

Critical Habitats Screening and Assessment

Appendix D



TITLE:

Critical Habitats Screening and Assessment

NOTE:

The document is applicable to eni Ghana Exploration and Production limited activities.

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APPENDIX D – Critical Habitats Screening and Assessment

EXECUTIVE SUMMARY

A critical habitat assessment has been conducted for the eni Ghana OCTP project. A discrete management unit (DMU) has been defined based on a 5 km outer buffer of the boundaries of the Amanzule Important Bird and Biodiversity Area (IBA). Species listed as Endangered or Critically Endangered on the IUCN Red List of Threatened Species and a potential presence in the IBA have been identified, which consisted of three mammals, one bird, three reptiles, four amphibians and 12 fish. Two migratory birds and habitats were included.

An Environmental Monitoring Program, complemented by a series of management /action plans has been developed for the present project (e.g. Avifauna Biodiversity Action Plan, Sea Turtles Biodiversity Action Plan). These programs/plans will allow that all identified sensitive biodiversity features be continuously monitored at the OCTP site in order to track NNL/NG commitments as well as to further confirm species presence/absence.

The potential of these biodiversity components to trigger a critical habitat status was assessed based on five criteria within the IFC Performance Standard 6 (PS6), with the following results obtained:

Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species

- Potential triggers include Hooded Vulture (*Necrosyrtes monachus*) Critically Endangered and Green Turtle (*Chelonia mydas*) Endangered. Both of these species are wide-ranging and the DMU concept is difficult to apply. These species are not critically dependent on the project area of influence (AoI), and therefore do not trigger a Critical Habitat designation. Mitigation that leads to No Net Loss (NNL) will need to be demonstrated for these species.
- Slender-snouted Crocodile (*Mecistops cataphractus*) Critically Endangered. There is insufficient data of the presence of this species to trigger a Critical Habitat designation.

Criterion 2: Endemic and/or restricted-range species

No Endemic or restricted-range species trigger a Critical Habitat designation.

Criterion 3: Migratory and/or congregatory species

- Hawksbill Turtle (*Eretmochelys imbricata*) Critically Endangered and Olive Ridley Turtle (*Lepidochelys olivacea*) Vulnerable. As described above for the Green Turtle, these turtles are a wide-ranging species and the DMU concept is

difficult to apply. These sea turtles are not critically dependent on the AoI, and therefore do not trigger Critical Habitat designations. Mitigation that leads to NNL will need to be demonstrated.

- Sanderling (*Calidris alba*) Least Concern. The IBA represents an important over-wintering point for 3.5% of the bioregional population. This bird triggers the IBA designation and also a critical habitat. Net Gain requirements will apply to this species.
- Royal Tern (*Thalasseus maximus*) Least Concern. This bird triggers the IBA designation and therefore also a critical habitat. Recent data suggest the global population is increasing and thus may no longer be an IBA trigger (Amanzule Wetland IBA assessment dating from 2001), nevertheless this finding should be verified and ultimately confirmed by Birdlife. Net Gain requirements will apply to this species.

Criterion 4: Highly threatened and/or unique ecosystems

- The Blackwater Swamp Forest that occupies the core of the IBA is a unique peat-based wetland, and therefore triggers a possible critical habitat designation. A habitat mapping study has found that this swamp type is not present in the eni concession, and thus will not be impacted by the project. Considering the swamp type found is a natural habitat NNL will need to be demonstrated.

Criterion 5: Key evolutionary processes

- Potential triggers include Johnston's Genet (*Genetta johnstoni*) and Puddle Frog (*Phrynobatrachus villiersi*) which are both classified as Vulnerable. Insufficient data is present to confirm these species trigger Critical Habitat designations.

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ACRONYMS

Acronym	Definition
AOO	Area of Occupancy
CH	Critical Habitat
CR	Critically Endangered
DMU	Discrete Management Unit
EIA	Environmental Impact Assessment
EN	Endangered
EOO	Extent of Occurrence
GN	Guidance Note
IBA	Important Bird Area
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LC	Least Concern
NNL	No Net Loss
PS	Performance Standard
USAID	United States Agency for International Development
VU	Vulnerable
WB	World Bank

1 CRITICAL HABITATS SCREENING AND ASSESSMENT

1.1 IFC/WB PERFORMANCE STANDARD 6 CRITERIA AND DEFINITIONS

The term « critical habitat » is defined in Paragraph 16 of IFC/WB Performance Standard 6, 2012 (PS6) as areas with high biodiversity value. This includes areas that meet one or more of the following criteria (Guidance Note [GN] 55):

- Criterion 1: Critically Endangered (CR) and/or Endangered (EN) species;
- Criterion 2: Endemic and/or restricted-range species;
- Criterion 3: Migratory and/or congregatory species;
- Criterion 4: Highly threatened and/or unique ecosystems; and
- Criterion 5: Key evolutionary processes.

However, as specified by paragraph GN56 of IFC/WB Guidance Note 6, the determination of critical habitat can include other recognized high biodiversity values which are to be evaluated on a case-by-case basis.

Following discussions held with IFC and WB (30 March 2016) ⁽¹⁾, ERM was requested to review and consider the Draft IUCN Key Biodiversity Area Standard version 1.0 ⁽²⁾ to selected components of the Critical Habitat Assessment for comparative purposes.

1.1.1 Critical Habitat Tiers

IFC/WB Guidance Notes GN71 through GN89 detail « tiers » of critical habitat, based on relative vulnerability (degree of threat) and irreplaceability (rarity or uniqueness). For Criteria 1 to 3, quantitative thresholds are provided to assign critical habitat into either Tier 1 or Tier 2. *Table 1.1* details the relevant thresholds. Criteria 1 through 3 are focused on species level, whilst Criteria 4 and 5 focus on ecosystem and landscape levels.

These thresholds rely on the availability of estimates of species global/local population (either from published sources or obtainable by reasonable means through an in-field assessment in the case of the local population). Should this type of information not be available for any of the species under consideration, the client is expected to use expert opinion to determine the significance of the unit of analysis for CH determination with respect to the global population. Surrogates of population size (e.g., extent of occurrence, estimates of total area of known sites, estimates of area of occupied habitat) can aid in this process.

(1) Teleconference (30-March-2016) with eni, Vitol, IFC and ERM. Participants included: Juan Deffis (eni); Elena Pavanel (eni); Emily Wood (Vitol); Lori Anne Conzo (IFC); Paolo Lombardo (IFC); Leanne Elizabeth Alonso (IFC); Amalia Fernandez Bilbao (IFC); Thomas Walton (WB); Pippa Howard (FFI); Jason Sali (FFI); David Marsh (FFI); Marilena De Stefano (ERM); Marco Rusmini (ERM); Andrew Cauldwell (ERM).

(2) IUCN Key Biodiversity Area Standard (version 1.0) available at: <http://www.kbaconsultation.org/>

Table 1.1 Quantitative thresholds for Tiers 1 and 2 of critical habitat criteria 1 to 3

Criteria	Tier 1	Tier 2
1. Critically Endangered (CR)/ Endangered (EN) Species	(a) Habitat required to sustain ≥ 10 percent of the global population of a CR or EN species/subspecies where there are known, regular occurrences of the species and where that habitat could be considered a discrete management unit for that species. (b) Habitat with known, regular occurrences of CR or EN species where that habitat is one of 10 or fewer discrete management sites globally for that species.	(c) Habitat that supports the regular occurrence of a single individual of a CR species and/or habitat containing regionally-important concentrations of a Red-listed EN species where that habitat could be considered a discrete management unit for that species/subspecies. (d) Habitat of significant importance to CR or EN species that are wide-ranging and/or whose population distribution is not well understood and where the loss of such a habitat could potentially impact the long-term survivability of the species. (e) As appropriate, habitat containing nationally/regionally important concentrations of an EN, CR or equivalent national/regional listing.
2. Endemic/ Restricted Range Species	(a) Habitat known to sustain ≥ 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species (e.g., a single-site endemic).	(b) Habitat known to sustain ≥ 1 percent but < 95 percent of the global population of an endemic or restricted-range species where that habitat could be considered a discrete management unit for that species, where data are available and/or based on expert judgment.
3. Migratory/ Congregatory Species	(a) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 95 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle where that habitat could be considered a discrete management unit for that species.	(b) Habitat known to sustain, on a cyclical or otherwise regular basis, ≥ 1 percent but < 95 percent of the global population of a migratory or congregatory species at any point of the species' lifecycle and where that habitat could be considered a discrete management unit for that species, where adequate data are available and/or based on expert judgment. (c) For birds, habitat that meets Birdlife International's Criterion A4 for congregations and/or Ramsar Criteria 5 or 6 for Identifying Wetlands of International Importance. (d) For species with large but clumped distributions, a provisional threshold is set at ≥ 5 percent of the global population for both terrestrial and marine species. (e) Source sites that contribute ≥ 1 percent of the global population of recruits.

Source: IFC/WB (Guidance Note 89 to PS6), 2012

Criterion 4 is triggered by ecosystems that are threatened, house unique assemblages of biome-restricted species, or are recognized for high conservation value, including protected areas. No quantitative thresholds are indicated by the PS6 Guidance notes; nonetheless, quantitative categories and criteria from Rodriguez et al. (2011) may be applied to evaluate ecosystem status if data allows it.

Rodriguez et al. (2011) propose a categorization of habitats following IUCN Red list species categories in: CR: Critically Endangered; EN: Endangered and VU: Vulnerable; based on a set of four criteria (and sub criteria) over which the analysis is conducted.

Criterion 5 applies to landscape-level features that can influence key evolutionary processes. Key landscape features such as unique topography that creates unique habitats and areas important for climate change adaptations have been identified using literature review and through expert consultation.

Criterion 5 also applies at the species level for “distinct species” which includes those coined as “Evolutionarily Distinct and Globally Endangered” (EDGE) (GN 95 IFC 2012b). Species within the unit of analysis identified as EDGE species will be evaluated for critical habitat on a case-by-case basis.

1.1.2 Terrestrial Unit of Analysis for Critical Habitat Determination

The scale at which a critical habitat determination takes places depends on underlying ecological processes for the habitat in question and is not limited to the footprint of the project. IFC/WB PS6 Guidance Note GN65 states that for Criteria 1 to 3, the determination of critical habitat should be based on a « discrete management unit » (DMU) which is an area that has a definable boundary within which the biological communities have more in common with each other than they do with those outside the boundary:

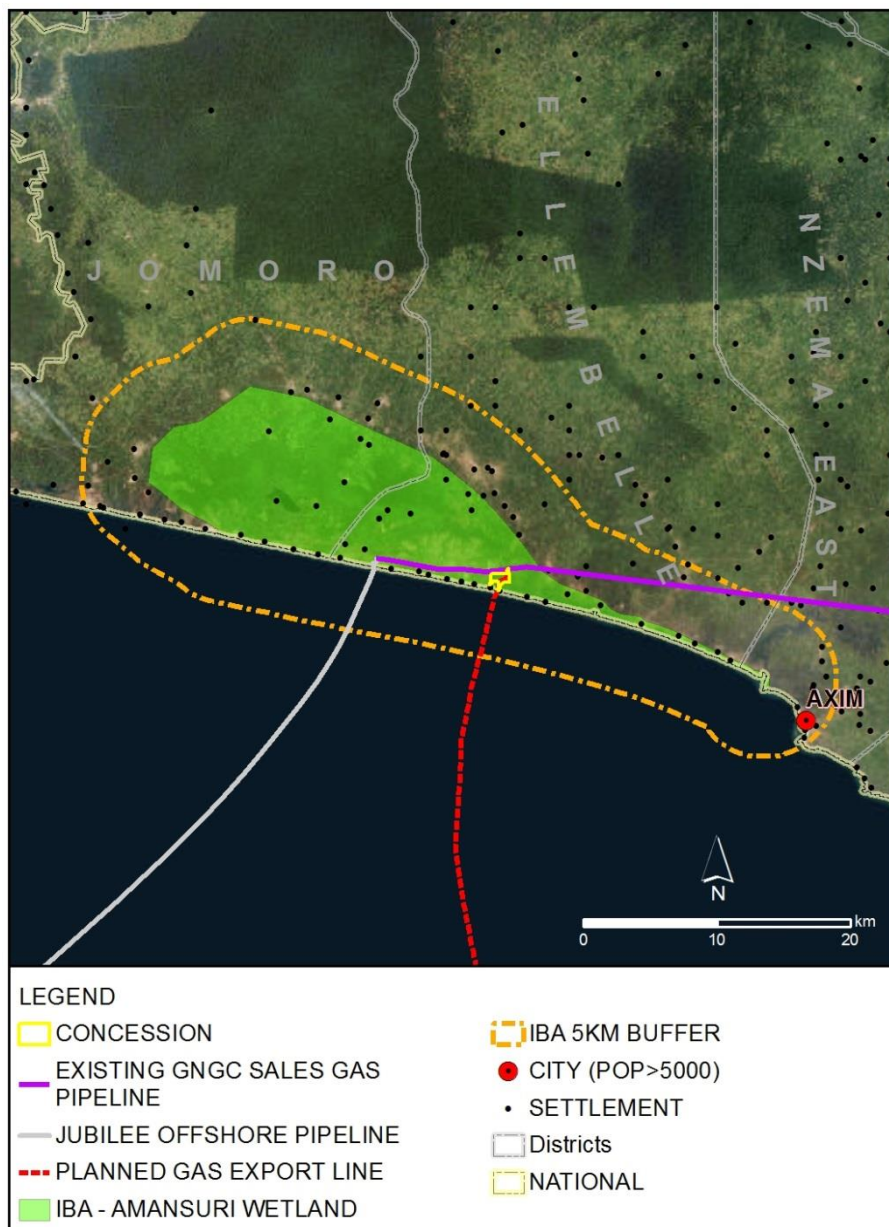
« A discrete management unit may or may not have an actual management boundary (e.g., legally protected areas, World Heritage sites, KBAs, IBAs, community reserves) but could also be defined by some other sensitive ecologically definable boundary (e.g., watershed, interfluvial zone, intact forest patch within patchy modified habitat, seagrass habitat, coral reef, concentrated upwelling area, etc.). The delineation of the management unit will depend on the species (and, at times, subspecies) of concern ».

Figure 1.1 shows that the eni Ghana concession lies within the Amanzule Wetlands IBA, which from satellite imagery can be seen that its northern limits follow an existing road (the N1). The Amanzule wetlands are a blackwater system with a wetland area of over 10,000 ha. Considering the overlap of the concession and potential impacts with this IBA, the DMU has been considered as the area defined for the IBA, plus a 5 km buffer area around it to account for: the coastal and marine environment adjacent to the Amanzule Wetland, and additional

wetlands that surround the IBA from the north thus incorporating a degree of habitat connectivity.

IBAs are designated by Birdlife International based on a set of defensible scientific criteria. These areas are not gazetted by local governments, but are recognized as key biodiversity areas within the IFC Performance Standards. Amanzule Wetlands IBA has been proposed for recognition as a Ramsar site by the Ghana Wildlife Services, but the site is not yet designated as such. A number of villages occur along the coastal strip of the IBA and along the northern edges. The interior of the IBA is not suitable for settlement due to extensive swamp forest, although some bird-based tourism does take place there.

Figure 1.1 Selected DMU for the Critical Habitat Assessment



Source: ERM, 2016

IFC have stated during discussions (30-March-2016, *Section 1.1*) that the DMU concept is difficult to apply to wide ranging species such as African vulture species and sea turtles. The CH assessment thus takes into consideration other factors that may be present (e.g. identification of a “hotspot”) in order to define the status of potential biodiversity CH triggers. For the case of Natural habitat, No Net Loss (NNL) approach is to be applied for the development of mitigation measures for relevant biodiversity features and potential CH species groups. Net Gain, on the other hand will need to be applied to the biodiversity components that trigger CH.

No Net Loss is defined in the IFC PS6 (paragraph 15) as the point at which project-related impacts on biodiversity are balanced by measures taken to avoid and minimize the project's impacts, to undertake on-site restoration and finally to offset significant residual impacts, if any, on an appropriate geographic scale (e.g., local, landscape-level, national, regional).

Net Gains are defined by the IFC PS6 (paragraph 18) as additional conservation outcomes that can be achieved for the biodiversity values for which the critical habitat was designated. Net gains may be achieved through the development of a biodiversity offset and/or through the implementation of programs that could be implemented in situ (on-the-ground) to enhance habitat, and protect and conserve biodiversity.

1.2 GENERAL METHODOLOGY

1.2.1 Classification of Modified and Natural Habitats

Habitats have been classified as modified or natural based on following criteria stipulated within the IFC PS6 (paragraphs 11 to 13):

- *Modified Habitat:* Modified habitats are areas that may contain a large proportion of plant and/or animal species of non-native origin, and/or where human activity has substantially modified an area's primary ecological functions and species composition. Modified habitats may include areas managed for agriculture, forest plantations, reclaimed coastal zones, and reclaimed wetlands. The developer is required to mitigate impacts to biodiversity within modified habitats as appropriate.
- *Natural Habitat:* Natural habitats are areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition. Based on IFC PS6 mitigation for any impacts is required to show No Net Loss of Biodiversity. Biodiversity Offsets may be required on a basis of like-for-like or better.

Land use within the greater project area has been mapped as part of the baseline studies for the ESIA. The land use map was used to delineate habitats that were classified as either modified or natural based on ground-truthing. Results are presented in the ecological baseline.

The area of influence (AoI)¹ was subsequently extended to a 5km radius around the ORF concession area. Land use data for the IBA has subsequently been published online.

(1) ¹ The Area of Influence is defined as the area within which the project may potentially affect resource/receptor and within which potential impacts (both direct and indirect) should be assessed.

Classification of habitats within the AoI has thus been based on both land use datasets and the results are presented in *Figure 1.24*.

1.2.2 Classification of Critical Habitat

The IFC PS6 recognises critical habitats to be based on either modified or natural habitats. The process of recognizing critical habitats therefore follows a different approach. Critical habitat was identified during the baseline development of the ESHIA following IFC's three-step approach (*Paragraph 66, GN6; IFC 2012b*).

1. **Stakeholder Consultation and Initial Literature Review:** A literature review was completed in consultation with relevant authorities, academic/scientific institutions, and other recognized external experts. In-field consultation and desktop research was undertaken to understand the biodiversity values present in the vicinity of project areas, identify existing conservation concerns, and identify gaps in existing knowledge.
2. **Field-survey data collection and verification of existing information:** Field data were collected to describe and map diversity, distribution, abundance and habitat associations of aquatic and terrestrial flora and fauna including species on conservation concern. Specialized field surveys on birds and marine turtles were conducted by fauna specialists (during a single season) as described in the BMP and associated BAPs.
3. **Critical Habitat determination:** CH was identified by delineating the proposed spatial unit of analysis, screening of biodiversity features (i.e., at the species, ecosystem and landscape scales), and evaluating to the extent possible the distribution of CH.

1.2.3 Specific Methodology by Criterion for Critical Habitat Determination

Criterion 1: Critically Endangered and/or Endangered Species

Footnote 11 of the IFC/WB Performance Standards 6 defines Critically Endangered and/or Endangered Species as those listed on the IUCN Red List of Threatened Species (2015, version 2015-4). With the definition of Critical habitat based on other listings being as follows:

- i. If the species is listed nationally / regionally as critically endangered or endangered, in countries that have adhered to IUCN guidance, the critical habitat determination will be made on a project by project basis in consultation with competent professionals; and
- ii. in instances where nationally or regionally listed species' categorizations do not correspond well to those of the IUCN (e.g., some countries more generally list species as "protected" or "restricted"), an assessment will be conducted to determine the rationale and purpose of the listing. In this case, the critical habitat determination will be based on such an assessment.

Chapter 6 Environmental Baseline of the Phase 2 ESHIA identifies globally, nationally and regionally Critically Endangered and Endangered species that are likely to be present within the Project's Study Area (see Figure 6.2 for the Study Area of the Biophysical Survey, Birds Survey and Sea Turtles Survey). Additionally, the bird and turtle pre-construction surveys indicate additional findings for these taxa. The reported species for CH definition have been completed with reference to the IUCN Red List of Threatened Species and their distribution relative to the proposed DMU.

Criterion 2: Endemic and/or restricted-range species

IFC/WB Guidance Notes GN79-80 provide the following definitions for Endemic and restricted-range species:

- An endemic species is defined as one that has $\geq 95\%$ of its global range inside the country or region of analysis.
- Restricted-range species:
 - For terrestrial vertebrates, a restricted-range species is defined as those species which have an extent of occurrence of 50,000 km² or less.
 - For marine systems, restricted-range species are provisionally being considered those with an extent of occurrence of 100,000 km² or less.
 - For freshwater systems, standardized thresholds have not been set at the global level. However an IUCN study of African freshwater biodiversity determined thresholds of 20,000 km² for crabs, fish, and mollusks and 50,000 km² for odonates (dragonflies and damselflies). These can be taken as approximate guidance values, although the extent to which they are applicable to other taxa and in other regions is not yet known.
 - For plants, restricted-range species may be listed as part of national legislation. Plants are more commonly referred to as "endemic" and the definition provided in paragraph GN79 would apply.

Species listed in *Chapter 6 Environmental Baseline of the Phase 2 ESHIA* were screened to identify whether they meet the definition of either endemic and / or range-restricted species.

Criterion 3: Migratory and Congregatory Species

IFC/WB Guidance Notes GN85-86 define migratory and congregatory species in the following way:

- Migratory species:
 - Any species of which a significant proportion of its members cyclically and predictably move from one geographical area to another (including within the same ecosystem).
- Congregatory species:

- Species whose individuals gather in large groups on a cyclical or otherwise regular and/or predictable basis.
- Species that form colonies.
- Species that form colonies for breeding purposes and/or where large numbers of individuals of a species gather at the same time for non-breeding purposes (e.g., foraging, roosting).
- Species that move through bottleneck sites where significant numbers of individuals of a species pass over a concentrated period of time (e.g., during migration).
- Species with large but clumped distributions where a large number of individuals may be concentrated in a single or a few sites while the rest of the species is largely dispersed (e.g., wildebeests distribution).
- Source populations where certain sites hold populations of species that make an inordinate contribution to recruitment of the species elsewhere (especially important for marine species).

Species listed in *Chapter 6 Environmental Baseline of the Phase 2 ESHIA* were screened to identify whether they meet one of the definitions of migratory, congregatory or resident species. This was completed with reference to published sources and in liaison with local experts contracted by ESL to participate in pre-construction surveys ⁽¹⁾. Considering the DMU is for the most part an IBA, bird species occurring in population sizes that meet Birdlife International's Criterion A4 for congregations would meet the Tier 2 classification for critical habitat.

Criterion 4: Highly Threatened and/or Unique Ecosystems

IFC Guidance Note GN90 defines highly threatened or unique ecosystems as:

- At risk of significantly decreasing area or quality;
- with a small spatial extent; and/or
- containing unique assemblages of species including assemblages or concentrations of biome-restricted species (i.e. species whose distributions are largely or wholly confined to one biome).

Rodriguez et al. (2011) propose the assignment of levels of threat to ecosystems at local, regional, and global levels (such as those used for species by IUCN) based on four main criteria:

(1) Consultation with in-country specialists included:

- Prof Ayaa K. Armah, Dept of Marine and Fisheries Science, University of Ghana (sea turtle specialist);
- Dr Angela Lamptey, Dept of Marine and Fisheries Science, University of Ghana (shorebird specialist) and member of Ghana Wildlife Society,
- Andrews Agyekumhene, member of the Ghana Wildlife Division and sea turtle specialist; and
- James Blimey, member of the Ghana Wildlife Division and forest bird specialist.

- A. Short-term decline in distribution or function (over 50 years);
- B. long-term decline in distribution or function (over 500 years);
- C. small current distribution and decline (in distribution or ecological function) or very few locations; and
- D. very small current distribution.

Considering that there is insufficient information with regards to evidences of recent or historical declines, Criterion A and B have not been assessed. Only criteria C and D have been used as qualitative aids for the assessment of critical habitat, since criteria and sub criteria require quantitative estimations as a minimum.

Criterion 5: Key Evolutionary Processes

Evolutionary processes are often strongly influenced by structural attributes of a region, such as its topography, geology, soil and climate over a period of time. IFC/WB Guidance Note GN95 suggests that this criterion is defined by:

- The physical features of a landscape that might be associated with particular evolutionary processes; and/or
- sub-populations of species that are phylogenetically or morphogenetically distinct and may be of special conservation concern given their distinct evolutionary history (i.e. EDGE species or Evolutionary Significant Units at population level).

Guidance Note GN96 also provides the following examples of spatial features that are associated with evolutionary processes:

- Level of isolation (e.g., islands, mountaintops, lakes are associated with populations that are phylogenetically distinct.);
- extent of endemism (areas of high endemism often contain flora and/or fauna with unique evolutionary histories);
- spatial heterogeneity;
- presence of environmental gradients (ecotones produce transitional habitat which has been associated with the process of speciation and high species and genetic diversity);
- edaphic interfaces; and
- connectivity between habitats (e.g., biological corridors).

Criterion 5 is usually considered to be heavily reliant on scientific knowledge, and thus would be triggered in areas that have already been investigated or where significant research results are available to indicate the potential or existence of unique evolutionary processes. Measurements and methods to identify evolutionary processes exist, but are usually out of the scope of EIA studies; therefore the presence of EDGE species has been screened according to available information to assess the applicability of criterion 5.

1.2.4 IUCN Key Biodiversity Areas Standard

During discussion with the IFC (*Section 1.1*), comparison against the IUCN Key Biodiversity Areas (KBA) Standard (version 1.0) ⁽¹⁾ has been included within this CH assessment. The IUCN KBA Standard is applied as an exercise of interest, and the results do not change the outcome of the CH assessment, which is applied according to the IFC PS6.

The KBA Standard has been developed following extensive consultation with a wide range of global biodiversity experts, and the standard builds on more than 30 years of experience in identifying important sites for different taxonomic, ecological and thematic subsets of biodiversity. These include, in particular, the 12,000 Important Bird and Biodiversity Areas (IBAs) identified by BirdLife International (2014) and a wide range of other important biodiversity areas. The KBA Standard is formally taken to include the definitions, the KBA criteria and thresholds, and the KBA delineation methodology.

This KBA Standard is developed to identify areas contributing significantly to the global persistence of biodiversity in terrestrial, inland water and marine environments. It specifically aims to:

- Harmonize existing approaches to the identification of important sites for biodiversity;
- Support the identification of important sites for elements of biodiversity not considered in existing approaches;
- Provide a system that can be applied consistently and in a repeatable manner by different users and institutions in different places and over time;
- Ensure that KBA identification is objective, transparent and rigorous through application of quantitative thresholds; and
- Provide decision-makers with improved understanding of why particular sites are important for biodiversity.

(1) IUCN Standard for the Identification of Key Biodiversity Areas. Prepared by the IUCN Species Survival Commission and IUCN World Commission on Protected Areas. Version 1.0, March 2016. Available at: <http://www.kbaconsultation.org/>

Box 1 Summary overview of the five criteria and sub-criteria of the IUCN KBA Standard (Version 1.0).

CRITERION A - THREATENED BIODIVERSITY

A1. Threatened taxa

Site regularly holds one or more of the following:

- (a) $\geq 95\%$ of the global population of a globally Critically Endangered (CR) or an Endangered (EN) taxon;
- (b) $\geq 0.5\%$ of the global population AND ≥ 5 functional reproductive units of a globally CR or EN taxon;
- (c) $\geq 1\%$ of the global population AND ≥ 10 functional reproductive units of a globally Vulnerable (VU) taxon;
- (d) $\geq 0.1\%$ of the global population AND ≥ 5 functional reproductive units of a globally CR or EN taxon qualifying only under Criterion A of the IUCN Red List Categories and Criteria, in any of sub-criteria A1, A2, or A4;
- (e) $\geq 0.2\%$ of the global population AND ≥ 10 functional reproductive units of a globally VU taxon qualifying only under Criterion A of the IUCN Red List Categories and Criteria, in any of sub-criteria A1, A2, or A4.

A2. Threatened ecosystem types

Site holds one of the following:

- (a) $\geq 5\%$ of the global extent of a globally CR or EN ecosystem type;
- (b) $\geq 10\%$ of the global extent of a globally VU ecosystem type.

CRITERION B - GEOGRAPHICALLY RESTRICTED BIODIVERSITY

B1: Individual geographically restricted species

Site regularly holds $\geq 10\%$ of the global population and ≥ 10 functional reproductive units of a species.

B2: Co-occurring geographically restricted species

Site regularly holds $\geq 1\%$ of the global population of each of a number of restricted-range species in a taxonomic group, determined as either ≥ 2 species OR 0.02% of the global number of species in the taxonomic group, whichever is larger.

B3: Geographically restricted assemblages

Site regularly holds one or more of the following:

- (a) Globally the most important 5% of occupied habitat for each of ≥ 5 species within a taxonomic group;
- (b) $\geq 0.5\%$ of the global population of each of a number of species in a taxonomic group restricted to an ecoregion, determined as either ≥ 5 species OR 10% of the species restricted to the ecoregion, whichever is larger;
- (c) ≥ 5 biome-restricted species or 30% of the biome-restricted species known from the country, whichever is larger.

B4: Geographically restricted ecosystem types

Site holds $\geq 20\%$ of the global extent of an ecosystem type.

CRITERION C - ECOLOGICAL INTEGRITY

Site is one of ≤ 2 per ecoregion characterized by wholly intact species assemblages, comprising the composition and abundance of native species and their interactions.

CRITERION D - BIOLOGICAL PROCESSES

D1. Demographic aggregations

Site predictably holds an aggregation representing $\geq 1\%$ of the global population of a species during one or more, but not all, key stages of its life cycle.

D2: Ecological refugia

Site supports $\geq 20\%$ of the global population of one or more species during periods of environmental

stress, for which historical evidence shows that it has served as a refugium in the past and for which there is evidence to suggest it would continue to do so in the foreseeable future.

D3: Source populations

Site predictably produces propagules, larvae, or juveniles that maintain $\geq 20\%$ of the global mature population of a species although the mature population at the site is usually below this

CRITERION E – IRREPLACEABILITY THROUGH QUANTITATIVE ANALYSIS

Site has a level of irreplaceability of ≥ 0.90 (on a 0–1 scale), measured by quantitative spatial analysis, and is characterised by the regular presence of species with ≥ 10 functional reproductive units known or inferred to occur (or ≥ 5 units for EN or CR species).

1.2.5 Limitations of this Critical Habitat Assessment

This critical habitat assessment is prepared based on available data from field surveys and online sources. The availability of baseline data for the proposed ORF site and surrounding areas is a constraint. Minimal background ecological data is available, and surveys and consultations with the conservation associations working on this area have been conducted to fill gaps and develop a baseline understanding. Monitoring evaluation programs are now under way to further improve the baseline information.

Classification of critical habitats has been confirmed based on species known to occur. A diversity of faunal species has a potential occurrence, but their presence has not been confirmed either through direct surveys and/or stakeholder engagement. Their potential impact on critical habitats is discussed but critical habitats are not defined based on such species.

1.3 REVIEW OF MODIFIED AND NATURAL HABITAT EXTENT

The AoI within and surrounding the concession area consists of mainly secondary thicket (with coconut and oil palm plantations), freshwater swamp forest and grassland. The freshwater swamp areas are interspersed with grassland with isolated thicket clumps, disturbed areas, and areas of agricultural use. Some of the species identified in the swamp forest are *Hallea stipulosa*, *Symphonia globulifera* and *Raphia hookeri*. The grassland is dominated by grasses and sedges such as *Panicum maximum*, *Oplismenus burmanii*, *Sporobolus pyramidalis*, *Mariscus longibracteatus*, *Imperata cylindrica*, *Fimbristylis littoralis* and *Fuirena umbellata*.

Modified Habitat

Modified habitat within the concession area consists largely of degraded coconut palm plantations, abandoned croplands and degraded vegetation (e.g. thickets). The ecological functioning is understood to be modified.

To the south of the concession area, coastal coconut palm plantations are planted parallel to the coastline and interspersed between the communities. The areas in vicinity of the communities are also characterised by the presence of modified habitats.

The coastal areas are dominated by regenerating vegetation comprised of palm trees and thorny shrubs (HPI, 2009). Previously forested land is also now understood to be used for tree crop plantations (coconuts, palm oil, rubber), forestry activities and farming. The physical environment of the area has been affected by human activities and no fully natural habitats were observed, although natural areas are reported to occur within the broader AoI.

Natural Habitat

The main natural habitat found within the concession is of swamp forest. Further studies focused on habitat mapping within the concession indicate that the type of wetland found within the concession is a natural habitat that has had limited transformation from human activities (e.g. limited presence of fishponds and harvesting activities).

To the northwest of the concession area (approximately 0.5 km from the concession area boundary) there exists a wetland identified as a Blackwater Swamp Forest which is highly intact. Mangrove areas found to the east of the concession commonly occur along the coastal areas of the Western Region at similar locations close to river mouths and provide a habitat for various organisms including maintaining nearshore fisheries as well as being an important area for fish and shellfish production and are highly sensitive to development. These areas have not been cultivated and although some felling of mangrove trees occurs, the natural ecosystem processes continue to function and these areas are described as natural habitat. Sandy beach/dune habitats are found within the landfall area of the concessions as well as within the wider area.

An overview of the classification of habitats into Modified or Natural categories within the extent of the landuse mapped for the baseline surveys is presented in *Table 1.2*.

Table 1.2 Classification of habitats into Modified and Natural classes based on landuse mapping for baseline surveys

Habitat Unit	Habitat Classification	Justification	Observations and extent within site (Ha)
Beaches and dunes	Natural	This habitat still resembles its original state, and is exposed to the same dynamics of wave erosion and shifting sands as occurred in its original state.	Coastal strand within the concession is very limited. 0,06 Ha
Construction site	Modified	This area has been transformed from its original state through the removal of vegetation.	n/a: actual acreage of ORF, ORF TCF, Access and Helicopter pad to be verified.
Cropland and natural vegetation mosaic	Natural	The majority of this area remains in a natural state where ecological processes continue to occur. These include maintenance of broad species diversity, pollination, germination and recruitment into populations and a range of faunal food chains from primary to higher levels.	There are areas where crops and mixed palm/crops exist within the concession. 4,64 Ha
Evergreen	Natural	This habitat retains its original	Same habitat as

forest		structure with a high percentage canopy cover, high species diversity, population recruitment and a range of faunal food chains.	freshwater swamps. 27,44 Ha
Extraction site	Modified	This site has been transformed through a high percentage loss of ground cover and natural ecosystem functions are disturbed.	A borrow pit is present within the concession 0,03 Ha
Permanent crops	Modified	This habitat has been transformed from its original state with a loss of species and replacement with cultivated crops.	Assumed as being existing Palm plantations 49,43 Ha
Road and track networks	Modified	The roads and immediate road reserve are in a constant state of disturbance through road maintenance programmes, and the rate of faunal road kills disrupts natural ecosystem functions.	Estimated at 1,57 Ha
Sparsely vegetated area	Modified	These areas are assumed to be disturbed through crop harvesting activities that have resulted in the loss of vegetation cover, and hence disturbance of natural ecosystem functions.	Assumed to be thicket areas within the concession 12,73 Ha
Swamp and mangrove forest	Natural	This habitat has not been transformed and maintains the naturally occurring diversity of vegetation species. Anthropogenic activities such as fishing or harvesting of wood are not expected to have disturbed natural ecosystem functions.	No mangrove areas are within the concession. Freshwater swamp habitat (note: in practical terms is the same as the Wet Evergreen forest)
Transitional woodland shrubs	Natural	This habitat has experienced some alteration through loss of the larger trees, however a high species diversity is maintained and advanced successional change maintains a range of natural ecosystem functions.	None mapped within concession, though sparsely present.
Urban	Modified	This habitat is fundamentally transformed from its original state and maintained in a constant state of disturbance through the prevention of successional change, introduction of alien plants and keeping of domestic pets.	A small urban area overlaps with the southeastern portion of the concession. 0.08 Ha

Table 1.3 Classification of habitats into Modified and Natural classes based on online landuse mapping for the Amanzule Wetland IBA

Landcover Unit	Habitat Classification	Justification
Rainfed Croplands	Modified	Correlates to the Permanent crops classification in <i>Table 1.2</i>
Mosaic	Modified	

Landcover Unit	Habitat Classification	Justification
croplands/Vegetation		
Mosaic vegetation/croplands	Natural	Correlates to the Cropland and natural vegetation mosaic classification in <i>Table 1.2</i>
Closed to open broadleaved evergreen or semi-deciduous forest	Natural	Correlates to Transitional woodland shrubs classification in <i>Table 1.2</i>
Open broadleaved deciduous forest	Natural	
Mosaic forest – Shrubland/Grassland	Natural	Grassland areas are not included in <i>Table 1.2</i> . These grassland areas interspersed with thicket clumps and Borassus Palm are described in the preconstruction bird survey report, The habitat retains its connectivity, natural structure and species diversity, and is therefore classified as natural.
Mosaic grassland/Forest – Shrubland	Natural	
Closed to open grassland	Natural	
Closed to open shrubland	Natural	Correlates to the Transitional woodland shrubs classification in <i>Table 1.2</i>
Closed to open broadleaved forest regularly flooded (fresh-brackish)	Natural	Correlates to the Swamp and mangrove forest classification in <i>Table 1.2</i>
Closed broadleaved forest permanently flooded (brackish-saline)	Natural	
Artificial areas	Modified	Urban
Sparse vegetation	Natural	Correlates to the Sparsely vegetated area classification in <i>Table 1.2</i>
Bare areas	Modified	
Water bodies	Natural / Modified depending on surroundings	Not included in <i>Table 1.2</i> , but classified based on adjacent habitats

The classification of modified and natural habitats in Table 1.2 and Table 1.3 has been applied to spatial data to generate a map of the layout of these classifications. Results are presented in Figure 1.24.

1.4 CRITICAL HABITAT SCREENING

1.4.1 Application of Criteria 1 and 2

Species identified in *Chapter 6 Biodiversity Baseline of the Phase 2 ESHIA* and *IUCN Red List of Threatened Species* as being likely to be present within the DMU have been screened in order to identify those that are classified as Critically Endangered or Endangered according to IUCN designations (i.e. globally threatened), as well as their endemism/range restriction. *Table 1.4* shows the species identified.

Table 1.4 Terrestrial and marine species potentially occurring within the DMU that have an Endangered or Critically Endangered status on the IUCN Red list

Class - species	Common name	Red List status	Ghana Protected Status	Endemic	Range Restricted
Mammalia (Mammals)					
<i>Pan troglodytes verus</i>	Robust Chimpanzee	Endangered	Schedule I	No	No
<i>Procolobus badius waldroni</i>	West African Red Colobus	Endangered	Schedule I	Yes	Probable
<i>Balaenoptera musculus</i>	Blue Whale	Endangered	-	No	No
Aves (Birds)					
<i>Necrosyrtes monachus</i>	Hooded Vulture	Critically Endangered	-	No	No
Amphibia (Frogs)					
<i>Hylarana occidentalis</i>	Ivory Coast Frog	Endangered	-	Yes	Yes
<i>Phrynobatrachus annulatus</i>	Ringed River Frog	Endangered	-	Yes	Yes
<i>Phrynobatrachus ghanensis</i>	Ghana river Frog	Endangered	-	Yes	Yes
<i>Phrynobatrachus intermedius</i>	Puddle Frog	Endangered	-	Yes	Yes
Reptilia (Reptiles)					
<i>Mecistops cataphractus</i>	Slender-snouted Crocodile	Critically Endangered	Schedule I	West African subpopulation	Probable
<i>Chelonia mydas</i>	Green Turtle	Endangered	Schedule I	No	No
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	Critically Endangered	Schedule I	No	No
Actinopterygii (Fish)					
<i>Epinephelus itajara</i>	Atlantic Goliath Grouper	Critically Endangered	-	No	No
<i>Epinephelus marginatus</i>	Dusky Grouper	Endangered	-	No	No
<i>Mormyrus subundulatus</i>	Elephant Fish	Endangered	-	Yes	Yes

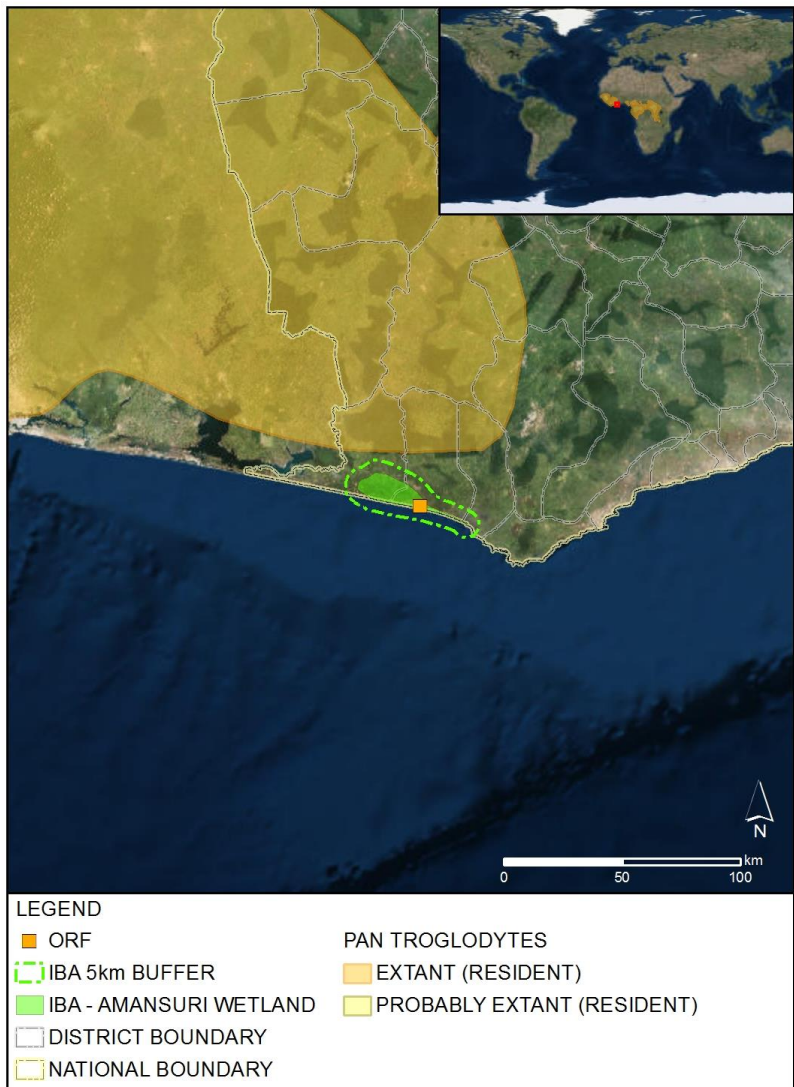
Class - species	Common name	Red List status	Ghana Protected Status	Endemic	Range Restricted
<i>Pseudotolithus senegalensis</i>	Cassava Croaker	Endangered	-	No	No
Condriichthyes (Cartilaginous fish)					
<i>Dasyatis margarita</i>	Daisy Stingray	Endangered	-	West African endemic	Probable
<i>Glaucostegus cemiculus</i>	Blackchin Guitarfish	Endangered	-	No	No
<i>Pristis pectinata</i>	Smalltooth Sawfish	Critically Endangered	-	No	No
<i>Pristis pristis</i>	(Largetooth Sawfish)	Endangered	-	No	No
<i>Rhinobatos rhinobatos</i>	Common Guitarfish	Endangered	-	No	No
<i>Rhynchobatus luebberti</i>	Lubbert's Guitarfish	Endangered	-	No	No
<i>Rostroraja alba</i>	White Skate	Endangered	-	No	No
<i>Sphyrna lewini</i>	Scalloped Hammerhead	Endangered	-	No	No

Source: IUCN Red List of Threatened Species, 2016

***Pan troglodytes verus* (Robust Chimpanzee) Endangered**

Chimpanzees have a wide but discontinuous distribution in Equatorial Africa, occurring from southern Senegal throughout the forested belt north of the Congo River to western Uganda and western Tanzania. Relevant subspecies *P. t. verus* (Schwarz, 1934) is found in West Africa from Senegal to Nigeria. There is no overlap of the DMU with current known distribution; these species have been found in the Ankasa Forest Reserve to the north of the DMU. Targeted interviews as part of the baseline surveys did not reveal that the Chimpanzee may be potentially present within the Amanzule wetlands Area. Thus the Chimpanzee is not considered as a potential trigger of Critical Habitat under Criterion 1.

Figure 1.2 Chimpanzee (*Pan troglodytes verus*) range in relation to the DMU

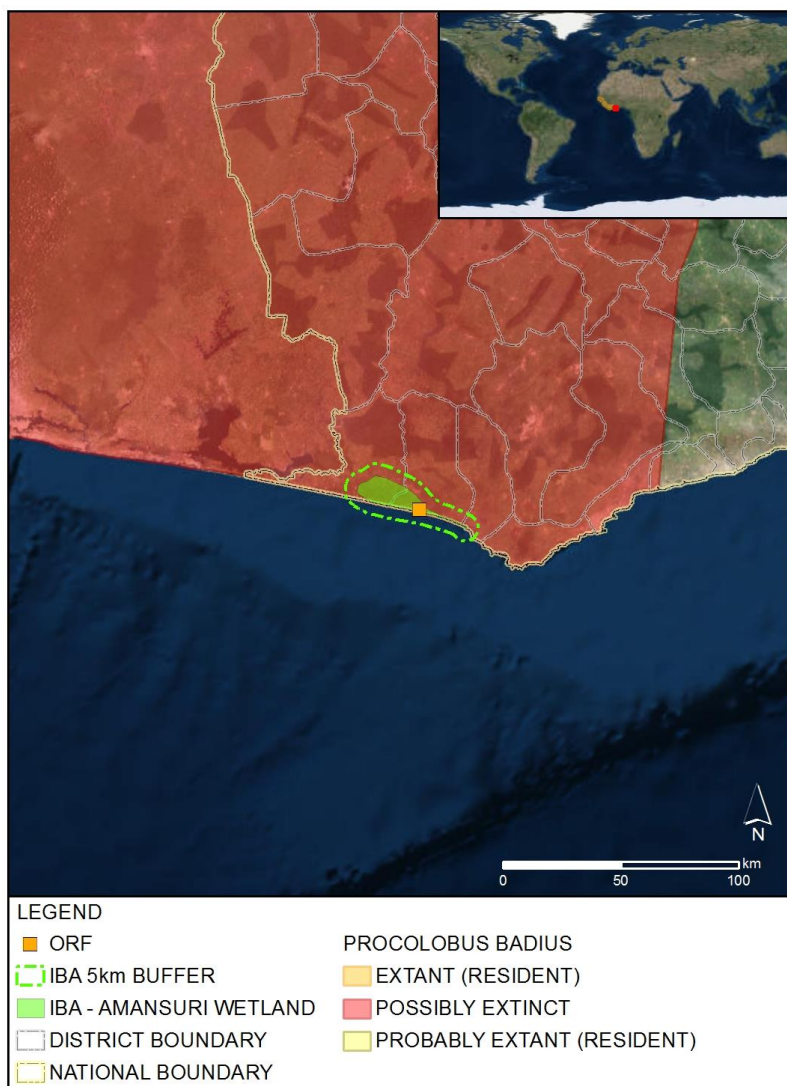


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Procolobus badius waldroni* (West African Red Colobus) Endangered**

P. badius waldroni is distributed as fragmented populations from Senegal to Ghana (Oates et al., 2008). This species ranged from the Nzi-Bandama River system in south-eastern Côte d'Ivoire to south-western Ghana (Oates et al. 2000; McGraw 2005). The taxon is possibly extinct over most of its range, with no live specimens having been observed for over 25 years in the wild. Recent evidence of their presence has been found though in Ivory Coast. This species is assumed to not be present within the DMU and therefore not considered as a possible Critical Habitat trigger under Criterion 1-2.

Figure 1.3 West African Red Colobus (*Procolobus badius waldroni*) range in relation to DMU

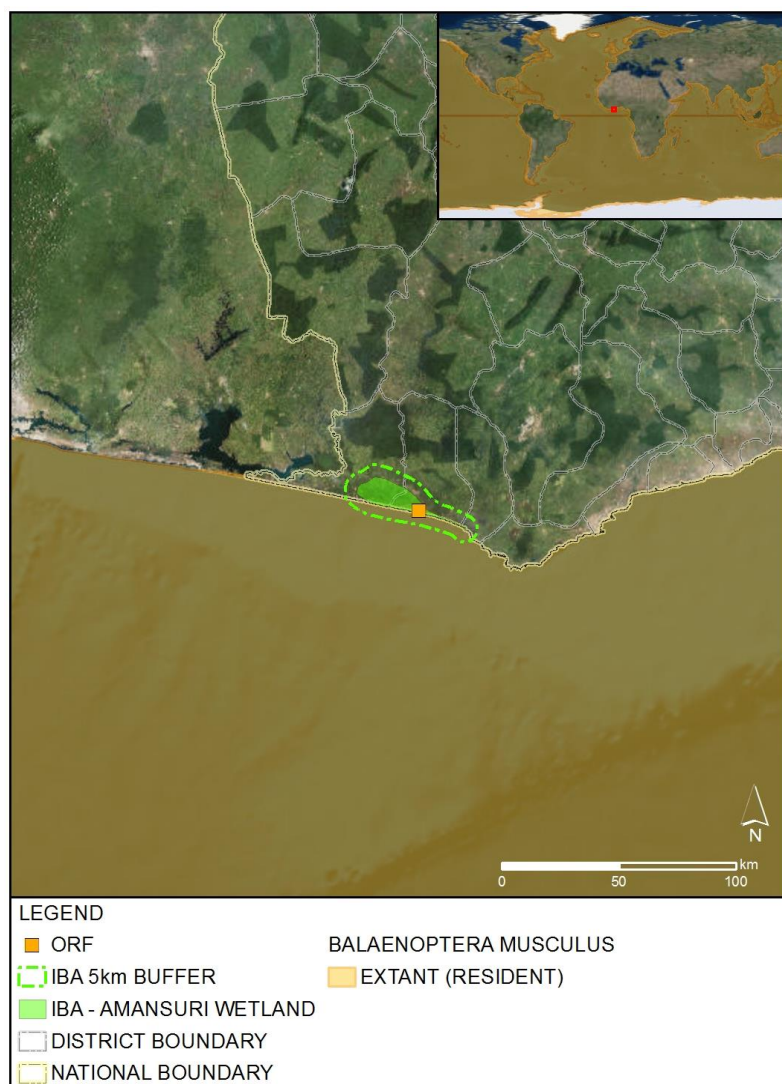


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Balaenoptera musculus* (Blue Whale) Endangered**

The blue whale is a cosmopolitan species, found in all oceans except the Arctic, but absent from some regional seas such as the Mediterranean, Okhotsk and Bering seas (Reilly et al., 2008). Its winter distribution is poorly known, but the presumption has been that animals migrate in winter to lower latitudes, largely because blue whales were caught off Namibia, South Africa and Chile in winter (Best 1998, Mackintosh 1965). Recent records of blue whales are very rare from the South Atlantic. Considering its extensive range, and absence of regular sightings in the regions, this species is not considered as a potential trigger for Critical Habitat under Criterion 1.

Figure 1.4 Blue Whale (*Balaenoptera musculus*) range in relation to DMU



Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Necrosyrtes monachus* (Hooded Vulture) Critically Endangered**

N. monachus is considered generally sedentary, with some dispersal of non-breeder/immature birds and movements in response to rainfall in the Sahel West Africa (Ferguson-Lees and Christie, 2001). Though widespread, the species is generally sedentary with some dispersal by non-breeders and immature birds, and movements in response to rainfall in the Sahel of West Africa (Ferguson-Lees and Christie 2001). In West Africa and Kenya it breeds throughout the year, but especially from November to July.

Birdlife (2012) and the IUCN Red List (2015) estimates this species' population to number a maximum of 197,000 mature individuals. Baseline and Bird survey results have demonstrated that Hooded Vultures are present in the eni ORF area, and their numbers within the AoI fluctuate widely within short periods of time, ranging from six to approximately 30 individuals. Observations suggest that this species is wide ranging and Hooded Vultures observed in the study area may therefore be part of a wider population in Ghana. Evidence of Hooded Vultures breeding within the vicinity of the project has not been demonstrated. These birds appear to be attracted to modified village habitats where they feed on poorly disposed waste. This modified habitat is not restricted to the DMU and these birds are not considered to be critically dependent on the habitats within the DMU. Considering that Hooded Vultures are a wide ranging species, their association with anthropogenic environments, and the difficulty of identifying a sensible DMU for the species; this species is not considered a Critical Habitat trigger under this assessment. **Considering these species may use both natural and modified habitat, mitigation measures will be required to demonstrate>NNL.**

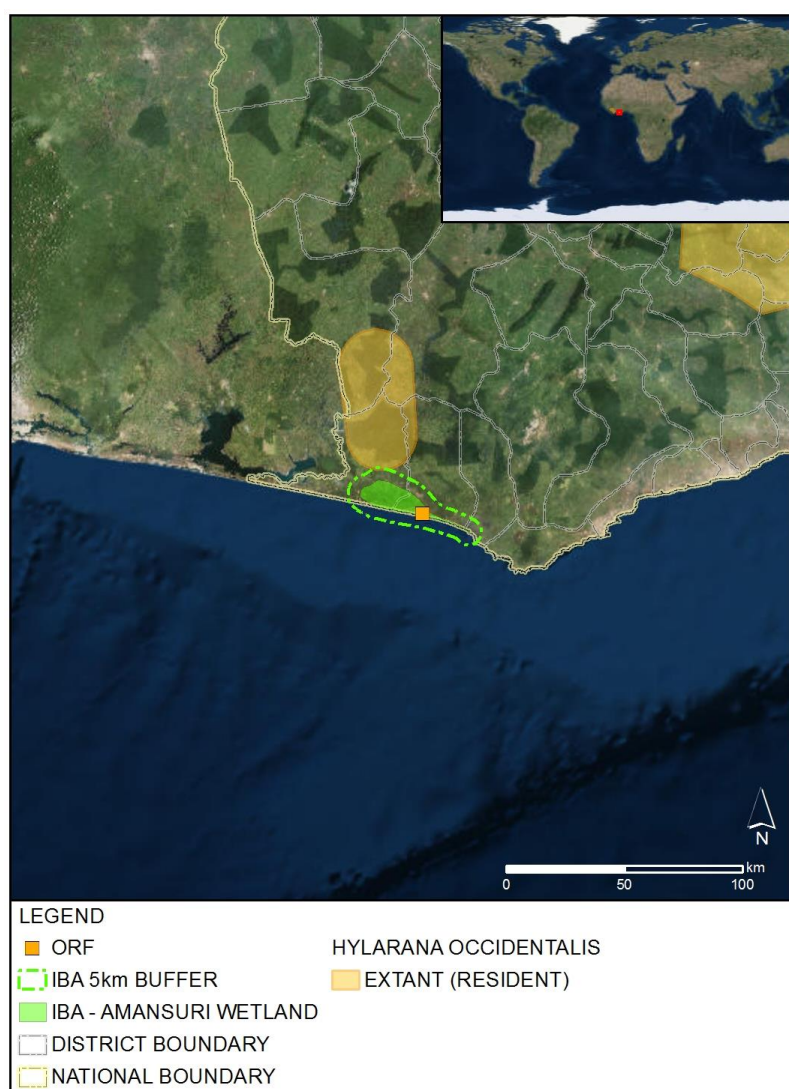
Table 1.5 Application of the IUCN KBA Standard to Hooded Vultures

Criteria	Assessment
A Threatened Taxa	The Hooded Vulture is classified as Critically Endangered on the IUCN Red List of Threatened Species and meets the criteria A2acd+3cd+4acd. The species qualifies under Criterion A of the IUCN Red List of Threatened Species, but numbers of these birds are low and the importance of the site for the species cannot be assessed accurately.
B Geographically Restricted Biodiversity	Not applicable
C Ecological Integrity	Not applicable
D Biological Processes	Not applicable
E Irreplaceability	Not applicable

***Hylarana occidentalis* (Ivory Coast Frog) Endangered**

This frog species is known from several records a number of protected areas in south-western Ghana: Kakoum National Park, Boi Tano Forest Reserve and the Ankasa Conservation Area, a twin wildlife protected area comprising Nini-Suhien National Park (166 km²) to the north and the Ankasa Forest Reserve (343km²) to the south (Ghana). It inhabits lowland forest, and is known only from undisturbed primary forest, presumably breeds in temporary pools. Considering the Amanzule area is largely flooded, it is unlikely that this species may be present in the DMU, or even that the DMU can be considered a management unit for these, thus it is not considered as a potential trigger for Critical Habitat under Criterion 1 or 2.

Figure 1.6 Ivory Coast Frog (*Hylarana occidentalis*) range in relation to DMU

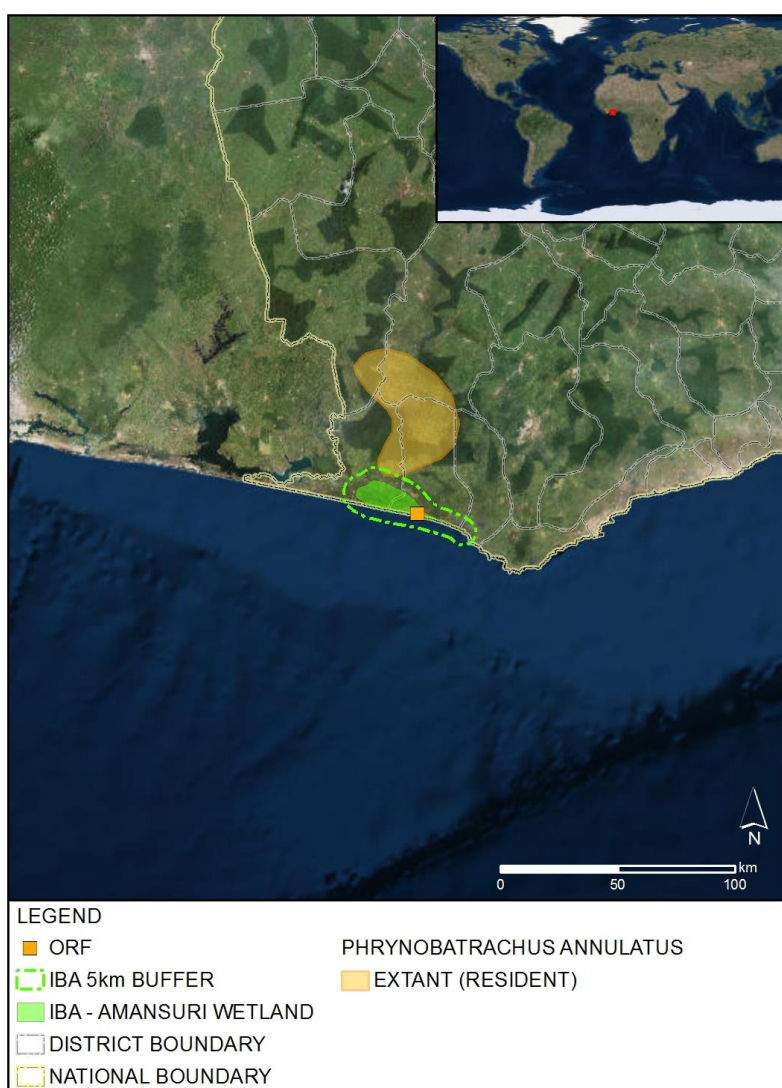


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Phrynobatrachus annulatus* (Ringed River Frog) Endangered**

This species is known only from the Mount Nimba area in extreme south-eastern Guinea and north-eastern Liberia, from the Taï National Park in south-western Côte d'Ivoire, and from Draw River and Boi Tano Forest Reserves, Ghana. It presumably occurs a little more widely than this, although it has not been found in surveys of many intervening areas (Rödel & Schiøtz, 2004). All specimens have been found in primary forest close to inselbergs in leaf-litter. Its biology and breeding are unknown, although most records have come from drier parts of the forest suggesting that it is not dependent on water for breeding. Considering the wetland nature of the DMU, it is unlikely that such species may be present, thus it does not trigger Critical Habitat under Criterion 1-2.

Figure 1.7 Ringed River Frog (*Phrynobatrachus annulatus*) range in relation to DMU

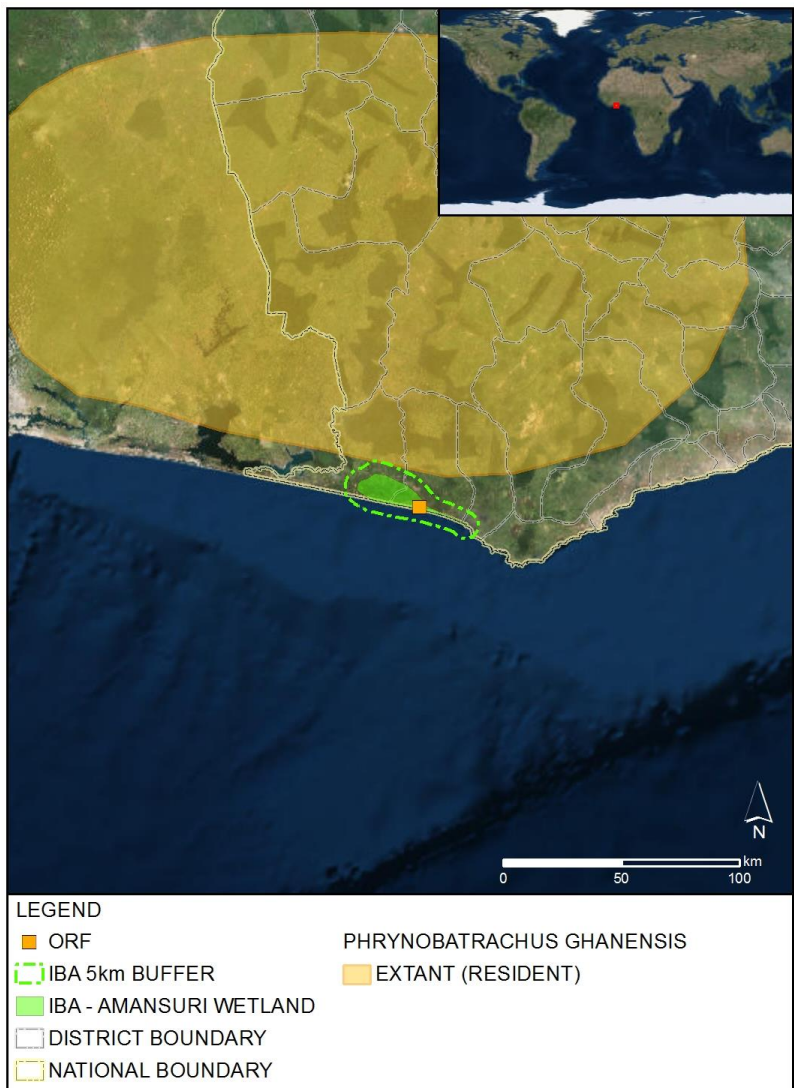


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Phrynobatrachus ghanensis* (Ghana River Frog) Endangered**

This species is known in the heavily fragmented forest region of south-western Ghana: Kakoum National Park; Boi-Tano Forest Reserve; Draw River Forest Reserve; the Ankasa Conservation Area, a twin wildlife protected area comprising Nini-Suhien National Park to the north and the Ankasa Forest Reserve to the south; and Bobiri Forest Reserve (Rödel & Schiøtz, 2004). It is usually found on the floor of swampy primary rainforest, but it has also been found at the edge of small temporary pools in bamboo forest and close to forest edge. Its breeding is unknown, though it is likely to take place in water. Considering the DMU is a wetland located just south of its known range, it may be probable that this species may be found in the north-western section of the DMU, depending on the degree of habitat connectivity between the Amanzule Wetlands and Ankasa Forest Reserve. Considering the latter, this species may potentially trigger Criterion 2 Tier 2b although no data is currently available to demonstrate this species as a Critical Habitat trigger.

Figure 1.8 **Ghana River Frog (*Phrynobatrachus ghanensis*) range in relation to DMU**

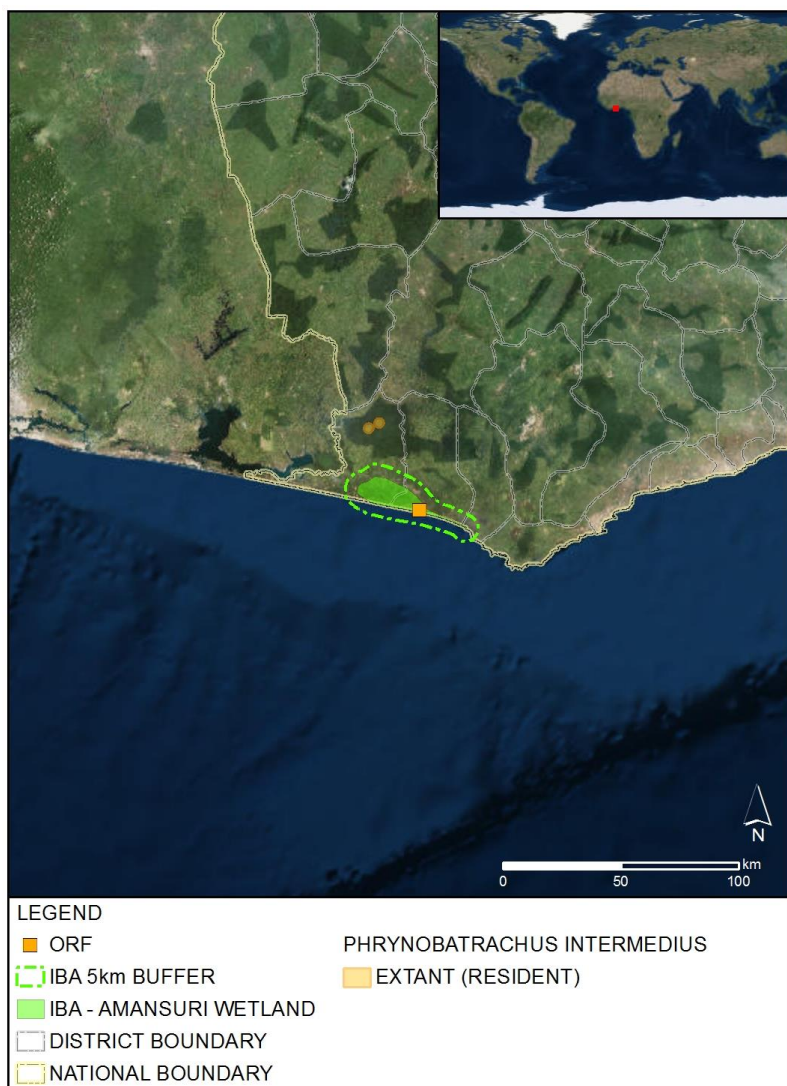


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Phrynobatrachus intermedius* (Puddle Frog) Endangered**

This frog is only known from two sites in the Ankasa Conservation Area in southwestern Ghana, separated by a straight-line distance of approximately 2 km (Rödel et al. 2009, C. Boateng pers. comm. December 2010), comprised of the Ankasa Resource Reserve and the Nini-Suhien National Park (Rödel et al. 2009). It is likely that this species occurs between these sites, and may be more widespread (Boateng pers. comm. December 2010, M.O. Rödel pers. comm. December 2010). This species is highly cryptic and known to occur in swampy areas within primary rainforests (Rödel et al. 2009). It is presumed to breed in water via larval development. the habitats of the DMU is not known to contain any primary rainforest and this species is therefore very unlikely to occur there. Considering the latter, this species is not considered as a potential trigger for Criterion 2 Tier 2b.

Figure 1.9 Puddle Frog (*Phrynobatrachus intermedius*) range in relation to DMU

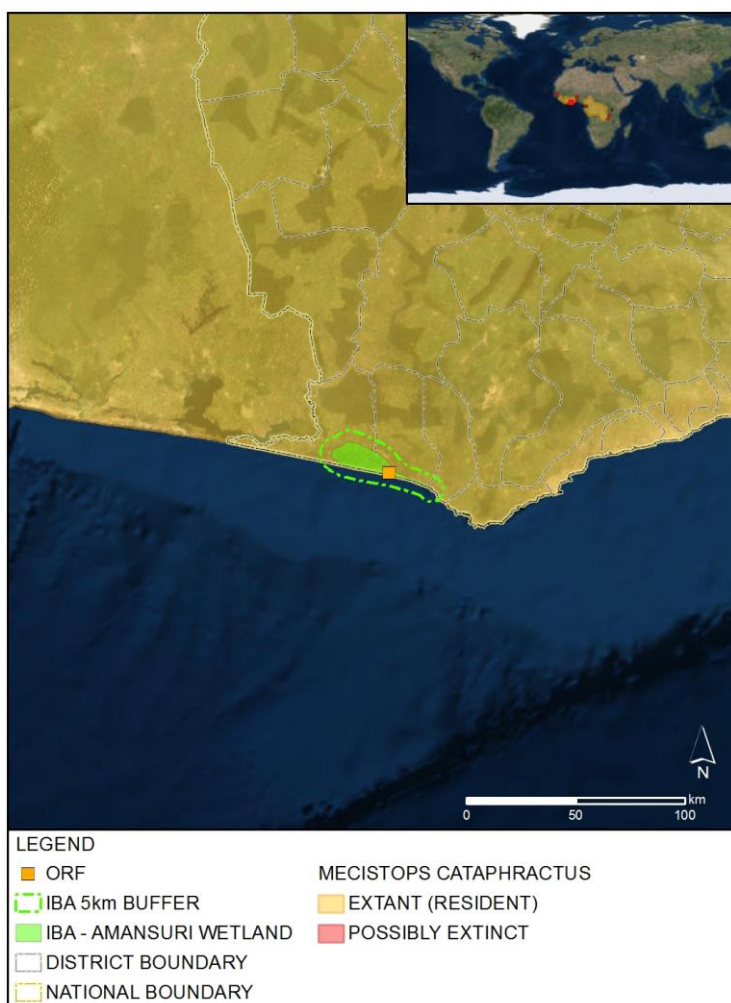


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Mecistops cataphractus* (Slender-snouted Crocodile) Critically Endangered**

Under its current taxonomic status (presently being revised), it is distributed throughout western tropical Africa from Lake Tanganyika and Lake Mweru in the east/southeast to the Gambia River in the west (Shirley 2010). Survey data from Ghana and Côte d'Ivoire (Shirley et al. 2009) suggest that *M. cataphractus* is all but extinct in West Africa (i.e., west of the Cross River, Nigeria) with fewer than 50 individuals and five adults detected in known surveys. The two regions (West and Central Africa) are completely isolated from each other underpinning the impending species split in this taxon. Considering the DMU is a wetland located within its known range, it may be likely that this species may be found. However, it should be noted that the presence of this species in the AoI was not confirmed during the March 2016 pre-construction fauna survey, and that the community members engaged were not aware of their presence in the area (they declared never to have observed it or heard about it). This species may potentially trigger Criterion 1 Tier 2c Critical habitat, although no data is currently available to demonstrate this species as a Critical Habitat trigger. As part of the Environmental Monitoring Program, as precautionary approach, subsequent surveys may allow to further define the presence of the species and abundance in order to refine the assessment.

Figure 1.10 Slender-snouted Crocodile (*Mecistops cataphractus*) range in relation to DMU



Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Chelonia mydas* (Green Turtle) Endangered**

Green Turtle has a circumglobal distribution, occurring throughout tropical and, to a lesser extent, subtropical waters. Green turtles are migratory and they undertake complex movements and migrations through geographically disparate habitats. Nesting occurs in more than 80 countries worldwide (Hirth 1997). Their movements within the marine environment are less understood but it is believed that green turtles inhabit coastal waters of over 140 countries (Groombridge and Luxmoore, 1989). According to recent data from Wildseas Conservation Ghana 2016 report on Sea Turtle Conservation in the Western Region; 12 and 19 Green turtles have been tagged in 2014 and 2015 respectively along the coastal villages of Axim, Ngelekazo and Beyin which are located within the DMU; with reports on nesting in the area. Sea turtles are a wide ranging species, and application of the DMU to this species is difficult. Important nesting sites for Green Turtle in West Africa are located at Guinea to the northwest and Sao Tome & Principe to the southeast (SWOT, 2011¹). Furthermore, it is

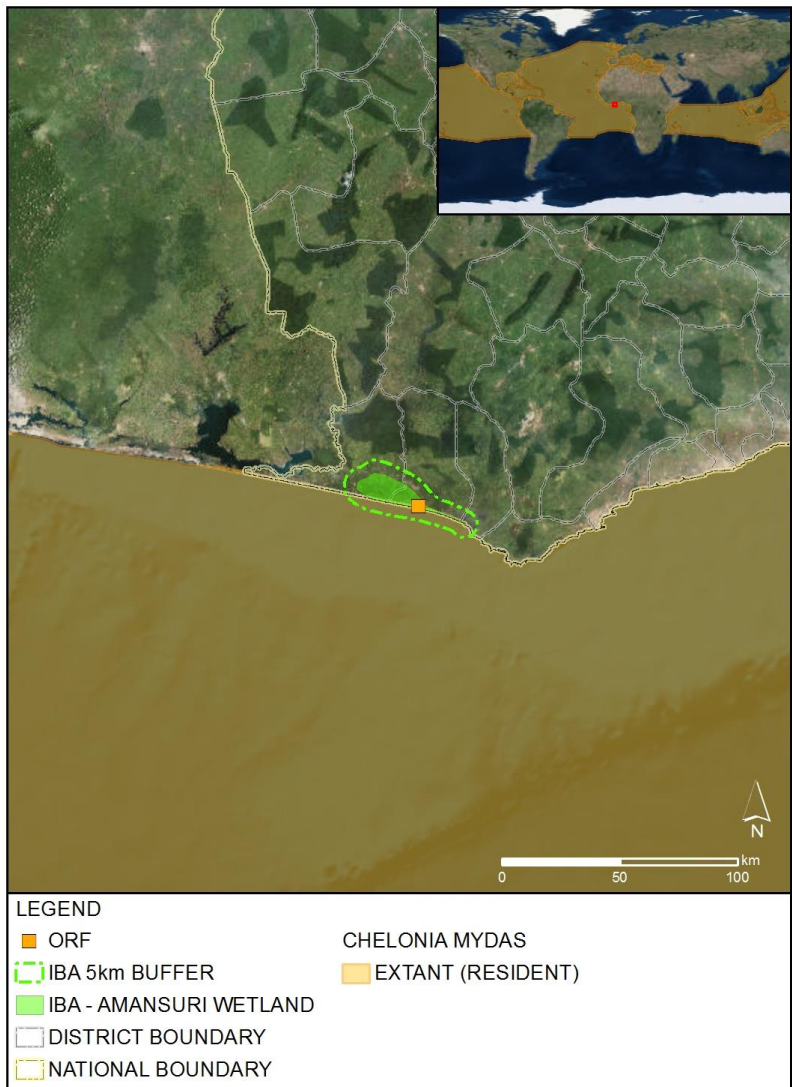
(1) ¹ State of the World's Sea Turtles, 2011. Report Vol VI. Available at:
http://www.seaturtlestatus.org/sites/swot/files/report/033111_SWOT6_FinalA.pdf

expected that the temporal (e.g. construction phase) loss of a limited stretch of beach associated with the project development will not threaten the regional viability of this species. This species is not considered a Critical Habitat trigger under this assessment. **Considering the presence of natural habitat for this species, mitigation measures will be required to demonstrate NNL.**

Table 1.6 Application of the IUCN KBA Standard to Green Turtles

Criteria	Assessment
A Threatened Taxa	The Green Turtle is classified as Endangered on the IUCN Red List of Threatened Species and meets the criteria A2bd, however the population size of this species is not well understood, and the IUCN KBA criteria and thresholds cannot be applied.
B Geographically Restricted Biodiversity	Not applicable
C Ecological Integrity	Not applicable
D Biological Processes	Not applicable
E Irreplaceability	Not applicable

Figure 1.11 Green Turtle (*Chelonia mydas*) range in relation to DMU

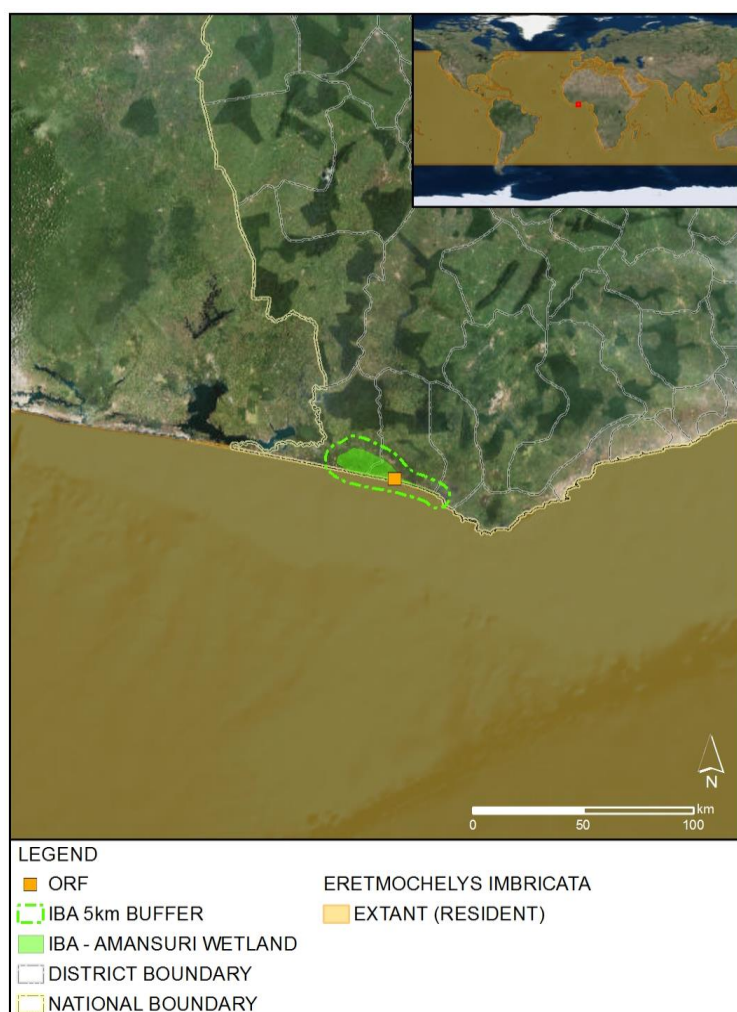


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Eretmochelys imbricata* (Hawksbill Turtle) Critically Endangered**

The Hawksbill has a circumglobal distribution throughout tropical and, to a lesser extent, subtropical waters of the Atlantic Ocean, Indian Ocean, and Pacific Ocean. Genetic analyses in the Atlantic and Indo-Pacific indicate that nesting populations comprise separate and identifiable stocks that should be treated as separate management units (Bass et al. 1996, Bowen et al. 1996, Bowen et al. 2007). Unconfirmed reports of fishermen catching Loggerhead and Hawksbill turtles at sea (Tanner, 2014; Alexander et al., 2012) may suggest that these species may still be utilizing Ghana's waters for feeding and possibly nesting on remote areas of Ghana's sandy beaches. According to recent data from Wildseas Conservation Ghana 2016 report on Sea Turtle Conservation in the Western Region, a single specimen had been caught during fishing activities, confirming the species presence and the possibility that it may nest in the area. Even though this species may potentially trigger Criterion 1 Tier 2c Critical habitat, being a wide ranging species and difficulties associated with defining a DMU, it is excluded as a potential trigger. **However, considering the presence of natural habitat for this species, mitigation measures will be required to demonstrate>NNL.**

Figure 1.12 Hawksbill Turtle (*Eretmochelys imbricata*) range in relation to DMU

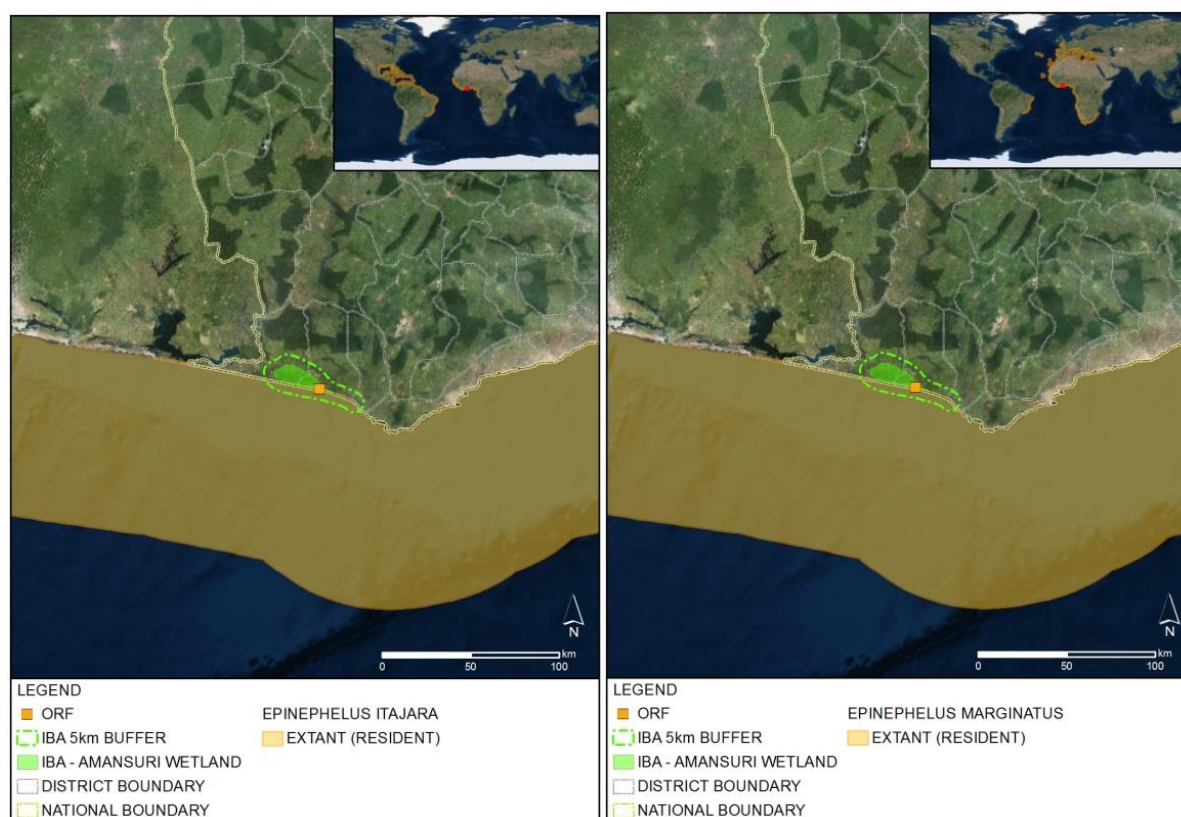


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Epinephelus itajara* (Atlantic Goliath Grouper) Critically Endangered and *E. marginatus* (Dusky Grouper) Endangered**

E. itajara is reported in the eastern Atlantic from Senegal to Congo; whilst *E. marginatus* occurs in the eastern Atlantic and western Indian Ocean: Mediterranean Sea and round the southern tip of Africa, except for Namibia (Fennessy, pers. comm. 2004) to southern Mozambique. Most of these species are found in depths shallower than 200 m. There is no data that suggests that the marine section of the DMU may constitute a Critical habitat for these species.

Figure 1.13 Atlantic Goliath Grouper (*Epinephelus itajara*) and *Epinephelus marginatus* range in relation to DMU

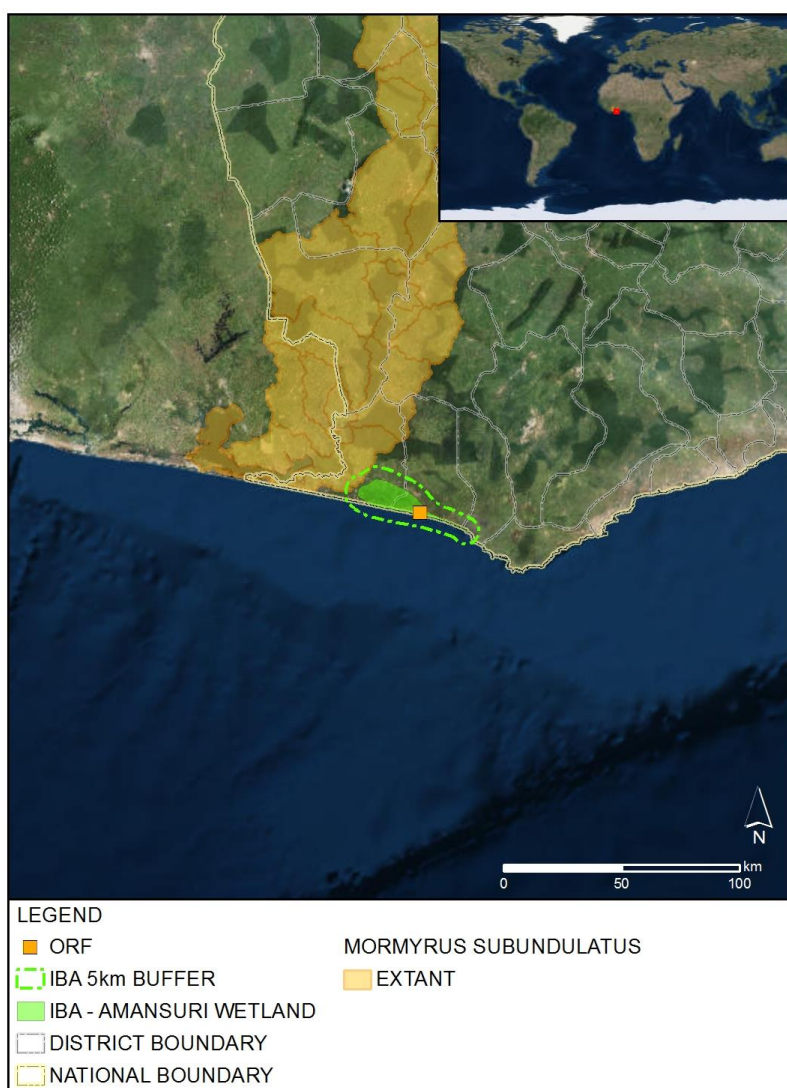


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Mormyrus subundulatus* (Elephant Fish) Endangered**

This species has a small Extent of Occurrence (EOO) and Area of Occupancy (AOO) (at less than 5,000 km² and 500 km² respectively) and known only from three locations. It is known only from the Bandama and the Tano rivers (Entsua-Mensah & Lalèyè, 2010). No data is available to support a Critical Habitat designation for the DMU, especially considering that it may not inhabit wetland areas.

Figure 1.14 Elephant Fish (*Mormyrus subundulatus*) range in relation to DMU

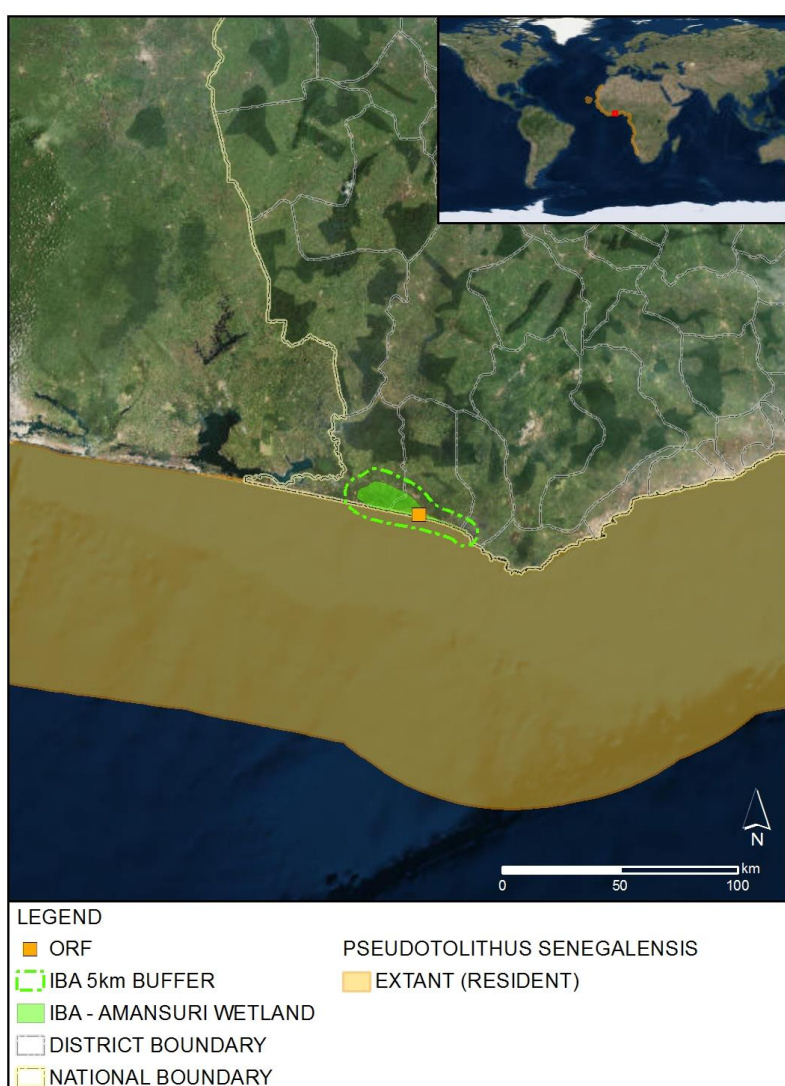


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Pseudotolithus senegalensis* (Cassava Croaker) Endangered**

This species is found in the East Atlantic from Morocco to Namibia, and in the Cape Verde Islands. It is the most common Sciaenidae in most of this region. Nigeria, Senegal, Ghana and Cameroon have the largest fleets in the West African region. In Ghana the sciaenids are exploited by the artisanal, semi-industrial and industrial fishing sub-sectors. *P. senegalensis* was found in low abundance at the Sanzule haul sampling conducted in 2014. Though found to be present, no data is available to support a Critical Habitat designation for the DMU.

Figure 1.15 Cassava Croaker (*Pseudotolithus senegalensis*) range in relation to DMU

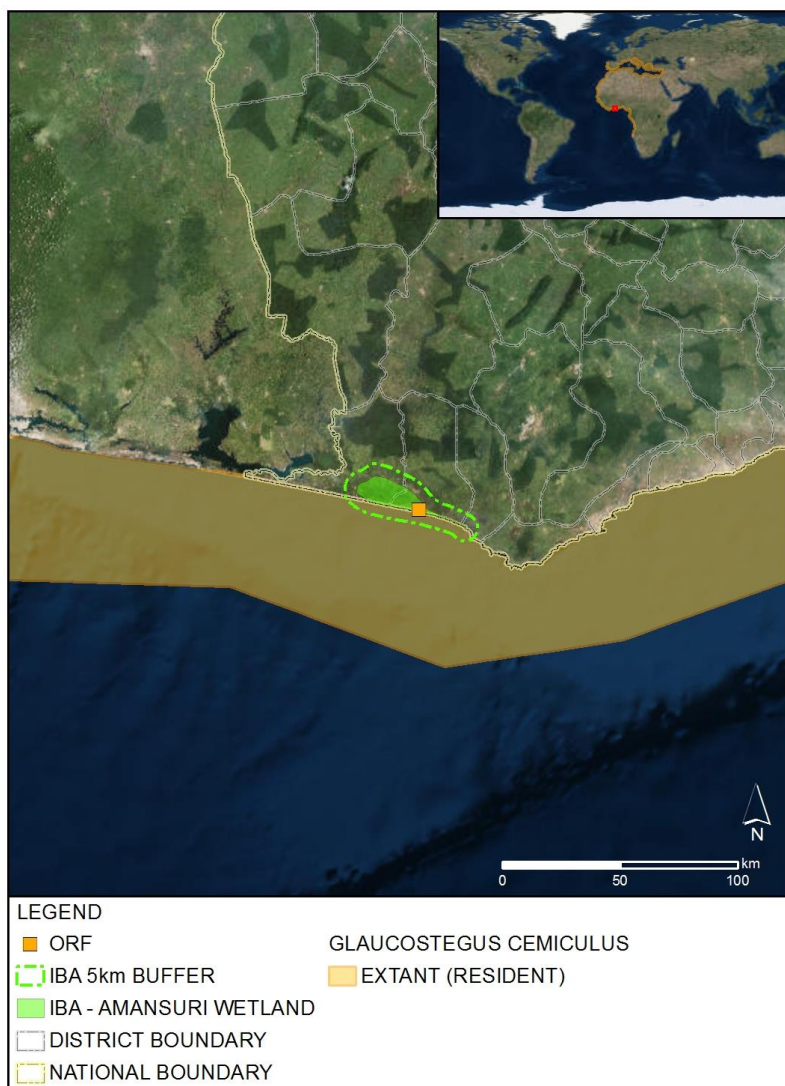


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Dasyatis margarita* (Daisy Stingray) Endangered**

This species is found in Eastern central and southeast Atlantic/West African coast and islands, from Senegal to Congo. Fishing for *D. margarita* occurs in inshore waters in all its distribution range along West African coasts off Senegal, Ivory Coast and Ghana, where it is caught mainly by artisanal and small scale commercial fisheries using trammel-nets, bottom trawls and beach seines (Stehmann 1981), but also by gill nets, fish traps, beach seines, and line fishing. (Compagno & Marshall). *D. margarita* was found in low abundance at the Sanzule and Bakanta haul samplings conducted in 2014. Though found to be present, no data is available to support a Critical Habitat designation for the DMU.

Figure 1.16 Daisy Stingray (*Dasyatis margarita*) range in relation to DMU

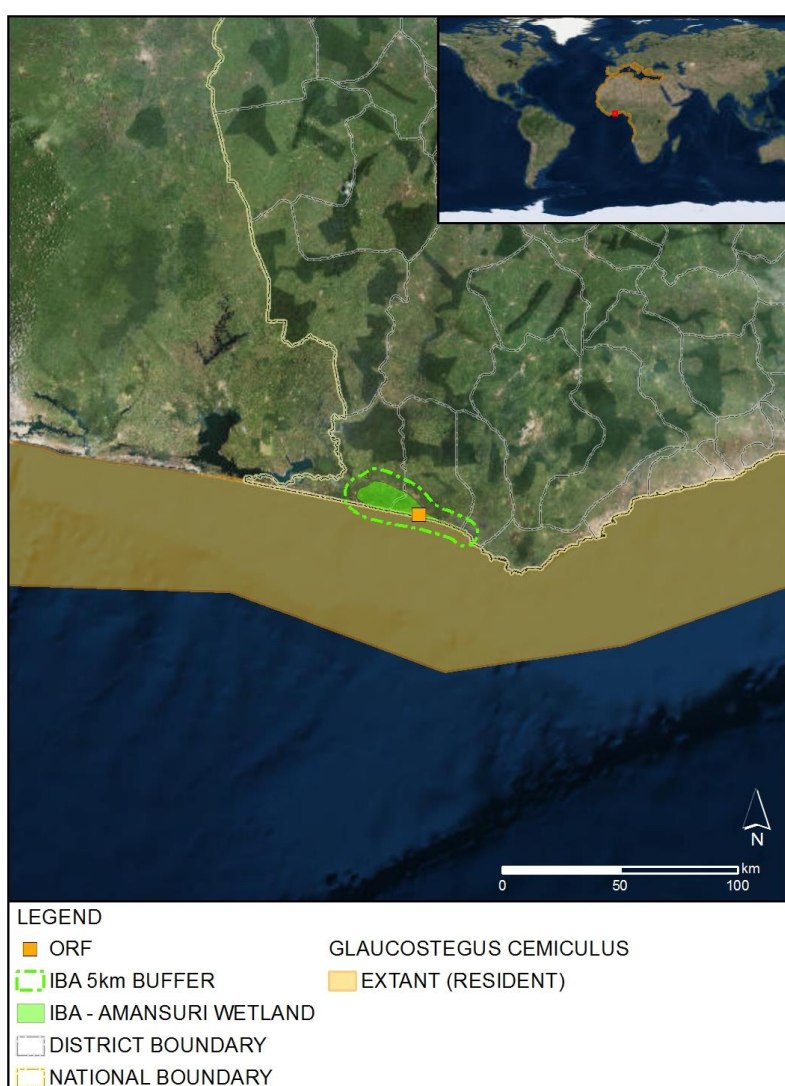


Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Glaucostegus cemiculus* (Blackchin Guitarfish) Endangered**

The blackchin guitarfish distribution extends from the Northern coast of Portugal, down the West African coast and including the Mediterranean Sea. In western Africa, the fins of the blackchin guitarfish are highly prized (they can fetch an estimated 100 Euro/kg), and as a result it is a major target species of artisanal fisheries operating along all coasts in this region (DuCrocq pers. comm. 2006). A reduction in the size of individuals and a strong decline in this species has been observed throughout its range in West Africa. No data is available to support a Critical Habitat designation for the DMU.

Figure 1.17 Blackchin Guitarfish (*Glaucostegus cemiculus*) range in relation to DMU



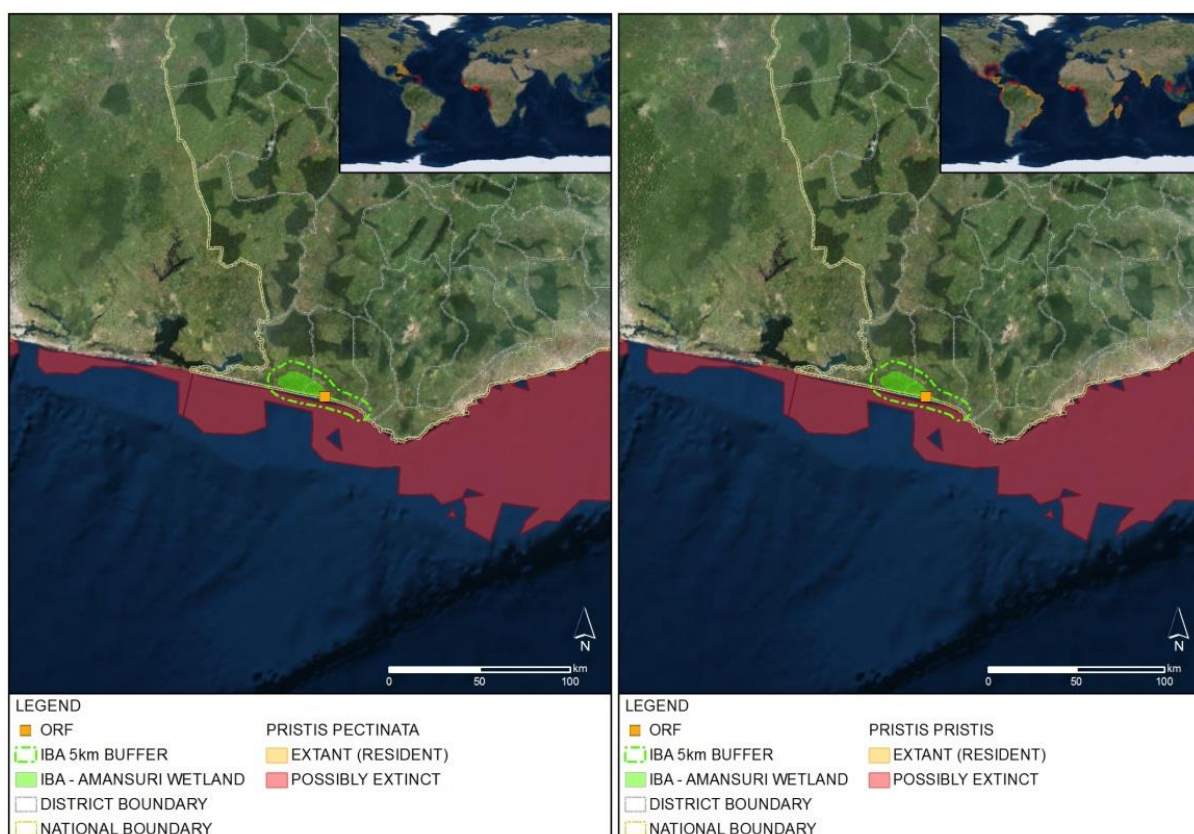
Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Pristis pectinata* (Small-tooth Sawfish) Critically Endangered and *P. pristis* (Large-tooth Sawfish) Endangered**

The current distribution of Small-tooth Sawfish *P. pectinata* in the Eastern Atlantic is uncertain due to species misidentification, lack of reporting, and the general contraction of its range. Small-tooth Sawfish was historically found along the coast of western Africa from Angola to Mauritania (Faria et al. 2013). There has been only one confirmed record for the region in the last 10 years (Carlson et al., 2013).

The Large-tooth Sawfish *P. pristis* formerly had a widespread tropical distribution, consisting of four subpopulations (Eastern Atlantic, Western Atlantic, Eastern Pacific and Indo-West Pacific). Recent records are rare (e.g., there have been very few records in the Eastern Atlantic in the last decade) (Kyne et al., 2013). No data on either species is available to support a Critical Habitat designation for the DMU.

Figure 1.18 Small-tooth Sawfish (*Pristis pectinata*) and Large-tooth Sawfish (*Pristis pristis*) range in relation to DMU



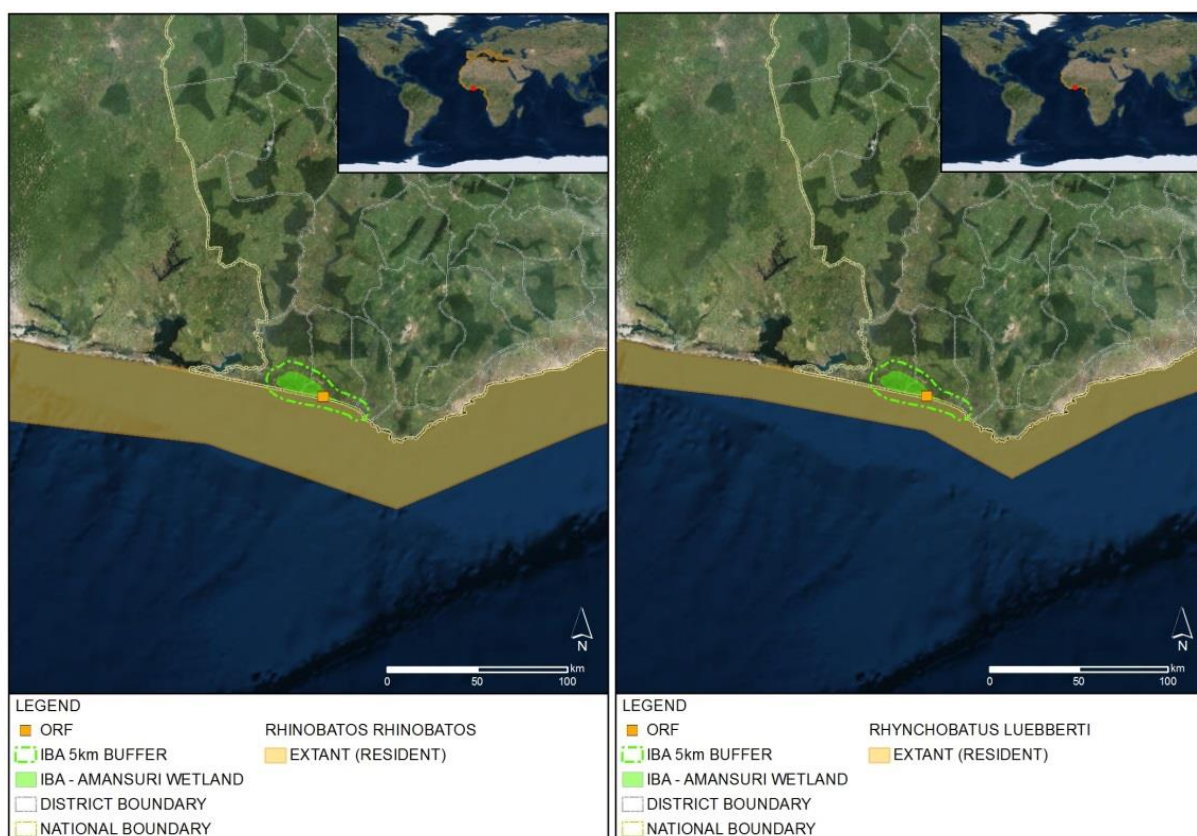
Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Rhinobatos rhinobatos* (Common Guitarfish) Endangered and *Rhynchobatus luebberti* (Lubbert's Guitarfish) Endangered**

The common guitarfish (*R. rhinobatos*) distribution extends from the southern Bay of Biscay southwards to Angola (including the Mediterranean). Although the distribution is fairly wide, it is subjected to fishing pressures throughout most of its range. Its existence along coastal inshore areas makes this species an easy target for subsistence fisheries (Notarbartolo di Sciara et al., 2007).

R. luebberti occurs off the West African coast from Mauritania through the Gulf of Guinea south to Angola. Large declines are known to have occurred throughout this species' range. Exploitation of the marine environment is intense in many parts of coastal West Africa, with the likelihood of increased exploitation as the human population continues to rise (Compagno & Marshall, 2006). There is no data that suggests that the marine section of the DMU may constitute a Critical habitat for either of these species.

Figure 1.19 Common Guitarfish (*Rhinobatos rhinobatos*) and Lubbert's Guitarfish (*Rhynchobatus luebberti*) range in relation to DMU



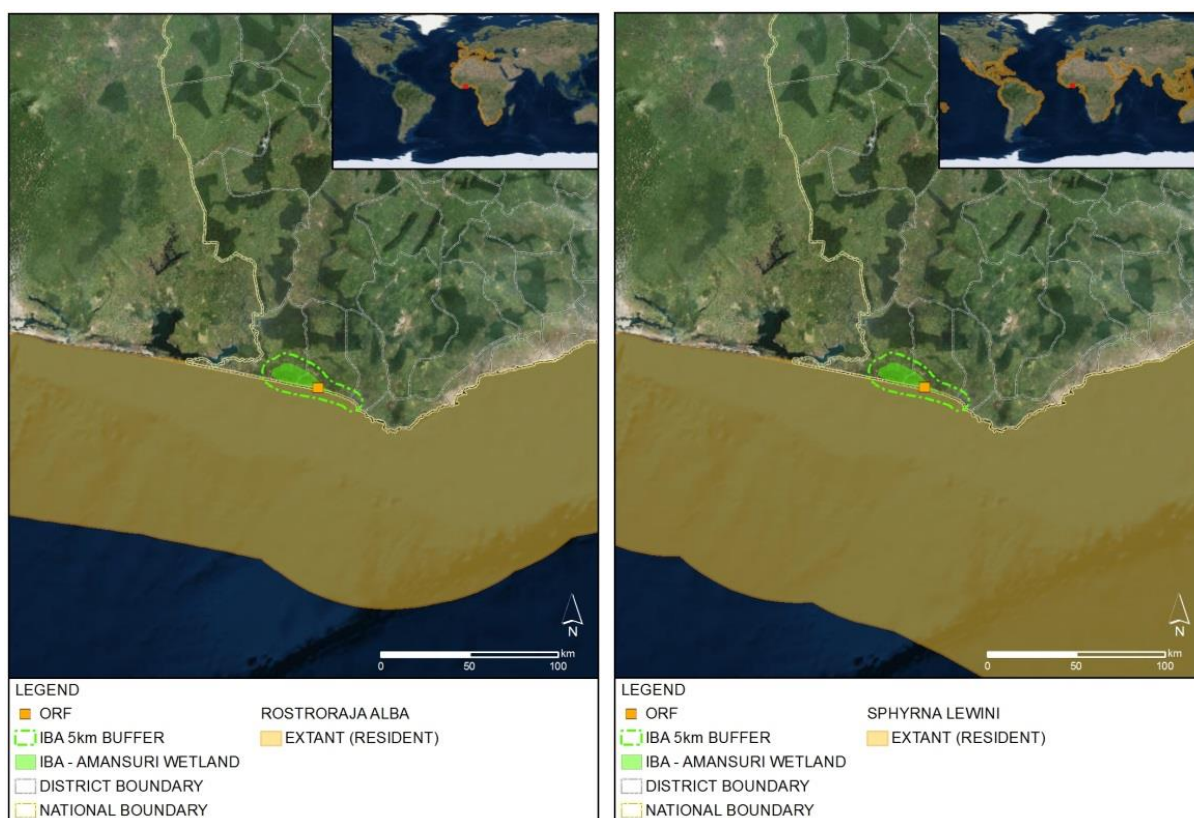
Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

***Rostroraja alba* (White Skate) Endangered and *Sphyrna lewini* (Scalloped Hammerhead) Endangered**

The overall geographical range of *R. alba* covers the Eastern Atlantic coasts from the southern British Isles south to South Africa, including the Mediterranean Sea, and extending into the southwestern parts of Indian Ocean (Dulvy, 2006).

The Scalloped Hammerhead *S. lewini* has a circumglobal distribution in coastal warm temperate and tropical seas. Although it is wide ranging, there is genetic evidence for multiple subpopulations. There is concern for this species in the Eastern central Atlantic since although it is still present in the catches, catches are comprised entirely of juveniles in some areas. This species is frequently caught along the western African coast and is heavily targeted by driftnets and fixed gillnets from Mauritania to Sierra Leone (Baum et al., 2007). There is no data that suggests that the marine section of the DMU may constitute a Critical habitat for either of these species.

Figure 1.20 White Skate (*Rostroraja alba*) and Scalloped Hammerhead (*Sphyrna lewini*) range in relation to DMU



Source: ERM, 2016, adapted from the IUCN Red List of Threatened Species

1.4.2 Application of Criterion 3

Chapter 6 *Environmental Baseline of the Phase 2 ESHIA* provides a list of all faunal species recorded in the eni Ghana area of influence during the field surveys, which have broader distribution ranges so are appropriate for analysis at the DMU scale. Further studies included a bird and sea turtle study as part of pre-construction surveys. Considering that the proposed DMU is basically the Amanzule Wetland IBA, trigger species under the birdlife A4 category have been also assessed.

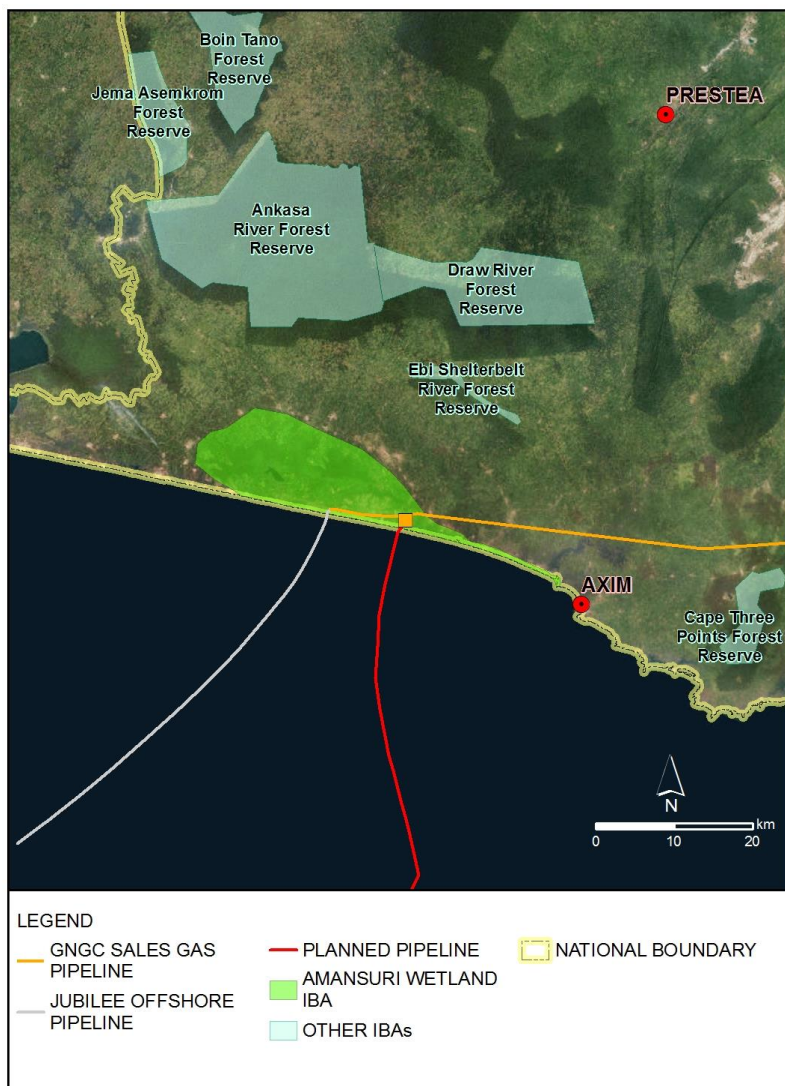
Table 1.7 IUCN Red list of migratory fauna identified in the DMU

Class species	Common name	IUCN Red List status	Ghana Protected status
Aves (Birds)			
<i>Calidris alba</i>	Sanderling	LC	-
<i>Thalasseus maximus</i>	Royal Tern	LC	Schedule II
<i>Pluvialis squatarola</i>	Grey Plover	LC	-
<i>Charadrius hiaticula psammmodroma</i>	Common Ringed Plover	LC	-
<i>Arenaria interpres</i>	Ruddy Turnstone	LC	-
<i>Haematopus ostralegus</i>	Eurasian Oystercatcher	NT	-
<i>Sterna sandvicensis</i>	Sandwich Tern	LC	Schedule II
<i>Sterna hirundo</i>	Common Tern	LC	Schedule II
<i>Chlidonias niger</i>	Black Tern	LC	Schedule II
Reptilia (Reptiles, sea specifically turtles)			
<i>Caretta caretta</i>	Loggerhead Turtle	VU	-
<i>Dermochelys coriacea</i>	Leatherback turtle	VU	Schedule I
<i>Chelonia mydas</i>	Green Turtle	EN	Schedule I
<i>Eretmochelys imbricata</i>	Hawksbill Turtle	CR	Schedule I
<i>Lepidochelys olivacea</i>	Olive Ridley	VU	-

Occurrence of Birds

Figure 1.21 shows the location of identified Important Birds Areas (IBA's) in relation to the proposed DMU, where the most notable IBA defined by Birdlife Criterion A4 (Congregations) is located surrounding the eni Ghana ORF onshore site.

Figure 1.21 Location of other Important Bird and Biodiversity Areas (IBA's) in relation to DMU



Source: Birdlife, 2015

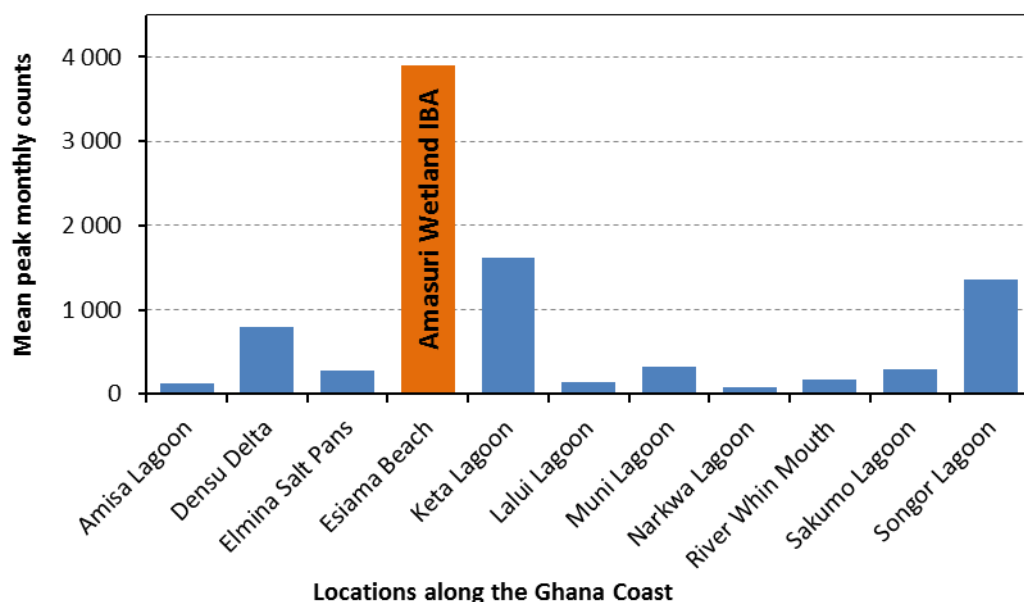
Sanderling (*Calidris alba*)

Sanderlings are not threatened, but are present in large numbers along the shoreline of the project area, as confirmed during the preconstruction bird survey. This species breeds in the Arctic regions and five subpopulations occur which migrate to different over-wintering grounds. The sanderlings that over-winter in Ghana form a part of the East Atlantic-Europe West & Southern Africa subpopulation, which is estimated to consist of 120,000 individuals, while the global population is estimated to comprise approximately 600,000 individuals (Waterbird Population Estimates, Wetland International Website) ⁽¹⁾.

(1) Wetland International Website presenting Waterbird Population Estimates is available at: <http://wpe.wetlands.org/> (accessed April 2016)

The preconstruction bird survey (Nov-2015) recorded approximately 1,000 sanderlings in the near vicinity of the project, though the entire shoreline of the IBA was not surveyed. Birdlife International factsheet on the Amanzule Wetlands (Birdlife, 2016) indicate a wintering population of 4,250 individuals, which is a qualifying criterion (A4) for designation of the IBA. Detailed counts of sanderlings have been conducted over the period from 2000 to 2006 by Ntiamoa-Baidu *et al.* (2014), having recorded monthly peaks ranging from 3,225 to 4,238 birds (mean of 3,898) along the beaches in the vicinity of the project area. This site has been found to support 43% of the Ghana population (*Figure 1.22*), and represents 3.5% of the East Atlantic-Europe West & Southern Africa subpopulation and 0.7% of the global population.

Figure 1.22 Mean numbers of sanderlings recorded along the Ghana Coast from 2000 to 2006 (Ntiamoa-Baidu *et al.* 2014)



The Sanderling is a migratory species and the DMU represents an important over-wintering area that is clearly important for maintaining the bio-regional subpopulation of this species. The IBA has been identified by Birdlife to meet criterion A4i (site known to hold, on a regular basis, greater than 1% of a biogeographic population of a congregatory waterbird species). Quantitative thresholds (*Table 1.1*) provided in Guidance Note 89 to the PS6 states that Birdlife criterion A4 is a qualifying feature for Criterion 3. **Numbers of Sanderlings do trigger Criterion 3 (Migratory and/or congregatory species) for Critical Habitat (Tier 2), therefore Net Gain requirements associated with the Critical Habitat designation will need to be demonstrated for this species.**

Table 1.8 Application of the IUCN KBA Standard to Sanderlings

Criteria	Assessment
A Threatened Taxa	Not applicable
B Geographically Restricted Biodiversity	Not applicable
C Ecological Integrity	Not applicable
D Biological Processes	- D1 (Demographic Aggregations): The IBA does not support a life history stage of Sanderlings and this sub-criterion is not applicable - D2 (Ecological Refugia): The IBA supports 0.7% of the global population (required to hold $\geq 20\%$) and therefore does not qualify.
E Irreplaceability	Not applicable

Royal Tern (*Thalasseus maximus*)

The Royal Tern was confirmed to occur in abundance in the project area during the preconstruction bird survey (Nov-2015) with approximately 800 birds recorded. The Birdlife International factsheet for the Amanzule Wetlands (Birdlife, 2016) describes a population of approximately 700 individuals in 2001, which qualified for criterion A4i for designation of the IBA.

The Waterbird Population Estimates database describes the West African population as belonging to the subspecies *T.m. albidorsalis*, which has a population estimated at approximately 225,000 individuals. The population estimate has been revised upwards since 2001. The global population of the species is estimated at 375,000 birds. The current population therefore represents 0.4% of the West African subspecies and 0.2% of the global species population. The Royal Tern population may presently not qualify for the Birdlife A4i criterion, based on the current population estimates, but has been designated as an IBA trigger by Birdlife International (i.e. assessed in 2001) and therefore **does trigger a Critical Habitat under Criterion 3**, based on the IFC PS6 (*Table 1.1*). Removal of the Royal Tern as an IBA trigger, and hence a Critical Habitat trigger will require the consent from Birdlife International. Under a precautionary approach, the Royal Tern is assessed as a Critical habitat trigger for Criterion 3 (tier 2), therefore Net Gain requirements associated with the Critical Habitat designation will need to be demonstrated for this species.

Table 1.9 Application of the IUCN KBA Standard to Royal Terns

Criteria	Assessment
A Threatened Taxa	Not applicable
B Geographically Restricted Biodiversity	Not applicable
C Ecological Integrity	Not applicable
D Biological Processes	- D1 (Demographic Aggregations): Not applicable - D2 (Ecological Refugia): The IBA supports 0.2% of the global population (required to hold $\geq 20\%$) and therefore does not qualify.
E Irreplaceability	Not applicable

Other Migratory Shorebirds

Grey Plover, Common Ringed Plover, Ruddy Turnstone, Eurasian Oystercatcher, Sandwich Tern and Common Tern are migratory shorebirds known to occur in the Amanzule Wetland IBA (*Table 1.7*). Many of these bird species were confirmed present in small numbers during the preconstruction bird survey. There is however, no known documented evidence of populations being present in numbers that would qualify for recognition of critical habitat for these species.

Occurrence of Sea Turtles

According to the Turtle Survey report, those listed in *Table 1.7* are present in Ghana waters, but only the Olive Ridley and leatherback seeming to nest more frequently (the former showing the highest relative abundance in Ghana). Nesting was observed during the limited survey, the Olive Ridley being the only confirmed species. However, the Wildseas Conservation Ghana 2016 report on Sea Turtle Conservation in the Western Region confirms that the most common species present/nesting in the area is the Olive Ridley, with a comparatively low abundance of Green Turtle during years 2014 and 2015.

As described earlier for the Green turtle (*Chelonia mydas*) and Hawksbill turtle (*Eretmochelys imbricata*) it is not possible to ascertain if either the Olive –ridley or Leatherback turtle species nesting in the area can be considered Critical Habitat triggers for the identified DMU. But considering the presence of natural habitat for this species, mitigation measures will be required to demonstrate NNL.

1.4.3 Application of Criterion 4

A description of the current habitats found within the Project AoI, as well as of the Amanzule Wetland is provided in *Chapter 6 Environmental Baseline of the Phase 2 ESHIA* and in Section 1.3 of this report. According to Birdlife (2016) the wetland is a blackwater system. The vegetation in the catchment is Wet Evergreen Forest, with swamp-forest in wetter parts. The most common tree in the swamps is the Raffia Palm *Raphia vinifera*, which grows in almost pure stands. Large areas of the swamp are largely untouched, and is considered the most extensive remaining stand of intact swamp forest in Ghana, the only known peat swamp forest in Ghana, and the best example of freshwater swamp forest characterized by black humic waters (Birdlife, 2016).

A land cover mapping of the wetland was produced by the Rhode Island Coastal Resources Center and USAID (see figure below); where major part of the core of the wetland system consists of “Closed to open broadleaved forest regularly flooded (fresh-brackish)”, surrounded by other land cover types such as:

- Rain-fed Croplands;

- Mosaic Croplands/Vegetation;
- Mosaic Vegetation/Cropland;
- Closed to open broadleaved evergreen or semi deciduous forest;
- Open broadleaved deciduous forest;
- Mosaic Forest - Shrubland/Grassland;
- Mosaic Grassland/Forest – Shrubland;
- Closed to open shrubland;
- Closed to open grassland;
- Sparse vegetation;
- Closed to open broadleaved forest regularly flooded (fresh-brackish);
- Closed broadleaved forest permanently flooded (brackish-saline);
- Artificial areas;
- Bare areas;
- Water bodies.

According to *Table 1.10*, the main natural habitat s that comprise the DMU have been assessed qualitatively according Rodriguez *et al.* 2011 descriptors for endangered ecosystems. The Blackwater Swamp Forest is described as a unique wetland system by Osei *et al.* (2015) ⁽¹⁾; Birdlife International (2015) ⁽²⁾ and Coastal Resources Centre (2011) ⁽³⁾. The Amanzule Wetland is listed in the Ghana Ramsar Representative (2015) as a priority site for Ramsar Designation ⁽⁴⁾. Considering the uniqueness of the Blackwater Swamp Forest it **is considered to trigger Critical Habitat under Criterion 4**; whereas the sandy beach strip adjacent to the southern section of the wetland does not trigger this criterion, considering its significantly large spatial extent.

(1) Osei, D; Horwich, R.H. and Pittman, J.M. 2015. First Sightings of the Roloway Monkey (*Cercopithecus diana roloway*) in Ghana in Ten Years and the Status of Other Endangered Primates in Southwestern Ghana. *African Primates* 10: 25-40. Available at: <http://www.communityconservation.org/publications/African+Primates+Vol+10+2015+Osei+et+al.pdf>

(2) BirdLife International (2015) Important Bird and Biodiversity Area factsheet: Amansuri wetland. Available at: <http://www.birdlife.org>. Accessed December 2015.

(3) Coastal Resources Center and Friends of the Nation. 2011. Assessment of Critical Coastal Habitats of the Western Region, Ghana. Integrated Coastal and Fisheries Governance Initiative for the Western Region of Ghana. Narragansett, RI: Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island. Available in pdf format at: http://www.crc.uri.edu/download/GH2009ICM005_5081.pdf

(4) Ghana National Report on the Implementation of the Ramsar Convention on Wetlands. Report submitted to the 12th Meeting of the Conference of the Contracting Parties, Uruguay, 2015. Available in pdf format at: http://www.ramsar.org/sites/default/files/documents/2014/national-reports/COP12/cop12_nr_isreal.pdf

Table 1.10 Critical habitat identification of Highly Threatened or Unique ecosystems

Identified habitat within the DMU	Critical habitat criteria			Critical habitat trigger
	At risk of significantly decreasing in area or quality	Small spatial extent	Presence of unique assemblages of species	
Beaches and dunes	Probable	No	No	No
Cropland and natural vegetation mosaic	No	No	No	No
Evergreen forest	No	No	No	No
Sparsely vegetated area	No	No	No	No
Swamp and mangrove forest	Probable	No	No	No
Transitional woodland shrubs	No	No	No	No
Blackwater Swamp Forest	Probable	Yes	Yes	Yes

Land cover data combined with baseline studies performed in the area suggest that the intact Blackwater Swamp Forest (e.g. the “core” areas of the Amanzule Blackwater Swamp Forest) is the likely trigger for critical habitat. The estimated extent of intact core area of Blackwater swamp Forest (excluding the mangrove forest) has been mapped in *Figure 1.24* along with a broad classification of natural and modified habitats based on field and photo-interpreted data.

In order to further refine the identification as to whether the wetland areas within the eni concession where to be considered BWSF or not, a habitat mapping study was developed based on existing photographic evidence as well as prior surveys conducted on soil and water features. The study suggests that the wetland area within the concession is to be considered a natural habitat, and thus NNL principles should apply. The intact Blackwater swamp forest is located towards the northwest of the concession, at a distance of 0,5 km.

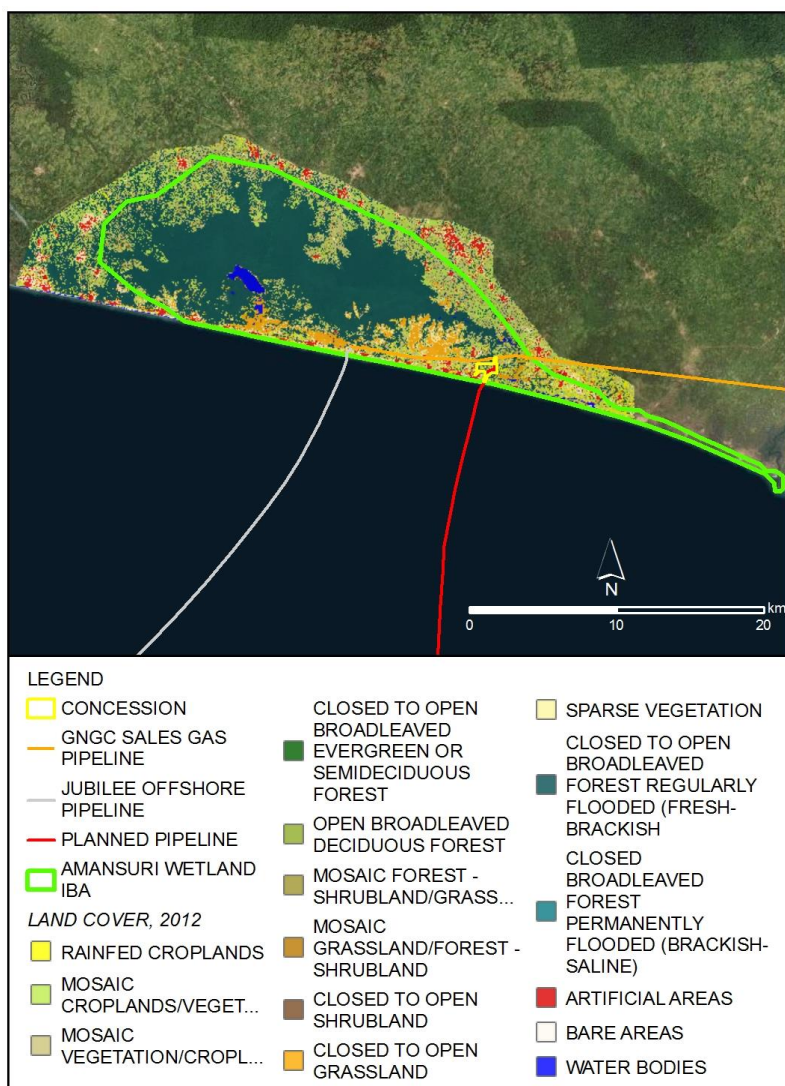
Based on the layout of the Black Water Swamp Forest (*Figure 1.24*), the OCTP project is not expected to impact this intact Blackwater Swamp Forest, although the wetland (i.e. swamp forest) which is within the concession (and project footprint) does qualify as a Natural Habitat, hence the requirement of No Net Loss should be implemented.

Table 1.11 Application of the IUCN KBA Standard to the Blackwater Swamp Forest

Criteria	Assessment
A Threatened Taxa	Not applicable
B Geographically Restricted Biodiversity	Not applicable
C Ecological Integrity	Published sources state that the Blackwater Swamp Forest is unique, and there are no other known examples of this habitat. Criterion C requires ≤ 2 sites per ecoregion to qualify. The Blackwater Swamp Forest qualifies as an IUCN KBA.

Criteria	Assessment
D Biological Processes	Not applicable
E Irreplaceability	Not applicable

Figure 1.23 2012 Landcover for the Amanzule Wetland Area, Ghana



Source: USAID-CRC, 2012

1.4.4 Application of Criterion 5

The DMU area is not considered to be within any Global 200 (WWF) site nor any Hotspot sites (CEPF). EDGE species that have been part of the assessment until now include:

- *Pan troglodytes* **(not considered to trigger Critical Habitat)**
- *Phrynobatrachus annulatus* **(unlikely to trigger Critical Habitat)**
- *Phrynobatrachus ghanensis* **(may potentially trigger Criterion 2 Tier 2b).**

New EDGE species identified as within or close to the DMU are:

- *Genetta johnstoni* (Johnston's Genet. IUCN: Vulnerable): This species is largely restricted to the forests of the Upper Guinea rainforest block. In the Taï National Park (Ivory Coast) it has been frequently observed in wetland areas including swamp forest (poor drainage areas dominated by prop-root trees and raffia palms) and riverine habitat (Dunham and Gaubert, 2008). Furthermore, traces of this species were identified within the AoI during the March 2016 pre-construction fauna survey, and the community members engaged confirmed their presence in the area (they declared to be familiarised with the species most commonly seen at night when it's hunting close to shoreline areas). It is probable that this species may also be present in the Wetland forest areas, thus may potentially trigger Critical Habitat under Criterion 5. An Environmental Monitoring Program, complemented by a series of management /action plans has been developed for the present project (e.g. Avifauna Biodiversity Action Plan, Sea Turtles Biodiversity Action Plan). These programs/plans will allow that all identified sensitive biodiversity features be continuously monitored at the OCTP site in order to track>NNL/NG commitments as well as to further confirm species presence/absence.
- *Phrynobatrachus villiersi* (IUCN: Vulnerable): This species is known only from south-western and south-eastern Côte d'Ivoire, and from south-western Ghana. It is a species of primary forest, and is not found in secondary forest. It deposits eggs on dried-up puddles just before the rains, and the larvae develop in very small puddles. It is probable that this species may be present in the Wetland forest areas, thus may potentially trigger Critical Habitat under Criterion 5. An Environmental Monitoring Program, complemented by a series of management /action plans has been developed for the present project. These programs/plans will allow that all identified sensitive biodiversity features be continuously

monitored at the OCTP site in order to track NNL/NG commitments as well as to further confirm species presence/absence.

1.5 CONCLUSIONS OF CRITICAL HABITAT SCREENING/ASSESSMENT

Having conducted an assessment of available data, the DMU does qualify as a Critical Habitat. *Table 1.12* summarizes which species/habitats are confirmed triggers of Critical habitat (majorly due to confirmed observations on species presence and/or abundance in the project area), whilst other species have been found that are probable/likely triggers, but further surveys would be required to confirm their status as Critical Habitat triggers.

Table 1.12 Summary of Critical Habitat designations for the proposed DMU

Trigger Species / Habitat	Tier	Comments
Criterion 1: Occurrence of Critically Endangered and/or Endangered species		
<i>Necrosyrtes monachus</i> (Hooded Vulture) CR	2 (item c)	This is a wide-ranging species and the DMU concept is difficult to apply. This vulture is not critically dependent on the AoI, and therefore does not trigger a Critical Habitat designation.
<i>Chelonia mydas</i> (Green Turtle) EN	2 (item b to e)	This is a wide-ranging species and the DMU concept is difficult to apply. This sea turtle is not critically dependent on the AoI, and therefore does not trigger a Critical Habitat designation.
<i>Mecistops cataphractus</i> (Slender-snouted Crocodile) CR	2 (item c)	Possible but no data to support a CH designation
Criterion 2: Occurrence of endemic and/or restricted-range species		
<i>No species confirmed as triggers for this criterion</i>		
Criterion 3: Occurrence of migratory and/or congregatory species		
<i>Chelonia mydas</i> (Green Turtle) EN	2 (items b to e)	As stated above for Green Turtle
<i>Eretmochelys imbricata</i> (Hawksbill Turtle) CR	2 (item c)	As with the Green Turtle, this is a wide-ranging species that is not critically dependent on the DMU, and therefore not a Critical Habitat trigger.
<i>Calidris alba</i> (Sanderling) LC	2 (item c)	Confirmed trigger for CH
<i>Thalasseus maximus</i> (Royal Tern) LC	2 (item c)	Designated as an IBA trigger by Birdlife International, and therefore triggers a CH designation.
<i>Lepidochelys olivacea</i> (Olive Ridley Turtle) VU	2 (item b to e)	As with the Green Turtle, this is a wide-ranging species and the DMU concept is difficult to apply.

Trigger Species / Habitat	Tier	Comments
		This sea turtle is not critically dependent on the DMU, and therefore not a Critical Habitat trigger.
Criterion 4: Presence of Highly threatened and/or unique ecosystems		
Amanzule Blackwater Swamp Forest	-	Listed as a unique habitat that triggers a Critical Habitat designation.
Beaches and Dunes	-	Does not trigger CH considering its significantly large spatial extent
Swamp and mangrove forest	-	Does not trigger CH considering its significantly large spatial extent
Criterion 5: Presence of Key evolutionary processes		
<i>Genetta johnstoni</i> (Johnston's Genet) VU	-	Possible but inadequate data to support a CH designation.
<i>Phrynobatrachus villiersi</i> (Puddle Frog) VU	-	Possible but no data to support a CH designation

Source: ERM, 2016

1.5.1 Implications of the Modified, Natural and Critical Habitat Classifications

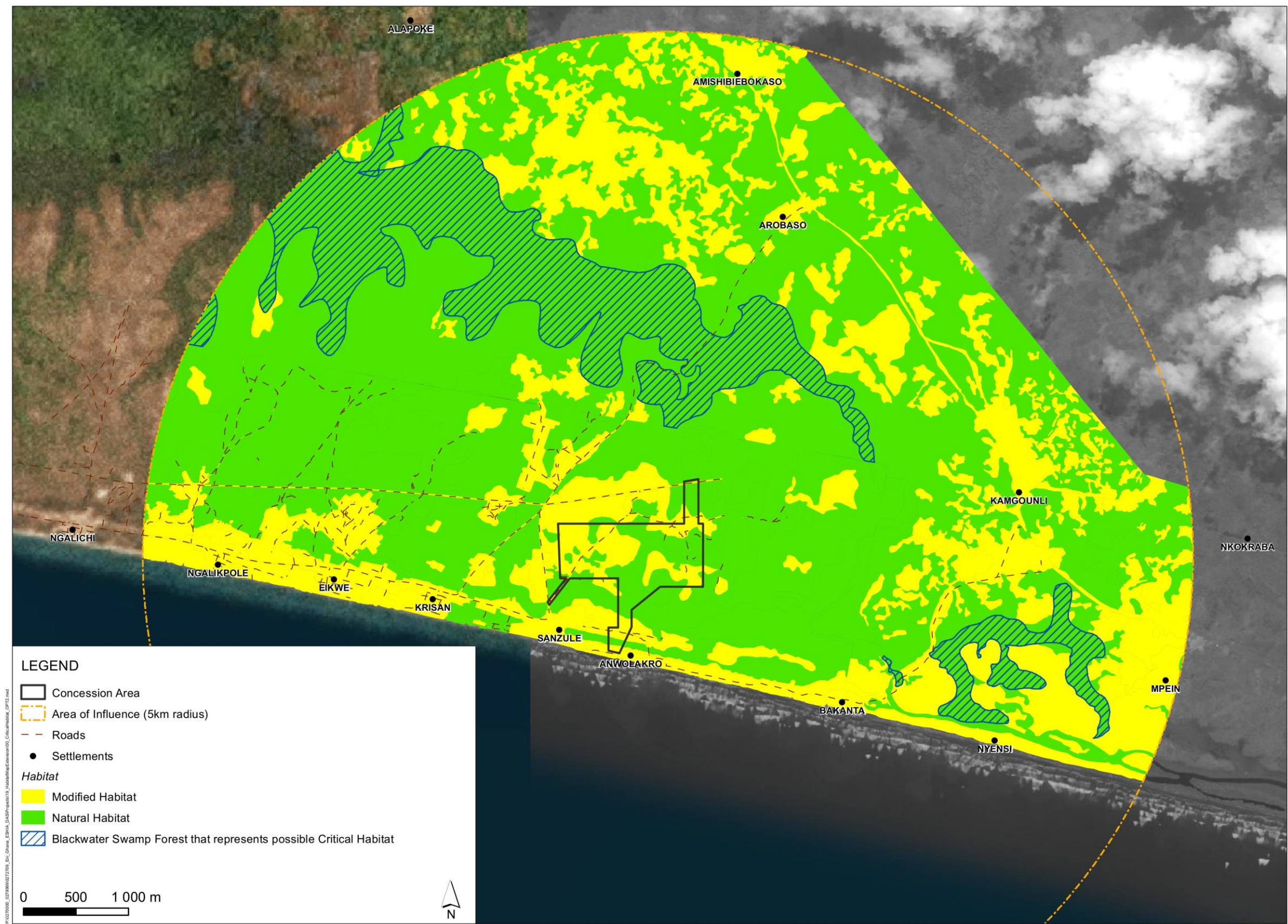
The IFC Performance Standard 6 (PS6) provides various mitigation requirements for proposed projects located within modified, natural and critical habitats. These requirements are addressed through the general biodiversity management plan and the associated bird action plan and turtle action plans.

Based on the results of this Critical Habitat assessment, the following mitigation requirements will need to be demonstrated to the relevant biodiversity components:

- No Net Loss (NNL) of biodiversity will need to be demonstrated for all natural habitats and biodiversity features impacted by the project.
- Sea Turtle species and Hooded Vultures do not apply as triggers of Critical Habitat although mitigation will need to demonstrate NNL of these species.
- **A Net Gain will need to be demonstrated for the Sanderling population** that forages along the beaches of the IBA.
- Royal Terns trigger the IBA designation and therefore also a critical habitat. Considering most recent data suggest the global population is increasing, the original IBA assessment (circa 2001) should be verified. This species has been assessed as a CH trigger under a precautionary approach and net gain requirement will be applied.

- The Blackwater Swamp Forest will not be impacted by the Project, and the Net Gain requirement will not apply to this habitat, although the NNL requirement will apply considering the features of the swamp forest found within the eni concession.

Figure 1.24 Layout of terrestrial-based modified, natural and critical Blackwater Swamp habitat within the AoI defined by a 5km radius around the ORF project area



Source: ERM, 2016