DIAGNOSTIC ASSESSMENT OF MAMMALS IN CONSERVATION AREAS OF PRESCO CONCESSION, OLOGBO, EDO STATE, NIGERIA

*Isikhuemen E. M., Oyibotie, G. O. and Aremu O. T.

Department of Forest Resources and Wildlife Management, Faculty of Agriculture, University of Benin, Benin City, Nigeria.
*Corresponding author: *ekeoba.isikhuemen@uniben.edu*; Phone: +2348033885159

ABSTRACT

A two-phase assessment of mammalian richness and diversity was conducted in the 4,600 ha Conservation Areas in Presco concession, Ologbo, Edo State, Nigeria. Using both direct and indirect techniques, 20 line/point transects (ca. 2% sampling intensity) and 24 (ca. 2.5% sampling intensity) were assessed in September, 2016 (wet season) and March, 2017 (dry season). The Bushnell binoculars was used to identify distant/fleeing animals while Nikon Laser Rangefinder (Forestry 500) was used to determine vegetation height. Assessment of floristics was largely anecdotal. Data were subjected to Shannon-Weiner and Brillouin diversity indices, and descriptive statistics. Wet season entry revealed seven families, 12 species and 118 individuals while Shannon-Weiner and Brillouin diversity indices were 2.27 and 2.10 respectively. The dry season entry revealed eight families, 14 species and 123 individuals while Shannon-Weiner and Brillouin diversity indices were 2.46 and 2.27 respectively. The Red river hog (Potamochoerus porcus) had the most abundant population in both wet and dry seasons. The 'White throated monkey (Cercopithecus erythrogaster)' was the only vulnerable species on the IUCN Red List (2019-3) recorded; however, based on National Biodiversity Approach (NBSAP), five wildlife species were endangered. Among flora, 66 tree/shrub/liane species spread across 25 families were encountered in the eco-zones. Despite the palpable drawbacks occasioned by illegal logging, poaching, unauthorized grazing/wildfires and resultant loss of species and ecosystems, the conservation areas have very rich potentials for transformation into wildlife sanctuary/rescue centre and repository for phyto-demographic and socio-cultural studies. For the CAs/buffer zones to be left undisturbed, alternative livelihood projects should be established for enclave/fringing communities and all forms of logging and poaching activities prohibited.

Keywords: Anthropogenic threats, declining ecosystems, non-timber resources, peripheral communities, species diversity, wildlife corridor,

INTRODUCTION

A greater portion of forested landscape under *de jure* government management and free or off-reserve areas under *de facto* control of communities/private concerns in the rainforest region of Edo State had overly been over-exploited and fragmented by the end of the 20th century. Presently, the freshwater and moist forest ecosystems in five out of the 16 forest reserves in the region have become seriously degraded – to the extent that only mere vestiges of secondary regrowth and farm fallows intermingled with fire-climax vegetation are evident. The critical drivers of ecosystem degradation and fragmentation in protected and free areas are diverse and largely anthropogenic: they include illegal logging, slash and burn subsistence farming practices, poaching, de-reservation, oil exploration and production activities; and very recently, invasion by cattle herders and associated wildfires (Isikhuemen, 2012; Isikhuemen and Ikponmwonba, 2020). Presently, most forest

reserves with extensive tracts of freshwater swamps and moist forest ecosystems with substantial old growth forest relics (e.g. Gilli Gilli, Obaretin, Ogba, Okomu, Ologbo, etc.) have either been fully or partly dereserved and/or ceded to oil palm companies, communities or government for purposes of agricultural intensification/expansion or development of infrastructure. The negative consequences of ceding and conversion of fragile ecosystems adorn with overly rich biodiversity to sundry land uses are legion: they range from spiraling habitat degradation, loss or accelerated genetic erosion and serial extinction of endemics as well as mono-specific/generic species with short geographic ranges (Isikhuemen, 2012). Ologbo Forest Reserve (Area: 194km^2) was constituted by Order No. 66 of September 6, 1911; amended by Order No. 52 of 1931 and converted by Order No. 26 of 1935 (Bendel State, 1976). It was renowned for its rich assemblage of biodiversity, particularly wildlife that are endemic to freshwater swamps and moist forest ecosystems in the western Niger Delta region (Isikhuemen, 2012). Ironically, at the turn of the century, a larger chunk of the protected forest estate had already been turned into patchworks of secondary regrowth and farm fallows consisting largely of class IV species – species useful only for fuelwood and charcoal production (*cf.* Redhead (1971). Several authors (e.g. Isikhuemen, 2012; Ogunjemite, 2015; Proforest, 2015) reported that logging, cattle herding and associated annual fires, slash and burn farming and poaching have negatively impacted the fragile ecosystems in Ologbo and adjacent Forest Reserves; thereby creating livelihood crisis among forest dependent enclave and fringing communities.

Ologbo Forest Reserve (OFR), together with five others, namely, Obaretin, Ogba, Ekenwan, Gele Gele and Okomu Forest Reserves, which constitute the legendary southern Benin wildlife corridor, account for over 70% of the freshwater swamp forest ecosystem in Edo State (Isikhuemen, 2012). According to Greengrass (2009), this extensive corridor, exhibiting a medley of contiguous fresh water swamps and moist forest vegetation, played critical roles in the past as migratory route and sanctuary for wildlife species, particularly primates common to the western Niger Delta. Haddad *et al.* (2003) defined a corridor as "any narrow swath of land connecting two habitat patches where the patches and corridor share a land cover dissimilar from the surrounding matrix". The importance of sprawling productive ecosystems in providing services that underpin biodiversity conservation and enhancement of community wellbeing has often been suppressed in the consciousness of many, and so fragile ecosystems are mismanaged, abused and excessively degraded (Shackleton *et al.* 2008).

Presco Plc. is a subsidiary of the SIAT Group specialised in the development of plantations (notably, Oil palm and Rubber); and processing of Palm Oil into diverse products and by-products, including specialty vegetable oil and fats. The company acquired *ca.* 13,000ha out of the total 19,400ha Ologbo Forest Reserve from Edo State Government in 2003 and 2014 respectively (Verwilghen, 2008; Proforest, 2015). Verwilghen (2005) surmised: "at the time Presco Plc. first acquired the concession, the forest reserve was already widely degraded through illegal logging, poaching and slash and burn subsistence agricultural practices by the rural communities". The concession, which extends from the core of the forest reserve to the south and south-west flanks, has much of the northern and east central flanges reserved for taungya farming activities by fringing communities and development of infrastructure through public-private partnerships. The 4600ha (*ca.*38%) Conservation Areas (CAs) – earmarked as refuge/sanctuary for the relic flora and fauna and protection for hydrological flows/river catchments – are largely located in the freshwater swamps and riparian/moist forest with Ossiomo River to the south and Ogba River on the western border.
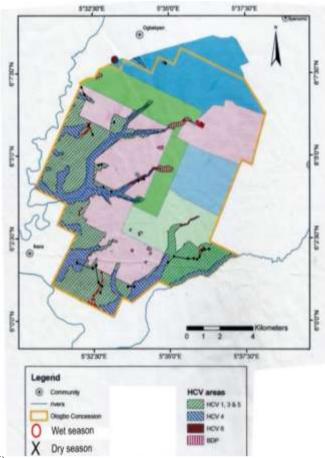
It is noteworthy that these freshwater swamps and riparian/moist forest relics that

traverse the entire south and west reaches of the concession, remain the only fairly contiguous and comparatively less disturbed portions in the entire land/waterscape (*cf.* Verwilghen, 2008; Proforest, 2015). However, these fragile and highly degraded ecosystems have often been perceived as potential allure and 'open access' resources by illegal loggers, poachers and Non Timber Forest Products (NTFPs) gatherers. With much of the CAs ecologically impaired by unregulated exploitation, and notable portions of the ecosystems damaged beyond limits of ecological resilience, Presco Plc. commissioned a baseline/impact study to ascertain the state of health of biodiversity (especially mammals) and the relic ecosystems in 2016. This paper is the outcome of a two-season diagnostic assessment of mammalian species richness and diversity in relatively intact portions of eco-zones in the CAs.

MATERIALS AND METHODS
Study Site
Presco concession is located between Lat. 06° 02´ to 06° 08´N and Long. 05° 30´ to 05° 40´E; and accounts for *ca*. 67% of the erstwhile Ologbo Forest Reserve. Situated in Ikpoba-Okha Local Government Area of Edo State, it takes approximately 40 minutes' drive to access the concession from Benin City, Edo state capital. Before being transformed into vestiges of fire-climax derived- and guinea savanna vegetation interspersed with grasses and forbs by anthropogenic drivers, e.g. slash and burn farming and related land use practices, the original biome types in the entire forest reserve were majorly three – freshwater swamps, moist, and riparian/gallery forests. The climate is characterized by two main seasons: Wet (April – October) and Dry (November – March). Rainfall pattern is bi-modal with two peaks (July and September); average annual rainfall is 2300mm, relative humidity: 83% while mean maximum and minimum temperatures are 35^0C and 23^0C respectively. The enclave is drained by two major Rivers (Ossiomo on the south and Ogba on the west) and network of streams, rivulets which originate from the inner recesses flowing southward and forming creeklets (Figure 1).

Source: Adapted from Impens (2016)

Figure 1: Map of Presco Concession showing Conservation Areas and Line/Point Transects.

Data Collection and Analysis

Secondary data were collected from Presco Plc and web-based published journals (e.g. Ogunjemite, 2005; Vermwilghen, 2005; Isikhuemen, 2012; Proforest, 2015). The CAs were summarily traversed by the study team to acquire first-hand information; familiarize with the terrain, and validate vegetation types as well as past/extant land use and tenure systems. In conformity with Proforest's (2015), five eco-zones, namely Moist/Freshwater-swamp forest (High Conservation Value 1, 3 & 5), Riparian forest (HCV 4), and (c) Biodiversity plots (BDP) (dominated by secondary regrowth/farm fallows) (d) Exploited Teak/Gmelina plantation relic, and (e) Bulldozed sites (invaded by fire climax grasses/forbs), the CAs were identified, delineated and characterized. However, following the scale of disturbance aggravated by persistent incursions by cattle herders and associated annual fires in the latter two eco-zones, the study was limited to the first three:

Moist/Freshwater swamp forest, Riparian forest and BDP (Figure 1).

Twenty (20) line/point transects located on existing and established trails with estimated distance of 8.15km (or 2% sampling intensity) were assessed during 'wet season' entry in September 2016 while a total distance of 9.0 km (i.e. 2.3% sampling intensity) was covered during "dry season" entry in March 2017 (Figure 1). Mammalian data were collected using direct and indirect survey techniques (sighting, calls, faecal droppings, nesting sites and footprints) (Jean and Pierre, 1970; Aremu et al., 2009). Line/point transects were purposively located, especially in freshwater swamps which experience seasonal and/or permanent inundation all year round. For ease of access but with minimal disturbance to wildlife territories, transects were guardedly established and allowed to rest for a few days to allow animals that might have fled or

relocated from their habitats ample time to return.

Each trail was traversed twice daily (7:00 and 17:00 hours) with an average walk speed of 1.0 km/hr. (e.g. Aremu *et al*., 2009). During the survey, a 200m dash-off was made on both sides of the main track at 500m intervals (*cf.* Buckland *et al., 2004*). Periods of traverse were intermingled with intervals of silence, watch and rest in order to increase chances of detecting animals that might have hidden or fled upon the approach of the observers (Oates 1995). The Bushnell Binoculars (10 x 40) was used to observe/identify distant or fleeing animals while Nikon Laser Rangefinder (Forestry 550) was used to measure vegetation height. Collection of data on common/abundant flora was largely visual and anecdotal; although it was accomplished through rapid assessment underscored by noticeable variations and peculiarities in floristic composition and homogeneity across eco-zones.

Mammalian species data were analysed using (i) Shannon-Weiner and (ii) Brillouin diversity indices (Gen Stat Procedure (PL20.1).
(i) Shannon wiener's Index of diversity (H′)
$$H' = -\sum_{i=1}^{s} p\text{i} \,(Inp\text{i}) \,\ldots\ldots\ldots \text{ (Eq. 1)}$$

where H' = Shannon index of diversity, $p\text{i}$ = the proportion of important value of the ^{i}th species (pi $= ni/N$), n_i is the important value index of ^{i}th species and N is the important value index of all the species).

(ii) Brillouin diversity index =

$$\frac{1}{N} \, In \, \frac{N!}{N1! \, N2! \, N3! \ldots\ldots Nx} \,\ldots\ldots\ldots \text{ (Eq. 2)}$$

where N is the total number of species, while N_1, N_2 to N_x are the abundance of the

different species counted (Spellerberg, 1991).

Classification of mammals followed the International Union for the Conservation of Nature and Natural Resources (IUCN) Red list (2019-3) and National Biodiversity Approaches (NBSAP). Identification of common/dominant flora and families followed Hutchinson and Dalziel (1963) and Keay (1989). Pressed samples of flora which could not be identified or authenticated in the field were taken to Forest Research Institute of Nigeria (FRIN) herbarium, Ibadan, Nigeria for identification and/or validation.

RESULTS
Population of Mammal Encountered During Wet Season Entry
The outcome of wet season entry revealed seven families, 12 species and 118 individuals. Species richness and diversity were low. Six species belonging to five families, namely Cephalopinae, Cercopithecidae, Hystricidae, Suidae and Thryonomydae recorded absolute abundance, i.e. they occurred in all eco-zones. While the moist/freshwater swamp forest had the largest population of mammals, BDP had least occurrence. Of the 12 species encountered during wet season entry, the Red River Hog (*Potamochoerus porcus*; Family: Suidae) recorded overall most abundant individuals with the highest occurrence (>60%) in moist/freshwater swamp forest eco-zone (Figure 2). But while the Grey duiker, *Sylivicapra grimmia* (Family: Cephalophinae) was fairly represented in all eco-zones, the Giant forest squirrel, *Protxerus stangeri* and Redless tree squirrel, *Fumisciurus anerythrus* (family: Sciuridae) recorded nil results during the initial entry in wet season. (Figure 2).
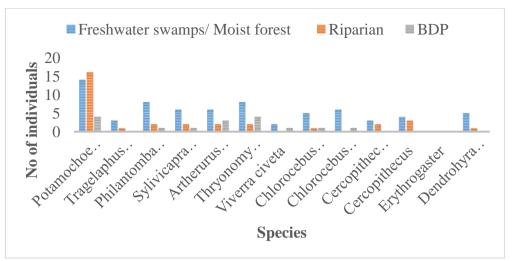
Figure 2: Distribution of Mammals in the Conservation Areas (Wet Season).

Population of Mammals Recorded During Dry Season Entry

The outcome of dry season entry revealed eight families, 14 species and 123 individuals. Species richness was highest in the moist/freshwater swamp/riparian forest, while biodiversity plot (BDP) also had least population in terms of species diversity and richness. Eight species belonging to six families, namely Cephalophinae, Hystridae, Suiridae, Scuiridae, Thryonomidae and Hystridae recorded absolute abundance. Again, the Red River hog was most abundant. However, while the Giant forest squirrel and Redless tree squirrel were recorded, only the latter was represented by very few individuals (Figure 3).

Overall Population of Mammals Recorded in Both Wet and Dry Season Entries

Generally, the investigations revealed that the moist/freshwater swamp forest had the largest population of wildlife species and concentration of individuals (Table 1). However, while the results of Shannon Weiner and Brillouin indices were generally low; there were variations in species diversity across the eco-zones. By and large, the River hog was most abundant; accounting for 20% (wet season) and 28% (dry season) of the entire mammalian population in the CAs. Although the study outcomes appeared poor, three mammals, namely, Giant squirrel, Cane rat and African civet cat recorded >10 individuals (Table 1).
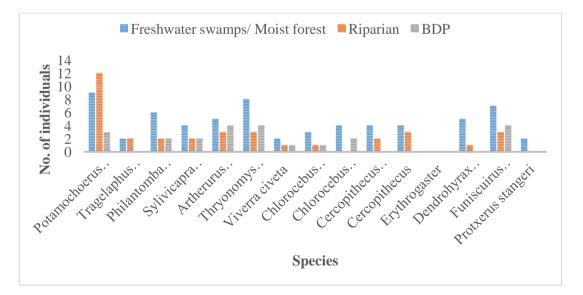

Figure 3: Distribution of Mammals in the Conservation Areas (Dry Season)

Table 1: Wildlife Species and Individuals Encountered in Eco-zones during the Two Entries

| Common name | Scientific name | Frequency | | | | | | | |
| | | Rainforest / Freshwater swamp | | Riparian | | Biodiversity (BDP) | | Total | |
		Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry
Bushbuck	*Tragelaphus Scriptus*	3	2	1	2	0	0	4	4
Grey duiker	*Sylivicapra grimmia*	6	4	2	2	1	2	9	8
Maxwell duiker	*Philantomba maxwellii*	8	6	2	2	1	2	11	10
Green monkey	*Chlorocebus sabacus*	6	4	0	0	1	2	7	6
Mona monkey	*Cercopithecus mona*	3	4	2	2	0	0	5	6
Tantalus monkey	*Chlorocebus tantalus*	5	3	1	1	1	1	7	5
White-Throated Monkey	*Cercopithecus erythrogaster*	4	4	3	3	0	0	7	7
Tree Hyrax	*Dendrohyrax dorsalis*	5	5	1	1	0	0	6	6
Brush Tail Porcupine	*Atherurus africanus*	6	5	2	3	3	4	11	12
Giant forest squirrel	*Protxerus stangeri*	0	2	0	0	0	0	0	2
Redless tree squirrel	*Fumisciurus anerythrus*	0	7	0	3	0	4	0	14
Red river hog	*Potamochoerus porcus*	14	9	16	12	4	3	34	24
Cane rat	*Thryonomys swinderianus*	8	8	2	3	4	4	3	4
African civet cat	*Viverra civeta*	2	2	0	1	1	1	3	4
Total		**70**	**65**	**32**	**35**	**16**	**23**	**118**	**123**
Shannon Weiner H index		**2.36**	**2.54**	**1.76**	**2.17**	**2.0**	**2.09**	**2.27**	**2.46**
Brillouin index		**2.10**	**2.23**	**1.43**	**1.78**	**1.55**	**1.67**	**2.10**	**2.27**
Species Richness		**12**	**14**	**10**	**12**	**9**	**9**	**12**	**14**

Wet =Wet Season; Dry=Dry Season

Classification of Mammals Based on IUCN Red list and National Biodiversity Approach

The cumulative results of the two entries revealed generally low population of mammals (Table 2). Only one species, the White-Throated Monkey classified on IUCN Red List (2019-3) as 'Vulnerable' was recorded. However, using the National Biodiversity Approach (Federal Government of Nigeria, 2010), five mammals were listed as 'endangered'; two 'threatened' and two 'rare' (Table 2).

Status of Vegetation and Common/Dominant Flora in the Eco-zones

The outcome of baseline study of vegetation revealed huge disparities in height and physiognomy across the different eco-zones. The heights of the different eco-zones ranged from 4m - 21m for freshwater swamp/moist forest; 5 - 19m for riparian forest, 3 - 8m for BDP, and 4 - 8m for relic of exploited Gmelina/Teak plantation stands. Sixty-six (66) species spread across four habits (tree, shrub, herb and liane) and distributed among 25 families were encountered in the study area. Among the taxa recorded, four, namely *Chromolaena odorantum* (herbaceous shrub)*, Calamus spp.* (lianes), *Thaumatococcus daniellii* (herb) and *Triclysia cordata* (liane), recorded absolute frequency (i.e. occurred in all eco-zones) (Table 3).

Table 2: Classification of Mammals based on IUCN Red list and National BD Approach

Common name	Scientific name	Local Name (Benin)	National Biodiversity status	IUCN Red List Classification (2019-3)
African civet cat	*Viverrac civeta*	Edi	Endangered (EN)	This taxon has not yet been assessed for the IUCN Red List, and also is not in the Catalogue of Life
Brush-tailed Porcupine	*Atherurus africanus*	Okhaen/Okhan	Threatened	Status: Least Concern; Pop. trend: unknown
Bushbuck	*Tragelaphus Scriptus*	Erue	Not classified	Status: Least Concern; Pop. trend: stable
Cane rat	*Thryonomys swinderianus*	Evuato/ Avuarto	Not classified	Status: Least Concern; Pop. trend: unknown
Forest giant Squirrel	Protxerus stangeri	Ukhor, Uhoro	Not classified	Status: Least Concern; Pop. trend: unknown
Grey duiker	*Sylivicapra Grimmia*	Uzo	Endangered	Status: Least Concern; Pop. trend: decreasing
Green monkey	*Chlorocebus sabacus*	Eme	Not classified	Status: Least Concern; Pop. trend: stable
Maxwell duiker	*Philantomba maxwellii*	Uzo	Endangered	Status: Least Concern; Pop. Trend: decreasing
Mona monkey	*Cercopithecus Mona*	Ogin	Threatened	Status: Least Concern; Pop. trend: unknown
Red river Hog	*Potamochoerus porcus*	Esi/Isi	Rare	Status: Least Concern; Pop. trend: decreasing
Tantalus monkey	*Chlorocebus tantalus*	Eme	Not classified	Status: Least Concern; Pop. trend: stable
Thomas rope Squirrel	*Funiscuirus anerythrus*	Otan	Not classified	Taxon not yet assessed for the IUCN Red List, and also is not in the Catalogue of Life
Tree hyrax	*Dendrohyrax dorsalis*	Akwaghagha	Rare	Status: Least Concern; Pop. trend: unknown
White-throated Monkey	*Cercopithecus erythrogaster*	Ekhokho	Endangered	Status: Vulnerable; Popn. trend: decreasing

Table 3: Checklist of some Common and Dominant Flora in the Conservation Areas.

Species scientific name	Species Freq.	Family	Habit	Rainforest/ Freshwater	Riparian	BDP	Plantation
Albizia spp	3	Fabaceae	T	X		X	
Allanblackia floribunda	1	Gutiferae	T	X	X	X	
Alchonea spp.	2	Euphorbiaceae	S	X	X	X	
Alstonia spp	2	Apocynaceae	T	X	X	X	
Anthoclestra spp.	2	Loganiaceae	T	X	X	X	
Anthonota sp.	1	Fabaceae	T	X	X	X	
Bambusa vulgaris	1	Poaceae	T/G	X	X	X	
Baphia nitida	1	Fabaceae	T	X		X	
Barteria spp.	2	Passifloraceae	T	X	X		
Calamus spp.	2	Arecaceae	W/L	X	X		
Cleistopholis patens	1	Annonaceae	T	X	X		
Chromolaena odorata	1	Asteraceae	S	X	X	X	X
Diospyros spp.	3	Ebenaceae	T	X	X		
Elaeis guinensis	1	Arecaceae	T	X		X	
Enantia chloranta	1	Annonaceae	T	X			
Entrandrophgrama spp	2	Miliaceae	T	X			
Ficus spp.	3	Moraceae	T	X	X	X	
Funtumia spp	2	Apocynaceae	T	X	X	X	
Gmelina arborea	1	Lamiaceae	T				X
Gossweilerodendron sp	1	Fabaceae	T	X			
Hallea leddermannii	1	Rubiaceae	T	X	X		
Lecanioduscus sp	1	Sapindaceae	T	X		X	
Lovoa trichiloides	1	Miliaceae	T	X			
Lophira alata	1	Ochnaceae	T	X	X		
Massularia acuminata	1	Rubiaceae	S	X	X		
Memecylon afzeli	1	Melastomataceae	S	X	X		
Microdesmis puberula	1	Pandaceae	S	X	X	X	
Musanga cercropoides	1	Moraceae	T	X	X	X	
Myrianthus arboreus	1	Moraceae	T	X		X	
Oxystigma spp.	2	Fabaceae	T	X	X		
Pausinystelia sp.	1	Rubiaceae	T	X			
Pentaclethra macrophylla	1	Fabaceae	T	X			
Petersianthus sp.	1	Lecythidaceae	T	X		X	
Picralima nitida	1	Apocynaceae	S	X			
Psydrax alnodiana	1	Rubiaceae	T	X		X	
Raphia hookerii	1	Arecaceae	T	X	X		
Senna alata	1	Fabaceae	S	X	X	X	
Strombosa spp.	2	Myristicaceae	T	X			
Tabernaemontana sp.	1	Apocynaceae	T	X			
Tectona grandis	1	Lamiaceae	T				X
Thaumatococcus daniellii	1	Marantaceae	H	X	X	X	X
Trema orientalis	1	Ulmaceae	T	X	X	X	
Trichilia spp.	3	Meliaceae	T	X	X	X	X
Triclysia cordata	1	Menispemaceae	W/L	X	X	X	
Rauvolfia vomitoria	1	Apocynaceae	T	X		X	
Uapaca sp.	2	Euphorbiaceae	T		X		
Vernonia spp.	2	Compositae	T	X	X	X	
	66	**25**					

T= Tree; S= Shrub; H= Herb; T/G: Treelike Grass; W/L=Woody Liane; X = Present
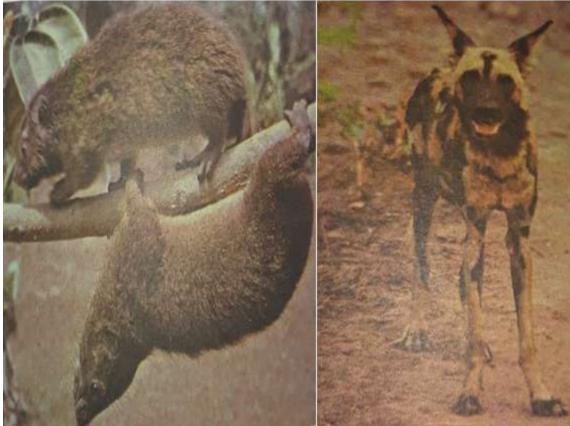
Photo © D.C.D. Happold (1973)

Figure 4: (Left) Tree hyrax, *Dendrohyrax dorsalis*; (Right) African wild/Hunting dog, *Lycaon*

pictus

Photo © A. U. Nwawe (2018)   Photo © E. M. Isikhuemen (2017)

Figure 5: Composite Shots of *Vitellaria paradoxa* (left) and *Lophira alata* (right) Saplings.

DISCUSSION

The outcomes of the two-season assessment of mammals in the conservation areas revealed generally low species richness (26) and diversity (2.46) suggesting that the entire population is impoverished and highly fragmented. Although, more mammalian individuals and species were recorded during the dry- than the wet seasons, overall results revealed rarity of mammals in the study area. According to Duran *et al.* (2006), a Shannon Weiner index ranging between 2.68 and 3.33 can be considered high; implying higher diversity of species. The relatively higher population of Red River hog in the wet season compared to dry season, and its abundance in the freshwater swamps/riparian/moist forest relative to other eco-zones, might not be unconnected with seasonal and/or permanent inundation, i.e. when the ecosystem is most suitable and where cover, habitat requirements and species ecological niche are optimal.

The paucity of mammals and other wildlife species in the CAs might have been occasioned by long term anthropogenic disturbances wrought on the fragile ecosystems, particularly by poachers and/or loggers who exploit keystone and umbrella fauna and flora species beyond elastic limits; thereby leaving the ecosystems in ruins. For example, the activities of poachers were profoundly noticeable across the entire CAs given the number of expended cartridges, and snares (including iron traps) neatly laid on trails of animals in the different eco-zones. Ijeomah *et al.* (2013) reported that "poaching is one of the critical drivers of wildlife species erosion/loss in protected areas in Nigeria. Despite the paucity of mammals in the CAs, the white throated Guenon (*Cercopithecus erythrogaster*) listed as 'vulnerable' on the IUCN Red list was enumerated. The findings in this study are in harmony with Proforest's (2015) results which reported that African brush-tailed porcupine (*Atherurus africanus*), Maxwell's Duiker (*Philantomba maxwellii)*, Tantalus Monkey (*Cercopithecus tantalus*), etc. were present in the CAs.

However, Proforest's (2015:14) claim of the presence of African wild dog/Hunting dog (*Lycaon pictus*) in the CAs – using faecal droppings as leading evidence and relying on anecdotal endorsement by the local people to confirm their results – does not only appear weird but conflicts with the findings in this, as well as earlier in studies. Besides, the author's affirmation does not only appear fanciful but in total disagreement with findings from earlier studies conducted in the Obarentin - Ologbo - Ogba - Ekewan - Gelle Gelle - Okomu wildlife corridor (*cf.* Greengrass, 2009; Isikhuemen, 2012; Ogunjemite, 2015). The African Wild dog is a large, slender, dog-like, gregarious carnivore with irregular pattern of black, brown, sandy yellow and white patches; it is adapted to the guinea-sudanno savanna ecology where they hunt in packs of up to 40; and with sustained speed, chase the prey until it is exhausted (Happold, 1973) (Figure 4).

The entire Presco concession, including the CAs, is located within the moist rainforest ecological region in southern Nigeria. In contrast to *Lycaon pictus*, the Tree hyrax (*Dendrohyrax dorsalis*) is a high forest species with long very dark hair; it has white/yellow patch on the middle of its back that surrounds the dorsal gland" (Happold, 1973). Unlike African Wild dog which is a carnivore, *D. dorsalis* is herbivorous/frugivorous; predominantly arboreal and nocturnal in habit – its activities are mostly restricted to the forest thicket, although it occasionally explores the forest floor for food, water and minerals. According to Happold, the 'call' of this largely solitary animal resembles that of a dog; this has resulted in Tree hyraxes being incorrectly called "bush dog". Arising from the foregoing, it is evident that the mammal that Proforest (2015) inadvertently identified as African wild dog in Presco concession, Ologbo was Tree hyrax which is called 'bush dog' in the local parlance of communities in the study area (*cf.* Figure 4).

The results of the baseline study on vegetation and associated flora revealed

significant decline in both forest and tree height. The noticeable rarity of important timber trees and damaged relic forest canopy architecture might have been responsible for the rise to dominance of pioneers or opportunists (e.g. *Cleistopholis patens, Albizia spp., Funtumia spp., Ficus, Trichilia spp.*, etc.) in the CAs. Majority of the tree species encountered/enumerated in the study area belonged to 'Least Concern (LC)' category of IUCN Red List' and Redhead (1971) classes III and IV species. These results agree with Proforest (2015) and Ogunjemite (2015) who also inventoried large number of rainforest pioneers, namely *Alstonia congensis, Margariteria discoiidea, Albizia lebbek* and *Alchornea cordifolia* etc. in the study area.

While the results of the baseline assessment of common flora revealed 66 rainforest species spread across 25 families; no tree species of the savanna ecology, including Shea butter tree was seen/identified in the entire CAs. But Proforest (2015:13) had alluded to the existence of Shea butter tree (*Vitellaria paradoxa*) C. F. Gaertn (Family: Sapotaceae); and reported that its ecology team counted/identified 10 stands of the tree species within 16-hectare transects in the concession. The Shea butter is a pioneer tree common in the derived/guinea savanna ecological zone; the tree grows up to 12m high and 6m girth; bark is grey and deeply fissured while slash is red and exudes white latex (Keay, 1989). The shape of the leaf is 'obovate'. On the other hand, *Lophira alata* Banks ex C. F. Gaertn*;* Family: Ochnaceae (common/local name: Iron wood/Eki) is the closest rainforest tree species which shares some biological semblance with *V. paradoxa* (Figure 5). But *L. alata* tree grows up to 60m high and 5m girth; bark reddish, flaking off in small patches while slash is red (Keay, 1989). The leaf of *L. alata* has 'lanceolate' shape. A significant number of *L. alata* juveniles were enumerated in the freshwater/fringing and moist forest eco-zones in the CAs. The foregoing profoundly indicates that it was *Lophira alata* that Proforest (2015) erroneously identified/enumerated as *Vitellaria paradoxa* in Presco concession, Ologbo (*cf.* Figure 5).

CONCLUSION AND RECOMMENDATIONS

Regardless of the low mammalian species abundance and diversity, the Presco conservation areas (CAs) in Ologbo, Edo State, Nigeria have very rich potentials for biodiversity conservation and subsequent conversion to wildlife sanctuary/rescue centre/repository for phyto-demographic and socio-cultural studies. However, amidst the promises are palpable drawbacks which include illegal logging, poaching, and unauthorized grazing and associated wildfires in the northern periphery. In the south are itinerant camp dwellers who reside in the buffer between the CAs and River Ossiomo and sporadically launch incursions into the CAs from time to time. These mobile camps also double as markets for specialized 'bush meat' and 'sawn timber' products. But judging from: (a) the rate of exploitation/loss of important timber species, wildlife and NTFPs; and (b) the increasing decline in ecosystem health across the CAs; it is doubtful if these highly impacted ecosystems can instigate inherent repair mechanisms, rebuild ecological resilience and/or recover without reasonable external assistance.

To this end, it is recommended that the CAs should be rehabilitated through participatory and/or joint forest management approaches. Additionally, concerted efforts should be made to provide alternative livelihood projects (e.g. artisanal fish- and snail farming, etc.) for enclave/fringing communities. Finally, all forms of logging and poaching in the CAs and buffer zones should be prohibited.

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