Agence Nationale des Parcs Nationaux

Wildlife and poaching assessment in Northeast Gabon

Preliminary results

In collaboration with

Wildlife Conservation Society,

World Wide Fund for Nature

Funded by:

The Republic of Gabon

CITES / Monitoring the Illegal Killing of Elephants

United States Fish and Wildlife Service

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I. Summary

A tidal wave of elephant poaching is currently sweeping across Africa. Recent results suggest that forest elephant numbers in DRC are below 10,000-15,000 and that the Republic of Congo has lost 50% of its elephants in the last 10 years. Today Gabon, which represents just 13% of Africa's rain forests, contains over half the surviving forest elephants (Maisels et al. in review).

However, even in Gabon there are more and more reports of ivory poaching as world black market prices soar. As ANPN has become more and more effective on the ground over the last three years more and more poachers have been arrested and ivory seized.

In 2011 the Gabonese National Parks Agency (Agence Nationale des Parcs Nationaux / ANPN) and the Gabonese military moved just over 6,000 gold miners out of several illegal gold camps in the Minkebe National Park and its buffer zone. These camps had grown exponentially in size over the previous 2-3 years in response to soaring gold prices as well as the high production of the gold mines, to the point where it represented a threat to national security. In addition to gold mining and trading it was noted that severe elephant poaching and other illegal activities such as arms and drugs trafficking were associated with these camps and encouraged by traders (Mike Fay and Richard Ruggiero, trip report).

In 2004, a survey of Minkebe National Park, Gabon, showed that it **supported the most important forest elephant population in Africa**, estimated at around **21,000 individuals (17,000-26800) (MIKE 2005)**.

Working with the World Wide Fund for Nature and the Wildlife Conservation Society, ANPN launched a survey of Minkebe National Park and its buffer zone in October 2012. The objective was to assess wildlife abundance and human impact across the area and in particular to assess the impacts of the dramatic surge in elephant poaching over recent years.

To date, eight of the 14 planned pilot transects in Minkebe have been completed (including the data entered, and a preliminary analysis and mapping of sign carried out). There are likely about 6900 elephants (95% c.l. 3600-13400) in the southern half of the Park. The northern half has not yet been surveyed. Parts of the northern part of the Park held no elephants in 2004 and the situation will have worsened since then, although it is possible that the swamps of the north, very difficult for poachers to access, may have escaped the severe pressure that has hit the rest.

Comparing the area already surveyed with the same area surveyed in 2004 suggests that between 44-77% of the elephants have been killed: in other words, that 11,100 elephants have been lost since 2004, or more than 1000 elephants per year.

Apes (some of which were definitely gorillas) exist in the area surveyed but at exceedingly low density and many transects had no ape sign at all. Human sign was recorded near all transects except one, but many of the signs (machete cuts) could also have been made by guards on patrol.

Of greatest importance were the presence of several hunting camps, three of which were in the Park (two near the Western border and one on the Ivindo River on the eastern Park limit), two rifle shots near the eastern camp, and three elephant carcasses. Two of the carcasses were near the western hunting camp and one was just outside the southern Park limit.

Introduction

In the last decade, elephant poaching in Africa has soared (CITES 2012), due to the accelerating demand for ivory from China (Martin & Vigne 2011; Vigne & Martin 2011), and the concomitant price rise (Wittemyer et al. 2011). Populations of elephants have dropped in West Africa (Bouché et al. 2011) and eastern DRC (Beyers et al. 2011; Vosper et al. 2013), and a recent massacre in northern Cameroon wiped out most of the elephant population of a National Park, previously several hundred individuals (Omondi et al. 2008) in a matter of weeks (Platt 201~~2~~). Even previously well-protected areas are now suffering, such as Samburu in Kenya (Wittemyer et al. 2013). Gabon likely holds half of Africa's remaining forest elephants (Blanc et al. 200~~7~~; Maisels et al. in review) but is under increasing poaching pressure. This report details the results from an ongoing survey of what, in 2004, was the most important National Park for forest elephants : Minkebe National Park in Gabon (MIKE 2005). However, since the 2004 survey there has been increasing human pressure around the Park and ivory prices have risen.

Pressures on the park's elephants have risen for several reasons:

Soaring ivory prices have led to a surge in ivory poaching operated by well organised criminal networks based all around Minkebe Forest. Basically ivory hunting has become a very lucrative criminal activity to which is linked a real mafia type of organisation. These criminal networks operate out of South Cameroon (Oveng, Djoum, Sangmelima, Mintom, Lele etc.), the western periphery of Minkebe (Minvoul, Oyem, Makokou) and the Southern periphery of Minkebe (Makokou, Ovan). Up to 2005, ivory prices were stable in the TRIDOM area, varying between typically 10,000-12000 FCFA/kg ($10-20). Since 2005, prices have increased tenfold (Fig. 1a). **Ivory from a single large elephant can now be sold for the equivalent of one year's average salary of a Gabonese citizen and four years salary for a Cameroonian citizen** (World_Bank 2012). At these prices the incentive for local people to engage in elephant poaching expeditions is huge.

Ivory hunting has been facilitated by a huge network of access roads as the western and southern periphery of Minkebe has been opened up by logging. Logging roads also reach the Ayina river in Cameroon.

Local gold prices rose fourfold from 5000 CFA/g (about $10) in 2005 up to 18000 CFA/g ($40) in 2011 and are currently (2013) around 20,000-24000 FCFA/g ($41-$50) (Fig. 1b). This led to a gold mining and prospection boom in the Minkebe Forest (Minkebe NP, Minkebe southern and western periphery). Gold miners typically operate deep in the forest,

where also most of the elephants reside. The camps also provide infrastructure used by elephant hunters. In particular the "Minkebe" gold mining camp boomed, not only because of high gold prices but also because of the very high production of the site (most productive pits produced more than 1 kg gold/day).

The Minkebe gold camp population started to rise from 2007, peaking in 2010-2011 (Fig. 1c). By 2011 only about 10% of the 5000 people there were Gabonese legal residents. The destruction linked to poaching, illegal immigration and large scale expatriation of Gabonese resources led the ANPN and the Gabonese Government to take the decision to carry out an orderly military evacuation of the Minkebe camp as well as all smaller camps in the park, in May 2011.

The Minkebe gold mining camp was reached by a 104 km trail coming from Cameroon. This trail was also a major conduit for ivory hunters and their quarry as it provides easy foot access to deep Minkebe, and the camp provided a logistical supply point deep in the forest.

Poaching has been and is a high reward - low risk activity with low detectability and low sanctions if detected (in Gabon max. 6 month jail sentence for a first time offence). And poaching networks are known to support a poacher's family when he goes to jail. So the economics of poaching and ivory traffic point to continuing decline. Higher detectability and drastically higher sanctions are needed. A crackdown on key traders might have very positive consequences as it might reduce local ivory demand and drive down the local ivory price.

The power and degree of organisation of the criminal ivory trade and poaching mafia should not be underestimated. The regular export of large quantities of ivory needs well organized trafficking routes. The corrupting power of the very rich ivory cartels is known to be very high. Without successful efforts to eradicate these networks, illegality will continue. This cannot be overstressed given the financial and security consequences for the state (Hollestelle 2012)

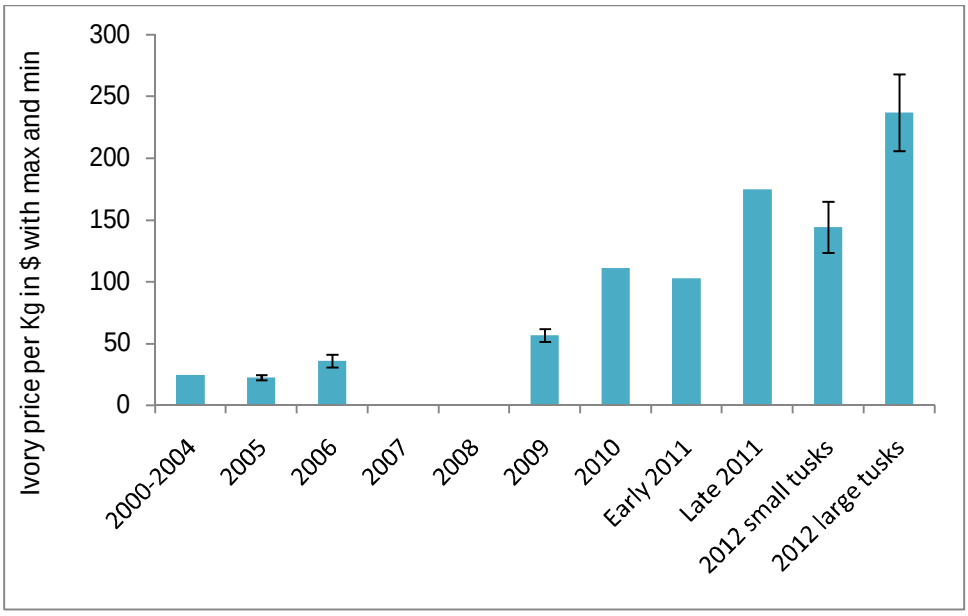


Fig. 1a. Trends in the price of ivory, 2000-2012

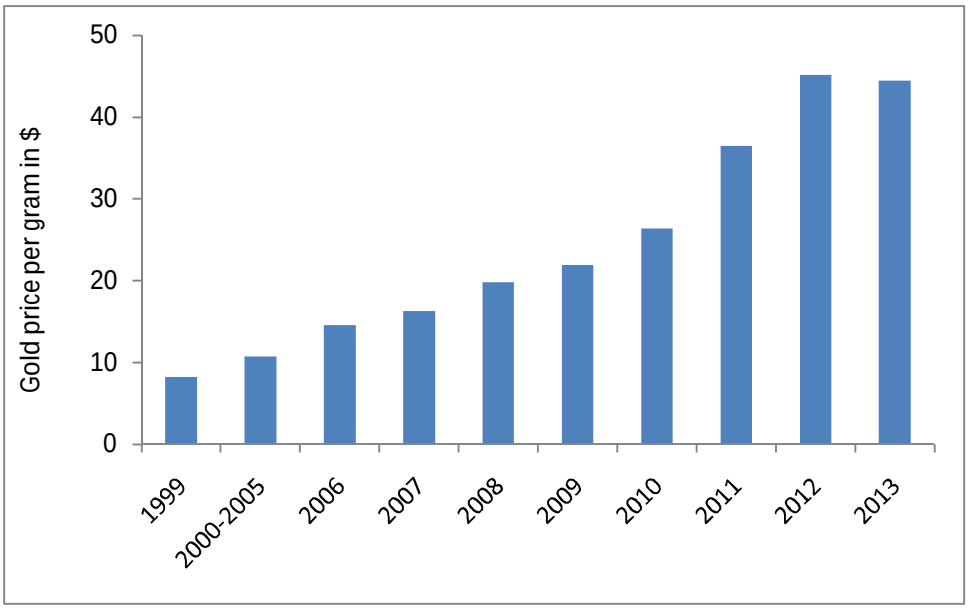


Fig. 1b. Trends in the price of gold, 1999-2013

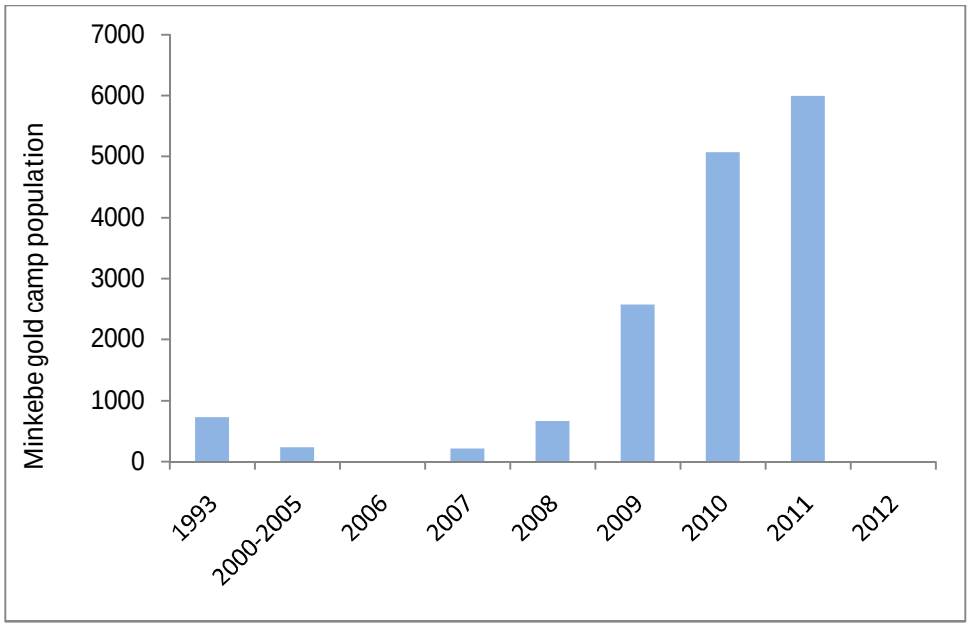
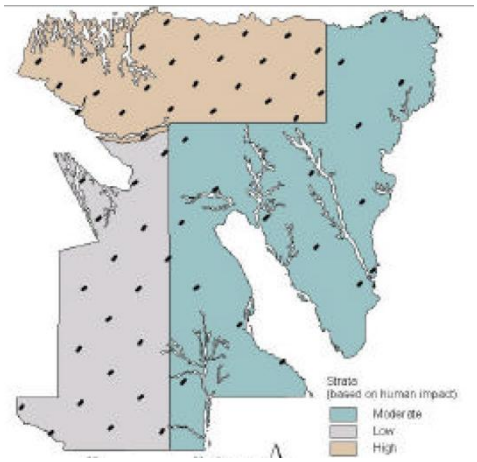


Fig. 1c. Trends in Minkebe gold camp population, 1993-2013

Pilot study: survey design

In 2004, a survey of Minkebe National Park and the area between the North of the Park and Cameroon was surveyed under the MIKE program (MIKE 2005). The area had been divided into three strata based on the presumed abundance of elephants (Fig. 2), but the results showed that, in fact, they were in the remote centre of the Park and in a swampy area of the non-Park area to the north (Fig. 3).



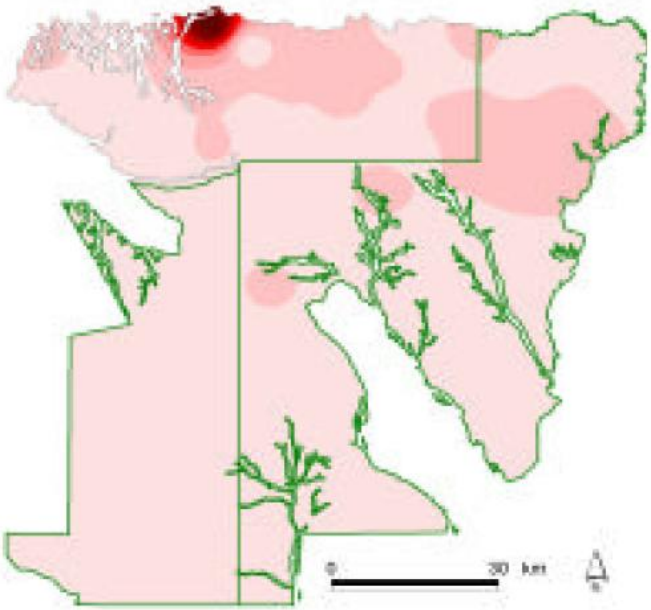


Fig. 2. Minkebe survey design 2003

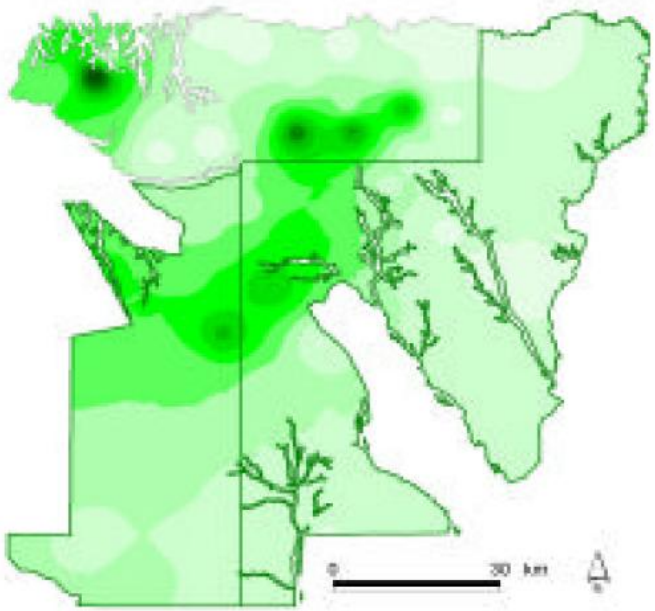


Fig. 3. Elephant and human abundance, 2003

Therefore, for 2012, we redrew the strata, where the most remote areas within the Park (which had highest elephant density in 2003) comprise one stratum, the rest of the Park another stratum, and the old "High human impact" stratum of 2003 remains roughly the same. The whole area to be surveyed in 2012-2013 is the Park and its 5km buffer zone, plus the area surveyed to the north in 2003 (Fig. 4)

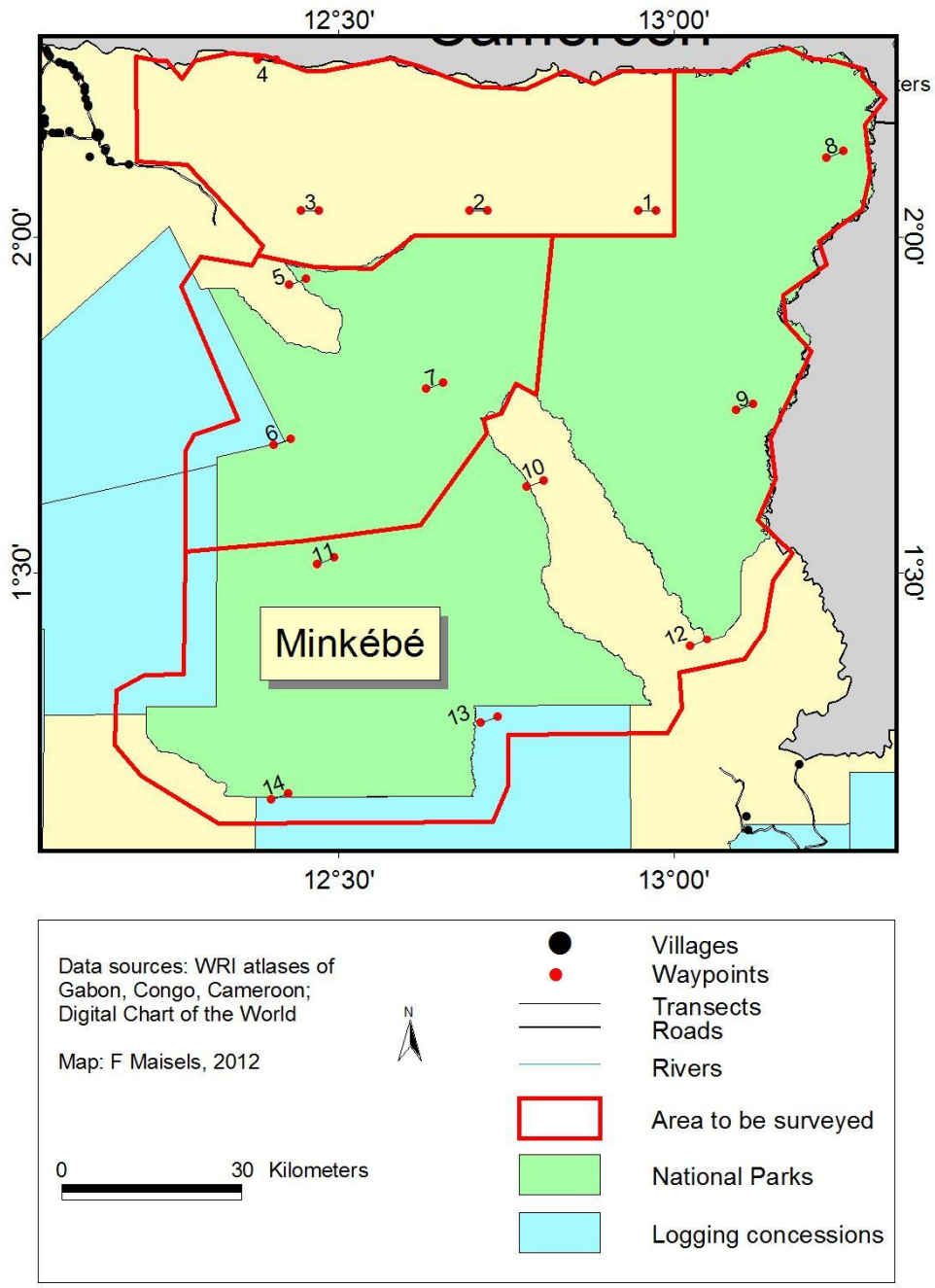


Fig.4. Pilot study survey design, 2012.

Transect survey design, (including pilot survey design) and analytical procedure are standard across the forests of the Congo Basin and elsewhere (Buckland et al. 2001; Maisels & Aba'a ~~201~~0; Thomas et al. 2010); field protocol can be found in the IUCN guidelines for great ape surveys (Maisels et al. 2008). Using the three strata seen in Fig. 4, we used DISTANCE to assign a small set of three-kilometre transects in each stratum. Total area was 11,956 km^2. Fourteen transects, and the waypoints of the start and finish points of each (Annexe 1, Fig 4), were

created. The elephant dung data from these pilot transects will be used for the full survey design, which will be implemented in 2013.

Implementation to date

Eight transects (20.2 km) have been completed to date (Fig. 5) covering just over half of the total area (7963km^2) by three different team leaders, all of whom have considerable experience (Anselme Mounguengui and Marc Ella Akou of WWF (2 transects each), and Prosper Motsaba of WCS (4 transects).

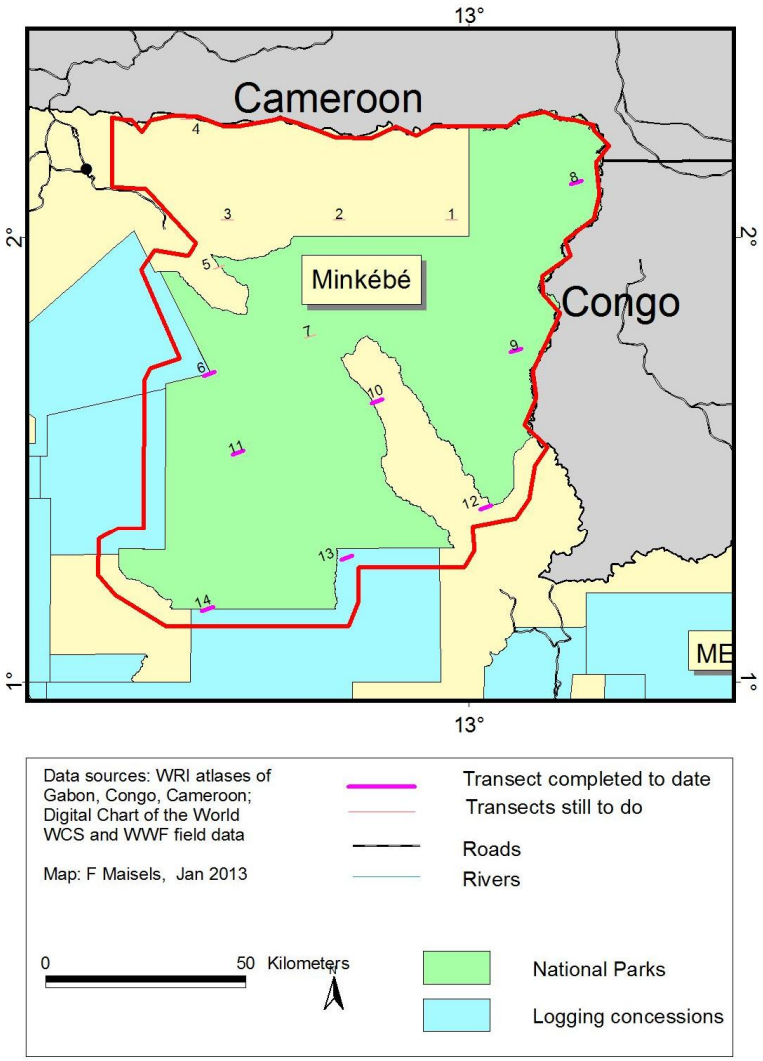


Fig.5. Transects completed, January 2013.

Results to date

Encounter rates of elephants, human sign, duiker dung and great ape nests recorded on transects were calculated (Fig. 6) and mapped.

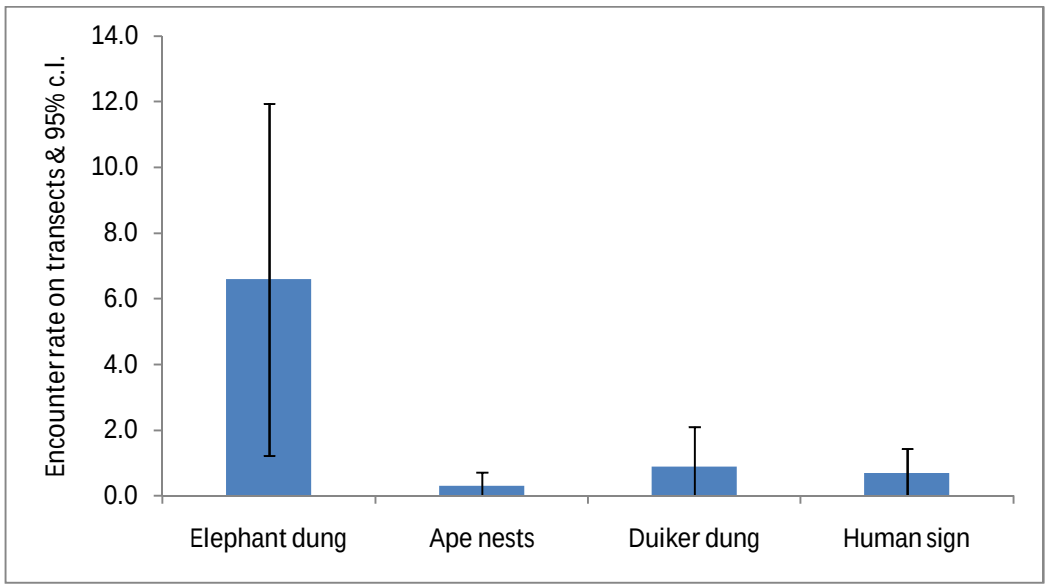


Fig.6. Encounter rates of elephant and duiker dung, ape nests, and human sign, January 2013.

Elephant sign

A total of 155 elephant dung were recorded. All transects walked had elephant dung (Fig. 7); those with fewest encounter rate were along the western edge of the National Park, next to the logging concessions of Tropical Timber Industry Board (CFAD 01-019) and Toujours Vert (Concession 01-028) (Fig. 8). Highest encounter rates were those along the eastern and central part of the Park surveyed so far, which, in 2004, had been treated as "Moderate" human impact. It is clear that the effect of the logging concessions to the West of the Park has been to greatly increase access and poaching in what had previously (a decade ago) been the most remote part of the Park.

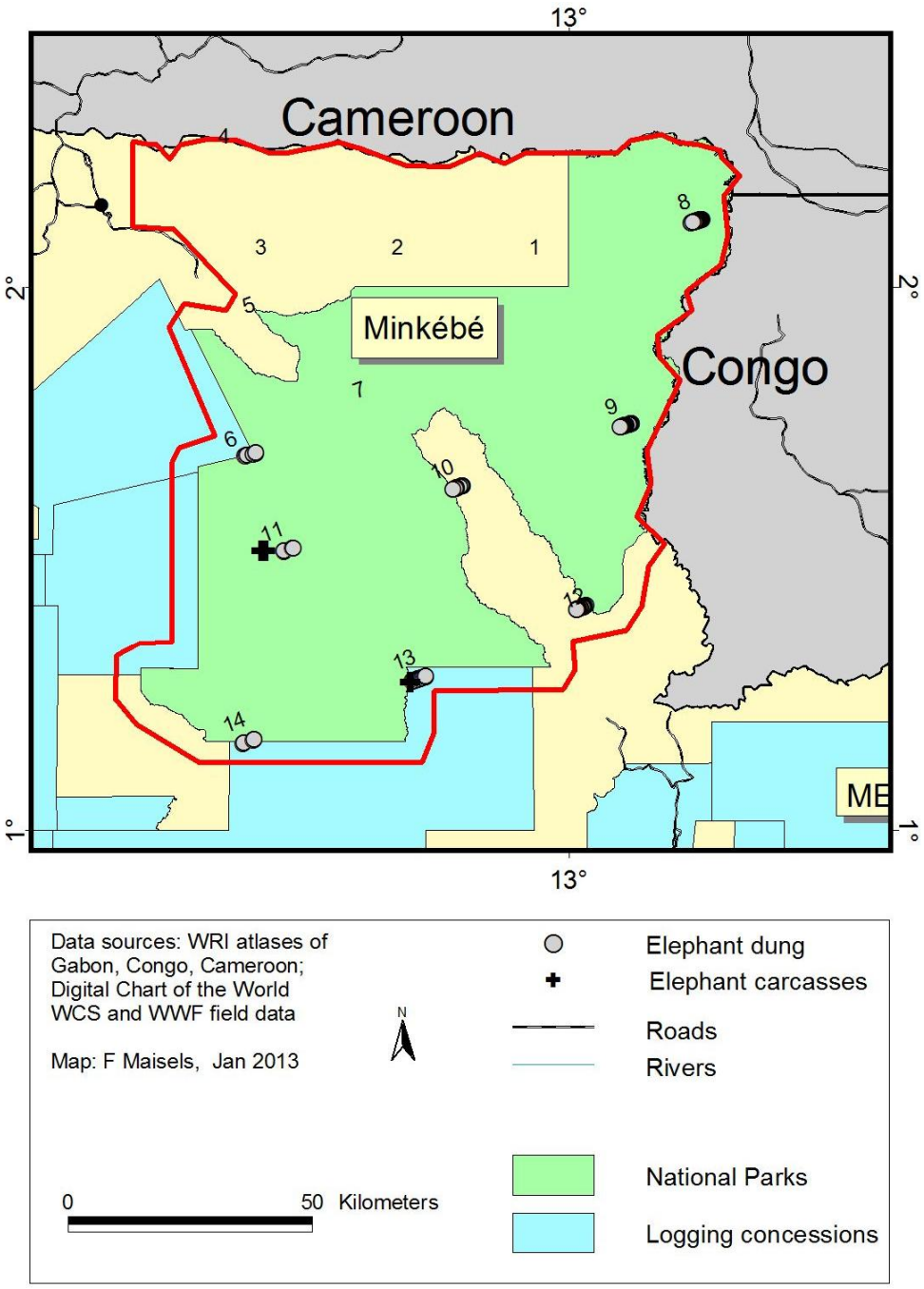


Fig.7. Locations of elephant dung and three elephant carcasses, January 2013.

Transects 1-5 and transect 7 have not yet been surveyed.

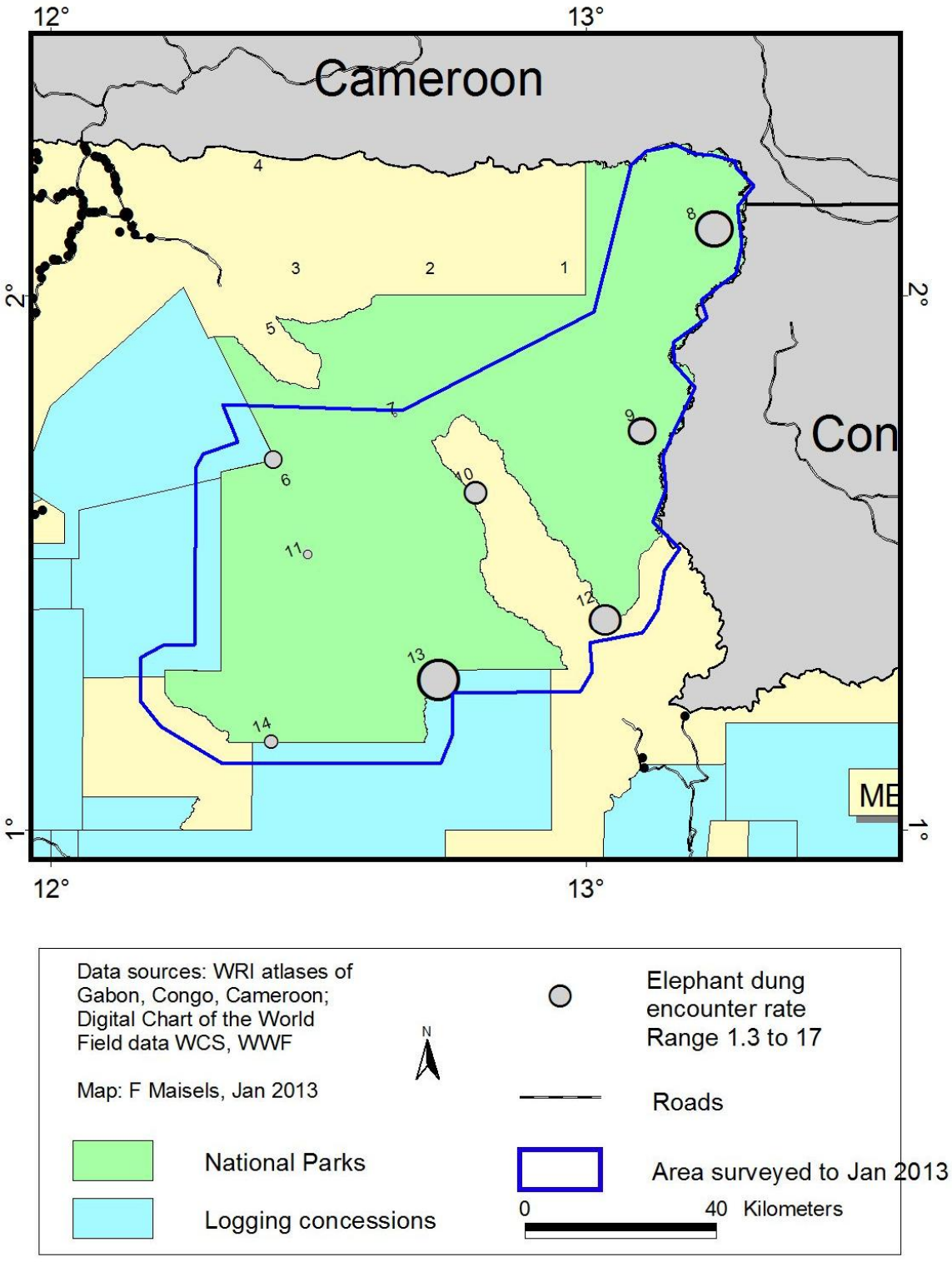


Fig.8. Encounter rates of elephant dung, January 2013.

The size of the grey circles is proportional to elephant dung encounter rate/ km walked. Transects 1-5 and transect 7 have not yet been surveyed.

Rough estimate of elephant density and abundance

Using the eight transects already walked, and the elephant dung recorded (81 were in dung classes A-D, for comparison with the 2004 analysis) we were able to come up with a rough estimate of elephant dung density and elephant abundance within the area surveyed. Dung density without E dung was about 830 / km2 (95% c.l. 424-1630-1740) with a coefficient of variation of 30%. Dung density when all dung was considered gave a density of 1941 (95% c.l. 1011-3727).

Using dung classes A-D, and using the standard decay rate of 90 days and a dung production rate of 19 after the previous survey in 2004 (MIKE 2005), the area surveyed, which is just over half of the whole area to be surveyed, has roughly 4100 elephants (2100-7900).

When we include all dung (classes A-E) elephant numbers were (roughly) 9100 (95% c.l. 4700-17400).

When we weight the result by the proportion of E dung found in 2004, **elephant numbers were (roughly) 6900 elephants (95% c.l. 3600-13400).**

It remains to be seen if the more northerly sector of the Park has similar elephant densities, or if it has been heavily poached. The final survey design will be based on the results of this pilot study, and strata may be altered accordingly.

Change in elephant density 2004-2012

In 2004, Minkebe was the most important site in Gabon for forest elephants, and one of the most important in Africa. Although there are still several thousand elephants remaining (and that the Park remains the most important for elephants in Gabon: Lope is the second most important (Maisels & Strindberg 2012), it is clear that there has been a huge population crash (Figs. 9, 10).

This has been due to poaching over a decade, but likely most intense in the last few years, concurrent with the huge rise in ivory prices driven from the demand in China (Martin & Vigne 2011; Vigne & Martin 2011; Wittemyer et al. 2011).

The proportion of E dung in 2004 (a single observer) was 23% of all dung, and the proportion of E dung in 2012 was 48% but varied widely between observers. If all the dung (including E dung) is included in the comparison between the area surveyed in 2012 and the same area surveyed in 2004, there has been a loss of 64% (95% c. 44-77%) (Fig. 9). Using the same proportion of dung to give elephant numbers in both cycles, there has been a loss of around 11,100 elephants within the area surveyed from 18,160 in 2004 (95% cl 13870-23780) to 6990 in 2012 (95% cl 3640-13420).

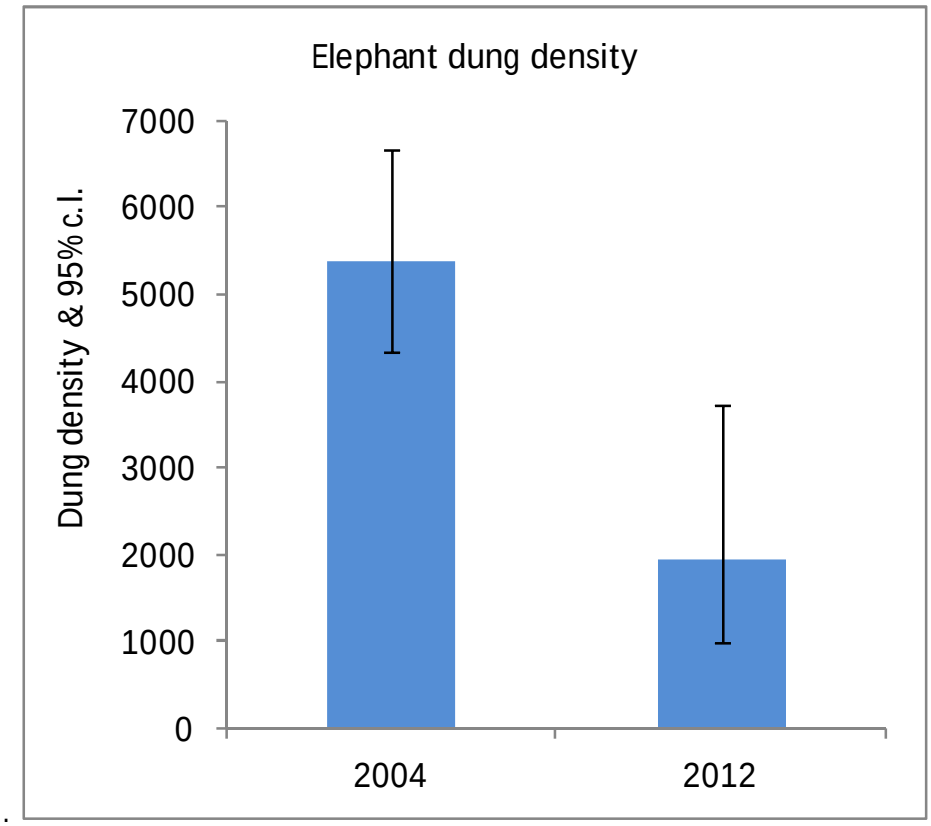


Fig.9. Density of elephant dung in the area surveyed to date, 2004-2012.

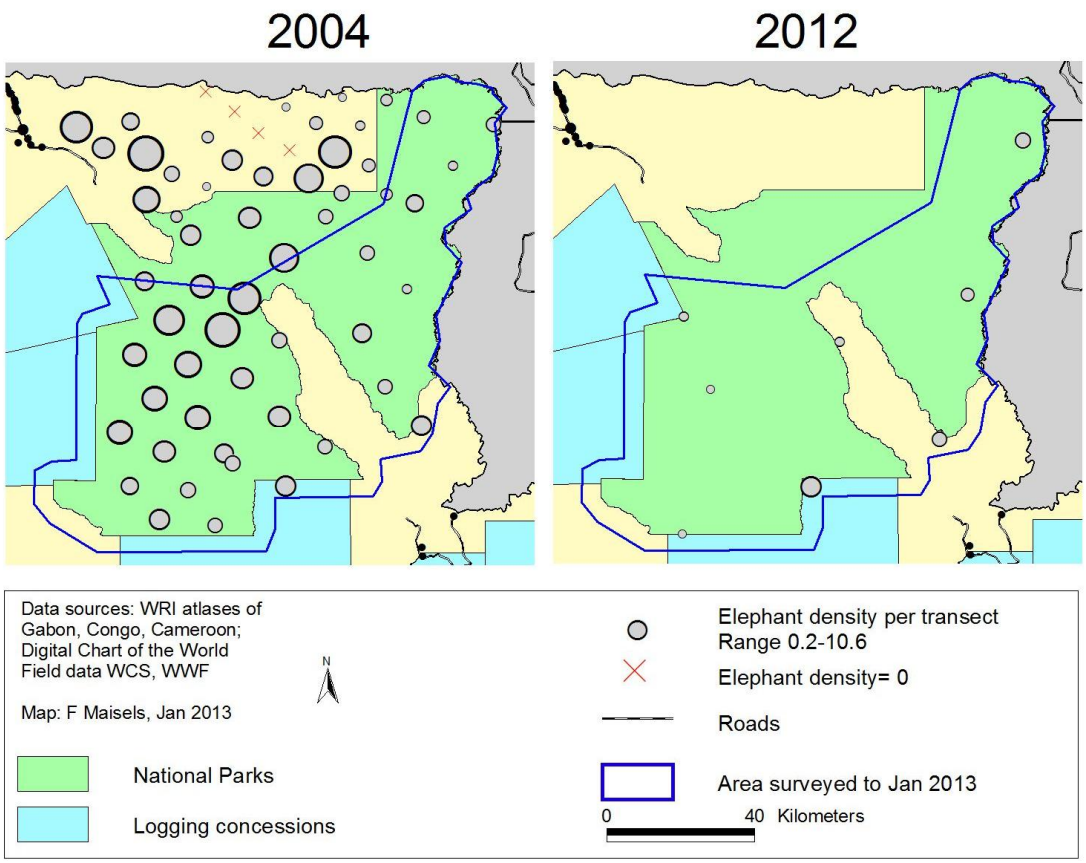


Fig. 10. Density of elephants per transect, 2004-2012.

Great apes

As expected, few ape signs were seen (eleven in total: Fig. 11), although they were not entirely absent. Four of the transects had either ape nests, feeding sign, or dung. The dung was gorilla dung and so was one of the nests; all other sign could only be attributed to "great apes". The four transects in the south of the area had no ape sign of any kind. Mean encounter rate of nests was extremely low (0.3; 95% c.l. 1.2-12.0); the highest encounter rate (of 1) was on the transect furthest north (Tr 8) so far surveyed (Fig. 12).

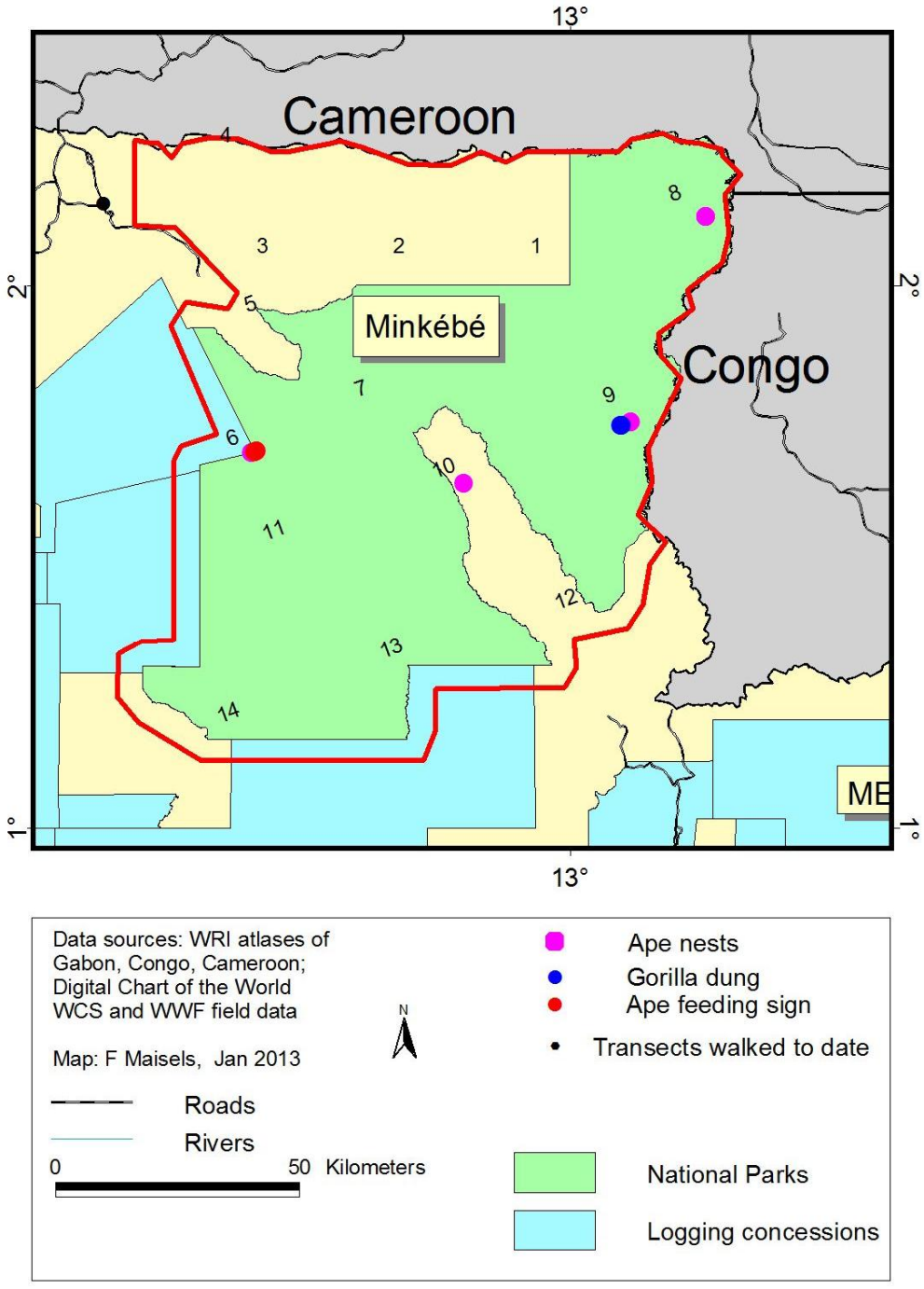


Fig.11. All great ape sign, January 2013.

Transects 1-5 and transect 7 have not yet been surveyed.

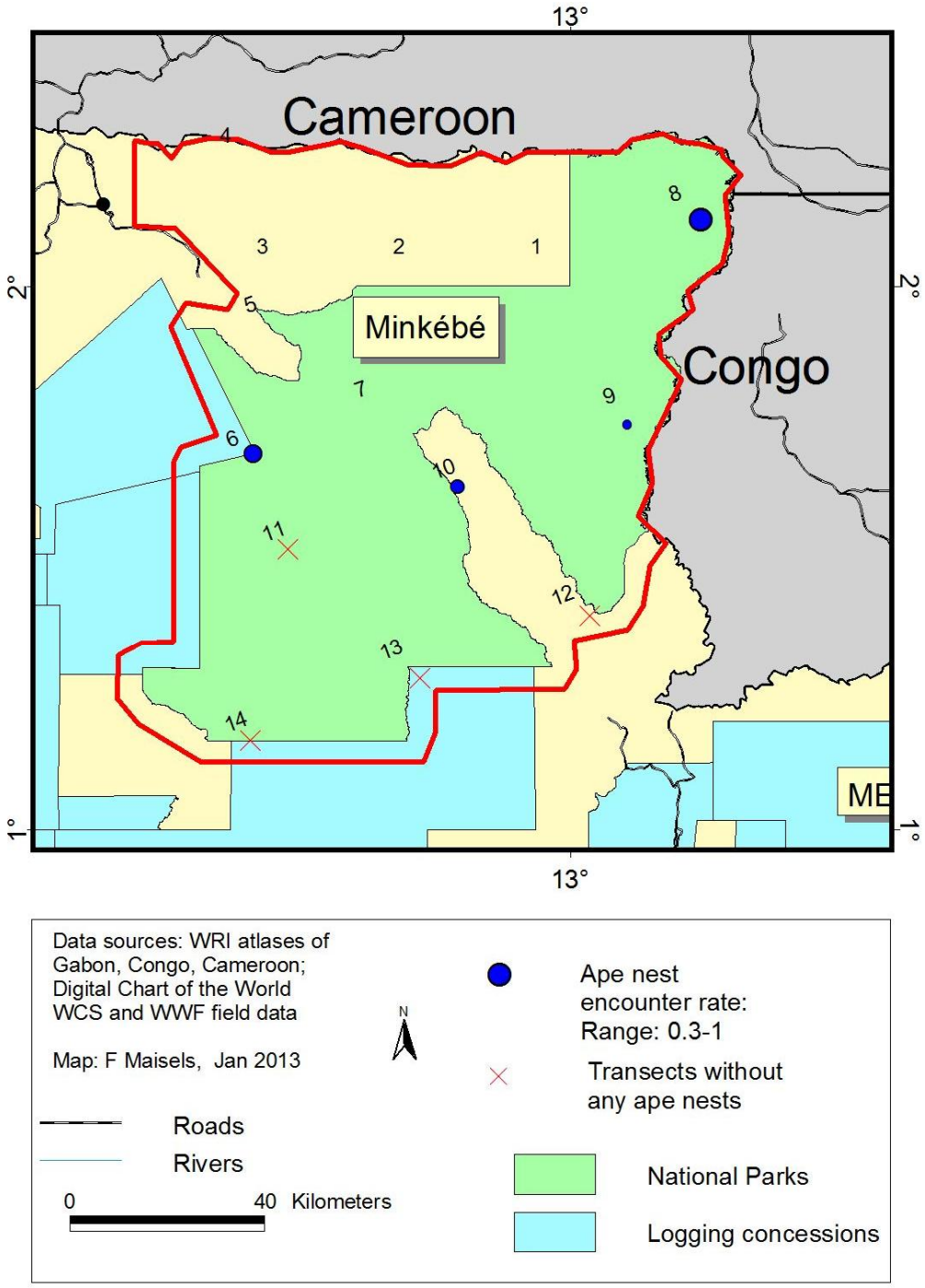


Fig.12. Encounter rates of great ape nests, January 2013.

The size of the blue circles is proportional to nest encounter rate/ km walked. Transects 1-5 and transect 7 have not yet been surveyed.

Ungulates

The ungulates recorded were medium and small sized duikers (dung) and red river hog. When we grouped all the duiker dung, encounter rate was unusually low (0.9; 95% c.l. 0-2.1) (Fig. 13) This seems to be characteristic of areas affected in the recent past by Ebola (Mwagne was the same: encounter rate inside the park post Ebola in 2004 was just 1.03) (Maisels et al. 2004) and may point to a much wider range of species being affected by this disease. By contrast, duiker dung encounter rate in Lope's old-growth forests (comparable to Minkebe) was around 4 per kilometre walked (Bezangoye & Maisels 2010). However, the low encounter rate of duiker dung in Minkebe could also be due to hunting.

Human sign

Recces are a better illustration of human sign distribution than transects, as humans follow the path of least resistance, unlike transects which can go through impenetrable swamps and thickets normally avoided by people. Nevertheless, all transects except 8, 11 and 14 had human sign on them (mostly machete cut and signs of passage), but transects 6, 10 and 13 were either not in the Park or only partially in the Park (Fig. 14). Transect 11 was the most isolated (17 km to Park limits). There was human sign along the trajectory to all transects except to Tr 12 (and this may be an error of transcription).

Machete cuts, footprints, and paths could be those made by Park guards. We recommend that guards do not use machetes to mark their passage, as this can be confused with signs made by of poachers. In many research sites in Central Africa, trails are marked using secateurs, as the signs are very different from those left by a machete.

Specific hunter sign included two camps near Transect 11, and one just inside park limits near Transect 9 (Fig. 15). Other camps were encountered as well, but all outside the Park. Two elephant gun shots (a .528) were heard in quick succession near transect 9.

Of greatest importance were the presence of seven hunting camps. Three were in the Park (two near the Western border close to transect 11) and one on the Ivindo River on the eastern Park limit near Transect 9). Three elephant carcasses were found. Two of the carcasses were near the western hunting camp and one was just outside the southern Park limit close to Transect 13 (Fig. 15).

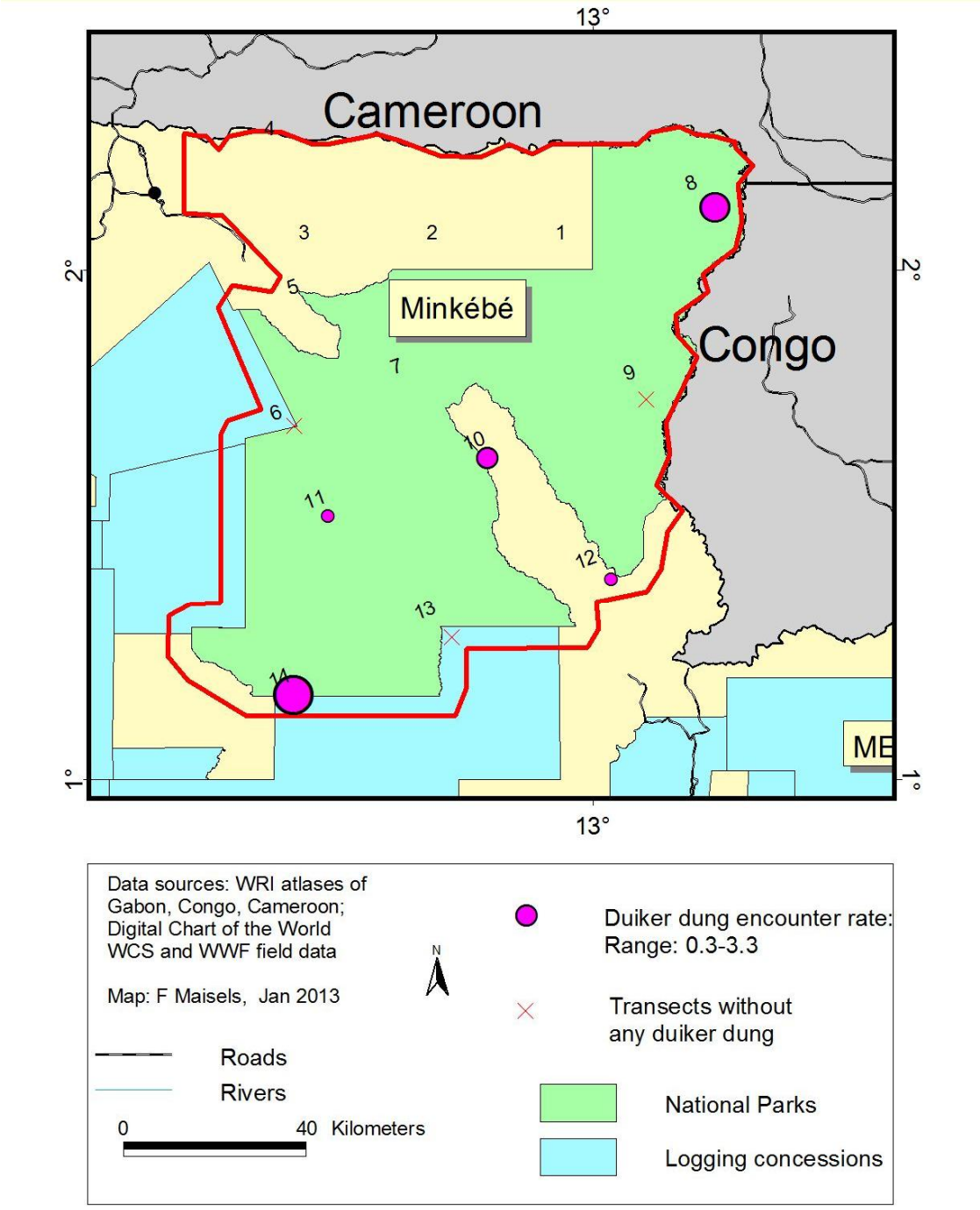


Fig.13. Encounter rates of duiker dung, January 2013.

The size of the purple circles is proportional to dung encounter rate/ km walked. Transects 1-5 and transect 7 have not yet been surveyed.

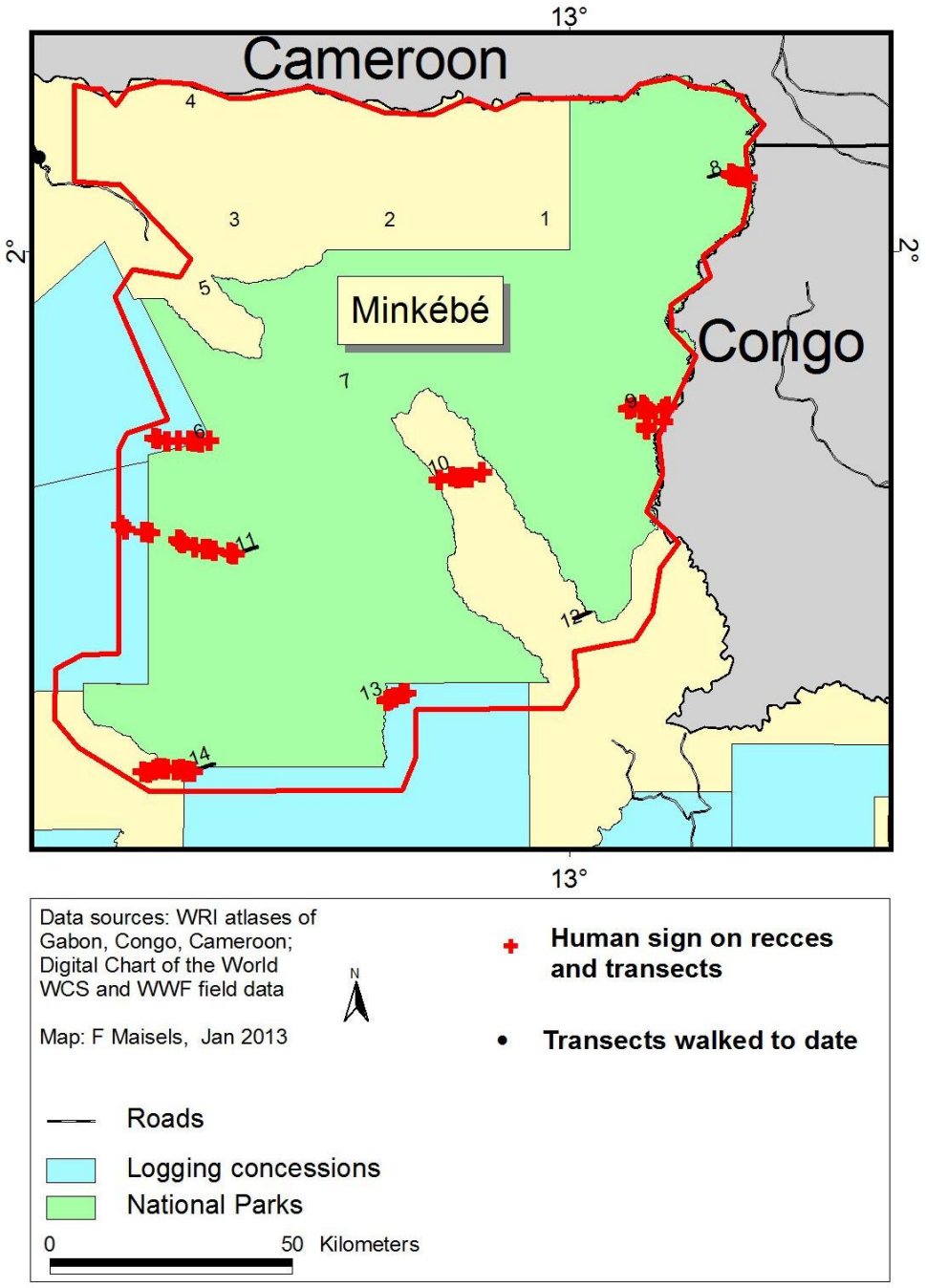


Fig.14. Locations of all human sign, January 2013.

Transects 1-5 and transect 7 have not yet been surveyed.

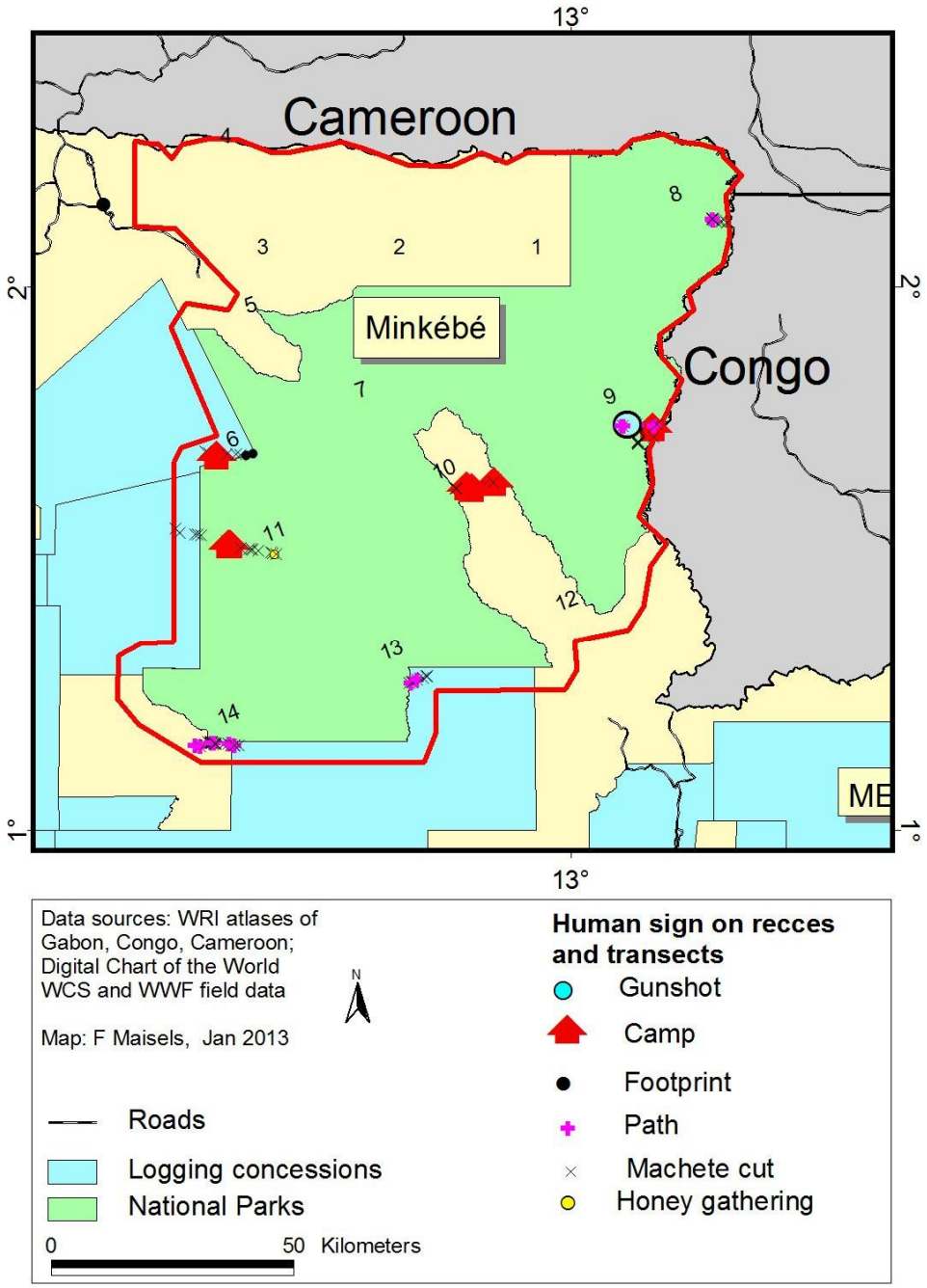


Fig.15. Locations of all human sign by type, January 2013.

Transects 1-5 and transect 7 have not yet been surveyed.

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Annex 1. Waypoints for Minkebe pilot transects, 2012

Stratum	Transect	WPT	Debut /fin	UTM33-X	UTM33-Y	Lat-DD	Long-DD	Deg Lat	Min Lat	Deg Long	Min Long
Buffer Nord	1	1	debut	274685	225493.5	2.03882	12.9743	2	2.329	12	58.458
Buffer Nord	1	2	fin	271685	225493.5	2.03879	12.94734	2	2.327	12	56.840
Buffer Nord	2	3	debut	246685	225493.5	2.03848	12.72269	2	2.309	12	43.361
Buffer Nord	2	4	fin	243685	225493.5	2.03844	12.69574	2	2.306	12	41.744
Buffer Nord	3	5	debut	218685	225493.5	2.0381	12.47113	2	2.286	12	28.268
Buffer Nord	3	6	fin	215685	225493.5	2.03806	12.44418	2	2.284	12	26.651
Buffer Nord	4	7	debut	208557.2	250493.5	2.2639	12.37976	2	15.834	12	22.786
Buffer Nord	4	8	fin	211557.2	250493.5	2.26395	12.40672	2	15.837	12	24.403
Park Ouest	5	9	debut	213685.3	213335.4	1.92815	12.42638	1	55.689	12	25.583
Park Ouest	5	10	fin	216504.4	214361.5	1.93746	12.45169	1	56.248	12	27.101
Park Ouest	6	11	debut	211123.1	186862.6	1.68885	12.40371	1	41.331	12	24.223
Park Ouest	6	12	fin	213942.2	187888.7	1.69816	12.42902	1	41.890	12	25.741
Park Ouest	7	13	debut	236494.8	196097.1	1.77262	12.6315	1	46.357	12	37.890
Park Ouest	7	14	fin	239313.9	197123.2	1.78193	12.65681	1	46.916	12	39.409
Park SudEst	8	15	debut	305699	235222.7	2.12713	13.25294	2	7.628	13	15.176
Park SudEst	8	16	fin	302879.9	234196.6	2.11782	13.22761	2	7.069	13	13.657
Park SudEst	9	17	debut	290704.8	193583.2	1.75045	13.11858	1	45.027	13	7.115
Park SudEst	9	18	fin	287885.7	192557.1	1.74115	13.09326	1	44.469	13	5.596
Park SudEst	10	19	debut	255936.2	180928.5	1.63571	12.80631	1	38.143	12	48.379
Park SudEst	10	20	fin	253117.1	179902.4	1.6264	12.781	1	37.584	12	46.860
Park SudEst	11	21	debut	221167.5	168273.7	1.52096	12.49413	1	31.258	12	29.648
Park SudEst	11	22	fin	218348.5	167247.6	1.51165	12.46882	1	30.699	12	28.129
Park SudEst	12	23	debut	283017.7	154603.3	1.39793	13.04984	1	23.876	13	2.990
Park SudEst	12	24	fin	280198.6	153577.2	1.38863	13.02452	1	23.318	13	1.471
Park SudEst	13	25	debut	248249.1	141948.5	1.28324	12.73761	1	16.994	12	44.257
Park SudEst	13	26	fin	245430	140922.5	1.27395	12.71229	1	16.437	12	42.737
Park SudEst	14	27	debut	213480.4	129293.8	1.16857	12.42546	1	10.114	12	25.528
Park SudEst	14	28	fin	210661.4	128267.7	1.15927	12.40016	1	9.556	12	24.010