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Report on the Chimpanzee and Large Mammal survey in the Kpayan Gross Concession Area of investigation of Golden Veroleum, Liberia

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SUMMARY

On assignment by Golden Veroleum (Liberia), Inc. (GVL) from the 5th of December 2013 to the 7th of January 2014, the Wild Chimpanzee Foundation (WCF) led a chimpanzee and large mammal survey in the Kpayan district Gross Concession area (**for reference on terminology related to area refer to Appendix 1**). Using IUCN standards for transect surveys of great apes; a sampling design was created to cover the whole of the EPA permit area. Data was collected along 54 linear transects of 1 km for chimpanzees, large mammals and anthropogenic pressure. From the data collected, we could estimate a total population of 48 chimpanzees in the 15,000 hectares area of field investigation, of which an estimated 14 chimpanzees can be found in the 8,000 hectare RSPO permit area. This compares to an estimated population of 7,008 chimpanzees in Liberia in a total area of 10,697,049 hectares (Tweh et al., in press) and 1,517 in the three protected areas of Liberia in a total area of 534,194 hectares (Tweh et al., in press). Estimations for the nursery area and other proposed first stage development areas are not possible due to the low number of data. Other IUCN high-risk animals' signs of presence observed in the field study area were the red colobus, Jentink's duiker, and also the pygmy hippopotamus based on a single footprint in GVL's proposed riparian protection zone. The southeast area of the GVL EPA permit area is high in biodiversity, as is the north-eastern area of the KP 8K RSPO permit area, and can be identified as High Conservation Value (HCV) for chimpanzees and other IUCN high-risk mammals, protected species of Liberia as well as certain CITES species. All such criteria, along with forest cover, needs to be taken into account for HCV assessment following the draft national interpretation of the guidelines for Liberia, and RSPO standards. WCF proposes these areas to be delimited as 'no-go' areas by GVL for development areas. The current developed concession areas, which includes the nursery and a small planting area, overlaps with chimpanzee distribution and we therefore advise to remove any plants and restore the area. However, results show that no neither signs of chimpanzees were found in the current 3 targeted areas for development, nor any IUCN high-risk mammals. Therefore, the 3 target zones for development do not cause any problems with regards to HCV. Other development guidelines are discussed in more detail in the text.

We advise following RSPO standards and the Forest Conservation Policy to not convert any forested area (this includes high, medium and low density forest) for development by GVL. Lastly, it is recommended that GVL takes conservation action within the concession to mitigate current operations, and outside to compensate for present areas already developed in HCV areas. Emphasis should also be placed on preventing the high-rate of hunting.

ACRONYMS

EPA: Environmental Protection Agency of Liberia

FCP: Forest Conservation Policy

FFI: Fauna and Flora International:

GAR: Golden Agri-Resources

GVL: Golden Veroleum Liberia

HCV: High Conservation Value

IUCN: International Union for Conservation of Nature

RSPO: Roundtable on Sustainable Palm Oil

WCF: Wild Chimpanzee Foundation

Please refer to Appendix 2 for acronyms and terms related to land areas.

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1. Introduction

The Wild Chimpanzee Foundation (WCF) was hired by Golden Veroleum Liberia (GVL) to lead a chimpanzee and large mammal survey in their Kpayan District Gross Concession Area in Sinoe County, southeast of Liberia. The survey was conducted as a precautionary measure after two chimpanzee nests were observed near the nursery development area, during a previous Rapid Biodiversity Assessment (RBA). As a member, GVL follows RSPO (Roundtable on Sustainable Palm Oil) set Principles and Criteria (2013) which clarifies how a member company should deal with High Conservation Value (HCV) areas in and adjacent to its areas of operation as well as a Forest Conservation Policy set by the company, which further affirms the need to responsibly manage HCVs and also commits to no net deforestation. In other words, while these policies overlap on HCV, both of them require environmental responsibility and conservation from the concessionaire. A review on the HCV principles is presented below in Section 2.

The 8,000 hectare area of investigation lies just south of the WCF's priority zone of activities, the Tai-Sapo-Cestos biodiversity hotspot (Mittermeier et al., 1999) (just over 14km from the Sapo National Park), a Key Biodiversity Area (KBA) of Liberia (Kouame et al., 2012) and known to be home to West Africa's largest remaining forest bloc harbouring an important population of the endangered West African chimpanzee (*Pan troglodytes verus*) and other important endemic and/or endangered wildlife such as the West African Elephant, Jentink's and zebra duikers, red colobus, and the pygmy hippopotamus. Developing large-scale oil palm production in this region of Liberia should thus take extra measures to prevent negatively impacting this important wildlife and ecosystem.

The current data available to GVL concerning the wildlife present in and around the Kpayan area of investigation is lacking and an extensive survey was thus needed to reassess the EPA permit area for the presence of chimpanzees and other IUCN high risk species (e.g. chimpanzee, pygmy hippopotamus, etc...) as well as those protected by Liberian law (see Appendix 1 for a full list of these species). By results from the current survey High Conservation Value areas (HCV) could then be identified and be used to help develop mitigation plans and propose 'no-go' areas to protect the present wildlife; update the concessionaire's HCV management plan to take into account the impact of the activities on these wildlife populations, as well as forest cover, and develop the activities in such a way as to decrease their negative impact on faunal and floral biodiversity.

This report presents all relevant information, data and results obtained during the survey, and discusses the possible actions and recommendations needed to be taken by GVL to ensure minimum impact on the important wildlife found within and adjacent to its concession, and to promote lasting protection of the endangered West African chimpanzee and other important mammal populations of the southeast of Liberia.

To recapitulate, WCF was required to achieve the expected results as follows:

1. Survey on chimpanzees and large mammals in the 8,000 hectare gross concession area is completed
2. Spatial distribution of chimpanzees and large mammals is known in the 8,000 hectare area
3. Map of zones of HCV for chimpanzees and other Liberian protected species and IUCN high-risk mammals are identified
4. Determine whether any or all of the area under investigation is HCV 1 for any of these species, as defined by ProForest and per the Roundtable on Sustainable Palm Oil (RSPO) Principles and Criteria.
5. Target areas for development by GVL are assessed in relation to the presence or absence of chimpanzees and other Liberian protected species and IUCN high-risk mammals, as well as the presence of forest cover in accordance with RSPO standards
6. Mitigation plans and ‘no-go’ areas are recommended to minimize overall impacts of GVL agricultural activities on chimpanzees and other Liberian protected species and IUCN high-threatened mammals
7. Improved protection/conservation policies and actions (chimpanzees and other Liberian protected species and IUCN high-risk mammals) are recommended prior to and following continuation of GVL development.
8. Larger long-term conservation programs for the protection of remaining chimpanzee populations in southeast Liberia are recommended

Results and discussions are presented below in relation to the expected results. Methodology is described in detail under Expected Result 1.

2. Review on sustainable oil palm standards and purpose of survey

GAR’s Forest Conservation Policy (FCP) states that it wants “to ensure that its palm oil operations have no deforestation footprint”. Core to this is:

- no development on high carbon stock forests
- no development on high conservation value forest areas
- no development on peat lands
- free, prior and informed consent for indigenous and local communities
- Compliance with all relevant laws and National Interpretation of RSPO Principles and Criteria.”

GAR also states that all projects it invests in must also follow the FCP. GVL’s main investor is GAR and thus must approach the management of the concession following the FCP. The FCP ensures thus that the same main principles of sustainable oil palm production standards and

guidelines, namely the RSPO and Liberia's draft national standards (developed by FFI and the Proforest Initiative), are followed by Oil Palm Companies.

GVL is a voluntary member of RSPO. RSPO's principle 5 "Environmental responsibility and conservation of natural resources and biodiversity", Criterion 5.2 states that "The status of rare, threatened or endangered species and high conservation value habitats, if any, that exist in the plantation or that could be affected by plantation or mill management, shall be identified and their conservation taken into account in management plans and operations". Due to the lack of extensive data from the previous RBA, WCF was commissioned to reassess the concession for these HCVs.

A **High Conservation Value (HCV)** is a biological, ecological, social or cultural value of outstanding significance or critical importance (Brown et al. 2013). GVL specifically requested WCF to determine whether any of the areas of the concession were **HCV 1**, as defined by the ProForest and per the Roundtable on Sustainable Palm Oil (RSPO) Principles and Criteria. The latter defines this as "*Forest areas containing globally, regionally or nationally significant concentrations of biodiversity values (e.g. endemism, endangered species)*" (2013). HCV standards for Liberia, drafted by FFI and the ProForest Initiative, divide HCV 1 into various categories. HCV1.2. is defined by the presences of viable populations or rare, threatened or endangered species that belong to IUCN categories CR and EN, as well as whether they are protected by Liberian law, or found in CITES Appendix I or II.

Having found the presence of chimpanzee nests adjacent to the developed concession area within in the RSPO permit area, it was necessary for GVL to reassess the broader areas under investigation for the presence of relevant faunal HCV before continuing development.

3. Results and Discussion

3.1. Expected result 1: Survey on chimpanzees and large mammals in the 8,000 hectare Gross concession is completed

A complete survey of chimpanzees and large mammals in the GVL gross concession area was completed between the 5th of December 2013 and the 7th of January 2014. A description of the area, methods and survey effort is presented below.

3.1.1. Study area

The survey was led in the Kpayan district Gross concession of GVL, located in Sinoe County, southeast Liberia. The area, permitted to GVL by the Environmental Protection Agency (EPA) of Liberia, is of 16,483 ha, of which 8,000 hectares have been delimited by GVL for detailed investigation that may lead to Oil Palm activities (named as KP 8K RSPO permit area). The 8,000 ha area lies in a lowland rural area of Liberia, consisting of a mosaic of degraded and regenerated forest types, resulting from subsistence-level cultivation and land use practices (Greengrass, 2013). The area identified for potential production is old farmed areas to the west

and central areas, with most forest areas (medium density secondary) occurring outside the KP 8K RSPO permit area, but within the EPA permit area to the east (D. Rothschild, *pers. Comm*). Some patches of high density forest are also only found in the EPA permit area to the east.

3.1.2. Survey Methodology and Design

Following IUCN standards for transect surveys of great apes (Kühl et al., 2008), a sampling design was created to cover the whole of the EPA permit area (**Erreur! Source du renvoi introuvable.**). The sampling design uses a systematic arrangement of transects recognized as the most effective method to study the distribution of animals (Norton-Griffiths 1978; Bouché 2001). In total, 54 transects of 1 km each running from north to south were placed systematically across the area, representing a total expected effort of 54 km. By placing the transects systematically across the area, accurate estimates of abundance and spatial distribution of some species can be calculated as well as determination of the factors influencing this distribution in space and time. Due to the cryptic behaviour and low densities of chimpanzees, the survey for this particular animal relied on counts of sleeping nests to estimate chimpanzee population status within the area (Marchesi et al. 1995; Plumptre and Reynolds 1996). We therefore conducted nest counts on the line transects using distance sampling methodology (Buckland et al. 2001; Kouakou et al. 2009). For other species, both direct and indirect signs were collected following the same method. Due to time constraints, the survey does not cover the whole 16,483 ha EPA permit area, with two areas omitted from the survey (West of T2 and West of T17 and T18). Overall the survey covers 15,700 ha of the EPA permit area, named WCF surveyed area for the purpose of the study

To collect data when walking along line transects, one team was composed of six people, all experienced in such transect surveys. Among them, four walked strictly on the line transect collecting data on habitat type, the presence of chimpanzees (nests, feeding sites or vocalisations), and other large mammals. Two others walked either side of the transect line to search specifically for chimpanzee nests. In addition to searching for chimpanzee and large mammal presence signs, we also recorded any signs of anthropogenic activity (e.g. hunting) and ecological factors (habitat type).

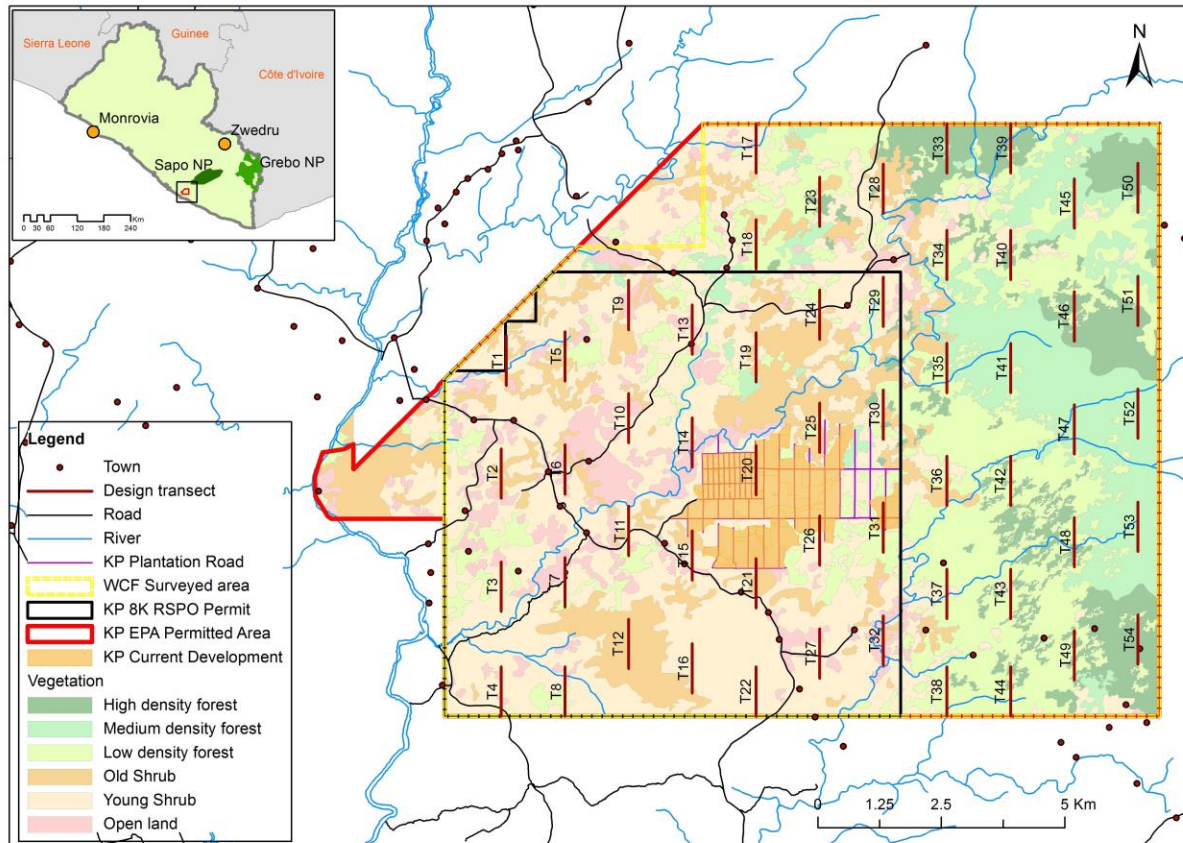


Figure 1. Survey Design for GVL Kpayan District concession

3.1.3. Survey effort and dates

In total, the teams collected data along 53.045 km of transect, representing 98% of the theoretical survey effort (54 km targeted). The study area presented some obstacles that made it difficult or impossible to cover all of the transects entirely. For this reason, it was impossible to complete 100 % of the designed transects. The survey ran from the 5th of December 2013 to the 7th of January 2014.

3.2. Expected result 2: Spatial distribution of chimpanzees and large mammals is known in the 8,000 hectare area

After the completion of the field survey, the data was used to generate spatial distribution maps of chimpanzees and large mammals. Sufficient data was also collected to estimate the chimpanzee population in the WCF surveyed area.

3.2.1. Data analysis

3.2.1.1. *Chimpanzee population status analysis*

To estimate the population size of chimpanzees in the EPA permit area, the densities of nests along transects, the mean lifetime of nests, and the nest production rate were the necessary covariates to be estimated. Given that no habituated chimpanzees (chimpanzees that are used to the presence of humans and do not change their behaviour nor are scared in the presence of humans) exist in the WCF surveyed area; and due to time constraints, for our conversions, we used the value of mean lifetime of nests (100.69 days) estimated from Sapo NP (WCF/FDA, 2010), due to its proximity. We used the nest production decay rate (1.143 nests/day) estimated from Tai National Park (Kouakou, 2009), Côte d'Ivoire. Calculations were made individually for both the KP 8K RSPO Permit area, where GVL are active and plan to develop their activities, and the WCF surveyed area.

3.2.1.2. *Spatial distribution of mammal populations and anthropogenic activities*

To estimate the spatial distribution of chimpanzees, large mammals and some anthropogenic activities in the area, we used observations assigned to each species/activity where enough data was possible. Hunting pressure was also mapped, though other anthropogenic activities were not, seeing as this is a rural area, inhabited by many communities. For all spatial distribution analysis, we used ArcGis 10. We specifically interpolated the encounter rate of the presence signs recorded for each transect with the Inverse Distance Weighted (IDW) option. Spatial distribution was mapped for the WCF surveyed area. Note that encounter rates for types of observations were also calculated using Excel for both the KP 8K RSPO permit area and the WCF surveyed area. Results for all encounter rates can be found in Appendix .

3.2.2. Chimpanzee population estimates and distribution

Among the 72 indirect observations of chimpanzees found, 66 were chimpanzee nests detected directly from the line transects across the whole survey area. This quantity of observations is sufficient to determine the population density of chimpanzees in the study area. The results from the analysis using the software Distance 6.0 are given below in Table 1. Results are provided for both the KP 8K RSPO permit area and the WCF surveyed area. We estimated 0.26 weaned chimpanzees per km² for the WCF surveyed area. Consequently, their population size was 41 weaned individuals and a total population of 48 including juveniles and infants. This average is a very high density in comparison to the estimated nationwide density of 0.047 (Tweh et al., in press). In comparison to Liberia's protected areas, this remains high, with proposed Grebo NP and Gola NP having 0.1 and 0.11 chimpanzees/km² respectively.

Note that the coefficients of variance for the population estimates are high due to the low number of nests detected along transects. For such analysis, a minimum of 60-80 nests is required. For this survey, we detected 66 which allowed for analysis but also means that the coefficients of variance are high.

Table 1. Population estimates of chimpanzees in the WCF surveyed area

Area name	Species	Abundance (N° of individuals.)	Density (Indiv./km ²)	Coefficient of variance
KP 8K RSPO permit (80 km ²)	Chimpanzees (weaned indiv.)	4	0.05	62.88%
		12	0.15	
	39	0.49		
	Chimpanzee (total indiv.)*	5	0.06	
WCF surveyed area (157 km ²)	Chimpanzees (weaned indiv.)	46	0.58	34.42%
		21	0.13	
	81	0.51		
	Chimpanzee (total indiv.)*	25	0.16	
		48	0.31	
		95	0.60	

* The total number of chimpanzees in WCF surveyed area was estimated to be 14 in the KP 8K RSPO permit area and 48 individuals for the total WCF surveyed area, considering that 17.5% of the individuals of a population are juveniles (as estimated by Plumptre and Reynolds, 1996).

The spatial distribution of chimpanzees was calculated using all observations and is presented in Figure 2. The majority of the nests (47) were observed outside the KP 8K RSPO permit area (to the east), though 19 nests were found within this area, near and around the current development area. The nest found along transect and during navigation (between camp and transect) are also shown on this map. (NB. Nests shown on map may be overlapping and therefore cannot be counted directly on the map below).

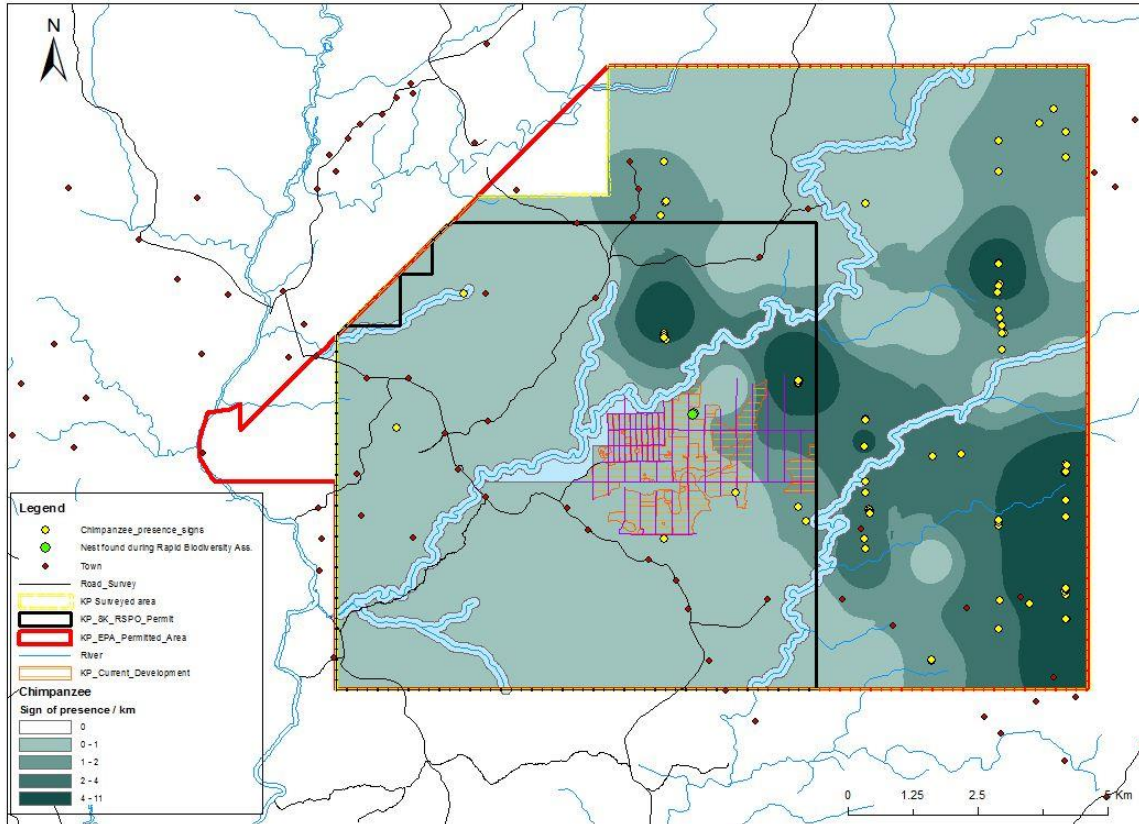


Figure 2. Spatial distribution of chimpanzees in WCF surveyed area

3.2.3. Bovid spatial distribution

Among the bovids encountered were two IUCN high risk species, the Jentink's duiker (EN) and the Zebra duiker (VU). Six of the species observed are protected by Liberian law. Spatial distribution analysis shows that bovids are found across the whole WCF surveyed area, with a higher abundance to the eastern side and far to the west (Figure 3).

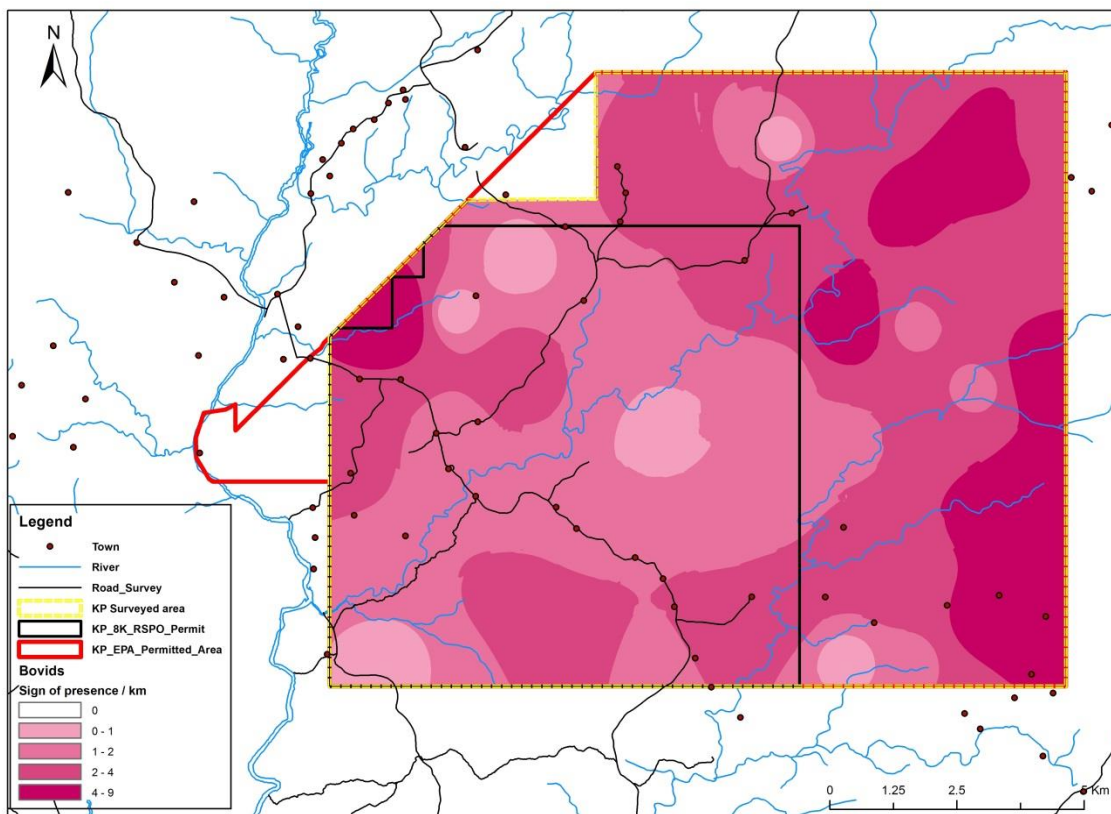


Figure 3. Spatial distribution of bovids

3.2.4. Other species

A variety of other species were encountered during the survey. Due to insufficient data, spatial distribution was not possible. The encounter rates are presented in Appendix . Note that the white-breasted fowl was observed within the KP 8K RSPO permit area, a protected bird of Liberia.

3.2.5. Anthropogenic pressure

Data was collected on all human activities during the survey. Encounter rates for all human activities are presented in Table 4 in Appendix . Hunting pressure is high, but more so outside the KP 8K RSPO permit area, with 2.09 signs per km. In comparison to nationwide data of 1.32 signs per km (Tweh et al., In press) this is relatively high hunting pressure. Spatial distribution analysis of hunting shows hunting pressure is found throughout the WCF surveyed area, with highest pressure in the northeast (Figure 4).

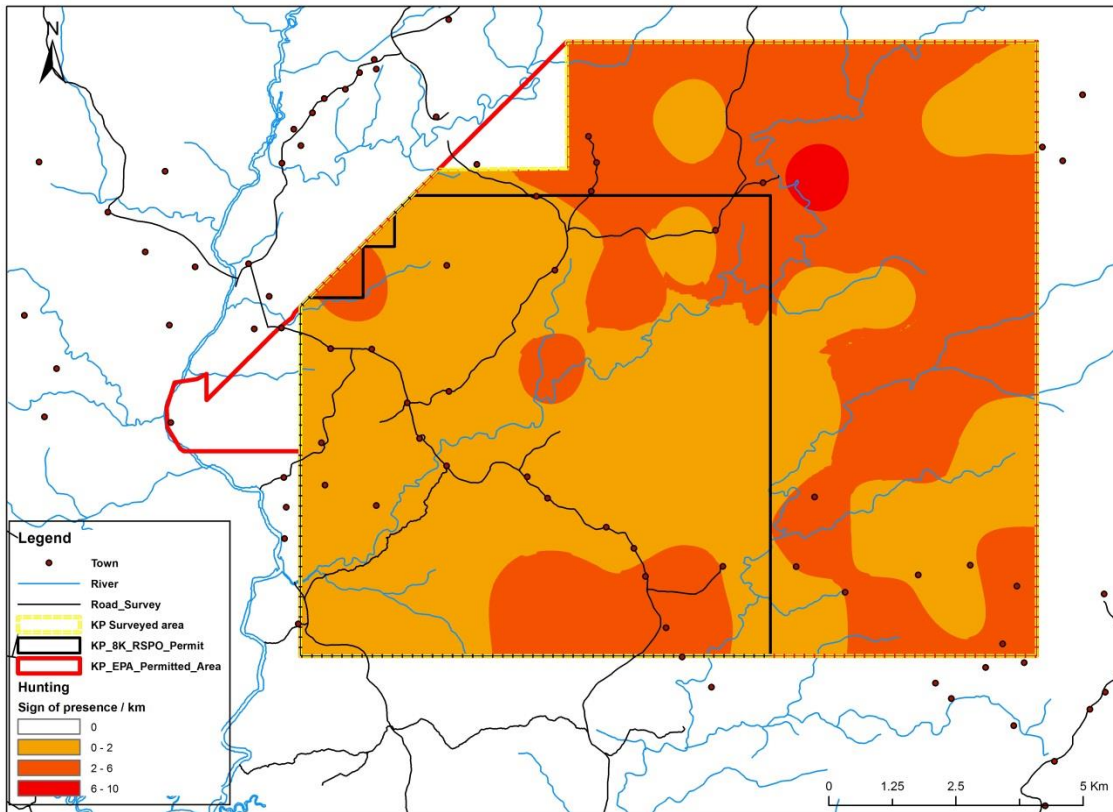


Figure 4. Spatial distribution of hunting signs

3.3. Expected result 3: Map of zones of HCV for chimpanzees and other Liberian species and IUCN high-risk mammals are identified

HCV assessment generally only takes into account IUCN high-risk species (endangered or critically endangered) but under the Liberian draft national standards, HCV assessment should also take into account protected species under Liberian law and those found on CITES Appendix 1 and 2. Encounter rates for all species are presented in Table 3 in Appendix , including those of IUCN vulnerable species. During the survey, a total of 4 IUCN endangered mammal presence signs were observed (chimpanzee, western red colobus, pygmy hippopotamus, and Jentink’s duiker). Figure 5 shows where the observations were made within the WCF surveyed area, specifically of the IUCN high-risk species, as well as the overall distribution of all species that fall under either IUCN high-risk, protected species of Liberia, and/or CITES appendix I and II. Areas indicated on the map can be described as HCV for IUCN high-risk mammals. Note that HCV for chimpanzees and the pygmy hippopotamus occurs within the 8K RSPO permit area. Another HCV area for other species is notably on the eastern side of the whole WCF surveyed area. (NB. Though only one footprint of a pygmy hippopotamus was observed, the presence sign means we need to include this data in our analysis due to its IUCN high-risk status). The results

show a similar distribution and highlight the south east of the WCF surveyed area and the northeast of the KP 8K RSPO Permit area as abundant in important wildlife to be taken into account in relation to oil palm development.

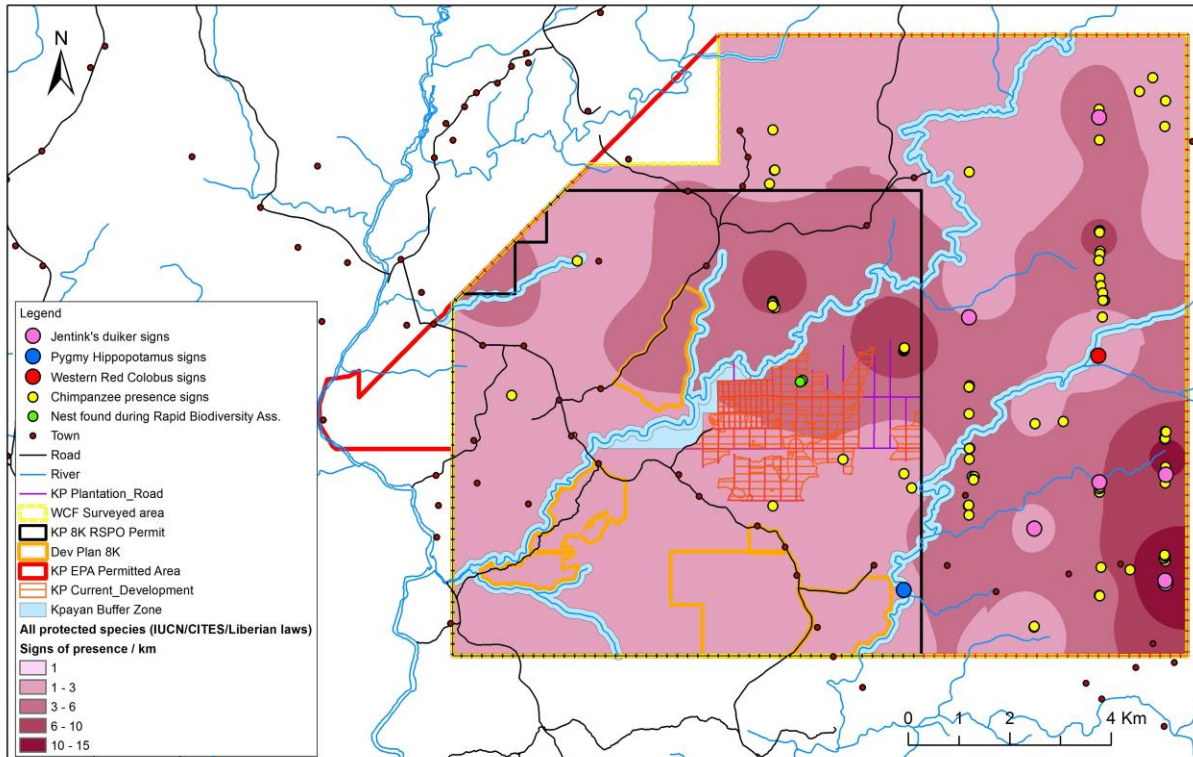


Figure 5. Spatial distribution of all IUCN High-risk, Protected and CITES Appendix I and II species

3.4. Determine whether any or all of the area under investigation is HCV1 for any of these species, as defined by ProForest and per the Roundtable on Sustainable Palm Oil (RSPO) Principles and Criteria.

In general, HCV1 assessment should consider **species diversity**, taking into account: Concentrations of biological diversity, including endemic species, and rare, threatened or endangered species, which are significant at global, regional or national levels. A complete HCV survey involves not just biological surveys, but also stakeholder consultations. This was not undertaken for the purpose of the study by the WCF, but is recommended to be done in the near future, to fully understand the local communities’ knowledge of local wildlife and their perception of it, and conservation. Nonetheless, in line with HCV guidelines, the whole WCF survey area was assessed for HCV and wildlife presence, not just the area of operations.

From the results (maps) above, the GVL concession contains HCV1.2. as defined by the presence of viable populations of rare, threatened or endangered species and that belong to IUCN categories CR and EN (FFI and ProForest, 2013). A viable population can be defined as “one

which maintains its genetic diversity; maintains its potential for evolutionary adaptation; and faces minimal risk of extinction or extirpation from demographic fluctuations, environmental variation and potential catastrophes, including over-use (Secretariat of the Convention on Biological Diversity, 1995). No CR species were located within the concession, though 4 endangered species (Jentink’s duiker, chimpanzee, red colobus and the pygmy hippopotamus) are found to be present within the WCF surveyed area. These four species are also all protected by Liberian law and found in CITES Appendix I or II.

Thus, the results clearly show that the GVL Kpayan area of investigation (EPA Permit area and RSPO Permit area) contains HCV1 for chimpanzees along with the other identified IUCN high-risk species and protected species of Liberia. It is of the utmost importance that these areas are taken into consideration for future development and management decisions.

3.5. Target areas for development by GVL are assessed in relation the presence or absence of chimpanzees and other Liberian protected species and IUCN high-risk mammals, as well as the presence of forest cover in accordance with RSPO standards

The proportions of different habitat types were calculated from the data collected (Table 2) and show that the KP 8K RSPO permit area holds 26.01% mixed closed understory forest and 29.27% young secondary forest, and which the surveyed area holds 47.47% mixed closed understory forest and 24.85% young secondary forest. This corresponds to high, medium and low density forest as defined by the SPOT analysis data provided by GVL. Under RSPO standards and the FCP, these areas should not be converted for any development by GVL.

Table 2. Proportion of different habitat types

Area	Human area	Farm or Plantation	Bush or non timber vegetation (scrubland)	Forest - Young secondary forest/ thickets	Forest – Mixed, closed understory	Forest on Wet ground	Inselberg or mountain forests	
KP_8K_RSPO_Permit (80 km ²)	0.20	9.74	32.30	29.27	26.01	1.78	0.70	Total
WCF surveyed area (157 km ²)	0.10	5.30	20.97	24.85	47.47	0.94	0.37	100.00

Additional forest cover analysis was done using the data provided by GVL in shapefile format (Figure 6) and shows that no target areas currently overlap with forest areas of high, medium or low densities. The FCP requires that no forested land should be converted for oil palm production, while Criterion 7.3 of the RSPO states that no planting should be done on any area

required to maintain or enhance HCV. From the map in Figure 6, it is clear that for the 3 targeted areas for development, no forest land or area of HCV will be converted.

Additionally, no signs of chimpanzees were found in the 3 targeted areas for development (yellow dots on the map), nor any IUCN high-risk mammals (red, purple and blue dots). Therefore, the 3 target zones for development do not cause any problems with regards to HCV (the purple dotted line represents the extent of the distribution of these key species).

Nonetheless, the results do show that a minimum of one group of chimpanzees has a territory overlapping with the GVL gross concession area, including the current developed area of the 38 hectares of planted crops.

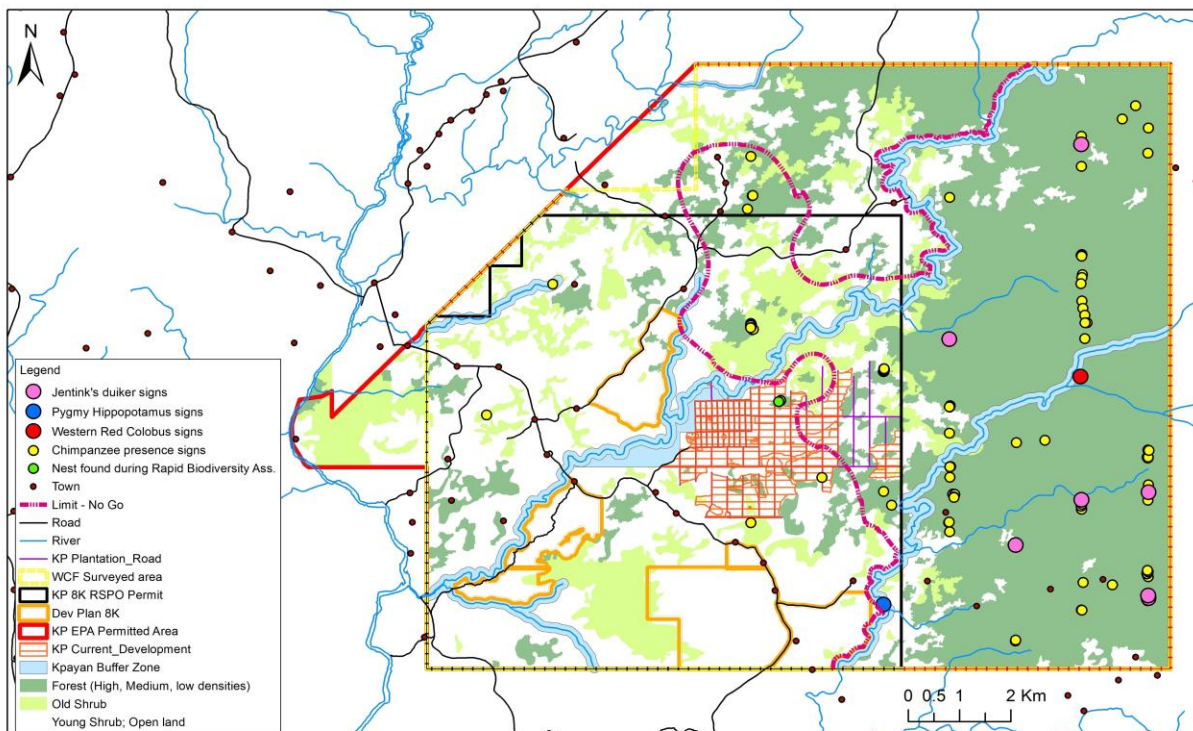


Figure 6. Forest cover and distribution of chimpanzees and other IUCN high-risk species (purple dotted line represents the extent of the distribution of these key species: chimpanzee and other IUCN high-risk species)

3.6. Expected Result 6: Mitigation plans and ‘no-go’ areas are recommended to minimize overall impacts of GVL agricultural activities on chimpanzees and other Liberian protected species, and IUCN high-threatened mammals

Erreur ! Source du renvoi introuvable. presents a first proposition on how to delimit areas as ‘no-go’ within the EPA permit area, in relation to the distribution of chimpanzees and other IUCN high-risk species (also shown in Figure 6). In Figure 7, the purple dotted line uses the spatial distribution as a basis for limiting areas as ‘no-go’, whilst taking into account areas also

noted as having other IUCN high-risk species present (red colobus, pygmy hippopotamus and Jentink's duiker), as well as forest cover. Rivers have also been used to mark natural boundaries for the 'no-go' area. The majority of this proposed area is located outside of the KP 8K RSPO permit area and covers most of the eastern edge of the EPA permit area. It does include, however, the northeastern area of the KP 8K RSPO permit area, due to the presence of chimpanzees. This area slightly overlaps with the current developed area of GVL, i.e. 38 hectares of planted crops. In order to mitigate this, GVL should move the nursery more towards the south, thereby leaving the chimpanzee distribution area free of oil palm activities, and restore the area if the canopy of any forested area within this zone has been destroyed. If only the understory has been converted for the nursery, no restoration is needed, though the area should be abandoned for continues activities. If such mitigation is impossible for various factors (e.g from an economic perspective), GVL is required to compensate for the current loss of HCV within their developed areas. Note that a chimpanzee feeding site was located on T21 (transect 21), where chimpanzees appear to have been feeding on the palm cabbage of the oil palm tree. This could indicate that other food sources in the territory are rare and natural habitat would then need to be restored to reduce encroachment by chimpanzees on plantations of GVL and also on crops of local communities within the concession.

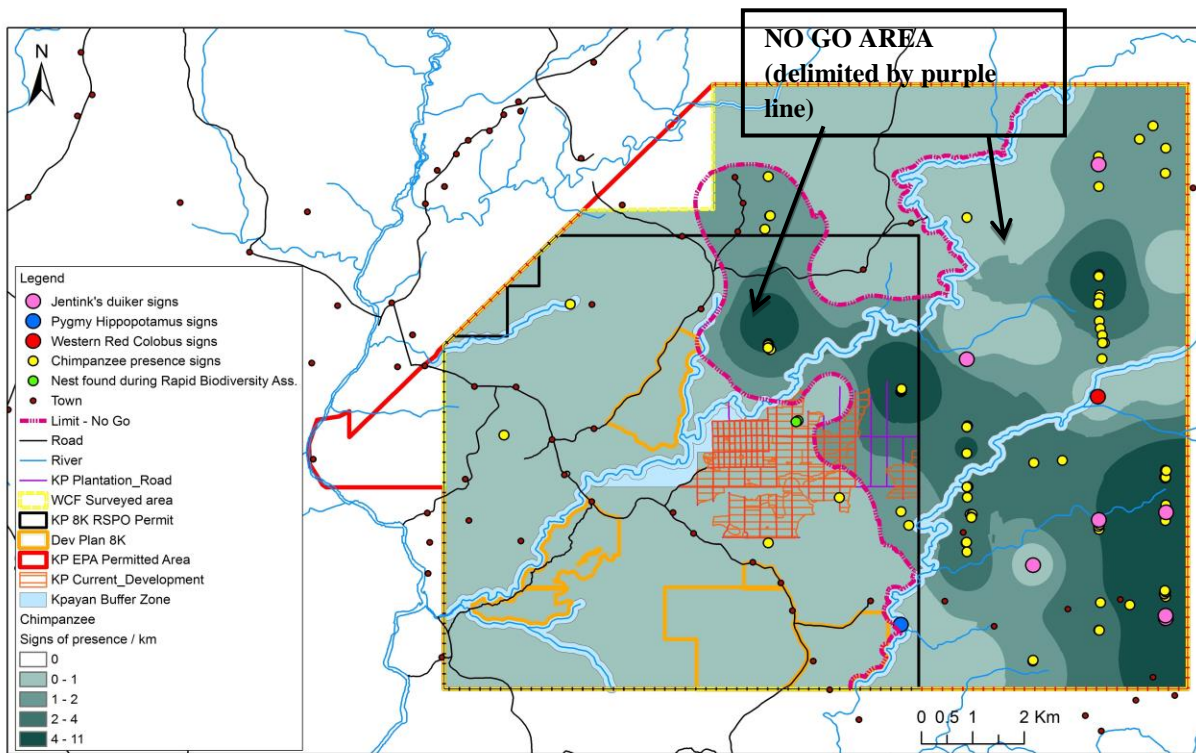


Figure 7. Proposition of areas that need to be delimited ad 'no-go' areas

3.7. Expected result 7: Improved protection/conservation policies and actions (chimpanzees and other Liberian protected species and IUCN high-risk mammals) are recommended prior to and following continuation of GVL development.

Hunting pressure is high inside the EPA permit area. Without mitigation actions, there is the risk that it may increase further with the influx of company workers. Reports made by Greengrass (2013) already highlight that hunting and trapping activities are done by some of the workforce of GVL, although further investigation into this would be needed to verify these claims. Although subsistence hunting is legal in Liberia, trapping is not, nor is any hunting of Liberia's protected species (see Appendix 1). The spatial distribution maps clearly show that hunting pressure is highest in areas of high abundance of animals and biodiversity (see Figure 4 above). RSPO standards state GVL needs to control any illegal or inappropriate hunting, fishing or collecting activities, and in response also develop responsible measures to resolve human-wildlife conflicts.

This refers to RSPO Indicator 5.2.2: *Where rare, threatened or endangered species, or HCVs, are present or are affected by plantation or mill operations, appropriate measures that are expected to maintain and/or enhance them shall be implemented through a management plan.*

For 5.2.2: *These measures will include: Ensuring that any legal requirements relating to the protection of the species or habitat are met; Avoiding damage to and deterioration of HCV habitats such as by ensuring that HCV areas are connected, corridors are conserved, and buffer zones around HCV areas are created; Controlling any illegal or inappropriate hunting, fishing or collecting activities, and developing responsible measures to resolve human-wildlife conflicts.*

As per 5.2.3: *There shall be a programme to regularly educate the workforce about the status of these RTE species, and appropriate disciplinary measures shall be instigated in accordance with company rules and national law if any individual working for the company is found to capture, harm, collect or kill these species.* Lastly, as defined in the permit agreement between GVL and EPA, GVL is required to ensure the protection of critical habitat of fauna and flora species, thereby highlighting the obligation of GVL to manage the EPA permit area accordingly.

It is possible that the population of chimpanzees close to the operations will have been negatively affected by the current operations, with some of their habitat degraded and destroyed. Feeding sites will be reduced which could ultimately lead to increased human-wildlife conflicts (HWC) with local communities and their farmlands in the area. This may be further aggravated by the foreseen influx of persons joining the workforce, who may also establish farms and other land-use activities in the zone. Management with the communities of land use within the permit area needs to be addressed to limit such potential conflicts.

A clear conservation strategy for the EPA permit area needs to be developed to include raising awareness with the communities concerning the importance of wildlife and conservation,

sustainable oil palm practices, and the issues regarding hunting/poaching in Liberia. Moreover, to reduce the levels of hunting, alternative livelihoods and micro-projects aimed at producing non-wild protein sources (raising chickens, fish, etc...), should be established with the communities that currently rely on the wildlife harvesting. Communities who own land in areas where chimpanzees are present should be seen as priority communities with which to develop such projects. Emphasis should also be placed on communities recognizing and respecting the wildlife of Liberia that is protected by law.

3.8. Expected Results 8: Larger long-term conservation programs for the protection of remaining chimpanzee populations in southeast Liberia are recommended

Beyond the scope of the specific challenges in Kpayan, (which are addressed in the points above), GVL requested WCF to give additional suggestions and ideas for a possible role that GVL might play in the longer term on a broader landscape level in SE Liberia. This point addresses that request. A recent nationwide survey across Liberia has allowed for priority conservation areas to be identified, see Figure 8 (Tweh et al., in press).

Though the proposition has not been adopted by the Government of Liberia, it will be used to guide future conservation strategies and natural resource use in the future for Liberia. The GVL area is located in one of these areas as it sits centrally between one established national park (Sapo NP) and 2 proposed protected areas (Grand Kru and River Cess). GVL should take this into account for further development of new concession areas and continue to push towards sustainable palm oil in the Kpayan District.

The results from the survey demonstrate the GVL 8000 ha NPP area in the Kpayan district overlaps with HCV1, and thus the company needs to address this fact appropriately. Moreover, the EPA permit area is also home to many local communities, some of which may develop their own oil palm fields in conjunction with GVL, or develop their land for other purposes. GVL is required to assist the former in managing their farms under RSPO standards, but is also required to ensure that areas of 'no-go' for oil palm development are also respected by local communities in relation to HCV and wildlife conservation. A list of short, medium and long-term conservation actions are provided below.

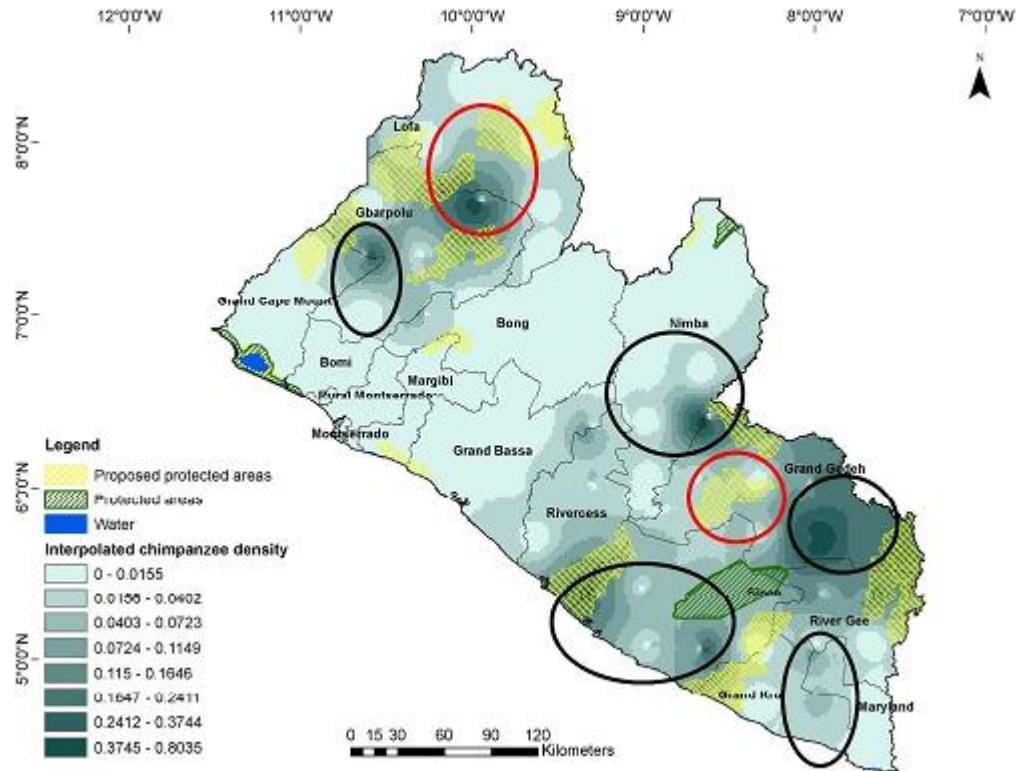


Figure 8. Proposed future priority conservation areas for chimpanzees (Tweh et al., in press)

In the short-term, we advise GVL to:

- Declare the proposed delimited areas as ‘no-go’ areas
- Favour development of oil palm production to the western area of the concession where biodiversity is lower, i.e. prevent extension of activities to the north
- Establish a clear conservation strategy within the EPA permit area with the local communities, in relation to the magnitude scope of development.
- Abandon current nursery and move the nursery area towards the south if this is possible and restore areas degraded by oil palm activities within the nursery.
- Following RSPO standards and the Forest Conservation Policy, no primary and high carbon stock forested area, nor any area defined as HCV should be converted for development.

In the mid-term (1-2 years), we advise GVL to:

- Implement projects to reduce hunting of protected species within the EPA permit area, such as:
 - a) environmental awareness programs (theatre, films, newsletters and school programs)

b) patrol guards with FDA to reduce and stop commercial hunting and trade

c) develop alternative livelihood projects with communities to reduce their consumption of bushmeat (e.g. poultry farms etc...)

- Implement an annual GVL monitoring program to monitor wildlife populations and anthropogenic pressures within the EPA Permit area
- Protect water sources in the eastern area of the concession. Chimpanzee nests were located between the two rivers and this could indicate that these rivers are important water sources for them. This could include increasing the current buffer zones around the main rivers, to be sure pesticide run-offs do not flow into the water sources and to reduce possible erosion for the nearby plantations.
- Carry out a sociological impact study to evaluate the attitudes, and perceptions of the local communities towards conservation
- Finance successful conservation actions in the southeast of Liberia, due to the high levels of biodiversity in the region, for which some will be affected by the increase in oil palm production across the region by GVL.
- Recognise that HCV1 for chimpanzees has been destroyed through GVL development activities within the 8000 ha NPP area and compensate accordingly in areas conservation priority areas in the southeast of Liberia. Further analysis on the exact location of compensation will be done using available data on chimpanzee distribution and forest cover.

In the long term,

- Demonstrate an effective sustainable and conservation conscience approach to oil palm production in Liberia.

4. Conclusion

The survey reported here has provided the establishment of extensive baseline data for GVL's Kpayan district concession for mammals and specifically chimpanzees. Emphasis is placed on the presence of IUCN high-risk species as well as Liberia's protected wildlife, and the necessity to follow HCV standards drafted for Liberia (FFI and ProForest Initiative, 2013). In compliance with the Forest Conservation Policy (FCP) and its membership of the RSPO, areas identified as High Conservation Value areas (HCV) should not be developed and suitable mitigation and management plans put in place, and thus GVL is required to take the necessary measures to minimize or compensate any negative impact the oil palm operations may have and already had on the targeted wildlife and forests.

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Appendix 1

List of protected species of Liberia

<u>Common name</u>	<i>Scientific name</i>	<u>Local name</u>
<u>Primata</u>		
Chimpanzee	<i>Pan troglodytes</i>	baboon/Gweh
Western black and white Colobus monkey	<i>Colobus polykomos</i>	lion monkey
Red colobus monkey	<i>Colobus badius</i>	red monkey
Olive colobus monkey	<i>Colobus verus</i>	verus monkey
Diana monkey	<i>Cercopithecus diana</i>	king or field monkey
<u>Sirania</u>		
Manatee	<i>Trichechus senegalensis</i>	sea cow
<u>Proboscidea</u>		
Elephant	<i>Loxodonta Africana</i>	elephant
<u>Artiodactyla</u>		
Pygmy hippopotamus	<i>Choeropsis liberiensis</i>	Water cow
Bongo	<i>Boocerus euryceros</i>	elk
Jentink's duiker	<i>Cephalophus jentiki</i>	while antelope
Yellow-backed duiker	<i>Cephalophys silvicultor</i>	antelope
Zebra duiker	<i>Cephalophus zebra</i>	marking or mountain deer
Ogilby's duiker	<i>Cephalophus ogilbyi</i>	deer
Giant forest hog	<i>Hylocherus meinertzhageni</i>	bush hog
<u>Carnivora</u>		
Leopard	<i>Panthera pardus</i>	leopard

Golden Cat	<i>Felix aurata</i>	small leopard
<u>Pholidata</u>		
Giant pangolin	<i>Manis gigantean</i>	ant bear, anteater
<u>Crocodylia</u>		
Nile crocodile	<i>Crocodylus niloticus</i>	alligator
long-snouted crocodile	<i>Crocodylus cataphractus</i>	alligator
African dwarf crocodile	<i>Osteolaemus tetraspis</i>	Crocodile
<u>Chelonia</u>		
All marine turtles		
<u>Aves</u>		
Bare-headed rock fowl	<i>Picathartes gymnocephalus</i>	

Appendix 2

The following table is based on GVL's description of terminology in the GVL Concession Agreement and RSPO procedures

Area Terminology Table	
Terminology	Description
Area of Interest	Overall regions defined in the Concession Agreement, within which GVL is interested in developing Oil Palm, and allowed to do so, subject to other conditions, by the Government. The GVL Concession Agreement ratified September 2, 2010, contains a map of the Area of Interest. According to GVL, the areas were selected based on suitability maps which excluded areas planned for other purposes, excluded contiguous landscape forest cover, protected, proposed protected and highly biodiverse areas.
Gross Concession Area	Overall area within which GVL would select final Net Concession Area, subject to other conditions, and which would also include the Outgrower Area, being an area of specifically organized smallholder or community oil palm. The Gross Concession area consists of segments defined from time-to-time. The Gross Concession Area is an interim definition stage, and much broader area than the actual final Developed Area. The WCF Survey Area of 15,700 hectares coincides with an approximately 16,483 hectare South-Eastern wing of GVL's Sinoe 33,000 hectare Gross Concession Area segment.
EPA Permit and EPA Permit Area	Area covered by permit granted Environmental Protection Authority of Liberia based on an Environmental and Social Impact Assessment (ESIA/SEIA) Report by independent registered Liberian consultant, community consultations and hearings. The EPA Permit Area coincides with or is a sub part of the Gross Concession Area. GVL may apply for EPA permits for whole or parts of the Gross Concession Area segments. The EPA Permit Area is typically a broader area than the actual final Developed Area. In Sinoe, GVL has an EPA Permit which coincides with the Sinoe 33,000 hectare Gross Concession Area segment or which the South-Eastern part coincides with the 16,483 hectares of the South-Eastern part of the Gross Concession Area.
NPP Area	Area covered by an assessment, planning and submission for public consultation under rules of the RSPO New Planting Procedures (RSPO NPP). The NPP requires an ESIA/SEIA study, an assessment of High Conservation Values by RSPO Approved Assessors, a Certification Body review, establishment of a Management Plan and submission for display and comments at RSPO. An NPP area is typically a sub-area of the Gross Concession Area and the EPA Permit Area. An NPP area is

	typically a broader area than the actual final Developed Area and may include the locations of HCV's, dense forests, community farming areas, and other such areas. In Sinoe, related to the study, GVL has an NPP Area of approximately 8,000 hectares.
Net Concession Area, FPIC Agreed Area	Net Concession Area is the remaining area covered by GVL's development plan, for which GVL has also obtained the Free Prior Informed Consent (FPIC) of the Communities holding legal or customary rights to the land. In GVL usage, Concession Area refers to the Net Concession Area as agreed through the FPIC. The Net Concession Area is formulated over time through the FPIC process and application of HCV management plans and GVL's FCP. The Net Concession Area excludes community areas, food farming area, outgrower and smallholder oil palm areas, most High Carbon Stock Areas (in accordance of GVL's Forest Conservation Policy, FCP) and other types of areas found within Gross Concession, EPA and NPP Areas. The Net Concession Area may not all be developed. In Sinoe, within the South-Eastern wing of the EPA Permit Area, GVL has currently approximately 1,200 hectares of Net Concession Area.
Developed Area	Area actually covered by land development of planted trees, roads, housing and other facilities. In the aforesaid Net Concession Area, GVL has currently ha N,NNN developed.
Planted Area	Area actually planted with production trees. In the aforesaid Developed Area GVL has currently ha N,NNN developed.
WCF Surveyed Area	Area of 15,700 ha included in the study which broadly coincided with but was slightly smaller than the above mentioned 16,000 hectare South-Eastern wing of GVL Sinoe Gross Concession Area (within which GVL has 8,000 ha NPP Area, within which 1,200 ha FPIC Agreed Area and N,NNN ha currently Developed Area and NNN ha Planted Area.

Appendix 3

Table 3. Encounter rates for mammals (Names in bold indicate IUCN high risk Species (EN=Endangered, VU=Vulnerable); *indicates protected status by Liberian law

Category of observation	Common Name	Genus	Species	Observation	N° - KP-RSPO-8K	N°- Surveyed area	Encounter rate - KP-RSPO-8K	Encounter rate - Surveyed area
CLASS: MAMMALIA								
ORDER: Artiodactyl								
FAMILY: Bovidae								
Direct observation	Bay duiker	Cephalophus	dorsalis	Direct Observation	1	1	0.04	0.02
Total Direct observation					1	1	0.04	0.02
Indirect observation	Bay duiker	Cephalophus	dorsalis	Dung	0	3	0.00	0.06
				Foot-print	7	13	0.25	0.25
	Black duiker	Cephalophus	niger	Dung	6	18	0.21	0.34
				Foot-print	13	39	0.46	0.74
	Bongo*	Tragelaphus	eurocyeros	Foot-print	0	3	0.00	0.06
	Buffalo*	Syncerus	caffer nanus	Feeding Site	1	1	0.04	0.02
				Foot-print	1	1	0.04	0.02
	Bushbuck	Tragelaphus	scriptus	Feeding Site	1	1	0.04	0.02
				Foot-print	9	10	0.32	0.19
	Jentink's duiker (EN)*	Cephalophus	jentinki	Dung	0	2	0.00	0.04
				Foot-print	0	5	0.00	0.09
	Maxwell's duiker	Cephalophus	monticola maxvelli	Dung	8	19	0.29	0.36
				Foot-print	5	16	0.18	0.30
	Ogilby's duiker*	Cephalophus	ogilbyi	Dung	0	2	0.00	0.04
Yellow-backed duiker*	Cephalophus	sylvicultor	Foot-print	0	1	0.00	0.02	
Zebra duiker (VU)*	Cephalophus	zebra	Dung	0	1	0.00	0.02	
			Foot-print	0	1	0.00	0.02	
Total Indirect observation					51	136	1.82	2.56
Total Bovidae					52	137	1.86	2.58
FAMILY: Hippopotamidae								
Indirect observation	Pygmy hippo (EN)*	Choeropsis	liberiensis	Foot-print	1	1	0.04	0.02
Total Hippopotamidae					1	1	0.04	0.02

FAMILY: Suidae								
Indirect observation	Red river hog	Potamochoerus	porcus porcus	Dung	1	1	0.04	0.02
				Feeding Site	4	14	0.14	0.26
				Foot-print	3	8	0.11	0.15
			Total Suidae	8	23	0.29	0.43	
FAMILY: Tragulidae								
Indirect observation	Water chevrotain*	Hyemoschus	aquaticus	Foot-print	1	3	0.04	0.06
			Total Tragulidae	1	3	0.04	0.06	
			Total Arctiodactyla	62	164	2.21	3.09	
ORDER: Carnivora								
FAMILY: viverridae								
Indirect observation	African civet	Civettictis	civetta	Dung	2	2	0.07	0.04
			Total Viverridae	2	2	0.07	0.04	
			Total Carnivora	2	2	0.07	0.04	
ORDER: Primata								
FAMILY: Cercopithecidae								
Indirect	Lesser spot-nosed	Cercopithecus	petaurista buettikoferi	Vocalisation	0	1	0.00	0.02
			Total Cercopithecidae	0	1	0.00	0.02	
FAMILY: Colobinae								
Direct observation	Western red colobus (EN)*	Piliocolobus	badius	Direct Observation	0	1	0.00	0.02
			Total Colobinae	0	1	0.00	0.02	
FAMILY: Pongidae								
Indirect observation	Chimpanzee (EN)*	Pan	troglodytes verus	Feeding Site	1	1	0.04	0.02
				Nest	19	66	0.68	1.24
				Vocalisation	0	5	0.00	0.09
			Total Pongidae	20	72	0.71	1.36	
			Total Primates	20	74	0.71	1.40	
			Total Mammalia	84	240	3.00	4.52	

Table 4. Encounter rates of human activities

c	Observation	Nbre - 8K	Nbre - Surveyed area	Encounter rate - 8K	Encounter rate - Surveyed area
Habitat disturbance	Clearing made by humans	1	2	0.04	0.04
	Cut down trees	45	59	1.61	1.11
	Farm	0	1	0.00	0.02
	Forest exploitation	16	16	0.57	0.30
Total Habitat disturbance		62	78	2.21	1.47
Human activity	Different tracks/paths	62	77	2.21	1.45
	Other human activity	9	12	0.32	0.23
	Path made by researchers/ecologists	3	6	0.11	0.11
	Vocalisation	15	15	0.54	0.28
Total Human activity		89	110	3.18	2.07
Hunting	Cartridges	3	7	0.11	0.13
	Gunshot	2	2	0.07	0.04
	Hunters' tracks/paths	28	80	1.00	1.51
	Traps	10	22	0.36	0.41
Total hunting		43	111	1.54	2.09
Settlement	Settlement	58	58	2.07	1.09
Total Settlement		58	58	2.07	1.09
Road	Road	13	15	0.46	0.28
Total Road		13	15	0.46	0.28
TOTAL		265	372	9.46	7.01

Table 5. Encounter rates of birds observed

Category of observation	Common Name	Genus	Species	Observation	N° - KP-RSPO-8K	N°- Surveyed area	Encounter rate - KP-RSPO-8K	Encounter rate - Surveyed area
CLASS: AVES								
ORDER: Coraciiformes								
FAMILY: Bucerotidae								
Indirect observation	Black-casqued hornbill	Ceratogymna	atrata	Feather	0	1	0.00	0.02
				Vocalisation	2	3	0.07	0.06
	Red-billed dwarf hornbill	Tockus	camurus	Vocalisation	3	10	0.11	0.19
	Yellow-casqued hornbill (VU)	Ceratogymna	elata	Vocalisation	0	1	0.00	0.02
			Total Bucerotidae	5	15	0.18	0.28	
			Total Coraciiformes	5	15	0.18	0.28	
ORDER: Cuculiformes								
FAMILY: Musophagidae								
Indirect observation	Great blue turaco	Corythaeola	cristata	Feather	1	5	0.04	0.09
				Vocalisation	10	20	0.36	0.38
			Total Musophagidae	11	25	0.39	0.47	
			Total Cuculiformes	11	25	0.39	0.47	
ORDER: Galliformes								
FAMILY: Numididae								
Direct observation	Crested guineafowl	Guttera	pucherani	Direct Observation	1	1	0.04	0.02
Indirect observation	White-breasted guineafowl (VU)*	Agelastes	meleagrides	Feather	6	6	0.21	0.11
			Total Numididae	7	7	0.25	0.13	
			Total Galliformes	7	7	0.25	0.13	
			Total Aves	23	47	0.82	0.89	

Table 6. Encounter rates of Giant African snails

Category of observation	Common Name	Genus	Species	Observation	N° - KP-RSPO-8K	N°- Surveyed area	Encounter rate - KP-RSPO-8K	Encounter rate - Surveyed area
CLASS: GASTROPODA								
ORDER: NA								
FAMILY: Achatinidae								
Direct observation	Giant African land snail (red)	Achatina	achatina	Direct Observation	1	2	0.04	0.04
				Total Achatinidae	1	2	0.04	0.04
				Total Gastropoda	1	2	0.04	0.04

Table 7. Encounter rates for reptiles observed

Category of observation	Common Name	Genus	Species	Observation	N° - KP-RSPO-8K	N°- Surveyed area	Encounter rate - KP-RSPO-8K	Encounter rate - Surveyed area
CLASS: REPTILIA								
ORDER: Squamata								
FAMILY: Elapidae								
Direct observation	Green mamba	Dendroaspis	viridis	Direct Observation	1	1	0.04	0.02
				Total Elapidae	1	1	0.04	0.02
				Total Squamata	1	1	0.04	0.02
ORDER: Testudines								
FAMILY: Testudinidae								
Direct observation	Forest hingeback tortoise	Kinixys	erosa	Direct Observation	0	1	0.00	0.02
				Total Testudinidae	0	1	0.00	0.02
				Total Testudines	0	1	0.00	0.02
				Total Reptilia	1	2	0.04	0.04