be much of a function of the existence of TFCAs. The relationship between TFCA and battle fatalities is thus probably at least in part accidental.



Map 2: Instances of Battles, 1997-2012

 = TFCA;  = Non-TFCA

These findings suggest that there may not be anything specifically related to the nature of TFCAs here, although their development might indeed be facilitated by relative peace. This does not constitute the test of a hypothesis but it hints that the relation might be more from peace to park than from park to peace. The number of battles in TFCAs seems to diminish because conflicts that overlapped with these areas have come to an end or temporarily abated. It is also possible that TFCAs being typically in remote areas see fewer military engagements than more central regions or than regions that are known to harbor natural resources that can be appropriated by the parties to a conflict.

Turning to civilian deaths (see Table 3 & Map 3), the general declining trend is similar, yet we observe some nuances. Compared to battle deaths, the overall average is higher for Africa as well as for border regions and TFCAs, indicating that conflict in Africa is more often a matter of attacking civilians than battling it out among armed actors. TFCAs are above the means of other regions in 2000 and 2003, but otherwise below.

Table 3. Average number of fatalities in violence against civilians (# of observations in parentheses)

	All Africa	Border Areas	TFCAs
1997	51.3 (748)	27.2 (91)	28.9 (71)
2000	6.0 (1382)	8.0 (149)	6.9 (134)
2003	4.8 (1496)	5.2 (58)	9.9 (56)
2006	2.4 (875)	1.3 (52)	1.6 (76)
2009	4.3 (1298)	2.5 (69)	3.1 (81)
2012	1.8 (2799)	1.4 (135)	1.2 (211)
Total	7.73 (8598)	7.9 (554)	6.62 (629)

If we look specifically at all non-TFCA observations, near borders or not, of which there are 7,963, versus all 629 TFCA observations, and remove one non-TFCA observation for the DRC which had a widely outlying value of 25,000 (probably the pursuit and murder of Rwandan Hutus in the DRC by the RPF), we observe mean fatalities of 4.7 for non-TFCAs and 6.6 for TFCAs, a significant difference ($P=0.04$). This suggests, therefore, that TFCAs witness greater amounts of civilian deaths than arise from conflicts in other parts of Africa, the opposite trend from battle deaths. If we do the same exercise looking at border areas compared to non-border areas, irrespective of TFCA status, we also see significantly higher number of fatalities in border areas (7.9 v. 4.6). one way to interpret this finding is that th TFCA effect is really a border

effect, as most TFCA fatalities occur in border areas. Apparently, even more such fatalities occur in border areas that are *not* TFCAs. It is possible that more remote border areas see more violence against civilians because there is less state presence there and people are therefore more vulnerable. The low population density might contribute to that; yet that more fatalities occur where there are fewer people suggest that the violence differential might be even more pronounced than hinted by the data. However, the relatively lower number of fatalities for TFCAs, the vast majority of which are on borders, indicates that parks might somewhat mitigate this border effect, maybe because of the presence of rangers or the difficulty for rebels and militias to operate in parks, and maybe because park borders have lower population density than regular borders (a supposition for which we do not currently have data).



Map 3: Violence against civilians

 = TFCA;  = Non-TFCA

Looking now jointly at battle-related and civilian deaths confirms the sharp decline across TFCAs as across Africa in general. However, there are two distinct groups of TFCAs in this respect. Those that are peace parks, mostly in Southern Africa, typically suffer from significantly lower levels of violence (Figure 2). This is true of Southern Africa in general too, compared to the rest of the continent, and it correlates probably with levels of democracy, state capacity and economic development. Here again, then, it is probably the region that is more conducive to peace than any particular quality of these parks.

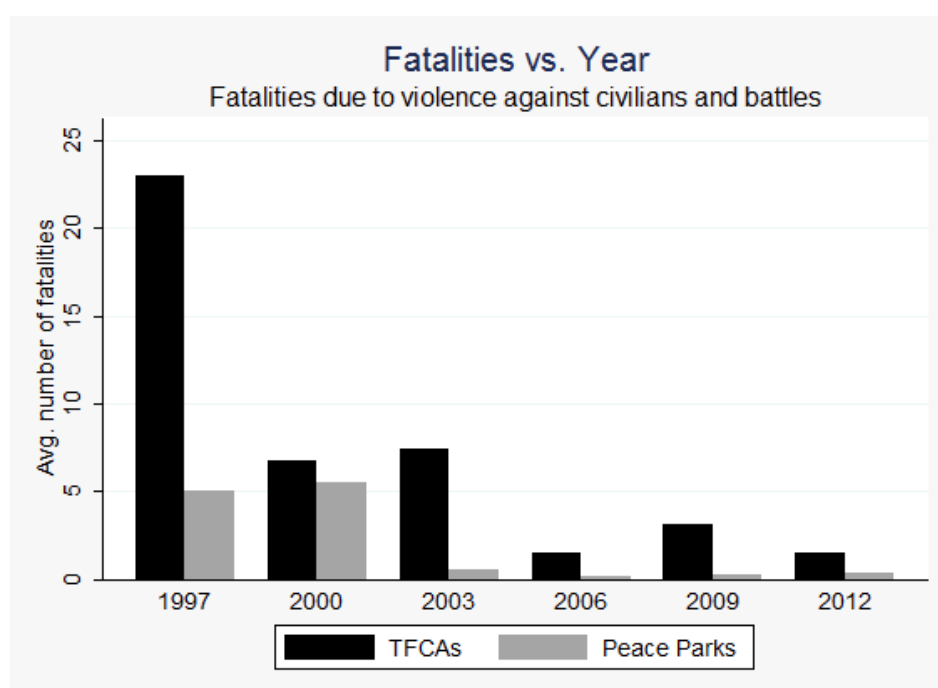


Figure 2

To conclude this section, we attempt a very basic regression analysis using the data set on all 46 parks. We do not have enough variables in the large conflict data set at this point to carry this exercise at a larger scale with the complete data set. Thus we are limited to observations that are TFCAs and cannot compare them to non-TFCA observations. Nevertheless, looking at total fatalities as the dependent variable in Model 1 and instances of conflict in Model 2 (Table 4), we see that population density and the size of the TFCA are the only two significant explanatory variables. We do not find any significant decline in violence from being a peace park, nor a significant increase from the degree of state failure of participating countries. These limited results highlight the need for further research and data development.

Table 4. Basic Regression Analysis on Conflicts in TFCAs

Model	(1)	(2)
Dependent variable	Total Fatalities	Instances of Conflict
Average state failure	5.99 (9.77)	1.82 (1.65)
Peace park	-101 (149)	-5.13 (23.8)
Population density	38.7* (11.8)	6.1* (2.4)
Total area (km ²)	0.006* (0.002)	0.001* 0.0005
N	46	46
R ²	0.59	0.53

* Denotes significance at 5%, two tails; constant omitted.

Do TFCAs Mitigate the Effects of Ethnic Partition?

In general, African borders suffer from a problem of arbitrariness, as they largely derive from colonial rather than fully endogenous and local decisions. There is evidence that the degree of arbitrariness of these borders is associated with international disputes and domestic conflicts (Englebert et al 2003; Alesina et al 2011). One way of measuring this arbitrariness is by quantifying the degree to which borders partition existing ethnic communities (Asiwaju 1985). It is tempting to wonder whether TFCAs, by essentially removing the border from the park, might reduce problems associated with partitioned people and mitigate the conflict propensity of the border. Schoon (2008) suggests that there is no evidence so far that any TFCA has brought divided communities back together or that they have fostered peace at the local level. In this section, we attempt to assess empirical patterns in this respect.

We begin with a visual display of the relationship between partitioned population and TFCAs. We measure the arbitrariness of each border by using the average percentage of each country's population (on each side of the border) that belong to ethnic groups partitioned by the border. The list of partitioned Africans is derived from Asiwaju (1986). The resulting index was designed by Englebert, Tarango and Carter (2003). The observations are the 98 bilateral borders of sub-Saharan Africa. We treat Sudan as unified country since most of our data predates 2011.

We can see from Figure 3 that there is a negative relationship between partitioned populations and the existence and number of TFCAs across the same borders. *The more a*

border breaks up existing communities, the less likely it is to have a TFCA. This relationship continues among borders that have TFCAs. In other words, the more the border “dismembers” the fewer the TFCAs. The outlier is the Malawi-Zambia border that is listed as having 4 parks. However, it can also be thought of as one large area (which is how www.peacepark.org lists it) and thus is a bit of an artificial outlier that does not invalidate the trend.

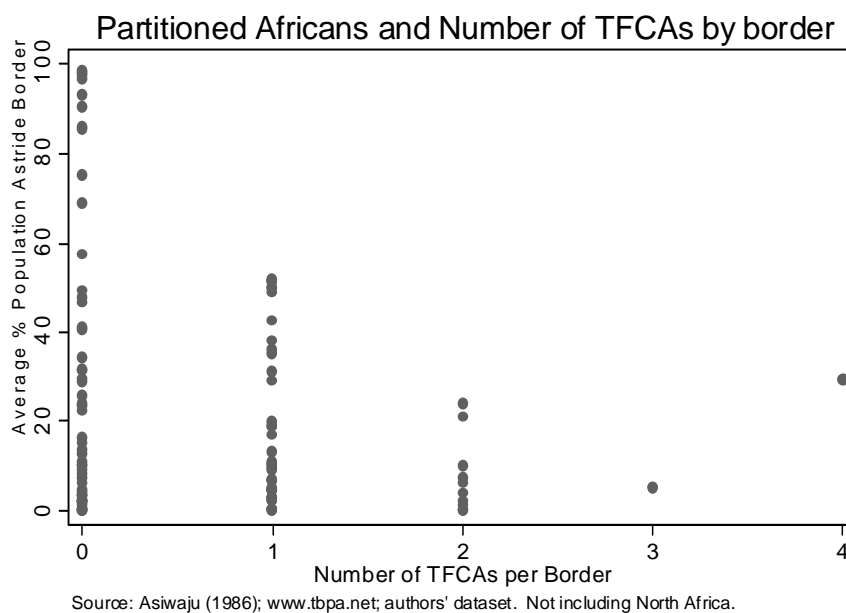


Figure 3

This finding suggests that TFCAs are not necessarily the right mechanism to address postcolonial boundary arbitrariness, as they seem harder to achieve when there is high arbitrariness. Of course, we still need to look at the relationship between partitioned people and local insecurity in and outside of TFCAs to fully assess their impact, something we return to below. But it bears noting that TFCAs are not developed in regions of greater postcolonial partitioning, that is, where they would be most needed if they were to alleviate the effects of postcolonial territorial arbitrariness. The average proportion of partitioned peoples is 22% for borders without TFCAs and 16% for borders with them, a difference significant at the 10% level (one tail).

In all likelihood, the more arbitrary the border, the more difficult it might be for countries to work together on the border area and “remove” it from their monopolistic sovereign oversight. Recall from Table 1 that TFCAs are more likely to be established along borders that are not the

object of a dispute (thus already peaceful borders). The average proportion of disputes is 41% for borders without TFCA and 36% for borders with them (not statistically significant). Because border dispute in Africa is a positive function of partitioned people (Englebert et al. 2003), the selection of low-partition borders for TFCAs might reflect this impact. Recall too that straight lines, which are also a factor of border dispute as they are more likely to reflect arbitrariness, had a 21% chance of happening on the borders that host TFCAs, as against 41% on other borders. (a difference statistically significant at 5% level, two tails), suggesting again that TFCAs typically get established in easier borders rather than as a means to solve the problems associated with difficult ones. Straight lines also correlate with partitioned people at $r=0.18$ (significant at 10%). The impact of partitioned populations on conflict is also hard to assess, as is the effect that TFCAs might have on this relationship. If we look at the entire data set of conflict observations, but excluding North African borders, we get an average proportion of partitioned people of 18.9% in non-TFCA border conflicts and 19.8% in TFCAs. Due to the large sample size, this is a statistically significant finding. As stated, TFCAs are less likely to be established on arbitrary borders containing partitioned ethnic groups, but the TFCA borders that are conflict prone host a slightly larger proportion of partitioned people than non-TFCA borders. In other words, the establishment of a TFCA may act as a catalyst for conflict among partitioned groups, but not by a significant amount. This could be due to the nature of protected areas, which generally have lower levels of management and border demarcation than other border areas. In turn, this may encourage conflict due to the ease of movement and lack of state intervention. Most of these conflicts are not occurring in southern Africa, so it is not to dispute the effectiveness of Peace Parks in promoting peace, but rather to examine the effects of transboundary conservation initiatives on partitioned populations.

Interestingly, this increased level of conflict among partitioned people in TFCAs corresponds to a lower level of fatalities in TFCAs ($\mu=5.29$) compared to non-TFCA border areas ($\mu=6.59$). Thus, border conflict containing partitioned people tends to be less violent on average in areas containing a TFCA despite a higher proportion. This reinforces somewhat our earlier finding that civilian deaths in TFCAs was lower than in border areas in general. If we break the data in two (Table 5), with one group representing observations with population astride below the overall mean ($\mu=19.9$), and the other group with observations above the mean, we find that for observations below the mean, non-TFCAs are significantly more violent than TFCAs.

For observations above the mean, the relationship is the opposite (violence is greater in TFCAs) but not significantly so and on average below what it was for the first group. It is very difficult to infer too much from these numbers. We suspect that the second group is largely affected by data from the DRC-Rwanda border (about 660 observations, two thirds of which are in parks).

Table 5. People Astride, TFCAs and Fatalities

Proportion astride	Non-TFCA mean fatalities	TFCA mean fatalities	P value
Less than the mean	8.1 (1,938)	4.9 (849)	0.01
Above the mean	4.7 (1,589)	5.8 (623)	0.14

Note: does not include North Africa, fatalities from non-combat non-violence against civilians activities and fatalities of 25,000 or more. The mean proportion astride is 19.9%.

Conclusions

While our findings do not demonstrate a causal effect of the creation of TFCAs on conflict and local populations, they help understand the trends of violence and partitioning among transfrontier parks, taking into account extraneous variables, such as political unrest, regional population differences, and border effects. With many case studies making claims about the preservation of peace and engagement of local communities in African TFCAs, using statistical methods help us interpret the significance of these claims on a larger scale. We found that many TFCAs are established on borders with more peaceful relations to begin with, resulting in fewer instances of combats in transfrontier parks. Thus, the existence of TFCAs have done little to improve dyadic relations, as those that have experienced greater instances of conflict are either consistent over time or are primarily determined by the political instability occurring in the state. Battles are also unlikely to occur in unpopulated wilderness areas, resulting in significantly fewer fatalities in TFCAs. Violence against civilians, however, have higher fatalities on average in TFCAs, but that is largely affected by the violence on borders between Democratic Republic of Congo, Rwanda, and Uganda due to political unrest and higher population density. African borders see even more civilian casualties than TFCAs, so this may lead to the notion that transfrontier parks might help mitigate this violence in some respect, a hypothesis worth investigating further.

Our findings among partitioned ethnic groups support the idea that TFCAs are more likely to be established along peaceful borders. With fewer partitioned people among TFCAs than non-TFCA borders, TFCAs are generally not being created along arbitrary borders. Thus, most of these individuals are unaffected by the existence of a transfrontier park, leading us to believe that TFCAs do not have a considerable effect on reuniting torn communities from colonial demarcation. However, among those that do live in or around transfrontier parks, there are higher instances of conflict than other areas involving partitioned people, but they are on average less violent.

While it is difficult to make a causal argument about the effects of TFCAs due to their diversity in management and organization, several conclusions can be made. These are that (1) TFCAs are more likely to *maintain* peaceful relations than to *create* peace in border areas, (2) peaceful relations in TFCAs are more affected by the region's political state, geography, and population density than by transnational initiatives, and (3) most partitioned people are unaffected by the creation of TFCAs as they are less often created on arbitrary borders.

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