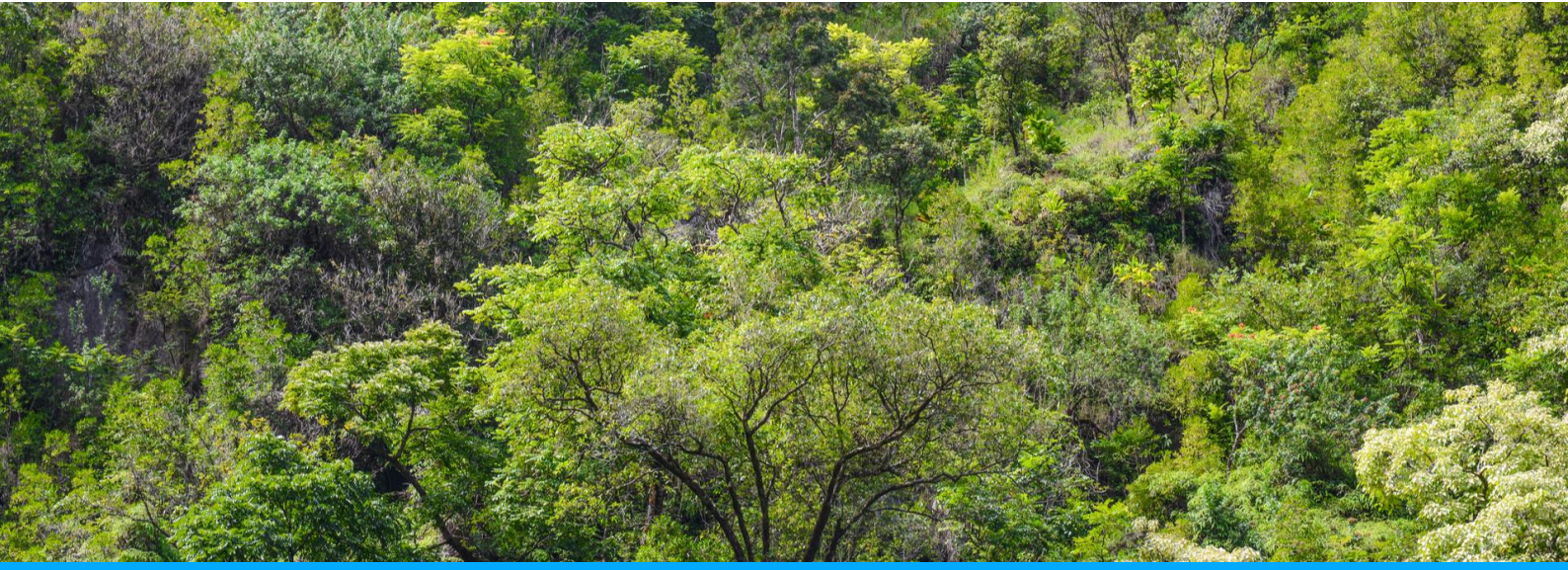


Risk Prioritisation, Olam Palm Project, Gabon (Annex 2 of BAP)

December 2021

Executive Summary

The Critical Habitat Assessment (CHA) (TBC 2021) undertaken for the Olam Palm Gabon (OPG) Project (the Project) in Gabon identified the Project's priority biodiversity features - both species and habitats. To align with IFC PS6, the Project will be required to achieve net gain for priority features that qualified for CH and a no net loss for Natural habitat, where feasible.

Although a number of priority biodiversity features have been identified in the Project landscape, there is variability in the likelihood that they will be impacted by the Project and the consequence for the conservation status of the species. Therefore, not all features are equal priorities for Project management actions. The prioritisation process described in this report identifies an appropriate level of management effort and future actions for each priority feature (see Table 1 for results).

The species and habitats classed as highest priority for immediate action (Action Category 1) are the Central Chimpanzee, Western Gorilla, Forest Elephant, and one habitat – lowland terra firma forest. For all 4 of these AC1 features, specific avoidance and minimisation measures will be required and a robust monitoring program will be needed to ensure net gain for species and habitats is achieved.

Table 1: Summary of risk prioritisation results for species and habitats

		Plantation					
Action Category	**Number of features**	**Awala**	**Makouke**	**Mouila Lot 1**	**Mouila Lot 2**	**Mouila Lot 3**	**Ndende**
AC1: High priority for habitat and / or species mitigation	**4** **(3 mammals; 1 habitat)**	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest	**Mammal:** Central Chimpanzee Western Gorilla Forest Elephant **Habitat:** Lowland terra firma forest
AC2: Contingency planning	**43** **(27 fish; 10 plants; 1 reptile; 1 amphibian 4 habitats)**	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus miltotaenia* *Plataplochilus chalcopyrus*	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus miltotaenia* *Plataplochilus chalcopyrus* *Amphyosemion hera* **Amphibian:** Ogowe river frog*	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus chalcopyrus* 7 x Amphyosemion sp. (*A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi*) *Epiplatys huberi*	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus chalcopyrus* 7 x Amphyosemion sp. (*A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi*) *Epiplatys huberi*	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus chalcopyrus* 7 x Amphyosemion sp. (*A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi*) *Epiplatys huberi*	**Reptile**: Slender-Snouted Crocodile **Stream / swamp associated Fish:** *Plataplochilus chalcopyrus* 7 x Amphyosemion sp. (*A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi*) *Epiplatys huberi*

		Plantation					
Action Category	**Number of features**	**Awala**	**Makouke**	**Mouila Lot 1**	**Mouila Lot 2**	**Mouila Lot 3**	**Ndende**
AC2: Contingency planning		**River associated Fish & Shrimp:** *Microsynodontis notata*	**River associated Fish & Shrimp:** *Bryconalestes bartoni* *Caridina gabonensis* *Caridina lineorostris* *Fontitrygon ukpam* *Microsynodontis vigilis* *Neolebias gossei* *Potamalpheops haugi* **Dragonfly:** *Neurogomphus angustisigna*	**River associated Fish & Shrimp:** *Bryconalestes tholloni* *Chrysichthys dageti* *Chromidotilapia melaniae* *Chromidotilapia nana* *Phractura stiassny* *Notoglanidium boutchangai* *Synodontis acanthoperca*	**River associated Fish & Shrimp:** *Bryconalestes tholloni* *Chrysichthys dageti* *Chromidotilapia melaniae* *Chromidotilapia nana* *Phractura stiassny* *Notoglanidium boutchangai* *Synodontis acanthoperca* **Plant:** *Gilbertiodendron barbulatum**	**River associated Fish & Shrimp:** *Bryconalestes tholloni* *Chrysichthys dageti* *Chromidotilapia melaniae* *Chromidotilapia nana* *Phractura stiassny* *Notoglanidium boutchangai* *Synodontis acanthoperca* **Plant:** *Gilbertiodendron barbulatum** *Ledermanniella pygmaea** *Inversodicraea gabonensis** *Anthonotha pellegrinii**	**River associated Fish & Shrimp:** *Bryconalestes tholloni* *Chrysichthys dageti* *Chromidotilapia melaniae* *Chromidotilapia nana* *Notoglanidium boutchangai* *Phractura stiassny* *Synodontis acanthoperca* **Plant:** *Psychotria acutigemma* subsp. *couvreuriana* *Cassipourea* sp. nov. *Ledermanniella pygmaea** *Inversodicraea gabonensis** *Ledermanniella letestui** *Dactyladenia pierrei** *Anthonotha pellegrinii** *Crotalaria tchibangensis** *Millettia le-testui**

		Plantation					
Action Category	**Number of features**	**Awala**	**Makouke**	**Mouila Lot 1**	**Mouila Lot 2**	**Mouila Lot 3**	**Ndende**
AC2: Contingency planning		**Habitat:** Gallery Forest Mangrove Freshwater	**Habitat:** Gallery Forest Freshwater	**Habitat:** Gallery Forest Freshwater	**Habitat:** Gallery Forest Freshwater	**Habitat:** Gallery Forest Dolines Freshwater	**Habitat:** Gallery Forest Dolines Freshwater
AC3: General mitigation measures	**13** **(3 mammals;** **2 birds;** **7 plants;** **1 habitat)**	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Anthonotha stipulacea* *Tarenna ogoouensis* *Guibourtia tessmannii*	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Anthonotha stipulacea** *Diospyros cleistantha** **Habitat:** Savannah	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Crateranthus congolensis* *Loesenera walker* *Anthonotha stipulacea* *Guibourtia tessmannii** **Habitat:** Savannah	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Loesenera walker* *Crateranthus congolensis** **Habitat:** Savannah	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Diospyros cleistantha** *Crateranthus congolensis** *Loesenera walker** **Habitat:** Savannah	**Mammal:** Red Capped Mangabey White Bellied Pangolin Giant Ground Pangolin **Bird:** African Grey Parrot Rosy Bee-Eater **Plant:** *Loesenera walker* *Diospyros cleistantha* **Habitat:** Savannah

		Plantation					
Action Category	**Number of features**	**Awala**	**Makouke**	**Mouila Lot 1**	**Mouila Lot 2**	**Mouila Lot 3**	**Ndende**
AC4: Remain aware	**60 (1 bird; 34 fish; 25 plants – although only 3 plants confirmed present in a plantation)**	**Bird:** African River Martin **Migratory Fish:** 8 x Potamadromous freshwater species **Plant:** *Eugenia ogoouensis** *Justicia tigrina** *Oddoniodendron normandii** *Pseudohydrosme gabunensis** *Diospyros subargentea**	**Bird:** African River Martin **Migratory Fish:** 16 x Potamadromous freshwater species **Plant:** *Combretum exellii* *Eugenia ogoouensis** *Justicia tigrina** *Oddoniodendron normandii** *Diospyros subargentea** *Dactyladenia librevillensis** *Diospyros rabiensis** *Cnestis macrophylla** *Dactyladenia jongkindii**	**Bird:** African River Martin **Migratory Fish:** 32 x Potamadromous freshwater species	**Bird:** African River Martin **Migratory Fish:** 32 x Potamadromous freshwater species **Plant:** *Rothmannia jollyana** *Beilschmiedia calcitranthera** *Tapura le-testui** *Cynometra nyangensis** *Gilbertiodendron limosum**	**Bird:** African River Martin **Migratory Fish:** 32 x Potamadromous freshwater species **Plant:** *Rothmannia jollyana** *Beilschmiedia calcitranthera** *Tapura le-testui** *Cynometra nyangensis** *Ledermanniella* sp. nov. 1 stamen* *Calpocalyx brevifolius**	**Bird:** African River Martin **Migratory Fish:** 32 x Potamadromous freshwater species **Plant:** *Croton tchibangensis* *Beilschmiedia cinnamomea** *Tapura le-testui** *Cynometra nyangensis** *Cynometra letestui** *Ledermanniella* sp. nov. 1 stamen* *Ledermanniella* aff. *pygmaea* sp. nov. 2* *Calpocalyx brevifolius** *Inversodicraea annithomae** *Inversodicraea paulsitae** *Synsepalum nyangense** *Autranella congolensis**
	*** Is used to indicate where a species is unconfirmed but anticipated to be present in a particular plantation**						

Overview

The Critical Habitat Assessment (CHA) (TBC 2021) provides an overview of all ´priority biodiversity features´ (habitats and species) that occur within the OPG ecologically appropriate Areas of Analysis (AoA), and that may trigger Critical Habitat (CH), but it does not account for the risk of impact to each species from the Project activities. There is variability in terms of ecology (e.g., habitat specialists vs generalists, restricted vs wide-ranging species), threat level and level of scientific understanding of the priority biodiversity features. The appropriate Project response for mitigating impacts on different priority features is, therefore, also variable.

PS6 requires a net gain for species that qualify for CH. However, the presence of CH-qualifying species does not necessarily mean that the Project will impact them. For example, there are many freshwater fish species identified in the CHA that are unlikely to be impacted by oil palm production so long as good practice is followed with regards to chemical run-off and soil erosion. Several impact scenarios are possible for CH-qualifying species - from impacts that are negligible, readily avoided or temporary, to those that are significant, long-term and challenging to mitigate.

To help the Project identify appropriate mitigation responses and allocate effort accordingly, TBC has undertaken a risk prioritisation of all CH-qualifying features to provide a more project-relevant list of features that are a) at risk of being impacted by the Project; and b) whose long-term viability would be at risk as a result of such impacts. This process:

1. Considered the *likelihood* and *consequence* of potential Project impacts on each feature;
2. Evaluated the potential risk given the screening of impacts; and,
3. Assigned each feature to an appropriate mitigation 'Action Category'.

The prioritization process (see Figure 1: The prioritization process) is not a full impact assessment but a qualitative screening process to facilitate appropriate management responses to potential biodiversity risks. It is an iterative process that should be repeated if significant new information is uncovered about a feature (e.g., if a species' global conservation status is up- or down-graded or if further locations are found that broaden the species' distribution). The results of the prioritisation exercise will be used to develop mitigation actions in the Biodiversity Action Plan, to identify accounting lines for biodiversity losses in the residual impact assessment, and to appropriately focus offset site selection and offset actions.

The risk prioritisation goes beyond the CHA because it specifically assesses the presence of CH-qualifying features **within** the 6 OPG plantations rather than in the broader AoA used in the CHA (seeFigure 2*: Map outlining the three Areas of Assessment (AoA) used in the Critical Habitat Assessment, and the location of the six OPG plantations within them*). For some species (mainly plants) where presence within an AoA is confirmed but presence within a plantation is not, these are included in the results (Table 4*: Risk Prioritisation results*) with a note highlighting the relevant AoA for which CH was initially triggered, and that the species is not actually confirmed as present in a plantation.

The following definitions are used in this assessment:

Plantation – follows the Biodiversity Management Plans and sub-divides OPG plantations into 6 separate plantations, namely: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, and Ndende.

Planted area – refers to the planted area within a plantation

Project area - refers to the footprint of all OPG plantations combined (both converted and unconverted areas).

Habitat type- follows the HCV definitions used in the CHA that classified 10 different habitat types in and around the plantations using a combination of expert input, direct observations and the land-cover types presented in HCV assessments.

Figure 1: The prioritization process

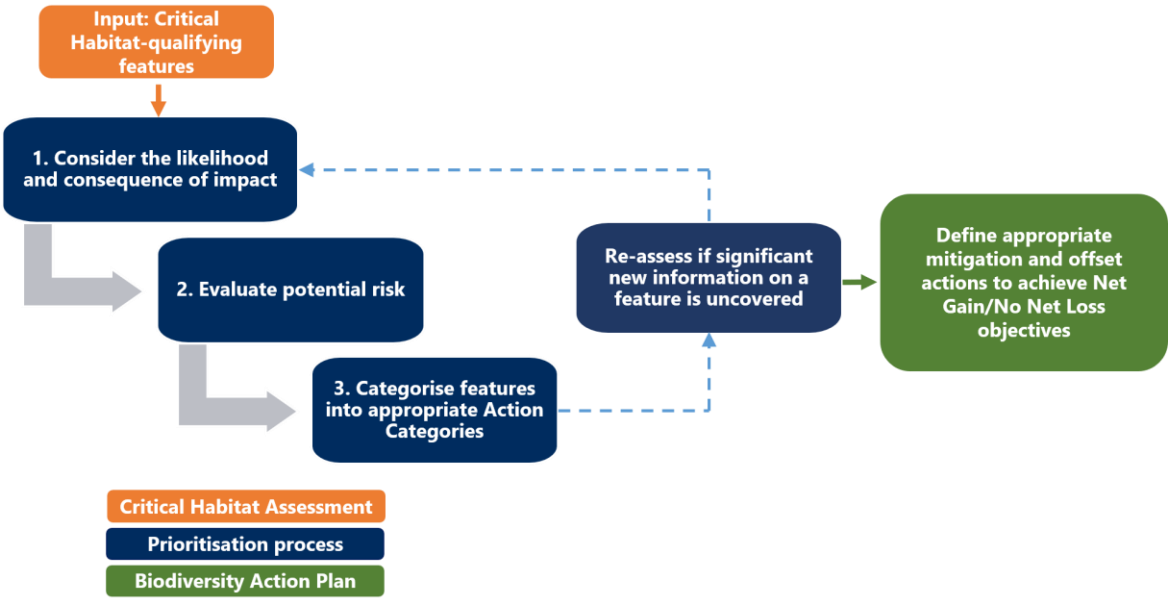
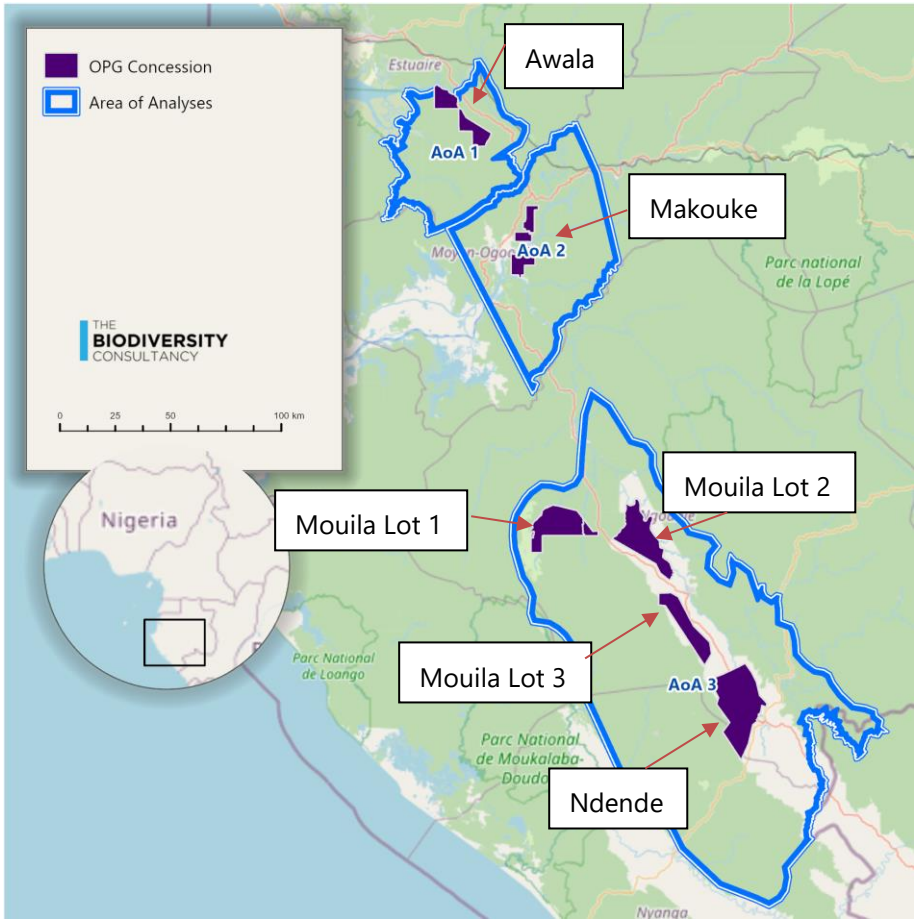


Figure 2: Map outlining the three Areas of Assessment (AoA) used in the Critical Habitat Assessment, and the location of the six OPG plantations within them



Risk prioritisation approach

Prioritisation is a risk screening exercise that evaluates each priority biodiversity feature for (i) impact likelihood and (ii) consequence of impact (see Table 2: Likelihood descriptors and Table 3: Consequence descriptors). The results determine which Action Category each priority biodiversity feature is placed into for mitigation, management and monitoring actions (Figure 3: Risk-based prioritisation matrix).

Habitats were prioritised **based on their importance for supporting priority biodiversity** and, like species, were assigned an Action Category (AC) for biodiversity management and monitoring purposes. The prioritisation process was based on Project information and literature review and is a preliminary screening that may be updated as further stakeholder consultation takes place during the Offset Feasibility Study. For a number of species (particularly plants and fish species) there is limited information available to determine risk. Prioritisation for these species is based on available knowledge on the species ecology and/or defined and established mitigation measures.

Table 2: Likelihood descriptors

Almost Certain	Likely	Possible	Unlikely
Degradation/loss of some/all of biodiversity feature will occur as it is known to be present/use habitat under the infrastructure footprint and/or will be affected by indirect impacts	Degradation/loss of some of the biodiversity feature may occur as it is known to use habitat/be present near to the infrastructure footprint and/or potentially be affected by indirect impacts	Degradation/loss of some of the biodiversity feature may occur because the feature is known to occupy similar habitat elsewhere in the region and it is therefore likely to occur in the plantation, but its presence is unconfirmed	Degradation/loss of some/all of biodiversity feature is not anticipated as it is not known to be present in/associate with habitat near to the infrastructure footprint or in the area of influence of indirect impacts

Table 3: Consequence descriptors

Critical	Major	Moderate	Low
Regional viability/ function may be lost and/or global viability could be reduced or lost	Regional viability/ function is likely to be reduced and/or global viability or function may be affected	Local viability/function may be lost and/or regional viability may be affected	Local viability/function of the feature may be reduced but regional viability is unlikely to be affected

For plants the following thresholds were used to determine the consequence of an impact:

- **Critical** = 0-1 known occurrences outside the Project area
- **Major** = 2 known occurrences outside the Project area
- **Moderate** = 3-5 known occurrences outside the Project area
- **Low** = 6 or more known occurrences outside the Project area

Figure 3: Risk-based prioritisation matrix

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="4">Likelihood of impact</td></tr>
<tr><td>Almost certain</td><td>Likely</td><td>Possible</td><td>Unlikely</td></tr>
<tr><td rowspan="3">Consequence of impact</td><td>Critical</td><td colspan="2" rowspan="2">AC1: High priority for habitat and / or species mitigation</td><td colspan="2" rowspan="2">AC2: Contingency planning</td></tr>
<tr><td>Major</td></tr>
<tr><td>Moderate</td><td colspan="2"></td><td colspan="2">AC4: Remain aware</td></tr>
</table>

	Low	**AC3:** General mitigation measures	

Results

The risk screening for each priority species and the justification for the results is provided in Table 4: Risk Prioritisation results, and results for Natural Habitats in Table 5: Prioritisation of Natural Habitat. The risk prioritisation for biodiversity features identified **three animal species/subspecies** (Central Chimpanzee; Western Gorilla; Forest Elephant;) and **one habitat** (lowland terra firma forest) as highest priority for habitat mitigation and/or species-specific actions (Action Category 1).

For these highest priority features, specific avoidance and minimisation measures will be required to ensure Net Gain is achieved. For Central Chimpanzee, Western Gorilla and Forest Elephant a species-specific approach that includes a robust monitoring program will be required. Establishing a baseline monitoring programme for apes is planned for 2022, and the same approach used for these species can be used to monitor elephants at the same time.

While lowland terra firma forest habitat technically qualifies for Action Category 3 (because the consequence of impact is considered moderate) it has been promoted to AC1 due to the dependence of many mammal species, including 3 CH-qualifying and AC1 listed highly charismatic species on it (Central Chimpanzee, Western Gorilla and Forest Elephant). Whilst the Project impacts represent a comparatively small loss to the total estimated population of each of these species in Gabon, all three populations are threatened by habitat loss and hunting and protecting their principal habitat must be a priority. The Project should avoid any further conversion of lowland terra firma forest to palm oil.

While no plant species were identified as AC1 in this assessment, very few plant specimens have been collected within most OPG plantations and botanical inventory is urgently needed to better understand the presence and distribution of threatened plants, particularly in savannah areas. There are 34 CH-qualifying plant species that have been found within proximity to one or more plantations but are as yet not confirmed as present in the Project area, and only with surveys can they either be confidently included or excluded from the assessment. Complete detailed botanical inventory of the Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3 and Ndende plantations is planned for 2022, and the results of these surveys will need to be fed into the CHA and risk prioritisation and may change the results and the actions in the BAP.

Contingency planning for freshwater areas is required because although impacts are unlikely, if they do occur they would be major and reduce the regional viability/function of many fish and aquatic plant species. The Project must ensure there are sufficient and well-maintained buffer zones between planted areas and waterways, and that such buffers are along both streams/rivers and lakes as well as swamp edges, and that these areas remain unpolluted and undisturbed. In order to effectively monitor this, the Project should develop a ground-truthed habitat map with good delineation of lowland terra firma, swamp, mangrove, savannah and gallery forests. GIS layers of riparian buffers should be developed as well as both planted AND cleared areas (only planted areas are currently mapped), and the Project should undertake annual monitoring to ensure such areas remain undisturbed. The Project already has in place a water quality management and monitoring plan that assesses turbidity (sedimentation), temperature (proxy for canopy clearance), electrical conductivity and nutrient profile (i.e., nitrite,

nitrate, phosphate, potassium) in streams and rivers within proximity to planted areas. In addition, OPGs irrigation approach is precautionary and will include real time monitoring of flow in the Ogooué, Ngounié, Dola and Ovigui rivers to ensure that river flow is not adversely impacted, as well as appropriate mesh and grills to prevent aquatic biodiversity becoming trapped or injured by the pumps. If buffers are not maintained, or if adverse impacts are observed through monitoring, some freshwater species could be elevated to AC1.

Table 4: Risk Prioritisation results

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Mammal	Central Chimpanzee, *Pan troglodytes troglodytes*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	1	Likelihood: Almost certain	**Ecology and distribution**: The Central Chimpanzee is Endangered and a high-profile charismatic species. Chimpanzees live in groups, are territorial and will defend their home range against neighbouring groups (Boesch *et al.* 2008; Mitani *et al.* 2010). Group home range size varies according to the habitat type, food availability and group size, but in Loango National Park (approximately 75km west of Mouila-Ndende) home range size is estimated between 28-59 km^2 for a community of c.47 chimpanzees (Martinez-Inigo *et al.* 2021). Chimpanzee home ranges comprise a core area (the area used most often within the home range, usually includes a high concentration of nesting sites (Kouakou *et al.* 2011)) and foraging areas, and in Central Africa Chimpanzees primarily occupy terra firma forest. Chimpanzees forage around core areas, investigating different habitats depending on food availability, so home range use varies over time. Baseline data on Chimpanzee abundance and distribution within the Project area is lacking, but they are confirmed as present in all plantations. **Likelihood of impacts**: The Central Chimpanzee is present within all OPG plantations, and the Project has impacted a large area of habitat that is known to be used by chimpanzees. Project activities may displace animals (both historically and in the present day) which may result in inter-community conflicts. The planted area footprint also fragments chimpanzee habitat. **Consequence of impacts:** Direct impacts include habitat loss and habitat fragmentation (which may lead to inter-community conflict). Indirect impacts such as disease transmission, increased risk of hunting due to in-migration and improved access, and habitat degradation due to noise, air and water pollution are considered to be insignificant as the Project has mitigation and monitoring measures in place for such impacts. Direct impacts will affect the local viability of the subspecies, and regional viability may be reduced if habitat connectivity between important areas of habitat in the landscape is not maintained. **Action:** Species specific mitigation measures will be required and the success of such measures on the local Chimpanzee population monitored. Actions already under development by OPG include implementing an ape monitoring and management plan, the first action of which will be baseline monitoring of Chimpanzees in all plantations. Note: The species qualifies for Action Category 3 as the consequence of impact is moderate (regional viability may be affected but is unlikely to be significantly reduced). It has however been promoted to AC1 as the Central Chimpanzee is an Endangered Great Ape with a lot of stakeholder interest, it is also territorial and impacts could be consequential even at a local scale, thus species-specific mitigation measures are key to reducing impact. Whilst the Project impacts represent a comparatively small loss to the total estimated population in Gabon, chimpanzee populations are threatened by habitat loss and, in some areas, by hunting. Project impacts are therefore an additional pressure on an already threatened population.
				Consequence: Moderate	

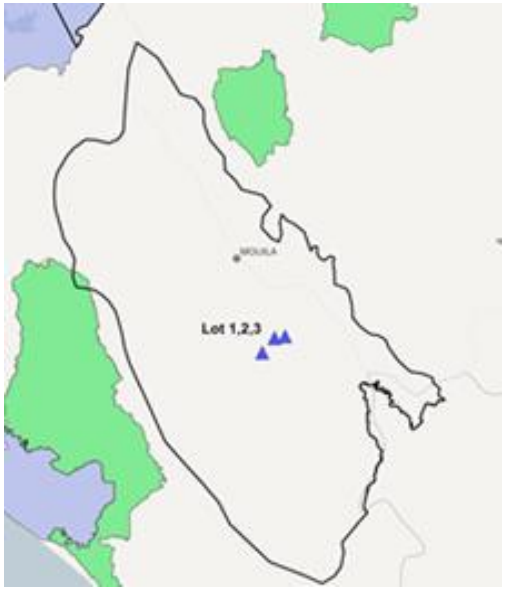
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Mammal	Western Gorilla, *Gorilla gorilla gorilla*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	1	Likelihood: Almost certain	**Ecology and distribution**: The Western Gorilla is Critically Endangered and a high-profile charismatic species. Western Gorillas live in groups of 2-20 individuals made up of one silverback and several females and their offspring. Solitary males also sometimes form temporary all male groups. Western Gorillas are found throughout Gabon, primarily in terra firma forest (both primary and secondary), particularly where there is dense ground-level herbaceous growth, and in swamp forests. Staple foods are pith, leaves and shoots. The fruit component of the diet is generally high but varies with seasonal availability. Home range size of Western Gorillas is significantly larger than their Mountain Gorilla counterparts, and in Loango National Park (approximately 75km west of Mouila-Ndende) has been estimated at 50-60km^2 (Head *et al.* 2013). Increased home range is largely due to an increased reliance on fruit and reduced availability of herbaceous vegetation. Baseline data on Western Gorilla abundance and distribution within the Project area is lacking, but they are confirmed as present in all plantations. **Likelihood of Impacts:** The species is present within all OPG plantations and the Project has impacted a large area of habitat that is known to be used by Western Gorillas. The planted area footprint also fragments Gorilla habitat.
				Consequence: Moderate	**Consequence of impacts:** Direct impacts include habitat loss and habitat fragmentation. Indirect impacts such as disease transmission, increased risk of hunting due to in-migration and improved access, and habitat degradation due to noise, air and water pollution are considered to be insignificant as the Project has mitigation and monitoring measures in place for such impacts. Direct impacts will affect the local viability of the subspecies, and regional viability may be reduced if habitat connectivity between important areas of habitat in the landscape is not maintained. **Action:** Species specific mitigation measures will be required and the success of such measures on the local Gorilla population monitored. Actions already under development by OPG include implementing an ape monitoring and management plan, the first action of which will be baseline monitoring of Gorillas in all plantations. Note: The species qualifies for Action Category 3 as the consequence of impact is moderate (regional viability may be affected but is unlikely to be significantly reduced). It has however been promoted to AC1 as the Western Gorilla is a Critically Endangered Great Ape with a lot of stakeholder interest and impacts could be consequential even at a local scale, thus species-mitigation measures are key to reducing impact. Whilst the Project impacts represent a comparatively small loss to the total estimated population in Gabon, Western Gorilla populations are threatened by habitat loss and, in some areas, by hunting. Project impacts are therefore an additional pressure on an already threatened population.

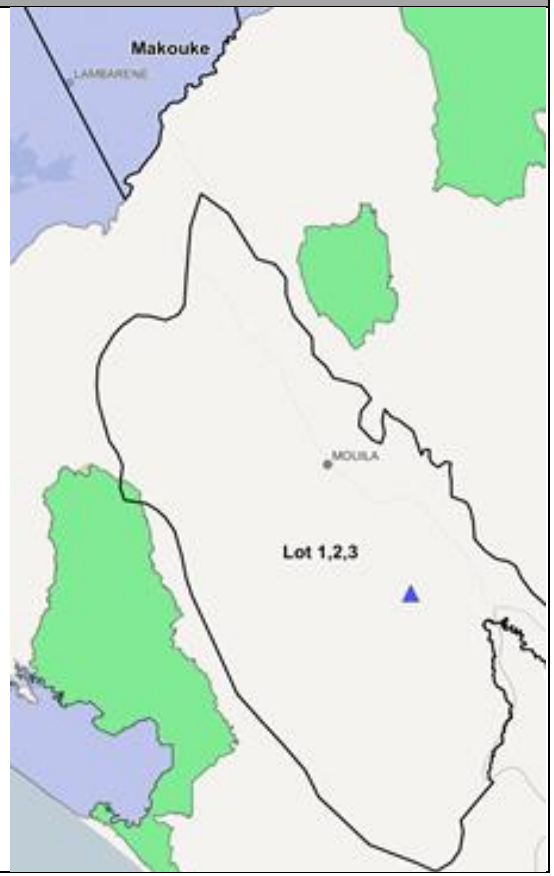
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Mammal	Forest Elephant, *Loxodonta cyclotis*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	1	Likelihood: Almost certain	**Ecology and distribution**: The high profile and charismatic Forest Elephant was recently classified as separate to the African Savannah Elephant, and its status reclassified from Vulnerable to Critically Endangered. Forest Elephants use a wide array of habitat types, from terra firma mature and secondary forest, to savannah and swamp forest. Gabon is the last stronghold offering a large quasi-continuous habitat to Forest Elephants (> 250,000 km^2; de Flamingh *et al.* 2015). Elephants are confirmed as present in all plantations (Q. Meunier pers comm). A recent national survey using genetic sampling estimates that Mouila Lot 1, Lot 3 and Ndende may have an elephant density of circa 0.75 individuals per km^2 - among the highest densities in Gabon (Laguardia *et al.* 2021). Densities are predicted to be lower in Makouke and the southern Lot in Awala – circa 0.08 individuals per km^2, while the northern Lot in Awala is predicted to hold circa 0.4 individuals per km^2. and Mouila Lot 2 circa 0.3 individuals per km^2. **Likelihood of Impacts:** The species is present within all OPG plantations, and the Project has impacted a large area of habitat that is known to be used by Forest Elephants. Furthermore, risk of conflict with elephants is high due to their preference for feeding on *Elais guineensis* stems and fruits, and this conflict needs careful management. The planted area footprint also fragments elephant habitat, while OPG trenches and fences built to exclude this species could result in natural movement patterns being restricted. Species-specific mitigation measures will be required to minimize impacts, and the success of such measures on the local elephant population monitored. **Consequence of impacts:** Direct impacts include habitat loss and habitat fragmentation. Indirect impacts such as, increased hunting due to in-migration and improved access, and habitat degradation due to noise, air and water pollution are considered to be insignificant as the Project has mitigation and monitoring measures in place for such impacts. Direct impacts may affect the local viability of the subspecies, and regional viability may be reduced if habitat connectivity between important areas of habitat in the landscape is not maintained. **Action:** Species specific mitigation measures will be required to minimize impacts, and the success of such measures on the local elephant population monitored. Monitoring of Forest Elephants could be achieved using the same approach as being implemented for great apes (i.e., camera trapping). Note: The species qualifies for Action Category 3 as the consequence of impact is moderate (regional viability may be affected but is unlikely to be significantly reduced). It has however been promoted to AC1 as the Forest Elephant is a Critically Endangered species with a lot of stakeholder interest and a priority focus of national action plans. Whilst the Project impacts represent a comparatively small loss to the total estimated population in Gabon, forest elephant populations are threatened by habitat loss and, in some areas, by hunting. Project impacts are therefore an additional pressure on an already threatened population.
				Consequence: Moderate	

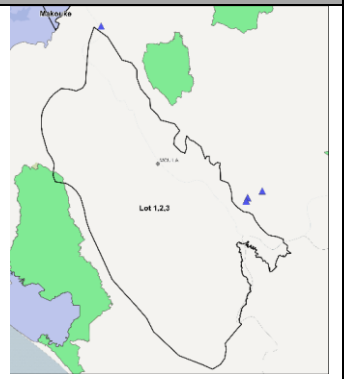
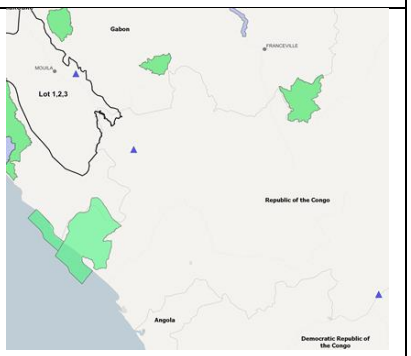
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Reptile	Slender-Snouted Crocodile *Mecistops cataphractus*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	2	Likelihood: Unlikely Consequence: Major	**Ecology and distribution:** The Slender-Snouted Crocodile is a shy species susceptible to human disturbance. The species was classified as Critically Endangered in 2014, due to a huge population decline across its range: the populations in West and Central Africa are now totally isolated, and this species is severely fragmented. Main threats are hunting pressure and habitat loss. The species is associated with forested rivers and densely vegetated bodies of water including lakes, and Gabon is known to be a stronghold for the remaining population. The species has been recorded close to the Makouke plantation. **Likelihood of impact:** Regardless of distribution, impacts on this species are unlikely because the Project should not affect the water system and implements a 50m riparian buffer that means they do not have planted areas on riverbanks. Therefore, the population is unlikely to suffer either fragmentation or habitat loss. The irrigation approach being used is precautionary and will include real time monitoring of flows, and appropriate grills and mesh to avoid injury to freshwater biodiversity from pumps. **Consequence of impact:** This species of crocodile is reported to be rapidly declining in numbers and in range and is classed as CR on the IUCN Red List. Any impacts to the species would affect the local and potentially regional viability of the population as all populations of this species are important for the species survival. **Action:** Contingency planning is required for this species because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of this species. The Project must ensure there are sufficient buffer zones between plantations and waterways, and that such buffers include both riverbanks and lakes as well as swamp edges, and that these areas remain unpolluted and undisturbed. Furthermore, proactive monitoring should be implemented to ensure that buffers are maintained, and water quality monitoring should check that key parameters such as temperature, turbidity and nutrient levels do not change, and that flow is not significantly affected.
Amphibian	Ogowe River Frog *Phrynobatrachus ogoensis*	AoA: 2 Plantation: none confirmed	2	Likelihood: Unlikely Consequence: Major	**Ecology and distribution:** This species is known from one location in Gabon (Lambarene – circa 20km south west of the Makouke plantation) and one in Liberia. More recently, it has been reported from Lopé National Park (Larson & Zimkus, 2015) circa. 150km east of Makouke, however there is some dispute over the validity of this sample (Rödel *et al*., 2015). Little is known about habitat preferences, but the Lopé specimen was found in leaf litter in secondary forest, and the species presumably breeds in water. **Likelihood of Impacts:** Impacts are not anticipated because the Project mitigation measures are designed to protect riparian habitat and there are no direct impacts to the aquatic environment, although some frog species in Gabon can reside quite some distance from rivers, and the suspected Lopé specimen was found in secondary forest. The irrigation approach being used is precautionary and will include real time monitoring of flows, and appropriate grills and mesh to avoid injury to freshwater biodiversity from pumps. **Consequence of impacts:** If the species were confirmed as present in the Makouke plantation then any Project impacts could significantly reduce the regional viability of this species. **Action:** Contingency planning is required for this species because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of this species. The Project must ensure there are sufficient buffer zones between planted areas and waterways, and that such buffers include both riverbanks and lakes as well as swamp edges, and that these areas

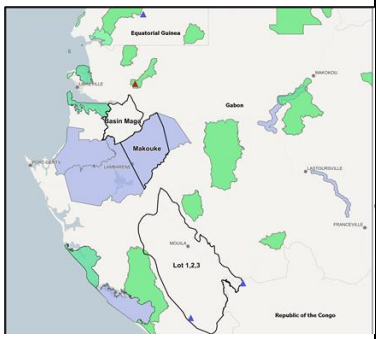
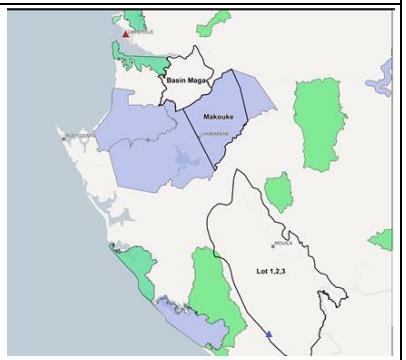
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					remain unpolluted and undisturbed. Furthermore, proactive monitoring should be implemented to ensure that buffers are maintained, and water quality monitoring should check that key parameters such as temperature, turbidity and nutrient levels do not change.
Fish	Restricted range species associated with swamp forest and small streams: 8 x Aphyosemion and 1 x Epiplatys fish species *Plataplochilus chalcopyrus* (EN); *P. miltotaenia* (VU)	AoA: 1 & 2 (*Plataplochilus chalcopyrus*; *P. miltotaenia);* AoA 2 (*A. hera*) and AoA 3 (all others) Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	2	Likelihood: Unlikely	**Ecology and distribution:** All *Aphyosemion* and *Epiplatys* species (specifically *A. hera; A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi and E. huberi*) and *Plataplochilus chalcopyrus* (EN) and *Plataplochilus miltotaenia* (VU) found in the Project area are small bodied and restricted range fish species that live in swamps and small streams. These species lay eggs on bank vegetation and rootwads so their reproductive success is closely tied to the terrestrial environment. Removal of gallery forest would cause the streams and swamps to warm up as a result of the decrease in shaded area, thus impacting these species. Furthermore, any degradation of bank vegetation could adversely impact breeding viability of these species. These species are primarily found in the Mouila Lots (1,2 and 3) and Ndende, with the exception of *A. hera* and the two *Plataplochilus* species, that are found in the Makouke and Awala planattions. **Likelihood of impact:** Impacts are not anticipated because the Project mitigation measures are designed to protect riparian habitat and irrigation occurs only during the dry season when these species are not breeding, and when there is no connectivity between large rivers and dolines, swamps and small streams. Appropriate grills and mesh will be used on irrigation machinery to avoid injury to freshwater biodiversity from pumps.
				Consequence: Major	**Consequence of impact:** Any impacts to these restricted range species could be major and reduce regional and / or global viability or function. **Action:** Contingency planning is required for this species because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of this species. The Project must ensure there are sufficient buffer zones between planted areas and waterways, and that such buffers include both riverbanks and lakes as well as swamp edges, and that these areas remain unpolluted and undisturbed. Furthermore, proactive monitoring should continue to ensure (a) that buffers are maintained, and (b) that key water quality parameters such as temperature, turbidity and nutrient levels do not change. If buffers are not maintained, or if adverse impacts are observed through monitoring, these species could be elevated to AC1.

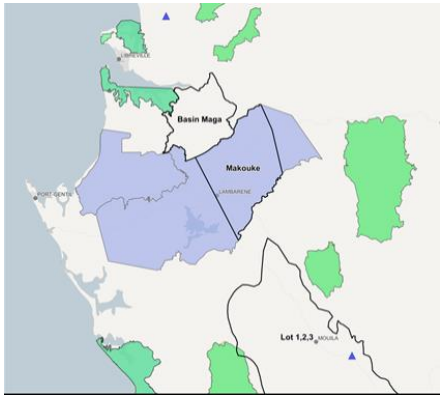
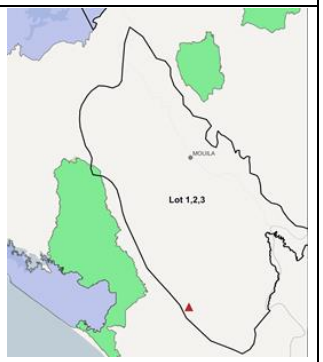
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Fish & Decapods	Restricted range species associated with larger streams and rivers: 14 x Restricted Range and 1 Threatened (EN) fish, and 1 decapod (EN)	AoA: 1,2,3 at: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	2	Likelihood: Unlikely	**Ecology and distribution:** The 14 Restricted Range freshwater species range are assessed as Least Concern or Data Deficient with the exception of one species that is both restricted range and threatened: *Chrysichthys dageti* (EN). There are an additional two species assessed in this group that are not restricted range but are threatened – one fish *Fontitrygon ukpam* (EN) and one Decapod - *Potamalpheops haugi* (EN). These species are typically Lower Guinea endemics that are restricted to less that 500km linear length of river, found in the major rivers and their tributaries within the AoA (Ngounié, Ogowe and Nyango rivers), as well as in lagoons. Sheltered areas near riverbanks and mangroves are often important nurseries for breeding. **Likelihood of impact:** Likelihood of impacts will be species-specific and dependent on to what degree each species may depend on the riverbank. Project impacts are likely to be terrestrial in nature and Project mitigation measures are designed to protect riparian habitat, therefore likelihood of impact is low. Irrigation will only take place during the dry season when these species are not breeding, and when there is no connectivity between large rivers and dolines, swamps and small streams. In addition, appropriate grills and mesh will be used on irrigation machinery to avoid injury to freshwater biodiversity from pumps. **Consequence of impact:** For some restricted-range species regional viability/ function is likely to be major and reduce regional and/or global viability or function. **Action:** Contingency planning is required for this species because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of this species. The Project must ensure that there are sufficient buffer zones between plantations and waterways (both riverbanks and lagoon / swamp edges), and that these areas remain unpolluted (i.e. action taken to avoid run-off into watercourses) and undisturbed. Furthermore, proactive monitoring should continue to ensure (a) that buffers are maintained, (b) that key water quality parameters such as temperature, turbidity and nutrient levels do not change. If buffers are not maintained, or if adverse impacts are observed through monitoring, these species could be elevated to AC1.
				Consequence: Moderate to Major	

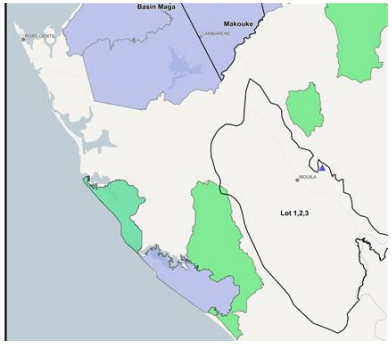
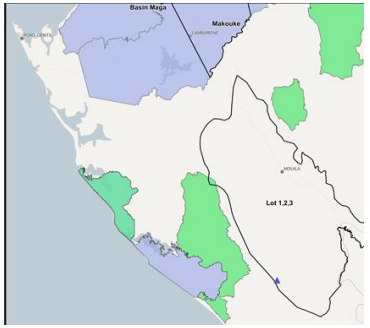
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Psychotria acutigemma* subsp. *couvreuriana* (EN)	AoA: 3 Plantation: Ndende	2	Likelihood: Unlikely Consequence: Critical	**Ecology and distribution**: Recently categorized as a new subspecies, *Psychotria acutigemma* subsp. *couvreuriana* is known from 4 collections, all of which are within the Ndende plantation. It is a shrub found in gallery forest, little else is known about its ecology. **Likelihood of impacts**: This plant has been observed within the Ndende plantation. The three locations where it has been observed to date are not in direct proximity to planted areas (circa 1km+), so even if impacts to gallery forest from water scarcity in the absence of sufficient buffers are confirmed in the future, this is unlikely to impact the current known locations of this species. **Consequence of impacts:** Given that all records to date are from within the plantation footprint, consequences of impacts are likely to be critical and potentially reduce or totally compromise the global viability of this subspecies (MBG pers comm). **Action:** Since impacts are unlikely but the consequences critical, this Endangered sub-species has been identified as AC2. Contingency planning is required for this species because if impacts occur they would be critical and reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022 identify further stands where this species occurs that are directly adjacent to planted areas, and gallery forest monitoring confirms that water scarcity is an issue, then the species may be upgraded to AC1. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Cassipourea* sp. nov. (CR)	AoA: 3 Plantation: Ndende	2	Likelihood: Unlikely Consequence : Critical	**Ecology and distribution**: While no occurrence data are available for this species, it is currently known from only one location - gallery forest in the Ndende plantation. This potential new species is distinctive and belongs to a genus that has recently undergone a systematic review, and so may well be truly rare. **Likelihood of impacts**: The plant has been observed directly within the Ndende plantation. The one location where it has been observed to date is not in direct proximity to planted areas (circa 2km+), so even if impacts to gallery forest from water scarcity in the absence of sufficient buffers are confirmed in the future, this is unlikely to impact the current known locations of this species. **Consequence of impacts:** Given that the only known location for this species is in proximity to the planted area footprint, consequences of impacts are likely to be critical and potentially reduce or totally compromise the global viability of this species (MVBG pers comm). **Action:** Since impacts are unlikely but the consequences critical, this species has been identified as AC2. Contingency planning is required for this species because if impacts occur they would be critical and reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022 identify further stands where this species occurs that are directly adjacent to planted areas, and gallery forest monitoring confirms that water scarcity is an issue, then the species may be upgraded to AC1. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Ledermanniella pygmaea* (EN)	AoA: 3 Plantation: none confirmed	2	Likelihood: Unlikely Consequence: Major	**Ecology and distribution**: *Ledermanniella pygmaea* is an aquatic plant endemic to Gabon and only grows in waterfalls. Within its small range (1010 km^2) it is known from 4 localities, 3 of which are in proximity to but not within the Ndende plantation (circa 30km northeast). Nevertheless, significant parts of the rivers where this species was found are located within Mouila Lot 3 and Ndende, and therefore it is considered possibly present. **Likelihood of impacts**: Impacts are anticipated to be unlikely because this species is aquatic, and the Project uses mitigation measures with riparian buffers around watercourses. Furthermore, the species is known to be restricted to waterfalls and rapids, and there are no such locations known with OPG plantations, so it is highly unlikely this species is present. **Consequence of impacts:** If impacts occurred, they would be major and likely reduce the regional viability of the species.  **Action:** Contingency planning is required for this threatened species because although impacts are unlikely, if they do occur they would be major and reduce the species regional viability / function. The Project must ensure sufficient buffer zones between planted areas and any rivers that exhibit waterfalls and that these areas remain unpolluted (i.e., action taken to avoid run-off into watercourses) and undisturbed.
Plant	*Inversodicraea gabonensis* (EN)	AoA: 3 Plantation: none confirmed	2	Likelihood: Unlikely Consequence: Major	**Ecology and distribution**: This aquatic plant species known from Gabon and the Republic of Congo, only grows in waterfalls and rapids. It is known from 3 occurrences, one of which is circa 25km northeast of the Mouila Lot 3 plantation. Parts of the rivers where this species was found are located within Mouila Lot 3 and Ndende, and therefore it is considered possibly present. **Likelihood of impacts**: While the species is known to occupy similar aquatic habitat elsewhere in the region, the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, the Project has mitigation measures in place to create riparian buffers along riverbanks.  **Consequence of impacts:** If impacts occurred, they would be major and likely reduce the regional viability of the species. **Action:** Contingency planning is required for this species because although impacts are unlikely, if they do occur they would be major and reduce regional viability / function of this threatened species. The Project must ensure that there are sufficient buffer zones between planted areas and any rivers that exhibit waterfalls and that these areas remain unpolluted and undisturbed.

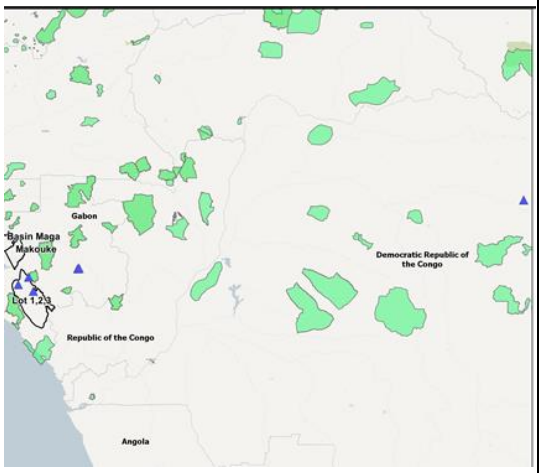
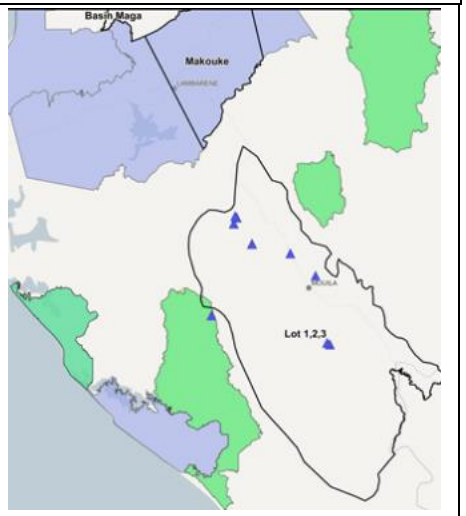
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Ledermanniella letestui (EN)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Unlikely Consequence: Major	**Ecology and distribution**: This aquatic species, found in waterfalls, is known from Gabon and Equatorial Guinea (Rio Muni). It is known from 4 collections that represent 4 occurrences, 2 of which are circa 50km south and east of the Ndende plantation. **Likelihood of impacts**: While the species is known to occupy similar aquatic habitat elsewhere in the region, the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** If impacts occurred, they would be major and likely reduce the regional viability of the species.  **Action:** Contingency planning is required because although impacts are unlikely if they occur they would be major and reduce the regional viability / function of this threatened species. The Project must ensure there are sufficient buffer zones between planted areas and rivers that exhibit waterfalls and that these areas remain unpolluted (i.e. action taken to avoid run-off into watercourses).
Plant	*Dactyladenia pierrei (CR)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Possible Consequence: Critical	**Ecology and distribution**: Endemic to Gabon, this species is a small tree up to 8 m tall, that probably grows in terra firma forest. It is known from 11 collections but ten of these were made between 1895-1902 around Libreville and are considered to be from populations extirpated due to urbanization. Therefore, it is considered that this species is known from one occurrence circa 50km southwest of the Ndende plantation. **Likelihood of impacts**: Although the known location of the species is outside the plantation areas, impacts are possible as the species is known to occupy (or to have occupied) similar habitat elsewhere in the region and therefore there is potential for it to be present in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted.  **Consequence of impacts:** If impacts occurred, they would be critical and likely reduce the global viability of the species. **Action:** Contingency planning is required for this species because if impacts occur they would be critical and may reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022, identify stands where this species occurs, the species may be upgraded to AC1 and the Project should establish mitigation measures to avoid conversion of these areas and ensure that such areas remain undisturbed.

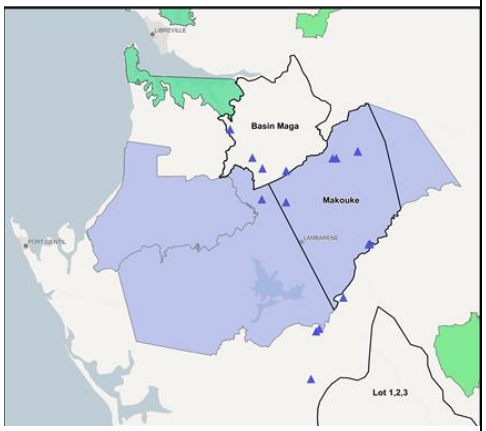
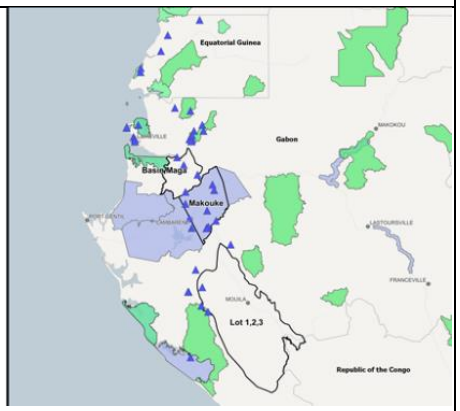
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Anthonotha pellegrinii (EN)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Possible Consequence: Major	**Ecology and distribution**: The species is a tree up to 30 m tall and 70–80 cm dbh, found up to 300 m elevations in terra firma forest. It is endemic to Gabon and known from two collections representing two occurrences, of which one lies circa 8km northeast of the Ndende plantation. **Likelihood of impacts**: Although the known location of the species is outside the plantation areas impacts are considered as possible as the species is known to occupy similar habitat elsewhere in the region and there is potential for it to be found in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be major and likely reduce the regional viability of the species. **Action:** Contingency planning is required for this species because if impacts occur they would be they would be major and may reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022, identify stands where this species occurs, the species may be upgraded to AC1 and the Project should establish mitigation measures to avoid conversion of these areas and ensure that such areas remain undisturbed. 
Plant	*Crotalaria tchibangensis (CR)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Possible Consequence: Critical	**Ecology and distribution**: Endemic to Gabon, this species is a stiff erect herb, known from a roadside, but the ecology is not clear, and it might be a savannah species also growing on roadsides. It is solely known from Tchibanga city, collected in 1983. The sole occurrence is located outside of protected areas and is threatened by urbanization, which might cause its extinction. The species is assessed as CR(PE) and is found circa 50km southwest of the Ndende plantation. **Likelihood of impacts**: Although the known location of the species is outside the plantation areas impacts are considered as possible as the species is assumed to occupy similar savannah habitat elsewhere in the region and it is therefore possible it occurs in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be major and likely reduce the global viability of the species. **Action:** Contingency planning is required for this species because if impacts occur they would be critical and may reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022, identify areas where this species occurs, the species may be upgraded to AC1 and the Project should establish mitigation measures to avoid conversion of these areas where possible and ensure that such areas remain undisturbed. 

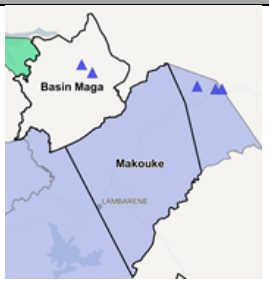
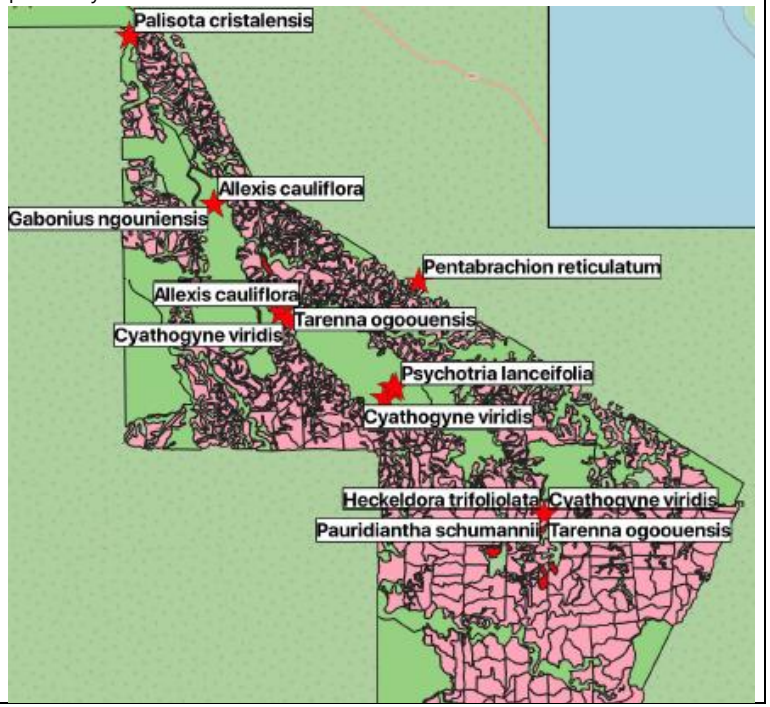
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Gilbertiodendron barbulatum (CR)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Possible Consequence: Critical	**Ecology and distribution**: Endemic to Gabon, this species is a tree up to 25 m tall and 20 cm in diameter, known from terra firma forest around 275 m in elevation. It is only known from one collection, thus one occurrence, made in 1927 near Maghounga in the Ngounié province. The species is assessed as CR with only one location circa 30km northeast of Mouila Lot 3. **Likelihood of impacts**: Although the known location of the species is outside the plantations, impacts are considered as possible as the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be critical and likely reduce the global viability of the species.  **Action:** Contingency planning is required for this species because if impacts occur they would be critical and may reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022, identify stands where this species occurs, the species may be upgraded to AC1 and the Project should establish mitigation measures to avoid conversion of these areas and ensure that such areas remain undisturbed.
Plant	*Millettia le-testui (CR)*	AoA: 3 Plantation: none confirmed	2	Likelihood: Possible Consequence: Critical	**Ecology and distribution**: Endemic to Gabon, this species is a woody liana known to occur in gallery forests in savannah, at around 100 m in elevation. It is only known from 2 collections, representing 1 occurrence, made in 1914 in Nyanga valley, near Mavoundi. The species is assessed as CR with only one location circa 50km southwest of the Ndende plantation. **Likelihood of impacts**: Although the known location of the species is outside the plantation areas impacts are considered as possible as the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted.  **Consequence of impacts:** If impacts occurred, they would be critical and likely reduce the global viability of the species. **Action:** Contingency planning is required for this species because if impacts occur they would be critical and reduce the global viability / function of this threatened species. If the plant surveys due to be undertaken in 2022, identify stands where this species occurs, the species may be upgraded to AC1 and the Project should establish mitigation measures to ensure that such areas remain unimpacted by the Project.

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Bird	African Grey Parrot *Psittacus Erithacus*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, 2, 3, Ndende	3	Likelihood: Likely Consequence : Low	**Ecology and distribution:** The African Grey Parrot is an Endangered bird species found through Gabon that typically inhabits dense forest and is commonly observed at forest edges, clearings, gallery forest, mangroves, wooded savannah and cultivated areas. **Likelihood of impact:** The Project will have impacted on this species through habitat loss (and associated food resources and / or nesting habitat) during plantation development. However, African grey parrots are known to cluster in and feed on oil palm e.g., *Elais guineensis* and thus the presence of planted areas may provide a year-round source of food for them and be a positive influence. **Consequence of impact:** It is not anticipated that Project activities will impact significantly on the species, and regional viability is unlikely to be affected. **Action:** This species has been categorized as AC3, but if no control measures are used to limit numbers, then it could potentially be downgraded to AC4. If control measures are required, measures that do not reduce the population should be used.
Mammal	Red Capped Mangabey *Cercocebus torquatus*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, 2, 3, Ndende	3	Likelihood: Likely Consequence : Moderate	**Ecology and distribution:** The Red Capped Mangabey is an Endangered primate species that is restricted to the Atlantic Forest coastal region, mainly occurring in high forest, mangrove, dryland, gallery and swamp forest, and around cultivated areas. The species lives in large groups of up to 100 individuals, and is more terrestrial than most mangabeys, often crossing savannah habitats in large groups. This species is known to occur in all OPG plantations, but its population and distribution are not confirmed. **Likelihood of impact:** The Project has impacted habitat that is likely to have been used by the red capped mangabey. **Consequence of impact:** Impacts to this species could affect the local and potentially regional viability of the population, although populations will remain as the species inhabits multiple habitat types including mangroves that will not be affected by the Project. **Action:** A habitat-based mitigation approach combined with the species-specific mitigation aimed at Central Chimpanzees and Western Gorillas is anticipated to provide appropriate mitigation for this species.
Mammal	White-Bellied Pangolin *Phataginus tricuspis*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, 2, 3, Ndende	3	Likelihood: Likely Consequence : Moderate	**Ecology and distribution:** The White-Bellied Pangolin is an Endangered species whose population is highly fragmented across West and Central Africa, and its distribution highly influenced by hunting activities. This species occurs predominantly in terra firma forest and secondary growth, but also occurs in gallery forest along water courses, and is also known to show a habitat preference for old oil palm (*Elais guineensis)* plantations. **Likelihood of impact:** Any removal of natural forested habitat is likely to have impacted on the resident population of this species. **Consequence of impact:** Significant impacts to this species could affect the local and potentially the regional viability of the population.

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					Action: A habitat-based mitigation approach combined with the species-specific mitigation aimed at Central Chimpanzees and Western Gorillas is anticipated to provide appropriate mitigation for this species.
Bird	Rosy bee-eater *Merops malimbicus*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	3	Likelihood: Likely Consequence : Moderate	**Ecology and distribution**: The Rosy bee-eater is a migratory species listed as Least Concern on the IUCN Red List. The species nests in large colonies of many hundreds of individuals in ground holes dug on savannah grasslands, and frequently returns to the same nesting sites year after year. There are indications that colonies are particularly susceptible to hunting (H. Rainey in litt. 2013). The Gamba Protected Areas complex (that lies circa 40km to the south west of Mouila Lots 1, 2 and 3 and Ndende) is recognized as an important breeding area for this species (Birdlife International, 2021). Savannah habitat in one or more OPG plantations (exact location to be determined) is confirmed as a breeding area for this species (Pers. Comm. Q. Meunier). **Likelihood of Impacts:** At least one of the plantations is confirmed as a breeding area for this species, and therefore it is likely that this species has been impacted by plantation development. **Consequence of impacts:** Impacts are anticipated to be moderate, and local viability may be lost if key breeding sites are planted on, and regional viability may be affected. **Action:** Given that it is savannah habitat that is the critical area for this species, habitat-based mitigation and avoidance of clearing further savannah habitat should suffice to avoid impacts and ensure local population viability.
Mammal	Giant Ground Pangolin *Smutsia gigantea*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	3	Likelihood: Likely Consequence : Moderate	**Ecology and distribution:** The Giant Ground Pangolin is an Endangered species whose population is highly fragmented across West and Central Africa. It occurs in terra firma and gallery forests, swamp forests, forest-savannah mosaic habitats and wooded savannah. The species also persists discontinuously in savannah woodland /agricultural mosaics. The elusive nature of this species means that it will be challenging to confirm its presence in the OPG plantations through traditional monitoring (transects and camera trapping), but a camera trapping study in the Mabounié mine site, circa 40km southeast of the Makouke plantation, confirms the presence of this species in proximity to this plantation (Golder, 2013). **Likelihood of impact:** Any removal of natural forested habitat is likely to have impacted on the resident population of this species. **Consequence of impact:** Significant impacts to this species habitat could affect the local and potentially regional viability of the population. **Action:** A habitat-based mitigation approach combined with the species-specific mitigation aimed at Central Chimpanzees and Western Gorillas is anticipated to provide appropriate mitigation for this species. Recording indirect signs of this species should be incorporated into the ape baseline monitoring activities.

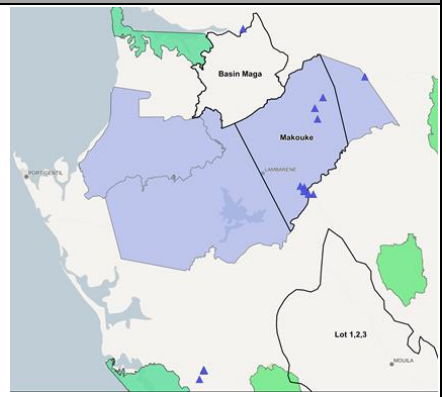
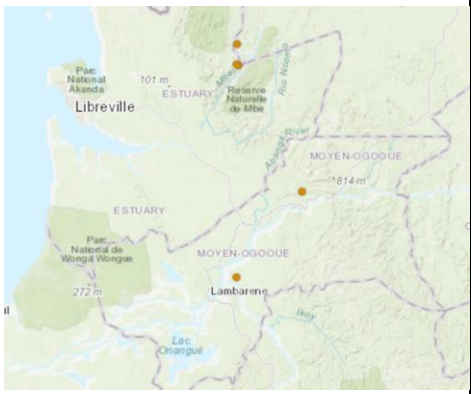
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Crateranthus congolensis* (EN)	AoA: 3 Plantation: Mouila Lot 1	3	Likelihood: Almost certain Consequence: Moderate	**Ecology and distribution**: The species is a small tree up to 15 cm in diameter, known from terra firma forest between 100 and 800 m in elevation. It is endemic to Central Africa occurring in Gabon and the Democratic Republic of the Congo and is known from six collections representing six occurrences of which one occurs within Mouila Lot 1, and a second is circa 3km east of Mouila Lot 3. **Likelihood of impacts**: This plant has been observed within (Lot 1) and adjacent to (Lot 3) the Project area, so it is almost certain this species has been impacted by plantation development. **Consequence of impacts:** If impacts occurred (or have occurred), they would be moderate and likely affect the regional viability of the species. **Action:** Since impacts are likely and the consequences moderate, this threatened species has been identified as AC3, and a habitat-based mitigation approach is considered appropriate to mitigate risks to this species. 
Plant	*Loesenera walker* (VU)	AoA: 3 Plantation: Mouila Lot 1, Mouila Lot 2, Ndende	3	Likelihood: Likely Consequence: Low	**Ecology and distribution**: The species is a tree up to 24 m high found in gallery forest along small streams, sometimes in swampy areas, between 100 and 500 m elevations. The species is endemic to Gabon and known from five herbarium collections and five human observations, representing ten occurrences of which four fall within the Project area – one in Mouila Lot 1, one in Lot 2 and two in Ndende. A further two occurrences lie circa 5 km north of Mouila Lot 1. **Likelihood of impacts**: This plant has been observed within multiple plantations, so it is likely this species has been impacted by plantation development. **Consequence of impacts:** Given that fewer than 50% of known occurrences lie within the Project footprint, consequences of impacts are likely to be low, and while local viability/function may be reduced, regional viability is unlikely to be affected. **Action:** Since impacts are likely but the consequences low, this threatened species has been identified as AC3, and a habitat-based mitigation approach is considered appropriate to mitigate risks to this species. 

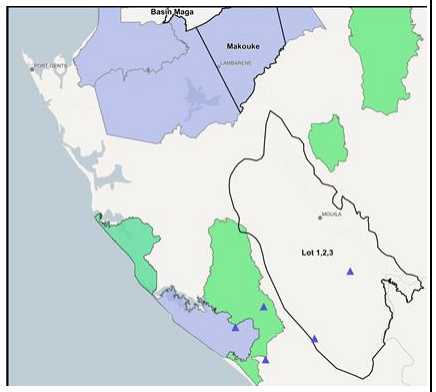
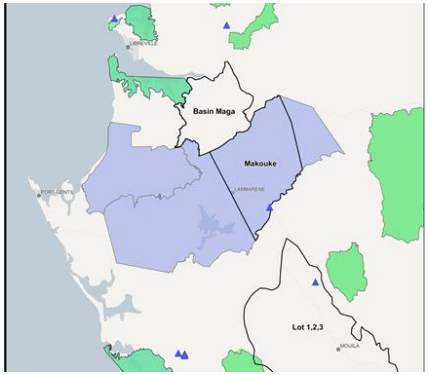
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Diospyros subargentea (VU)*	AoA: 1 & 2 Plantation: none confirmed	3	Likelihood: Likely Consequence : Low	**Ecology and distribution**: The species is a small tree up to 10 m tall and 12 cm in diameter, known from terra firma forest between 40 and 160 m in elevation. It is endemic to Gabon and is known from 18 collections representing 17 occurrences of which two are directly adjacent to the Makouke plantation (circa 1km north). **Likelihood of impacts**: This plant has been observed directly adjacent to the Makouke plantation, so it is likely that the species has been impacted by conversion of natural habitat to oil palm plantation. **Consequence of impacts:** If impacts occur (or have occurred), they would be low and may lead to local viability being lost, but regional viability is unlikely to be affected. **Action:** Since impacts are likely and the consequences moderate, this threatened species has been identified as AC3, and habitat-based mitigation is considered appropriate to mitigate risks this species. 
Plant	*Anthonotha stipulacea (LC)*	AoA: 1,2,3 Plantation: Awala, Mouila Lot 1	3	Likelihood: Almost certain Consequence : Low	**Ecology and distribution**: The species is an annual shrub known to grow in terra firma forests in Gabon and Equatorial Guinea, and is not a habitat specialist. It has recently been downgraded from NT to LC because since 2012 eleven collections of the species were made throughout Gabon increasing its distribution, and EOO is now calculated as 48,840 km^2. One occurrence of this species is found in the Awala plantation, with a further two on the western and northern edges of Mouila Lot 1. While no occurrences are found directly within the Makouke plantation, it has been found adjacent to the north, east, south and west of this plantation. **Likelihood of impacts**: This plant has been observed both within and directly adjacent to multiple OPG plantations, so it is almost certain this species has been impacted by plantation development. **Consequence of impacts:** If impacts occurr (or have occurred), they would be of low consequence due to the widespread distribution of the species and while local viability may be reduced, regional viability is unlikely to be affected. **Action:** Since impacts are almost certain but the consequences low, this species has been identified as AC3 and habitat-based mitigation for terra firma forest are considered appropriate to mitigate risks. 

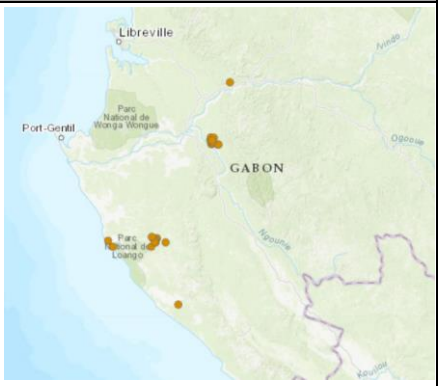
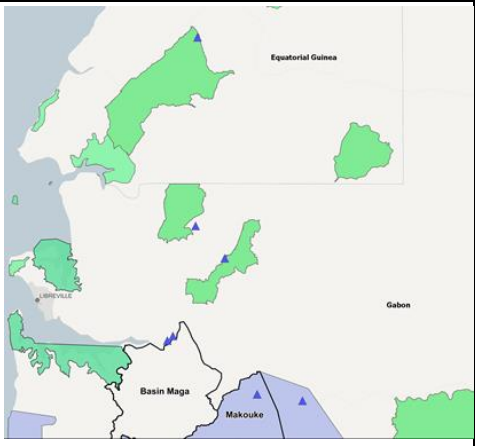
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Tarenna ogoouensis (EN)*	AoA: 1 Plantation: Awala	3	Likelihood: Likely Consequence: Moderate	**Ecology and distribution**: The species was assessed as CR following the IUCN methodology in 2020 (MBG), with 1 location. However, since 2020, four collections of the species were made in Gabon, increasing its distribution. It is a small shrub up to 2 m tall, known from riparian forests, between 10 and 170 m in elevation. It is endemic to Gabon and is known from five collections representing five occurrences of which two fall within the Awala plantation. **Likelihood of impacts**: This plant has been observed directly within the plantation (MBG 2020- see map below for location of this species within the planted area footprint). Although measures are in place to protect 50m of riparian buffers, riparian forest may extend further than this from riverbanks, so it is likely that the species has been impacted by the conversion of natural habitat. **Consequence of impacts:** Impact consequences are anticipated to be moderate – local viability may be lost, and regional viability may be affected. **Action:** If impacts occur (or have occurred) it is not anticipated that the consequences would be significant. General habitat-based measures for riparian forest are considered appropriate to mitigate risks to this species.  

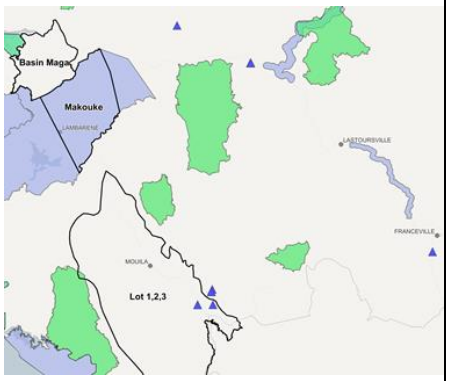
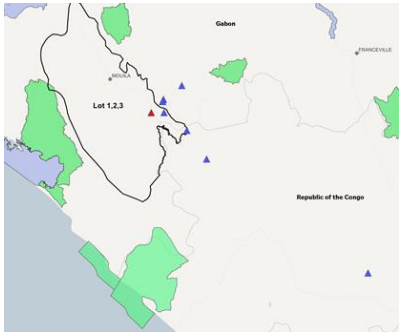
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Diospyros cleistantha (VU)*	AoA: 2 & 3 Plantation: Ndende	3	Likelihood: Almost certain Consequence: Low	**Ecology and distribution**: The species is a tree up to 10 m tall, known from periodically flooded forests and rarely the undergrowth of terra firma forest, between 140 and 200 m in elevation. It is endemic to Central Africa, occurring in Gabon, Equatorial Guinea, and Cameroon. It is known from ten collections representing 8 occurrences, of which two fall within the Ndende plantation. A third occurrence is found circa 10km northeast of Makouke.  **Likelihood of impacts**: This plant has been observed directly within and also adjacent to (circa <10km) OPG plantations, it is very likely this species has been impacted by plantation development. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected, regional viability is unlikely to be affected. **Action:** This species is assigned AC3 status, because if impact does occur it is anticipated that the consequences would be moderate. General habitat-based mitigation measures for terra firma forest are considered appropriate to mitigate risks to this species.
Plant	*Guibourtia tessmannii (EN)*	AoA: 1 & 3 Plantation: Awala	3	Likelihood: Likely Consequence: Low	**Ecology and distribution**: Assessed in 2021, this large hermaphrodite and polyploid species of tree reaches 60 m in height, growing on well-drained soil in terra firma forest. It is distributed from Cameroon to Gabon and has an estimated extent of occurrence of over 265,000 km^2. The species has high commercial and social importance and is under significant pressure from illegal logging mainly because of the global demand for rosewood timber. In addition, subpopulations are sensitive to hunting pressures on the seed dispersers they rely upon for regeneration (primates and hornbills). One occurrence is located circa 15km southwest of Awala plantation, and a second circa 15km northeast of Mouila Lot 2. In addition, MBG confirmed the presence of this species in Awala during their inventory.  **Likelihood of impacts**: Impacts are considered as likely – the species is confirmed in Awala and is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Mouila plantation, but its presence, and thus risk of impact in the latter, remains unconfirmed until botanic inventories are conducted in the remaining plantations. **Consequence of impacts:** Impact consequences are anticipated to be low. The species appears to be found in a wide range of locations across Central Africa, so while local viability may be impacted, regional viability is unlikely to be affected. **Action:** This species is assigned AC3 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.

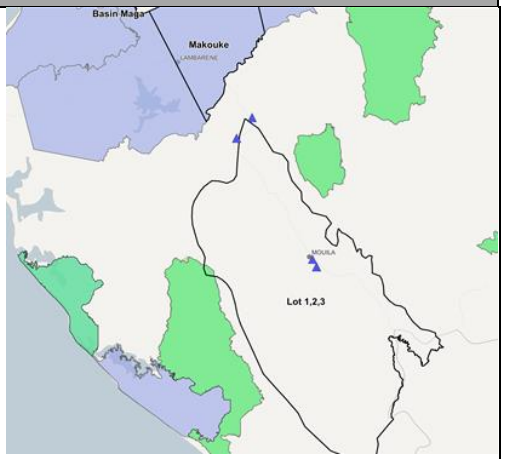
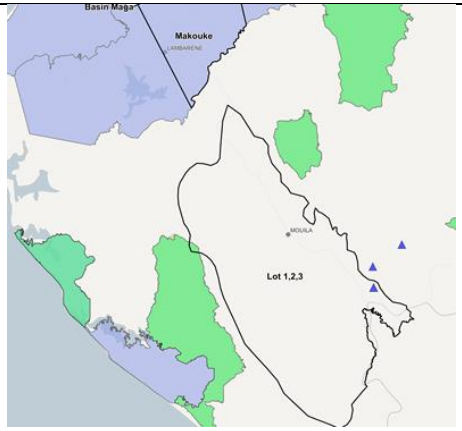
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Bird	African River Martin *Pseudochelidon eurystomina*	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	4	Likelihood: Unlikely Consequence : Low	**Ecology and distribution:** The African River Martin is a migratory species listed as Data Deficient on the IUCN Red List. The species breeds in large colonies (up to c.800 individuals) along forested rivers, on islands with sandy shores, on beach ridges in coastal savannah and sandy grassland areas within coastal forest-savannah mosaic. Nest holes are dug into sandbars which are exposed when river levels are low. Outside the breeding season it roosts in reed-beds or riverine vegetation. **Likelihood of impact:** Likelihood of impact is low because Project impacts are likely to be terrestrial in nature and this species is largely confined to river systems for breeding. Furthermore, the riparian buffer approach applied by the Project will minimize impacts to the river system. **Consequence of impact:** If impact occurred it is not anticipated that the consequences would be significant for this species, and while local viability/function of the species may be reduced, regional viability is unlikely to be affected. **Action:** Habitat-based measures put in place to create riparian buffers should be sufficient to protect this species.
Fish	34 migratory fish species (8 species in Awala; 16 in Makouke and 32 in Mouila Lots 1-3 and Ndende)	AoA: 1,2,3 Plantation: Awala, Makouke, Mouila Lot 1, Mouila Lot 2, Mouila Lot 3, Ndende	4	Likelihood: Unlikely Consequence : Moderate	**Ecology and distribution:** The 34 migratory fish found within the Project area are all Potamadromous freshwater migrants listed as Least Concern on the IUCN Red List. Potamodromous fish are born in upstream freshwater habitats, then migrate downstream (still in freshwater) as juveniles to grow into adults before migrating back upstream to spawn. **Likelihood of impact:** Impacts are not anticipated because Project mitigation measures are designed to protect riparian habitat. Furthermore, direct impacts to the aquatic environment from irrigation are expected to be negligible, since the approach taken by OPG is precautionary, real time monitoring of flows will be implemented, and biodiversity-friendly grills and mesh used at pump entries to avoid injury or death to fish. **Consequence of impact:** If impact occurred it is not anticipated that the consequences would be significant for these species, and while local viability/function of these species may be reduced, regional viability is unlikely to be affected. **Action:** Habitat-based measures put in place to avoid impacting restricted range and *Aphyosemion* / *Epiplatys* species should be sufficient to also ensure the avoidance of impacts to migratory species, including their reproduction sites.

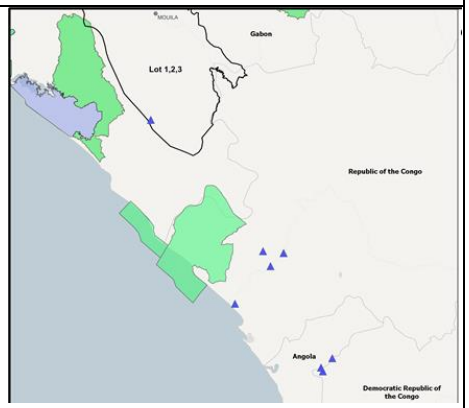
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Eugenia ogoouensis (VU)*	AoA: 1 & 2 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: The species is a small tree up to 5 cm in diameter, known from mature or secondary terra firma forest, riverside forest, flooded forest, and swamp forest, between 10 and 110 m in elevation. It is endemic to Gabon and is known from 22 collections representing 21 occurrences. One of these occurrences is located circa 3km east of the Awala plantation, while five are located circa 20km south and 3 located circa 20km east of the Makouke plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat in proximity to (within 30 km) the Mouila Lot 1 plantation and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected, regional viability is unlikely to be affected. **Action:** Since impacts are unlikely and the consequences low, this Vulnerable species has been identified as AC4, meaning the Project should remain aware of its presence, but no specific action is required. 
Plant	*Combretum exellii (VU)*	AoA: 2 Plantation: Makouke	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: Assessed in 2020, this species is a large liana that grows in terra firma forests. While no occurrence data is recorded on the IUCN Red List, the estimated extent of occurrence is 15,564 km^2 and the estimated area of occupancy 32 km^2. Although both values may be an underestimate due to under-collection, Onana (2013) reports that this species is quite rare and has a reduced area, and the true AOO is suspected not to exceed 2,000 km^2. Known from 8 specimens, one is located within the Makouke plantation. **Likelihood of impacts**: This plant has been observed within the Makouke plantation where minimal habitat has been cleared by the Project, therefore it is unlikely that the species has been impacted by habitat loss. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be impacted, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because impacts are unlikely and it is not anticipated that the consequences would be significant. Therefore general habitat-based mitigation measures for lowland terra firma forest are considered appropriate to mitigate risks to this species. 

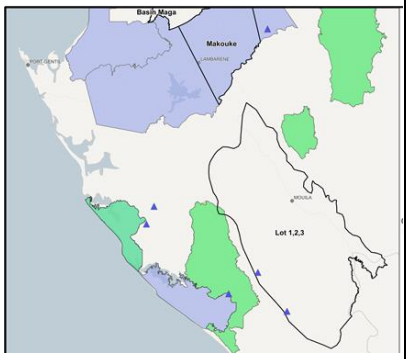
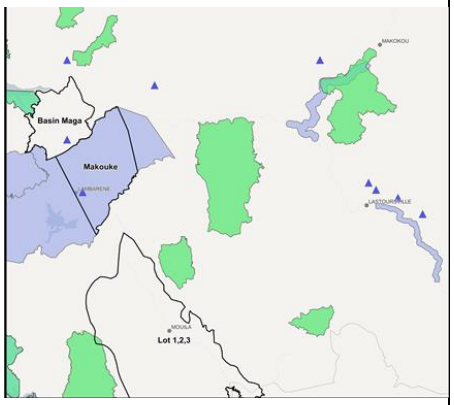
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Croton tchibangensis (EN)*	AoA: 3 Plantation: Ndende	4	Likelihood: Unlikely Consequence: Moderate	**Ecology and distribution**: The species is a shrub or small tree to 10 m tall, known from forest edges, gallery forests surrounded by savannah, and shrubby dolines, between 30 and 300 m in elevation. It is endemic to Gabon and known from six collections representing five occurrences of which one falls within the Ndende plantation, and a second is circa 30km to the south of Ndende. **Likelihood of impacts**: This plant has been observed directly within and also adjacent to (within 30km) the Ndende plantation. However it is restricted to gallery forest and dolines, both of which have not been cleared for development so it is unlikely this species has been impacted by plantation development. **Consequence of impacts:** Impacts are anticipated to be moderate, the Project will impact some of the population at one location thereby affecting local viability and maybe regional viability. 
Plant	*Dactyladenia librevillensis (VU)*	AoA: 2 & 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: The species is a tree up to 15 m tall, known from terra firma forest, and the edge of swamp forest, between 10 and 600 m in elevation. The species is endemic to Gabon and is known from 13 collections representing 9 occurrences of which one is located circa 10km northeast of Mouila Lot 2, and a second is located circa 40km southeast of the Makouke plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected. **Action:** Since impacts are possible but consequences low, this species has been identified as AC4, meaning the Project should remain aware of its presence, but no specific action is required. 

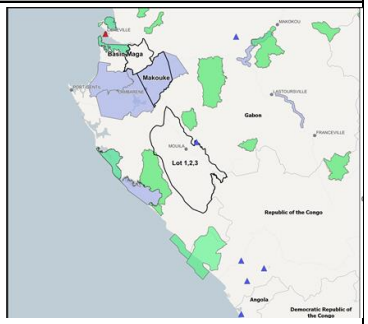
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Diospyros rabiensis (VU)*	AoA: 2 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: Assessed in 2021, this Gabon endemic tree species grows up to 28 m tall and 59 cm in diameter, occurring in primary and old secondary terra firma forests between 10 and 300 m elevation. It is known from 38 collections made between 1990 and 2012, which represent 27 occurrences and five subpopulations. Seventeen of these collections were recorded from the Mabounié mine site, circa 40km southeast of the Makouke plantation. The majority of the remaining occurrences are located circa 100+km west of the Mouila Lots. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in OPG plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be low and while local viability may be affected, it is unlikely to reduce the regional viability of the species. **Action:** Since impacts are possible but consequences low, this species has been identified as AC4, meaning the Project should remain aware of its presence, but no specific action is required. 
Plant	*Justicia tigrina (Champluviera nuda)* (VU)	AoA: 2 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: Endemic to Gabon, this aquatic plant species is found in shady areas in the border of rivers. It is now known from seven occurrences, two of which are located circa 10km northeast of the Awala plantation, and a third circa 40km southeast. **Likelihood of impacts**: Impacts are considered unlikely since even if the species is confirmed as present in plantations by future inventories, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because **i**f impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required. 

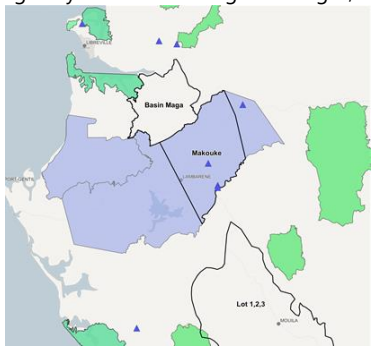
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Inversodicraea annithomae* (EN)	AoA: 3 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: This aquatic plant species, endemic to Gabon, only grows in waterfalls and rapids. It is known from 28 collections representing 25 occurrences of which 5 are located circa 30km east of the Ndende plantation. **Likelihood of impacts**: Impacts are considered unlikely since the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, even if the species is confirmed as present in plantations by future inventories, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon. If impacts occur, they may reduce local viability but regional viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.
Plant	*Inversodicraea paulsitae* (VU)	AoA: 3 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: This aquatic plant species, endemic to Gabon, only grows in waterfalls and rapids. It is known from 12 collections representing 12 occurrences, 6 of which are located 20-50km East of the Ndende plantation. **Likelihood of impacts**: Impacts are considered unlikely since the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, even if the species is confirmed as present in plantations by future inventories, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a range of locations across Gabon, and while local viability may be reduced, regional viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.

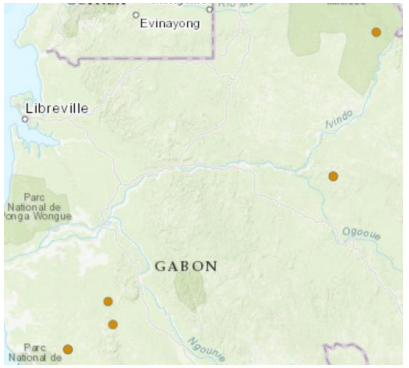
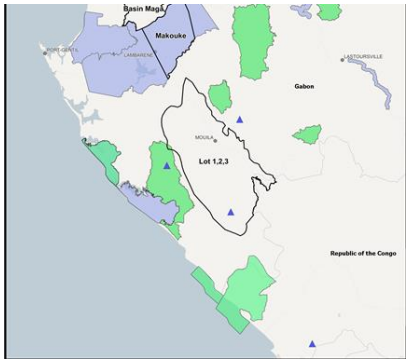
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Ledermanniella* sp. nov. 1 stamen (EN)	AoA: 3 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: This is a new species of Podostemaceae identified recently, and only known from the Ngounié river. It is endemic to Gabon and known from 20 collections representing 7 occurrences, of which 2 are found adjacent to Mouila Lot 3 (within 5km). **Likelihood of impacts**: Impacts are considered unlikely since the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, even if the species is confirmed as present in plantations by future inventories, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required. 
Plant	*Ledermanniella* aff. *pygmaea* sp. nov. 2 (EN)	AoA: 3 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Low	**Ecology and distribution**: This is a new species of Podostemaceae identified recently. It is endemic to Gabon and known from 20 collections representing 6 occurrences, of which 4 are located circa 30km East of the Ndende plantation. The 2 other occurrences are within 50km, and this species is only known from the Ngounié river. **Likelihood of impacts** Impacts are considered unlikely since the species is restricted to waterfalls and rapids and there are no such locations known within OPG plantations, so it is highly unlikely this species is present. Furthermore, even if the species is confirmed as present in plantations by future inventories, the Project has mitigation measures in place to create riparian buffers along riverbanks. **Consequence of impacts:** Impact consequences are anticipated to be low since there are 6 occurrences of this species outside OPG plantations, so while local viability might be impacted, regional viability is unlikely to be affected. 

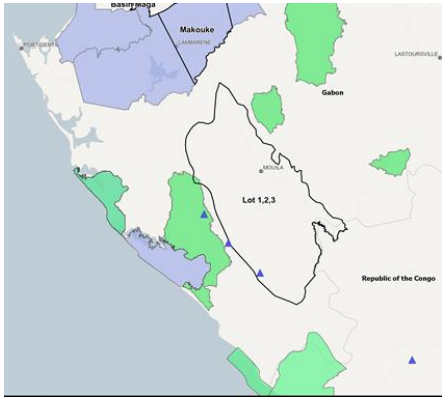
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					Action: This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.
Plant	*Cynometra letestui (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: A riparian species that grows in gallery forest up to 20 m high found up to 500 m elevation. The species occurs in Gabon, the Republic of the Congo, the Democratic Republic of the Congo, and Angola. It is known from nine available collections representing seven occurrences of which one is circa 40km southwest of the Ndende plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Ndende plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, and therefore local viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.
Plant	*Calpocalyx brevifolius (VU)*	AoA: 3	4	Likelihood: Possible	

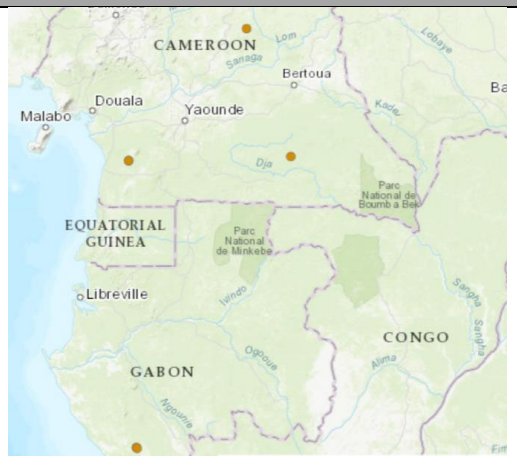
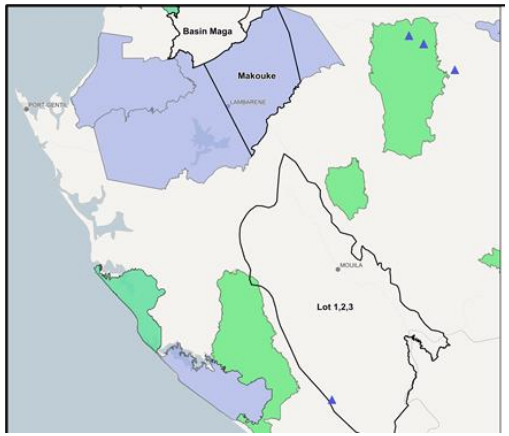
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
		Plantation: none confirmed		Consequence: Low	**Ecology and distribution**: The species is a large tree up to 40 m high and 80 cm in diameter known from secondary or mature rainforests, gallery forests in savannah landscapes interspersed with forests, and riverside forests between 50 and 250 m in elevation. The species is endemic to Gabon and known from 6 collections representing six occurrences of which two are circa 40km southwest of the Ndende plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Ndende plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required. 
Plant	*Oddoniodendron normandii (VU)*	AoA: 1 & 2 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: The species is a non-timber tree of 15-45 m high and 60-80 cm in diameter, found in terra firma forest, up to 500 m elevation. It is endemic to Gabon and is known from 10 collections representing 9 occurrences of which one is circa 15km South and a second is 20km West of the Makouke plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Makouke plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be impacted, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required. 

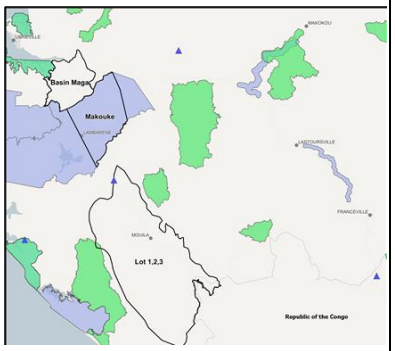
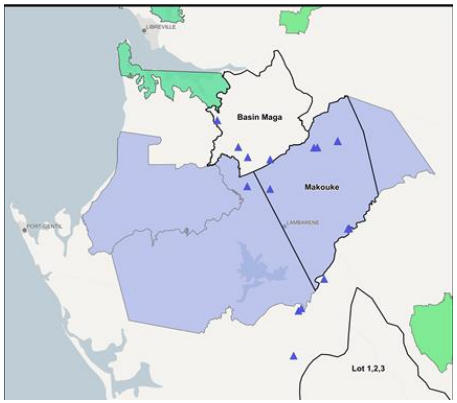
Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Rothmannia jollyana (VU)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Low	**Ecology and distribution**: The species is a treelet up to 5 m tall, known from the undergrowth of terra firma forest, between 300 and 600 m in elevation. It is endemic to Gabon, Republic of the Congo and Angola known from 7 collections made between 1876 - 1987. The Libreville occurence is considered extirpated because of urbanization and the fact it hasn't been found since 1891 despite Libreville being one of the best-collected areas in Gabon. The 6 available collections represent 6 occurrences of which one is located circa 25km northeast of Mouila Lot 3.  **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Mouila plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low – the species appears to be found in a wide range of locations across Gabon, so while local viability may be impacted, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated to be significant. The Project should remain aware of its presence, but no specific action is required.
Plant	*Cnestis macrophylla (EN)*	AoA: 2 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: Assessed in 2020, this relatively rare liana species grows in terra firma forest in Gabon, Cameroon, and Nigeria. While no occurrence data is recorded on the IUCN Red List this species has an estimated extent of occurrence 218,106 km2 (outside the threshold for a threatened category under criterion B), but the area of occupancy of 16 km^2 is below the threshold for an Endangered category. The species is known from four collections, one of which is located circa 40km south of the Makouke plantation.  **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Makouke plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be moderate – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected.

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					Action: This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2.
Plant	*Dactyladenia jongkindii (VU)*	AoA: 2 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Moderate	**Ecology and distribution**: The species was assessed as EN following the IUCN methodology in 2020 (MBG), with 5 locations. However, since 2020, more information is available for this tree known from terra firma and gallery forest and mangrove fringes, between 0 and 350 m in elevation and it is now classed as VU. It is endemic to Gabon and is known from nine collections representing eight occurrences, of which one is located circa 5km east of Makouke plantation. **Likelihood of impacts**: Impacts are considered as unlikely – the species is known to occupy similar habitat in proximity to (within 5km) the Makouke plantation but does not occur within the plantation. **Consequence of impacts:** Impact consequences are anticipated to be moderate – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because impacts are unlikely and anticipated to be moderate. 
Plant	*Pseudohydrosme gabunensis (EN)*	AoA: 1 Plantation: none confirmed	4	Likelihood: Unlikely Consequence: Moderate	**Ecology and distribution**: Assessed in 2020 this species is a herb with a cylindrical rhizome that occurs in Gabon and potentially in the Republic of the Congo. The species occurs in shady areas within forests, on well drained or loamy soil, and is able to undergo vegetative propagation, with new plants able to develop from the roots at some distance from the main rhizome. It is known from 4 locations, one of which is located on the eastern periphery of the Awala plantation. **Likelihood of impacts**: Impacts are considered as unlikely – the species is known to occupy similar habitat in close proximity to (within 1-2 km) the Makouke plantation and is therefore likely to occur in the plantation but OPG have not clearer any natural habitat in this plantation. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					Consequence of impacts: Impact consequences are anticipated to be moderate – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because impacts are unlikely and anticipated to be moderate.
Plant	*Beilschmiedia calcitranthera (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: Assessed in 2019, this tree species of unknown height is endemic to Gabon and only known from five scattered localities in terra firma forest, two of which are located circa 30km southwest of Mouila Lot 1. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat in proximity to (within 30 km) the Mouila Lot 1 plantation and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be moderate – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2.
Plant	*Tapura le-testui (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: The species is a tree with a trunk up to 40 cm in diameter, known from terra firma forest, between 400 and 800 m in elevation. It is endemic to Central Africa, occurring in Gabon and the Republic of the Congo. It is known from five collections representing 4 occurrences of which one is located circa 25km south of Ndende, and a second circa 50km east of Mouila Lot 2. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat in proximity to (within 25-50 km) the Ndende and Mouila Lot 2 plantations and is therefore likely to occur in the plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be moderate and while local viability may be reduced, regional viability is unlikely to be affected. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
					Action: This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2.
Plant	*Cynometra nyangensis (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: The species is a tree up to 25 m tall and up to 60 cm in diameter, found in gallery and swampy forests, up to 300 m elevation. It occurs in Gabon and the Republic of the Congo and is known from four collections representing four occurrences three of which are located circa 50km southwest of Mouila Lots 2 and 3 and Ndende. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat to the West of OPG plantations and is therefore likely to occur in OPG plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be moderate – the species appears to be found in several locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2.
Plant	*Beilschmiedia cinnamomea (EN)*	AoA: 3	4	Likelihood: Possible	

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
		Plantation: none confirmed		Consequence: Moderate	**Ecology and distribution**: Assessed in 2019, this tree species of unknown height grows in terra firma forest and is only known from four scattered localities in Gabon and Cameroon, the two closest of which are located circa 75km southwest of the Ndende plantation in Moukalaba Doudou National Park. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in OPG plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be moderate and may reduce the regional viability of the species. **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2. 
Plant	*Synsepalum nyangense (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: The species is a tree up to 35 m tall, known from terra firma forest, between 200 and 700 m in elevation. It is endemic to Gabon and known from 10 collections representing four occurrences of which one is located circa 45km southwest of Ndende. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in OPG plantations, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** anticipated to be moderate – the species appears to be found in a range of locations across Gabon, so while local viability may be affected, regional viability is unlikely to be impacted. **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Gilbertiodendron limosum (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: The species presents as a riparian tree in gallery forest, or a ramose shrub partially submerged in floods, found up to 500 m elevations. It occurs in Gabon and the Republic of the Congo and is known from four herbarium collections representing four occurrences of which one is located circa 30km north of Mouila Lot 1 and Lot 2. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat elsewhere in the region and is therefore likely to occur in the Ndende plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be moderate – the species appears to be found in a wide range of locations across Gabon, so while local viability may be affected or even lost, regional viability is unlikely to be affected.  **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2.
Plant	*Diospyros subargentea (VU)*	AoA: 1 & 2 Plantation: none confirmed	4	Likelihood: Possible Consequence: Moderate	**Ecology and distribution**: The species is a small tree up to 10 m tall and 12 cm in diameter, known from mature or secondary terra firma forests, between 40 and 160 m in elevation. It is endemic to Gabon and is known from 18 collections representing 17 occurrences of which 2 are located directly north of (<5km) the Makouke plantation. **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat in proximity to the Makouke plantation and is therefore likely to occur in the plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** If impacts occurred, they would be moderate and likely impact the local and maybe regional viability of the species. **Action:** This species is assigned AC4 status, because likelihood is only possible and impacts anticipated to be moderate. However, if botanic inventories confirm its presence in a plantation, it may be moved to AC3 or AC2. 

Group	Species	Relevant AoA & Plantation	Action Category	Likelihood & Consequence Descriptors	Summary Justification for Categorisation
Plant	*Autranella congolensis (EN)*	AoA: 3 Plantation: none confirmed	4	Likelihood: Possible Consequence : Low	**Ecology and distribution**: Assessed in 2021, this large tree is distributed from southeastern Nigeria to the DRC and Angola in terra firma forest. Although widespread with an extent of occurrence (EOO) over 2.4 million km^2, the species is quite rare and mainly threatened by overexploitation for timber that is often unsustainable. In addition the species has unfavourable ecological and demographic indicators (low density, slow growth, natural regeneration problems, etc.). One occurrence of this species lies within 5km of the Ndende plantation.  **Likelihood of impacts**: Impacts are considered as possible – the species is known to occupy similar habitat in proximity to the Ndende plantation and is therefore likely to occur in the Ndende plantation, but its presence, and thus risk of impact, remains unconfirmed until botanic inventories are conducted. **Consequence of impacts:** Impact consequences are anticipated to be low. The species appears to be found in a wide range of locations across West and Central Africa, so while local viability may be impacted, regional viability is unlikely to be affected. **Action:** This species is assigned AC4 status, because if impact does occur it is not anticipated that the consequences would be significant. The Project should remain aware of its presence, but no specific action is required.

Table 5: Prioritisation of Natural Habitat

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Lowland terra firma forest	1	Likelihood: Likely Consequence: Moderate	**7 animal species** (Central Chimpanzee, Western Gorilla, Forest Elephant, Red Capped Mangabey, White-Bellied Pangolin, Giant Ground Pangolin, African Grey Parrot). Up to **27 plant species**	**Ecology and distribution:** The classification of forests in Gabon is an on-going process that is being refined based on genetic, floristic and other studies. Lowland terra firma forest has a limited distribution along the coast of Gabon, and is characterised by a high proportion of endemic plants (Senterre 2005). However, lowland terra firma forest is a broad-scale characterisation that masks significant local variation strongly influenced by the logging history of Gabon's coastal forest (Boupoya *et al.* 2017). It ranges from pockets of unique and highly threatened habitat (typically areas that have not been exploited for timber and with a high level of endemism, and that are under-represented in the Gabonese protected areas network), to widespread areas of heavily logged lowland terra firma whose composition has been significantly impacted (e.g., *Aukoumea klaineana* lost in many areas). Lowland terra firma forest is present in all OPG plantations, but there is no way to know what types of lowland terra firma forest were present in the OPG plantations pre-clearance (although the MBG inventories will indicate which types of lowland terra fima forest remain in set asides, which may give a good indication of what was cleared), and whether they are rare or common, although OPG prioritized heavily logged and degraded forest for clearance (Q Meunier pers comm). There is increasing evidence for a zone of endemism that includes the lower-lying forests either side of the Ngounié River (Bidault *et al*. 2014), encompassing the regions of Mouila Lots, 1,2 and 3, Ndende, and likely Makouke, and lowland terra firma forest has been assessed as qualifying as CH in the CHA. Furthermore, many CH-qualifying species are present in this habitat, making it a high priority for impact avoidance and minimization measures. **Likelihood of impact:** This habitat has likely been impacted by the Project and been cleared to develop the planted area footprint, primarily in Awala and Mouila Lots 1 and 2. **Consequence of impact:** Loss of this habitat could affect the local and potentially regional viability of the CH-qualifying species that depend upon it, as well as threatening the habitat itself. **Action:** This habitat qualifies for Action Category 3 because the consequence of impact is moderate. It has however been promoted to AC1 due to the dependence of 3 CH qualifying and highly charismatic species on it (Central Chimpanzee, Western Gorilla and Forest Elephant), all listed as AC1. Whilst the Project impacts represent a comparatively small loss to the total estimated population of each of these species in Gabon, all three populations are threatened by habitat loss and hunting and protecting their principal habitat must be a priority.

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Gallery Forest[1]	2	Likelihood: Unlikely Consequence: Critical	**10 Plant species** (*Psychotria acutigemma* subsp. *couvreuriana; Cassipourea* sp. Nov; *Loesenera walker; Millettia le-testui; Croton tchibangensis; Tarenna ogoouensis; Cynometra nyangensis; Cynometra letestui; Gilbertiodendron limosum; Dactyladenia jongkindii*) **11 fish species** (restricted range) associated with swamp forest and small streams (*Aphyosemion hera; A. hofmanni; A. citrineipinnis; A. exigoideum; A. ocellatum; A. primigenium; A. joergenscheeli; A. wuendschi;*	**Ecology and distribution:** HCV assessments by ProForest (2011-2018) identified gallery forest as present in Mouila Lot 1, Mouila Lot 3 and Ndende. However, the same assessments confirmed all 6 plantations as having rivers and streams present, indicating gallery forest is almost certainly present in Awala, Makouke and Mouila Lot 2. Furthermore, the MBG botanic inventory of Awala (MBG 2020) confirmed gallery forest species are present in this plantation (*Tarenna ogoouensis*), while the CHA (TBC 2021) confirmed that gallery forest species are present in Makouke (*Dactyladenia jongkindii*) and Mouila Lot 2 (*Gilbertiodendron limosum, Cynometra nyangensis*, and *Loesenera walker*). We therefore consider gallery forest to be present in all plantations. However, expert consultation confirms that there are two different types of gallery / riparian forest within OPG plantations – those that are associated with savannah ecosystems (specifically Mouila Lot 3 and Ndende); and those that are contiguous with terra firma forest blocks. The former is a unique ecosystem with a specific species composition that includes multiple rare plant species; the latter exhibits much greater heterogeneity and typically doesn't include rare plant species. To avoid confusion, in all other documents we refer to gallery habitat associated with savannah (in Mouila Lot 3 and Ndende) as "gallery forest"; and gallery habitat associated with terra firma forest (in Awala, Makouke, Mouila Lot 1 and 2) as "riparian habitat". Gallery forest and riparian habitat are characterized by circa 50 m wide strips along rivers and streams, and typically consist of closed-canopy rainforest with trees up to 25 m high. Riparian habitat in the Bas Ogooué region (where Makouke is located) is known to be rich in rare and threatened species. Gallery and riparian forests are not considered threatened, but are habitats upon which several priority plants depend. **Likelihood of impact:** Impacts to this habitat are considered unlikely, since the Project has mitigation in place to ensure a minimum 50 m buffer between watercourses and planted areas. However, only long-term monitoring will demonstrate whether or not plantation development affects the viability of gallery forests.

[1] Expert consultation confirms there are two different types of gallery / riparian forest within OPG plantations – those associated with savannah ecosystems, and those contiguous with terra firma forest blocks. The former is a unique ecosystem with specific species composition that includes multiple rare plant species; the latter exhibits greater heterogeneity and typically doesn't include rare plant species. To avoid confusion, we refer to gallery habitat associated with savannah (in Mouila Lot 3 and Ndende) as "gallery forest"; and gallery habitat associated with terra firma forest (in Awala, Makouke, Mouila Lot 1 and 2) as "riparian habitat".

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
			Epiplatys huberi; Plataplochilus chalcopyrus; *P. miltotaenia*) **5 animal species** (Central Chimpanzee, Western Gorilla, Forest Elephant, Red Capped Mangabey, Giant Ground Pangolin, African Grey Parrot)	**Consequence of impact:** For plant species that are primarily restricted to gallery forest then impacts could be critical and potentially reduce the global viability of these species. Gallery forest is also critical for many small-bodied restricted range fish species associated with small streams, for which impacts could be major and reduce regional and / or global viability. Impacts are not anticipated to be significant for priority animal species that utilize savannah woodland and gallery forest since it is habitat that does not typically represent core area for any of the animal species listed. **Action:** This habitat qualifies for Action Category 2 because although impacts are unlikely, the dependence of multiple CH qualifying plant and fish species means that avoiding impacts to this habitat needs to be a priority, and long-term monitoring will be required to demonstrate that plantation development does not affect the viability of gallery forests.

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Mangrove	2	Likelihood: Unlikely Consequence: Major	**Up to 28 restricted range, migratory or threatened fish species**, including the mud skipper fish. **1 plant species** (*Dactyladenia jongkindii*) is also found on the fringes of this habitat **4 animal species** (Slender Snouted Crocodile, Central Chimpanzee, Western Gorilla, Red Capped Mangabey,)	**Ecology and distribution:** Mangroves consist of closed to open (100–40) % semi-deciduous high trees on permanently flooded land, in saline water. In Gabon mangroves are predominantly made up of *Rhizophora sp* - a genus of tropical mangrove trees, sometimes collectively called true mangroves. Mangroves are known to provide refuge and nursery grounds for juvenile fish, crabs, shrimps, mollusks, and other invertebrates, and are particularly important to CH qualifying mudskipper fish that are adapted to an aquatic-terrestrial life, and who hunt almost exclusively on land feasting on insects, small crustaceans, and worms. Red capped mangabeys occur exclusively within 300km of the coast and frequently colonize wetlands, spending up to 25% of their time in mangrove forest for feeding and resting, particularly in the rainy season (Head *et al.*, 2019). Both great apes also use mangrove areas as refuge (Head *et al.*, 2019). Mangroves are only found in the northernmost part of Awala in a designated set aside (Q. Meunier pers comm). Mangrove in Central Africa is classed as Least Concern by the IUCN and is not CH, but it is important habitat for multiple CH qualifying species. **Likelihood of impact:** Impacts to mangrove habitat are not anticipated because the Project has classed mangrove habitat as a conservation zone. Furthermore, such terrain is unlikely to provide suitable planting habitat for oil palm. **Consequence of impact:** If impacts were to occur they could be significant for many fish species due to their role as nurseries during breeding. Impacts to these restricted range species could be major and reduce regional and / or global viability or function. Botanic inventories are required to confirm the distribution of - and plant species associated with - mangrove habitat in the Project plantations. **Action:** Contingency planning is required for this habitat because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of the CH qualifying species that rely on it. The Project must ensure there are sufficient buffer zones between planted areas and mangroves and that these areas remain unpolluted and undisturbed.

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Dolines	2	Likelihood: Unlikely Consequence: Major	**1 plant species** (*Croton tchibangensis*)	**Ecology and distribution:** Dolines are flooded or wet depressions in the landscape formed by erosion of the karst bedrock with a clay soil layer which retains water, and the habitat is unique in Gabon. They are under-studied, but the Ndende region appears to support the largest number of dolines in Gabon. They have a variety of forms with varying amounts of water and woody vegetation (Bidault *et al.* 2017). Dolines are found scattered throughout the savannah area of Mouila Lot 3, especially in the south, and in large numbers in the Ndende plantation. Dolines have been assessed as a rare and threatened ecosystem in Gabon (Tropicos / Missouri Botanical Garden 2021) and qualify as CH in this assessment. One priority plant species has been identified as present in this habitat, although it is also known from forest edges and gallery forests surrounded by savannah, so could not be considered a doline endemic. **Likelihood of impact:** Impacts are considered as unlikely because dolines were classed as HCV 3 (ProForest 2015-2017) and were not planted because of that, however planted areas occur around them, which may have restricted connectivity. Planned irrigation is not anticipated to have an impact on dolines since irrigation of adjacent rivers will only occur in the dry season when there is no connectivity between rivers and dolines. Similarly, the irrigation approach is precautionary enough that groundwater is not expected to be impacted. **Consequence of impact:** Dolines are recognized as a CH-qualifying threatened ecosystem, therefore if impacts occur they are likely to be major and regional viability/function is likely to be reduced. **Action:** Contingency planning is required for dolines because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of this threatened habitat. It is also important to note that sampling of plants in dolines is extremely limited, and so the Action Category for this habitat may be upgraded to AC1 as more information becomes available as a result of MBG's botanic inventory.

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Freshwater habitats	2	Likelihood: Unlikely Consequence: Major	**4 animal species** (Slender Snouted Crocodile, River Martin, Siphontail Dragonfly, Ogowe River Frog) **58 fish and 3 shrimp species** **8 freshwater plant species** (*Ledermanniella pygmaea, L. letestui, L. aff. pygmaea sp. nov. 2, L. sp. nov. 1 stamen; Inversodicraea gabonensis, I. annithomae; I. paulsitae Justicia tigrina (Champluviera nuda)*)	**Ecology and distribution:** Freshwater habitat refers to the main rivers and the tributaries of the Ogooué (Makouke), Ngounie (Mouila Lots 1-3 and Ndende) and Komo (Awala), as well as both permanently and seasonally inundated habitat found within the plantations. Freshwater habitat is not threatened and does not qualify as a priority habitat, but all of the fish, shrimp and aquatic plant species highlighted in the risk prioritization are reliant on these freshwater ecosystems, as are the slender snouted crocodile, and if present, the Ogowe river frog. Freshwater habitats are also important breeding areas for migratory river martins and for dragonfly. **Likelihood of impact:** Impacts to this habitat are not anticipated because the Project has mitigation measures in place to ensure riparian buffers are maintained within 50m of watercourses. OPG is planning to irrigate all planted areas of Mouila Lot 1 from surface water of the Ngounié river; circa 10% of Mouila Lot 2 from the Ovigui river, circa 10% of Mouila Lot 3 from the Dola river, and the Makouke plantation from both the Ogooué and Ngounié rivers, but OPG are taking a precautionary approach to ensure that flow is minimally affected. Furthermore, pumps will be equipped with appropriate grids and gauzes to avoid negative impacts to aquatic biodiversity. Likelihood of impacts to freshwater habitats from OPG operations are therefore considered to be low. **Consequence of impact:** For restricted-range fish and dragonfly species, endemic plants and slender-snouted crocodiles, impact is likely to be major and reduce regional and/or global viability or function, particularly for fish who lay eggs on riverbanks. For migratory fish species and river martins impacts would likely be low and while local viability/function of the species may be reduced, regional viability is unlikely to be affected. **Action:** Contingency planning is required for freshwater habitat because although impacts are unlikely, if they do occur they would be major and reduce the regional viability / function of the CH qualifying species that rely on it. The Project must ensure there are sufficient buffer zones between planted areas and riverbanks and that these areas remain unpolluted and undisturbed. Proactive monitoring should also ensure (a) that buffers are maintained, and (b) that key water quality parameters such as temperature, turbidity and nutrient levels do not change, and that flow is not significantly affected. If buffers are not maintained, or if adverse impacts are observed through monitoring, this habitat could be elevated to AC1.

Natural Habitat (NH)	Action Category	Likelihood & consequence descriptors	# of Priority species associated with the NH	Justification for categorisation
Savannah Grassland	3	Likelihood: Likely Consequence: Major	**3 animal species** (Rosy Bee-Eater, African River Martin, Forest Elephant)	**Ecology and distribution:** Savannah typically occurs on well drained soils. Savannah grassland is widespread in Mouila Lots 1-3 and in Ndende, with a small area of savannah in Makouke and none in Awala (according the Proforest HCV surveys and the Land Cover Africa layer. Savannah typically consists of herbaceous vegetation with medium sparse trees and <10% tree canopy cover. It often occurs in a mosaic with patches of original and secondary forests. This habitat is a result of large climatic fluctuations over the last 10 million years and of human activities - especially cultivation and burning, and the boundary of forest savannah areas is constantly changing depending on the impacts of fire and the interventions of humans. Savannah is not considered a threatened habitat, although Gabon is developing a National Savannah Strategy. However, one priority bird species depends on this habitat type for breeding purposes (Rosy Bee-Eater) and a second uses it for breeding (African River Martin), while Forest Elephants also browse in this habitat, although it is a less important habitat for them than lowland terra firma forest. Savannah is also a key habitat for dolines (T. Stevart pers. comm) – a unique and threatened CH qualifying-ecosystem. **Likelihood of impact:** Impacts to this habitat are considered likely, since this area was prioritized for planting in, Mouila Lot 2 and Ndende. **Consequence of impact:** The savannah of Mouila Lot 3 and Ndende is confirmed as a breeding area for Rosy Bee-Eaters and the consequences of impact for this species are anticipated to be moderate. Other CH-qualifying species associate with this habitat (e.g., Central Chimpanzee, Western Gorilla, Red-Capped Mangabey), but this is primarily for travel between forested areas and such species do not depend upon savannah. The exception is Forest Elephants that feed on savannah grasses, particularly in the rainy season (Mills *et al*. 2018). **Action:** Given that savannah habitat is an important breeding area for Rosy Bee-Eaters, the Project should ensure habitat-based mitigation and avoidance of clearing further savannah habitat in order to avoid impacts and ensure local population viability. Sampling of plants in savannah areas is limited, so it is also recommended to undertake botanical inventories as soon as possible, since the findings of such a study may change the Action Category for Savannah.

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