

Surveys from the Subri River Forest Reserve, Ghana

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Abstract: The forests in southwest Ghana are part of the West African Forest biodiversity hotspot and contain a diverse anthropoid primate community. This community is especially threatened, and for effective primate conservation in Ghana it is necessary to conduct comprehensive surveys in all forests to determine where to focus efforts. The largest forest reserve (FR) in Ghana is the Subri River FR (590 km²), and the status of primates at this reserve is not well known. In 2009 and 2010, hunters at Subri River FR claimed the presence of Endangered species, including Miss Waldron's red colobus (*Piliocolobus badius waldroni*), rolaway monkeys (*Cercopithecus diana rolaway*) and white-naped mangabeys (*Cercocebus atys lunulatus*). The objective of this paper is to report on the investigation of these claims and to assess the remaining primate populations. We conducted 29 reconnaissance (recce) walks in the southwest, north, and southeast of Subri River FR, totaling 125.6 km and 110.5 hours. We had five encounters each with spot-nosed monkeys (*Cercopithecus petaurista*) and Lowe's monkeys (*C. campbelli lowei*), and it is likely that viable populations of these species still exist; we also heard many reports of the highly cryptic olive colobus (*Procolobus verus*), and it is likely that viable populations of this species also exist. We found no sign of the Endangered primate species but saw much potential habitat for mangabeys in swampy areas of the south, and we received reports of the presence of chimpanzees (*Pan troglodytes verus*). Subri River FR deserves more conservation attention. Future surveys should be conducted in the north-central area, and camera traps should be utilized in potential mangabey habitat. There also is an opportunity to develop ecotourism given the reserve's proximity to Takoradi, which already has ecotourism options.

Key words: Subri River Forest, *Cercopithecus*, chimpanzees, mangabeys, primate surveys

Résumé: Les forêts du sud-ouest de la Ghana font parties du hotspot des forêts de l'Afrique de l'Ouest et abritent une communauté diverse de singe anthropoïde. Ces forêts sont particulièrement en danger et afin d'entreprendre des actions de protections des primates avec succès, il est nécessaire de poursuivre des sondages dans toutes ces forêts afin de déterminer où concentrer les efforts. Le statut des primates dans la plus grande réserve forestière du Ghana, la réserve forestière de la rivière Subri, est mal connu. En 2009 et 2010, des chasseurs soutiennent avoir vu des colobes rouge de Miss Waldron (*Piliocolobus badius waldroni*), des cercopithèques de Rolaway (*Cercopithecus diana rolaway*) et des mangabeys couronnés (*Cercocebus atys lunulatus*) dans la réserve forestière de la rivière Subri. Le but de cet article est de présenter les résultats d'investigations faites à ces sujets ainsi que d'évaluer la population de primates restante. Nous avons conduits 29 marches de reconnaissance (recce) dans les Sud-ouest, Nord et Sud-est de la réserve forestière de la rivière de Subri pour un total de 125.6 kms et 110.5 heures. Nous avons compté 5 rencontres avec des Hocheurs au blanc-nez (*Cercopithecus petaurista*) et des Mones de Campbell (*C. campbelli lowei*) et il se peut donc que des populations viables existent. Nous avons aussi entendus des rapports sur les très cryptiques Colobes vert (*Procolobus verus*) et il se peut donc aussi que des populations viables existent pour cette espèce. Nous n'avons trouvé aucune trace d'espèces en danger mais nous avons trouvé beaucoup d'habitat très propice aux mangabeys dans les zones marécageuses du Sud ainsi que des rapports de la présence de chimpanzés (*Pan troglodytes verus*). La réserve forestière de Subri mérite donc plus d'actions de conservation. L'utilisation de pièges photographiques dans les zones d'habitat potentielles de mangabeys ainsi que de futures enquêtes dans la zone Nord-Centre devraient être conduites. Il est important de souligner la possibilité de développer l'écotourisme dans cette région sachant que la réserve est proche de Takoradi ou des actions d'écotourisme sont déjà présentes.

Mots clé: Forêt de la rivière Subri, *Cercopithecus*, chimpanzés, mangabeys, recensement des primates

INTRODUCTION

The forests of southwest Ghana are part of the West African Forests biodiversity hotspot containing high species richness and large numbers of endemic species (Myers *et al.*, 2000). For example, the anthropoid primate community contains eight species (or sub-species) of monkeys and apes (Oates, 2006), three of which are unique to Ghana and eastern Côte d'Ivoire, including Miss Waldron's red colobus (*Piliocolobus badius waldroni*), rolaway monkeys (*Cercopithecus diana rolaway*), and white-naped mangabeys (*Cercocebus atys lunulatus*).

The forests of Ghana are now reduced to less than 20% of their original size and are threatened by encroaching agriculture, mining activities, logging and illegal hunting (Gatti, 2010). The anthropoid primates are especially threatened and recent surveys have demonstrated that Miss Waldron's red colobus is now likely extinct in Ghana, while rolaway monkeys, white-naped mangabeys and chimpanzees (*Pan troglodytes verus*) are Endangered (Gatti, 2010; IUCN, 2010). The black and white colobus (*Colobus vellerosus*) is listed as Vulnerable, but its conservation status needs to be revised to Endangered (Bi *et al.*, 2010). The primates that are most commonly observed, namely the lesser spot-nosed monkeys (*Cercopithecus petaurista petaurista*), Lowe's monkeys (*C. campbelli lowei*) and olive colobus (*Procolobus verus*) are cryptic and often utilize dense secondary forest habitat. They are thus better adapted to high human hunting pressure than the Endangered primates in Ghana. For effective primate conservation in Ghana, it is necessary that comprehensive surveys be conducted in all of the forests to determine where to focus efforts and resources, especially considering the continued population growth (Ghana Statistical Service, 2011) and increasing threats from surrounding communities.

The largest forest reserve (FR) in Ghana is the Subri River FR (590 km²); however, the status of primates at this reserve is not well known. Four lines of evidence suggest the varied presence of different monkey species: (1) Surveys carried out by the Ghana Wildlife Division in 2001 yielded an encounter rate with spot-nosed monkeys of 0.01 per hour; (2) Dowsett-Lemaire & Dowsett (2009) reported hearing Lowe's monkeys at their camp at the southeast edge of the reserve during bird surveys; (3) Dowsett-Lemaire & Dowsett (2009) interviewed a hunter who claimed that red colobus, rolaway monkeys, mangabeys, and olive colobus were present, and that chimpanzees were last seen in 2007; and (4) A hunter interviewed in the same area in 2010 claimed that mangabeys and black and white colobus were present (K. Silenga, pers. comm.). Hunter information is often unreliable, so the West African Primate Conservation Action NGO (WAPCA) organized surveys to assess the

remaining primate populations at the Subri River FR. This paper summarizes the findings of those surveys.

METHODS

Study area

The Subri River FR was gazetted in 1950 and is under the management of the Takoradi Forest District. Approximately 60 km² in the southwestern part of the reserve have been listed as a Globally Significant Biodiversity Area (GSBA) by the Forest Department (Figure 1). The topography is generally undulating with altitudes typically between 60–125 m, but in the northern, southeastern and central parts of the reserve there are steep-sided hills that reach 300 m. The reserve forms part of the watershed between the Bonsa and Pra Rivers and is traversed by tributaries of each, resulting in extensive areas of swampy vegetation which make access difficult even in the dry season. The vegetation is moist and wet evergreen forest. Some areas of the reserve were subjected to salvage felling between 1966 and 1976, followed by selective logging since 1978. Approximately 124 km² in the southeast of the reserve have been converted to plantation (primarily *Gmelina arborea*), and there is evidence of illegal gold mining (Birdlife International, 2011).

Surveys

Because of the brevity of survey time (February 10 – March 8, 2011) and the size of Subri River FR, it was decided to use a reconnaissance (recce) walk method instead of a line-transect method (White & Edwards, 2000). We conducted 29 different recce walks in the southwest, north, southeast and GSBA of Subri River FR, totalling 125.6 km and lasting 110.5 hours (Figure 1). We also conducted a one km recce walk in Bonsa River FR that started approximately 5 km west of Benso village at N5° 09.35 ' W1° 56.14 ' and lasted 4 hours.

We conducted recce walks together or with one or two local guides along hunter trails, following the path of least resistance through the forest when off trail, and on infrequently used logging roads (Figure 1). Recces generally started in the morning from 05:15–08:30, but also from 16:30–18:00, and were walked at a speed of 1–2 km per hour; on five days we conducted more than one recce walk. We recorded any visual or audible signs of primates and other mammals, as well as large birds. These signs included footprints, resting sites, dung pellets, and evidence of feeding, such as fruit scraps. During the walks, we also noted the degree of logging disturbance and visually estimated the most abundant tree species in the under-story (5–20 m), the main canopy (20–40 m), and in the emergent level (>40 m). We noted signs of human activity and visited hunter camps to interview hunters and note animal off-take.

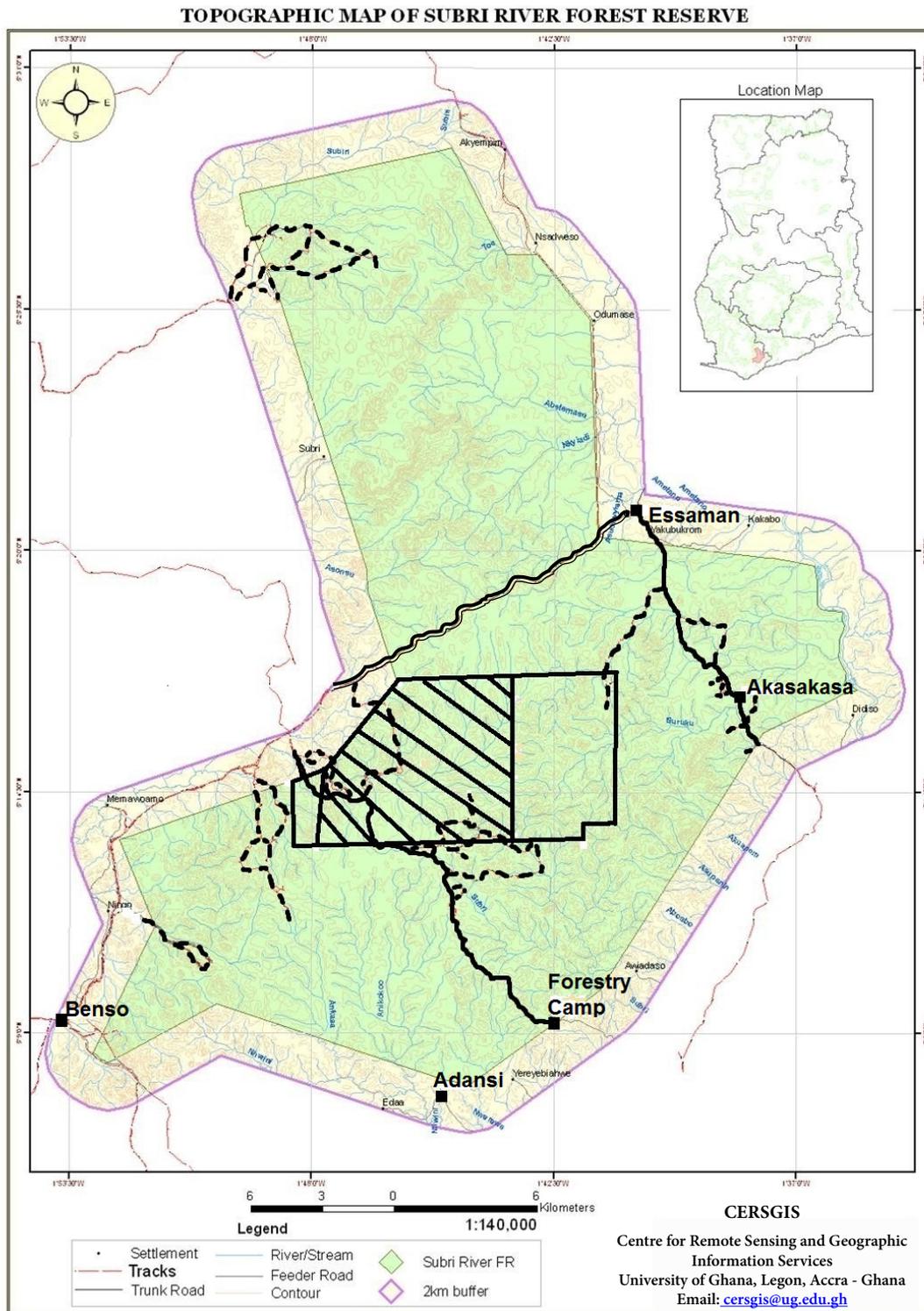


Figure 1. Map of Subri River Forest Reserve and a 2 km buffer zone showing the locations of GSBA (striped area), old GSBA (clear area in heavy black border), recce walks along minor roads (black line), recce walks along forest trails (dashed lines) and the major road through the center of the reserve (double line).

RESULTS

Forest structure

The forest was least disturbed by logging in the southwest of Subri River FR and in the GSBA, especially in hilly and swampy areas. In other areas there was much more secondary forest. The tree species and fruiting species most commonly seen during recce walks are listed in Table 1.

Sign of primates, other mammals and humans

We noted the presence of primates, other mammals and humans during recce walks. These observations are combined for all Subri River FR in Tables 2 & 3, and presented by individual recce walk in Table 4. The results are discussed below for each of the different regions covered by the surveys.

The Southwest. From February 10-14 and on February 24, we conducted five recce walks on different routes, totaling 28.5 km in 31.1 hours, in the southwest of Subri River FR, as well as one recce in the Bonga River FR approximately 5 km west of the village Benso, where we noted the presence of animals and humans (Table 4). Evidence for monkey feeding included: (1) fruit scraps from *Parkia bicolor* and other species, (2) chewed leaves, (3) sign of root digging that was attributed to Lowe's monkeys by local guides, and (4) broken giant snail shells that were attributed to mangabeys by local guides at Bonga River FR. Some of the *P. bicolor* scraps were found in areas without *P. bicolor* trees, suggesting cheek pouch use. We also recorded various hunter claims for primate presence (Table 4).

The North. From February 15-17, we walked three recces on different routes, totaling 22.3 km over 18.5 hours, and noted the sign of primates, other mammals and humans (Table 4). We did not observe or hear any monkeys but did find five areas with fruit scraps from potential monkey feeding, including much *P. bicolor*.

We recorded hunter claims for primate presence (Table 4). At one of the hunter camps there were fresh and smoked remains of at least 12 giant rats, two pangolins (*Uromanis tetradactyla*), one tree hyrax (*Dendrohyrax dorsalis*), one brush-tailed porcupine (*Atherurus africanus*), and four giant snails.

The Southeast. From February 19-21, we walked seven recces on different routes, totaling 17.5 km over 15.6 hours, including a 1 km walk in *Gmelina arborea* plantation starting at Forestry Camp (Figure 1), where we noted the presence of animals and humans (Table 4). We also heard two spot-

nosed monkey calls and found three areas of monkey fruit scraps, including *P. bicolor*, near Essaman, as well as one Lowe's monkey long call from the camp near Akasakasa (Figure 1).

We recorded hunter claims for primate presence (Table 4) and interviewed Mr. Amakye, an officer at Subri Industrial Plantation Limited (SIPL). Mr. Amakye reported seeing two chimpanzees in February 2010 near the north boundary of the plantations; one of the chimpanzees was reported to have been killed by a hunter a month later. There was much evidence of illegal logging, and several cases are pending in court with the Forest Services Division (K. Adu-Bonnah, pers., comm.).

The GSBA. From February 25 - March 7, we conducted 14 recce walks over different routes, totaling 57.3 km and lasting 45.3 hours, where we noted the presence of animals and humans (Table 4). We did not observe or hear any primates during recce walks, but heard two Lowe's monkey long calls from the southeast camp (N5° 13.25' W1° 45.27') in the direction of the GSBA. In addition to the gunshots heard during recce walks, we also heard 17 gunshots from the southeast camp and the northwest camp (N5° 15.5' W1° 48.33').

We recorded hunter claims for primate presence, including those from a hunter with 30 years of hunting experience (Table 4). Multiple hunters described a large chimpanzee that had entered a hunting camp and attacked a dog; this chimpanzee was reportedly killed in 2010, and all hunters claimed that the chimpanzees have moved south to the village of Adansi (Figure 1). At a hunter camp we found a total of 14 giant rats, a Maxwell's duiker, a brush-tailed porcupine, and a tortoise over two successive days. At the other camp we found five giant rats, a Maxwell's and a bay duiker, a brush-tailed porcupine, two Nile monitors, a tortoise, and a giant snail, over two successive days.

Birds

We observed many bird species at Subri River FR that had not been recorded in previous surveys (IRNR, 2005; Dowsett-Lemaire & Dowsett, 2009; Birdlife International, 2011; Table 5).

DISCUSSION

Subri River FR still has forest in good condition in many areas and deserves more conservation attention. The varied topography at Subri River FR results in a variety of hilltop and swampy habitats and limits human access to many areas,

Table 1 - Tree species that were commonly seen during recce walks at Subri River FR. (F) indicates fruiting species at the time of surveys.

EMERGENTS	MAIN CANOPY	UNDER-STORY
<i>Piptadeniastrum africanum</i>	<i>Uapaca spp.</i>	<i>Carapa procera</i>
<i>Ceiba pentandra</i>	<i>Dacryodes klaineana (F)</i>	<i>Myrianthus spp.</i>
<i>Parinari excelsa (F)</i>	<i>Strombosia glaucescens</i>	<i>Picralima nitida</i>
<i>Parkia bicolor (F)</i>	<i>Protomegabaria stapfiana</i> (common around swamps and wet areas)	<i>Microdesmis puberula</i>
<i>Chrysophyllum subnudum (F)</i>	<i>Hallea spp.</i> (common around swamps and wet areas)	<i>Cola chlamydantha (F)</i>
<i>Khaya spp.</i>	<i>Pentadesma butyracea</i>	<i>Diospyros kamerunensis</i>
<i>Dialium aubrevillei</i>	<i>Afrostryrax lepidophyllus</i>	<i>Rattan spp.</i>
<i>Heritiera utilis</i>	<i>Irvingia gabonensis</i>	
<i>Guarea cedrata</i>	<i>Mammea africana</i>	
<i>Entandrophragma angolense</i>		

Table 2 - Encounters with animals (sighted/heard) and other animal sign from recces totaling 110.5 hours and 125.6 km's at Subri River FR.

Animals/Animal sign (number of encounters)	Encounters/hour
Spot-nosed monkeys <i>Cercopithecus petaurista</i> (5)	0.05
Lowe's monkeys <i>C. campbelli lowei</i> (5)	0.05
Potential primate feeding sign (17)	0.15
Giant squirrel <i>Protoxerus stangeri</i> (10)	0.09
Other squirrel (20)	0.18
Maxwell's duiker <i>Cephalophus maxwellii</i> (1)	0.01
Maxwell's duiker spoor (7)	0.06
Bushbuck <i>Tragelaphus scriptus</i> /large duiker spoor (6)	0.05
Bongo <i>Tragelaphus euryceros</i> tracks (4)	0.04
Forest buffalo <i>Syncerus caffer nanus</i> tracks (1)	0.01
Red river pig <i>Potamochoerus porcus</i> diggings (9)	0.08
Cusimanse <i>Crossarchus obscurus</i> (2)	0.02
Cusimanse feeding sign (1)	0.01
African civet <i>Civettictus civetta</i> tracks (2)	0.02

Table 3 - Encounters with humans and human sign from recce walks totaling 110.5 hours and 125.6 km's at Subri River FR.

Number of times humans or human sign were encountered	Encounters/hour
Shotgun shells (73)	0.66
Gunshots (17)	0.15
Snares (101)	0.91
Hunters/collectors (25)	0.23
Old/current Hunting camps (7)	0.06
Burns for giant rats <i>Cricetomys emini</i> (1)	0.01

Table 4 - The encounters with animals and humans on recces in the southwest, north, southeast and Globally Significant Biodiversity Area (GSBA) of Subri FR, as well as the Bonsa River FR. For each location we also recorded hunter claims regarding primate presence. The category bushbuck includes large duikers and the category duiker includes Maxwell's duiker and other similar sized duikers.

Date	Location	Duration	Animals (type of encounter)	Human Sign (#)	Hunter Claims
2/10/2011	SW	4 km; 3.5 hrs	monkey (2 food scraps), Giant squirrel (sight) squirrel (heard), bushbuck (tracks), duiker (spoor)	Shotgun shell (5), snare (2); gold mine (2)	Campbell's, spot-nosed, roloway monkeys; olive and black/white colobus
2/11/2011	SW	4.5 km; 5.5 hrs	Spot-nosed monkey (sight, 2 heard)	Gold mine (1)	
2/12/2011	Bonsa	1 km; 4 hrs	Mangabey (food scraps); Giant squirrel (2 heard); bushbuck (sight)	---	Campbell's and spot-nosed monkeys; magnabeys
2/13/2011	SW	6.5 km; 7 hrs	Giant squirrel (heard); squirrel (sight, heard); duiker (spoor)	Shotgun shell (9); hunter (3)	
2/14/2011	SW	7 km; 7.5 hrs	Campbell's monkey (5 heard); squirrel (sight); bushbuck (tracks)	Gunshot (2); snare (1); hunter (3); camp (1)	
2/24/2011	SW	6.5 km; 7.6 hrs	Monkey (5 food scraps); Bushbuck (2 tracks) duiker (2 spoor); squirrel (sight)	Burn (1); camp(1)	
2/15/2011	N	3 km; 2.5 hrs	Monkey (food scraps); Giant squirrel (heard); African civet (tracks)	Shotgun shell (5); snare (3); hunter (2)	Campbell's, spot-nosed, roloway monkeys; olive and black/white colobus; mangabeys
2/16/2011	N	12.2 km; 10.5 hrs	Monkey (3 areas of food scraps); duiker (tracks); bongo (tracks); red river pig (3 areas of digging)	Shotgun shell (7); snare (23); camp(1); hunter (2)	
2/17/2011	N	7.1 km; 5.5 hrs	Monkey (food scraps); red river pig (2 areas of digging)	Snare (13); hunter (2)	
2/19/2011	SE	4 km; 4.8 hrs	Monkey (3 areas of food scraps) Spot-nosed monkey (sight, heard); Giant squirrel (heard); bongo (tracks); duiker (tracks)	Shotgun shell (2); snare (2) camp(1); gunshot(1)	Campbell's and Spot-nosed monkeys; olive and black/white colobus; chimpanzees
2/20/2011	SE	9 km; 7.3 hrs	Spot (sight) Giant squirrel (2 heard); squirrel (3 heard) duiker (tracks)	Shotgun shell (2); snare(13)	
2/21/2011	SE	4.5 km; 3.5 hrs	Squirrel (sight, 3 heard); bushbuck (spoor); cusimanse (sight); African civet (tracks)	Shotgun shell (3); snare(4); hunter(1)	
2/25/2011	GSBA	2.5 km; 1.8 hrs	Squirrel (sight, heard)	Shotgun shell (2); hunter(2); gold mine (2)	Campbell's and spot-nosed monkeys; olive colobus; mangabeys; chimpanzees
2/26/2011	GSBA	6.5 km; 5 hrs	Squirrel (2 heard)	Gunshot (4)	
2/27/2011	GSBA	6.5 km; 5.1 hrs	Monkey (food scraps)	Shotgun shell(3); snare(1); gold mine (3)	
2/28/2011	GSBA	5.5 km; 4.4 hrs	Monkey (food scraps); squirrel (heard); buffalo (tracks)	Shotgun shell(3); snare(1) gunshot(4); camp(1); hunter (2)	
3/2/2011	GSBA	8.7 km; 6.4 hrs	Squirrel (heard); cusimanse (sight, spoor)	Shotgun shell (7); snare(21)	
3/3/2011	GSBA	4.5 km; 3.2 hrs	Giant squirrel (heard); squirrel (heard); duiker (tracks)	Shotgun shell (5); snare(4); hunter(3)	
3/4/2011	GSBA	7 km; 5.2 hrs	Red river pig (digging) bongo (tracks)	Shotgun shell (6) snare(9)	
3/5/2011	GSBA	8.1 km; 6.4 hrs	Giant squirrel (2 heard); squirrel (heard); duiker (heard)	Gunshot(2); hunter(2)	
3/6/2011	GSBA	5 km; 5.4 hrs	Squirrel (2 heard) red river pig (digging) bongo (tracks)	Shotgun shell (13); snare(4); gunshot(4); camp(1)	
3/7/2011	GSBA	3 km; 2.4 hrs	Red river pig (2 areas of digging)	Shotgun shell(1)	

even in the dry season. This topography conserves a variety of habitats, and the more limited access contributes positively to wildlife conservation in the area. We did not observe any Endangered primate species; however, we heard extensive, detailed evidence of chimpanzees from timber company officers, as well as hunters. White-naped mangabeys were frequently mentioned in hunter interviews, and the swamp forests provide much potential mangabey habitat. In Ghana, mangabeys are most common close to swamp forests, which provide a refuge from danger (Booth, 1979; Kingdon, 1997). We observed spot-nosed and Lowe's monkeys (N=10) and heard many reports of olive colobus; it is very likely this highly cryptic species still exists here (J. Oates, pers. comm.). We also found signs of other threatened mammals such as bongos and forest buffalo. Buffalo tracks also were seen on recent transects in the north of Subri River FR by A.J.A. Parker.

The quality of the Subri River FR is reflected in the diversity of birds and butterflies (IRNR, 2005; this study). Of particular interest were the crowned eagles (*Stephanoaetus coronatus*), heard in both the southwest and the north. Crowned eagles feed heavily on primates and other large mammals (Schultz, 2002), and the presence of top-level predators like crowned eagles are indicators of a healthy ecosystem. It also was encouraging to observe many large birds such as cuckoos, francolins and hornbills, including the black and white casqued hornbill (*Bycanistes subcylindricus*), which is considered Critically Endangered in Ghana (Dowsett-Lemaire & Dowsett, 2009).

Indications of the abundance of primates and other mammals at Subri River FR were comparable with earlier surveys from the reserve, as well as from other forests in southwest Ghana, while signs of hunting appear to have decreased (GWD, 2001; Oates, 2006). The number of shotgun shells and wire snares encountered per hour at Subri River FR decreased from 2.33 in 2001 (GWD, 2001) to 1.57 during our study, and this encounter rate was much lower than the rates of encounter at Suhuma and Krokosua forests (Oates, 2006; P. Buzzard, unpub. data). The decrease in hunting may be for several reasons. First, there may be less hunting now simply because there are fewer animals to hunt. In addition, there may be less hunting because villagers are more focused on illegal logging and mining. Finally, the major trap-lines and/or shooting areas were not surveyed, so many snares and shotgun shells were missed. None of these possibilities is particularly encouraging, especially since illegal logging and mining also are highly damaging to the environment. Steps are being taken by FSD to curb illegal mining/logging and hopefully this will continue.

Many hunters claim that they focus their hunting efforts on the GSBA. The southern GSBA boundary facilitated

hunting and was known as "the game line," so it is clear that the GSBA concept does not work at Subri River FR, as has been found for previous GSBA's (Oates, 2006). In the future, it may be useful to post signs that clarify hunting/firearm regulations together with stiffer enforcement of these regulations. It also may be possible to allow seasonal snaring, but to actively prosecute those hunting with guns. Placing a value on the wildlife in addition to bush-meat also is essential. One potential way to accomplish this is through ecotourism, and there is substantial ecotourism potential for at least the southern areas of Subri River FR, especially with the influx of oil money that is expected at Takoradi. Takoradi is approximately an hour away and the mining roads help greatly with logistics. One could package this ecotourism with ecotourism already present on the beaches around Takoradi (e.g., Cape Three Points, Green Turtle Lodge). There already has been some limited ecotourism focused on white-crested tiger herons (*Tigriornis leucolopha*) at Essaman village, and an ecotourism proposal has been submitted by the Takoradi FSD (K. Adu-Bonnah, pers. comm.). In addition, there is potential to work with ecologically conscientious timber companies such as Samartex and JCM. Samartex promotes ecotourism at their nearby Samreboi site, while JCM has a saw-mill at Takoradi and worked with the Zoological Society of London's (ZSL) Wildlife Wood Project from 2006-2009.

As noted by Dowsett-Lemaire & Dowsett (2009), there is a major road through the centre of Subri River FR (Figure 1), and in the future conservation efforts should focus on the area south of the road. More surveys and camera trapping can be used to document the remaining chimpanzee and mangabey populations. Recces also should be conducted in the north-central area, from Subri village to Nsadweso, where a line of hills may provide good primate habitat (Figure 1). It also would likely be productive to return to the nearby Bonsa River FR, where hunting pressure seemed low and there was much potential primate (especially, mangabey) habitat. The proximity of these two reserves would facilitate logistics, and a survey team, for example, could set camera traps in the GSBA of Subri River FR and then survey nearby Bonsa River FR.

CONCLUSIONS

1) Spot-nosed and Lowe's monkeys were observed in the south of Subri River FR, and it is likely that there are still viable populations of spot-nosed and Lowe's monkeys, as well as olive colobus.

2) We did not observe mangabeys, but there is much potential habitat of swamp forest in the old GSBA, and we found possible mangabey feeding signs in Bonsa River FR.

3) We heard detailed and credible reports of chimpanzees from 2010 in the southeast of Subri River FR from multiple hunters and a timber company officer.

4) We found no sign of Miss Waldron's red colobus, black and white colobus, or roloway monkeys.

5) Subri FR is an important forest for other mammals such as bongos, and for birds such as crowned hawk eagles.

6) Given the wildlife encountered in our short surveys and the amount of potential habitat, there is much potential for primates and other wildlife at Subri River FR; but to fully evaluate this potential, more surveys are necessary in the whole reserve, and especially in the north-central and southern regions.

7) Because of the limited scope of the surveys in this study, there is significant probability that the results may not fully and accurately reflect the presence and abundance of primates and other wildlife within the Subri River FR. More systematic studies are required to validate these observations.

8) The ecotourism potential of Subri River FR should be investigated, especially given the proximity to Takoradi and the ease of access.

9) The importance of Bonsa River FR should be further investigated.

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