

Eni Ghana

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Biodiversity Management Plan

Appendix A: Avian Biodiversity Action Plan



Avian Biodiversity Action Plan (BAP)

NOTES:

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

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APPENDIX A – AVIAN BIODIVERSITY ACTION PLAN

EXECUTIVE SUMMARY

Eni Ghana Exploration & Production Ltd. (“Eni Ghana”) has developed this Avian Biodiversity Action Plan (BAP) for the production operations phase as part of its Framework Environmental, Social and Health Management Plan (ESHMP). A BAP is a company commitment and in line with the requirement of the World Bank Group¹ Performance Standard 6 (WBG PS6) when operating in critical habitat and is recommended when operating in natural habitats. IFC/WBG performance standards apply to the Eni Ghana OCTP project. The Avian BAP is one of several complementary appendices to the Biodiversity Management Plan (BMP). The first draft of the Avian BAP was produced in August 2016, and updated on 21st June 2018 to reflect change in LTE construction methodology and gas production. It was updated further on 26th September 2019 to include the preliminary analysis of monitoring results carried out prior to this time. This draft accommodates operational changes associated with the cessation of the development phase and commencement of operations at the ORF site.

The over-arching goal of the BAP is to ensure adequate management, control and monitoring of operational activities that may pose a risk to priority bird species and their associated habitat in the Area of Influence (AoI) in accordance with IFC/WBG PS6. The BAP aims to avoid where possible, and reduce impacts to birds and their habitats to as low as reasonably practicable and design/implement measures to achieve no net loss or a net gain as required.

This report starts by describing the baseline situation. The ESHIA finalized and submitted to WBG in 2016 identified three avian species of conservation importance within the ESHIA. These include two migratory shorebirds; Sanderling (*Calidris alba*) and Royal Tern (*Thalasseus maximus*), and the critically-endangered hooded vulture (*Necrosyrtes monachus*). A Critical Habitat Assessment (BMP appendix D) completed in 2016 concluded that the shoreline of the Amansuri wetland (the DMU) provided critical foraging for both species of shorebird exceeding the criteria for critical habitat, however, vultures, on account of being wide-spread, were not critically dependent on the AoI. Subsequently, a “Net-Gain” (NG) target objective for shorebirds has been developed. The hooded vulture did not trigger critical habitat status, but in line with WBG expectations, “No Net Loss” (NNL) performance objective is required.

The expected performance requirement for species triggering CH are outlined in paragraphs 17-19 of WBG PS6. In brief, these include elements for ensuring the facility does not lead to measurable adverse impacts, implementing a long-term monitoring programme and to plan, by way of a BAP, actions to secure Net Gain. In addition, monitoring of the general category of “forest birds” is also included as an indicator of natural habitat condition.

Monthly monitoring of all migratory shorebirds commenced in April 2017 and 28 months of data have been collected to March 2020, covering both the peak (September-April) and low (May-August).

¹ WBG Performance Standards refer to WB, IFC and MIGA Performance Standards

migration season. Monitoring has been conducted in two locations: at shorebird foraging habitat across an 8km shoreline transect covering the Area of Influence (AoI) directly “in front” of the ORF facility, and at the shorebirds “preferred” roosting habitat at the Amansuri River Estuary, approximately 7.5 km east of the ORF facility; outside of the expected AoI. The average monthly population naturally vary through the year; so this assessment uses peak season monthly average to compare abundance over three peak seasons (with multiple months of data) since 2017. Results are assessed in the context of a pre-project baseline taken from observations conducted in November 2015, noting that a single monitoring event and a monthly average across a season are not statistically comparable and that landfall construction activity was concentrated between April 2018 and January 2019.

Average peak season monthly density for Sanderlings ranged from 0 to 29.4 individuals/km, with an average of 6 birds/km within the 8km shoreline Area of Influence (AoI). Observations were highest during the 2017/18 migration season, before landfall construction or post trenching had commenced. Observations declined in the subsequent two years and were lowest in the 2019/20 season, although no construction activity ongoing at the time and corresponding increases in observation at the Estuarine location were recorded. In all years, the monthly averages have lower than the November 2015 baseline observation (42 birds/km). No observations of this size have been recorded since this time, suggesting this density is not a common or representative occurrence. Disturbance monitoring report suggests that coastal fishing and motorbike transportation along beach has increased over the monitoring period. Changes in food availability along the coast and at the estuary have not been monitored, but is a recommendation for similar projects, as this species is highly mobile and occurrence is linked to feeding opportunities.

The estuary is approximately 7.5km from the OCTP onshore concession, and observations there are not believed to be influenced by the project activities. This location also saw similar declines as those observed along the shoreline between the 17/18 and 19/20 monitoring periods. The observers also noted the presence of disturbance factors including an increase in vessel movements and associated noise from fishing and tourism activities within the estuary itself. Frequent (non-project related) disturbance within the estuarine area may have also have the effect of pushing local populations to other less disturbed regions along the coastline.

Royal terns are uncommon along the shoreline within the AoI, with only two sightings during the monitoring period. This species is more common at the estuarine location where their peak season average abundance has been recorded at 66.6 birds per observation. Although lower than baseline observations, the observed populations have steadily increased each year since 2017/18. The stretch of shoreline in front of the ORF is not significant for this species and the project has not impacted this species to any observable degree.

Monitoring of hooded vulture nesting and foraging has also been conducted during the construction phase. As per the pre-construction baseline, no individuals or nests have been found within the onshore concession area. Surveys within the local communities also suggests that their abundance is declining slightly through the study area with peak season (May-October) average of 19 individuals in

2017 and 21 individuals in 2018 at Ngalekyi. This decline is believed to be due to improved waste management systems, unrelated to the project.

In line with Eni Upstream’s technical guidelines and best practices, the BAP outlines mitigation measures, following the mitigation hierarchy and including additional conservation actions (ACAs). Eni’s BES policy aims for continuous performance improvement towards maintaining and contributing to the long-term regional persistence for these species in recognition of their irreplaceable ecological and social value. Production operations within the ORF are not believed to influence feeding to condition or cause disturbances along the coastline. Nevertheless, mitigation measures relevant to minimise indirect impacts during the production operations phase include:

- Increased awareness raising for staff and contractors.
- Continued support for engagement with local Non-Government Organisations (NGOs) and/or other stakeholders to the reduce threats to avian species, including, for example the need reduce disturbances during foraging periods.

The numbers observed at the estuary indicates that priority areas for additional conservation actions include the Amansuri, Esiama and the larger Ankobra river estuaries, where interventions can target larger populations and therefore be more effective.

Additional Conservation Actions (ACAs) are outlined to contribute towards securing the broader IBA and the success of the Eni Ghana biodiversity management programme, such as expanding beach clean-ups to Esiama beach, engaging with conservation efforts at Amansuri Estuary, working at the village level to reduce vulture-poaching threats, and collecting additional data to inform conservation efforts. Eni has participated in the establishment of a Cumulative Impact Co-Management Platform to collaborate in joint activities to address cumulative effects on biodiversity. Eni will work to ensure that future objectives for this forum include the development of a joint strategy for biodiversity management, in collaboration with local authorities and communities.

Monitoring is one of the key elements of the BAP, considering the need to understand the pressures, state, and response of avian populations (locally and within the broader IBA) in order to inform required management measures to mitigate impacts on priority species through the mitigation hierarchy. Continued monitoring will establish whether the proposed mitigation and compensatory measures are achieving their targets or need to be supplemented or otherwise altered. This will track progress of a number of biodiversity indicators, including:

- Shorebird recovery following the completion of the construction phase;
- Monthly disturbance assessments to determine how preferred habitats are being affected by project and other anthropogenic sources;
- Improvements in the monitoring of the conservation status of the IBA;
- The hooded vulture population in the region; and
- The diversity of forest birds indicative of changes to forest habitat

The BAP includes descriptions and references to established protocols and methodologies for data collection to ensure standardisation to support future analysis.

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Acronyms

ACA	Additional Conservation Actions
AEWA	African-Eurasian Waterbird Agreement
ALARP	As Low as Reasonably Possible
AoI	Area of Influence
BAP	Biodiversity Action Plan
BLI	BirdLife International
BMP	Biodiversity Management Plan
CR	Critically Endangered (IUCN Red List Category representing species facing an extremely high risk of extinction in the wild)
DMU	Discrete Management Unit
EN	Endangered (IUCN Red List Category representing species facing a very high risk of extinction in the wild)
ESHIA	Environmental, Social and Health Impact Assessment
ESHMP	Environmental, Social and Health Management Plan
ESL	ESL Consulting Limited
IBA	Important Bird and Biodiversity Area
IUCN	International Union for the Conservation of Nature
IWC	International Waterbird Census
GPS	Global Positioning System
GWD	Ghana Wildlife Division
GWS	Ghana Wildlife Society
LC	Least Concern (IUCN Red List Category representing species that do not qualify for a higher threat level)
LTE	Land Termination End
MIGA	Multilateral Investment Guarantee Agency
NT	Near Threatened (IUCN Red List Category representing species close to qualifying for a threatened category in the near future)
OCTP	Offshore Cape Three Points
PS	Performance Standard(s)
SSBP-G	Save the Seashore Birds Project – Ghana

1. INTRODUCTION

1.1. Purpose

Eni Ghana has developed this avian Biodiversity Action Plan (BAP) by as part of its Environmental, Social and Health Management Plan (ESHMP). The Avian BAP is one of several complementary plans (appendices) to the Biodiversity Management Plan (BMP). Three avian species were identified as high priority biodiversity components and two of them are critical habitat trigger species, specifically the sanderling (*Calidris alba*) and the royal tern (*Thalasseus maximus*). Both sanderling and royal tern were identified as critical habitat trigger species under WBG/IFPS6 criterion 3, while neither are considered globally threatened (both classified as Least Concern on the IUCN RedList). Although not a critical habitat trigger, the critically endangered hooded vulture (*Necrosyrtes monachus*) is also recognized as a priority biodiversity component that occurs in the project area. The BAP is a requirement for compliance with the WBG/IFC PS6 and is an integral component in Eni's internal biodiversity and ecosystem service management approach.

The purpose of the Biodiversity Action Plan (BAP) is to specify the actions that will be taken to meet Eni Ghana's goals and objectives for biodiversity in line with applicable Project Standards. The document applies to Eni Ghana production operations activities and is a guideline for all employees, contractors and visitors during production operations phase of the Offshore Cape Three Points (OCTP) Project.

The over-arching goal of the Avian BAP is to ensure adequate management including the application of the mitigation hierarchy to achieve net gain (for shorebirds), and no net loss (for hooded vulture) during the production phase. Where residual impacts, together with those of the previous construction phase, are assessed as significant, additional conservation shall be applied with an ultimate goal of achieving net gain of priority biodiversity features.

The Plan is set out as follows:

1. Introduction; outlines the purpose of the document, lender requirements, relationship with other management plans, independent experts and plan area of application.
2. Overview of the biodiversity features addressed by the BAP (i.e. Natural and Critical Habitat affected by the Project).
3. Mitigation strategy: Provides mitigation measures designed to address impacts in the framework of the mitigation hierarchy: avoid, minimise, restore and rehabilitate, and offset. Provided in tabular format.
4. Summary of residual impacts that are anticipated after the implementation of mitigation measures.
5. Resources and implementation required to implement the mitigation measures.

The BAP outlines potential impacts and conservation opportunities specific to bird species that utilize and depend on:

- The coastal zone within the project Area of Influence (Aol) (see Figure 1-1);
- Other habitat within the Aol, and;
- The broader IBA and important shorebird habitat.

In addition, it outlines an appropriate mitigation measures and a monitoring programme. Although the emphasis of the scope of this BAP is focused on the two species (sanderling and royal tern) that originally triggered Amansuri Wetland's IBA status and the critically endangered hooded vulture, it includes actions to safeguard the broader IBA in line with guidelines for the implementation of additional conservation actions (ACA).

The overall purpose of the BAP is to:

- Compensate for project impacts during construction and operation and achieve NG and NNL as required
- Ensure adequate management, control and monitoring of production operations activities that pose a risk to the target avian species and their nesting and foraging habitats;
- Ensure that production operations direct and indirect impacts do not contribute to declines of target species in the region; and
- Undertake actions to contribute to avian conservation in the region through the implementation of additional conservation actions.

The specific objectives of this phase of the Avian BAP are to achieve NG for sanderling and royal tern, and achieve NNL for hooded vulture through the following:

- Actions to reduce disturbance to key shorebird habitat to achieve NG for sanderling and royal tern;
- Conducting community awareness programmes as a contribution to achievement of NNL objectives for hooded vulture;
- Reduce pressure and improve the state and response (targeted conservation actions) of the IBA through additional conservation actions;

In addition, specific monitoring activities are outlined in order to:

- Continue monitoring of shore birds within the Aol in order to assess recover and monitor progress towards net gain requirements;
- Continue monitoring vulture populations and nesting sites, and
- Continue monitoring of forest birds towards demonstration of no net loss of natural habitat.

1.2. Project description and ecological context

The Offshore Cape Three Points (OCTP) project is located in the western region of Ghana. Eni Ghana is the operator of the Offshore Cape Three Points (OCTP) Project in western region of Ghana. The offshore component is located in deepwater, approximately 55km off the coast of Ghana. Production is achieved via a FPSO, producing up to 85 kboe/d through 18 subsea wells. The development activities progressed and in 2017 production wells planned were drilled and linked to the production facility achieving the planned peak production of 45 kbbbl/d one year earlier than scheduled. The project includes the transportation of non-associated gas to an Onshore Receiving Facility (ORF) to be processed and linked to Ghana's national grid. The ORF is located in a mix of Modified and Natural terrestrial habitat approximately 700 m inland from the coastline. The pipeline transporting gas from the offshore facilities to the ORF makes landfall between the communities of Sanzule and Anwolakrom. The beach at the landfall location supported coconut trees and largely modified habitat is located between the beach and the ORF.

The onshore receiving facility (ORF) and related project infrastructure are located within the boundaries of an IBA designated by BirdLife International for containing globally important numbers for sanderlings and royal terns. In addition to the aforementioned species, the IBA contains a nationally significant extent of intact swamp forest, as well as the only known peat swamp forest in Ghana. The Amansuri IBA supports wintering aggregations of the qualifying species for which it was established, namely royal tern (*Thalasseus maximus*) and sanderling (*Calidris alba*). The population of these species within the IBA are estimated at over 1% of the total biogeographic population of the species (criteria A4i). The Amansuri river estuary located within the IBA boundary is an important roosting site for large numbers of birds for which the shoreline is an important foraging habitat, although it is situated outside of the project area of influence.

Pre-construction bird surveys also identified the presence of hooded vultures (*Necrosyrtes monachus*), classified as critically endangered on the IUCN Red List of Threatened Species. These showed evidence of being resident within the IBA, although no nests were identified in the onshore concession area. The IUCN Red List assessment estimates that that this species' population is declining rapidly with an estimated 83% decline within the past 50 years, and little information currently exists about the population status of hooded vultures in Ghana (Roberts 2013).

Additionally, three other bird species of regional conservation concern have been shown to be present; one of which is classified endangered (EN) - the African grey parrot (*Psittacus erithacus*), and two which are classified near threatened (NT) – Eurasian oyster-catcher (*Haematopus ostralegus*) and copper-tailed glossy starling (*Lamprotornis cupreocauda*). These species, although formally globally classified as endangered, carry a higher national conservation priority due to declining national population trends. The African grey parrot is also listed in Appendix I of the Convention for International Trade in Endangered Species

(CITES), which prohibits international trade in specimens of these species except when the purpose of the import is not commercial (e.g. for scientific research). Also expected to be present, but not directly observed, is yellow-bearded greenbull (*Criniger olivaceous*) which is also considered to be a local conservation priority, although classified as Vulnerable (VU) on the IUCN Red List. Table 1.1 provides a summary of the species of conservation concern (i.e. all with either a threatened or near-threatened status), noting that not all species listed carry measureable performance targets, we anticipate that they will also benefit from wider conservation measures that are implemented.

Table 1-1 Bird species of conservation concern confirmed or likely occurring in the Aol

Common name	Scientific name	IUCN – Global Status	BAP Requirement	Likelihood of occurrence	Preferred Habitats
Shorebirds					
Royal tern	<i>Thalasseus maximus</i>	LC	Net Gain	Confirmed, non-breeding	Coastal zone, particularly between project site and Amansuri Estuary. royal tern appear mainly to use estuarine areas.
Sanderling	<i>Calidris alba</i>	LC	Net Gain	Confirmed, non-breeding	
Eurasian oystercatcher	<i>Haematopus ostralegus</i>	NT	None ²	Confirmed, non-breeding	
Vultures					
Hooded vulture	<i>Necrosyrtes monachus</i>	CR	No Net Loss	Confirmed	Natural/Modified dependent on tall trees and associated with human settlements
Forest Birds					
Grey parrot	<i>Psittacus erithacus</i>	EN	None ²	Confirmed	Natural habitat forest dependent but also using modified habitat. Grey parrot particularly dependent on tall, mature trees for roosting and nesting.
Copper-tailed glossy starling	<i>Lamprotornis cupreocauda</i>	NT	None	Confirmed	
Yellow-bearded greenbull	<i>Criniger olivaceous</i>	VU	None ²	Likely, unconfirmed	

² None, as project-related impacts are not expected, and the species is not a Critical Habitat trigger, but the species will benefit from BAP actions

1.3. Legislative, regulatory and policy framework

The Project must comply with all relevant laws, regulations, policies and standards relating to biodiversity. The Environmental and Social Impact Assessment (ESIA) completed in 2015 details the full legal framework within which the Project operates. Although neither of the trigger species for the IBA (sanderling and royal tern) are on the schedules of the Ghana Wildlife Conservation Regulations, 1971 (L.I. 685, sub-regulation 5) the law requires that ‘No person shall at any time as group hunters, hunt, capture or destroy any wild animal’ (exemptions are provided for licensed hunting). In addition, capture or trade of any vulture or vulture parts is illegal in Ghana.

1.3.1. Lender requirements

The International Finance Corporation (IFC) Performance Standard (PS) 6 is the relevant performance standard for the design and implementation of the BAP and relates to Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC PS6, 2012, Guidance note 2019).

The Project is required to comply with the Environmental & Social Safeguards of the WBG, including application of the International Finance Corporation’s Performance Standards (PS), and specifically for Biodiversity and Ecosystem Service (BES) management, PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC, 2012).

IFC PS6 requires that clients fully implement the mitigation hierarchy³ ensuring actions to first avoid, then minimise, and restore project impacts. If significant residual impacts on biodiversity still remain after all feasible preventive and restorative action has been taken, specific forms of compensation (e.g. offsets) must be developed to deliver a Net Gain of biodiversity with 'Critical Habitat' affected by the Project and No Net Loss⁴ (NNL) (where feasible) of 'Natural Habitat' (IFC, 2012, 2019). Paragraphs 17-19 set out all requirements that must be met before any Project activities should take place in critical habitat (IFC, 2012, 2019).

1.3.2. Corporate framework & policies

This Project is one of the first to be aligned to the objectives of the Eni 2018 BES policy from pre-development (DEV) phase. This policy has the objective of working towards no net loss / net positive impact on natural and critical habitat respectively, following a risk-based

³ IFC PS6 GN 16 (2018)

⁴ No net loss, is defined in footnote 9 of IFC PS6 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).

approach. The project aligns with Eni Upstream’s Biodiversity and Ecosystem Service (BES) Technical Guidance (Eni BES TG013r00). In practical terms, this translates to actions that effectively mitigate dependencies and potential impacts on identified key BES components according to the Mitigation Hierarchy steps (Avoid, Minimize, Restore and if necessary Offset residual impacts). The BES Policy was updated in 2018 and the Annex E-F of the HSE-IMS Biodiversity and Ecosystems Annex E-F revised in 2019, these are supported by implementation guidance including AMTE-TG-013 - Biodiversity and Ecosystem Services (BES) Impact Assessment and Management (2016).

1.4. Area of Influence

The OCTP Phase 2 ESHIA study, conducted for Eni Ghana, identified a specific Area of Influence of relevance to avian species. This is considered the area that may be directly or indirectly affected by Project activities and was defined using a 5km radius around the centre-point of the Onshore Receiving Facility site.

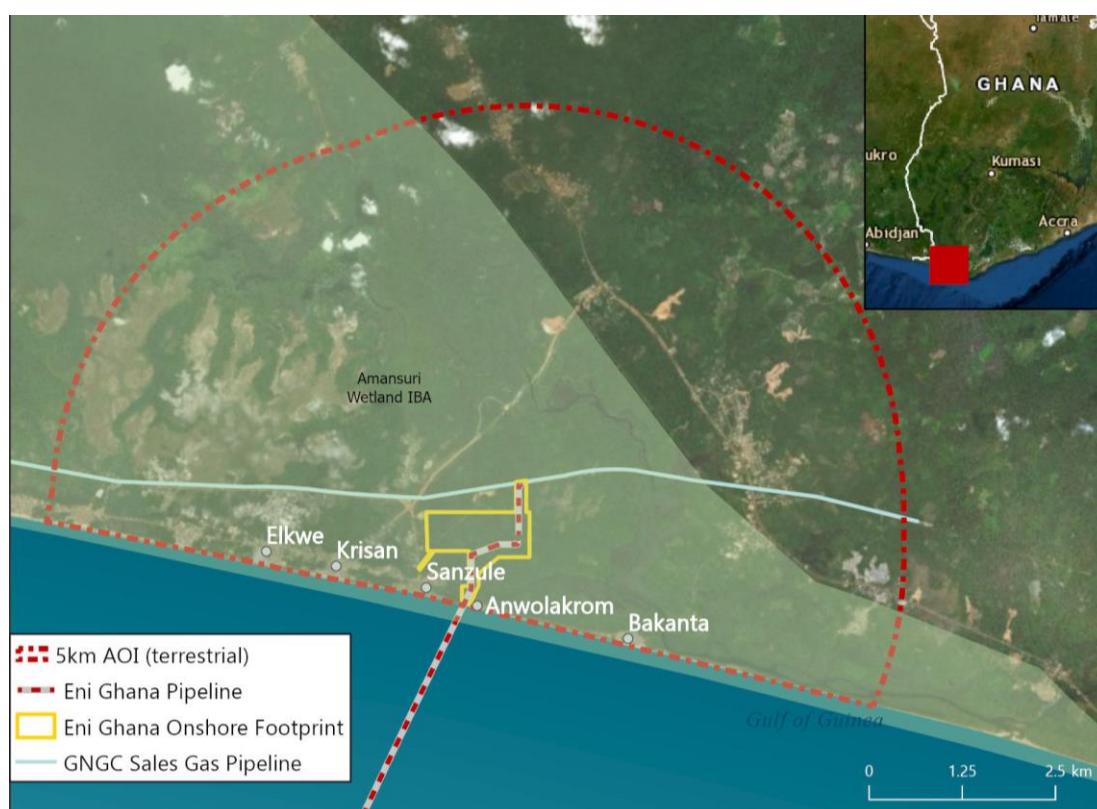


Figure 1-1. Area of Influence - Aol water, sediment quality protected areas and avifauna. (Source adapted from ERM 2017).

The long coastline of the Amansuri Wetland IBA is relevant to the BAP specifically when planning for conservation actions. Key threats to shorebird populations are more likely to occur in areas where the birds congregate, either for breeding, nesting, good foraging or resting during long migrations (stop-over points). These include river estuaries. The effectiveness of conservation programmes are otherwise limited in areas where the

distribution of birds is more dispersed, such as the beachfront within the Aol. In particular, the most important site for sanderling in Ghana is Esiama beach (Ntiamoa-Baidu et al, 2014), to the east of the project location, and the most important habitat for royal tern (although outside the Aol) known is at the Amansuri Estuary (ERM 2015) . In short, although impacts are expected to be limited to within the Aol, to achieve net gain as required by IFC PS6, Eni Ghana shall identify opportunities outside the boundaries of this 5km radial area.

2. AVIAN ECOLOGICAL ASSESSMENT

2.1. BAP Target Species

This BAP draws utilises information from primary and secondary sources. Primary sources include field surveys, specifically point and transects counts undertaken during the ESHIA (by ERM) and ongoing monitoring undertaken on behalf of Eni Ghana, focussed on the target avian species in the project Area of Interest (Aoi). The pre-construction avian surveys (ERM, 2015) reveal that the Aoi contains three priority avian species – two of these species (royal tern and sanderling) are trigger species for the designation of the Amansuri IBA within the Aoi, while hooded vulture is critically endangered (IUCN Redlist).

Table 2.1: BAP Target Species

Common name	Scientific name	IUCN – Global Status ⁵	Likelihood of occurrence	Preferred Habitats	Criteria for inclusion
Royal tern	<i>Thalasseus maximus</i>	LC	Confirmed, non-breeding	Coastal zone, particularly between project site and Amansuri Estuary. royal tern appear mainly to use estuarine areas.	Trigger for Amansuri IBA (Natural Habitat); Meet or exceed 1% criteria. PS6 requirement for net gain
Sanderling	<i>Calidris alba</i>	LC	Confirmed, non-breeding		
Hooded vulture	<i>Necrosyrtes monachus</i>	CR	Confirmed	Natural/Modified dependent on tall trees and associated with human settlements	Critically endangered (IUCN Redlist); Does not trigger critical habitat. PS6 requirement for no net loss

Royal tern (non-breeding) (LC)

The Amansuri IBA is reported to contain at least 700 individuals (BirdLife DataZone) and is one of two species for which Global IBA status was conferred to Amansuri Wetland. Royal terns typically nest on open sandy beaches of barrier islands, sandbars, sand/shell substrates; and on newly created dredged-material islands (Spendelow and Patton 1988). Colony site requirements include the absence of quadruped predators; isolation from disturbance,

⁵ IUCN Red List of Threatened Species threat categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT), Data Deficient (DD), Not Evaluated (NE), LC Least Concern.

combined with excellent visibility; proximity to areas of extensive shallows; and proximity to oceanic inlets (Buckley and Buckley 1984).

In Africa, royal terns breed from Mauritania to Guinea (no breeding records from Ghana), ranging in winter from Morocco to Namibia. Outside of the breeding season the species forages within 100 m of the coast along sheltered coasts in estuaries, harbours and river mouths, sometimes also foraging a short distance inland along broad rivers. Its diet consists predominantly of small fish 3-18 cm long as well as squid, shrimp and crabs (del Hoyo *et al.* 1996). It is known to forage along the coastal zone within the project Aol. Royal terns have also been recorded at Amansuri and Ankobra estuaries in significant numbers (CRC/FoN 2011), however neither estuary is within the project Aol.

During the pre-construction bird survey, a congregation estimated at 850 individuals was observed at Amansuri River Estuary at a point East of the 5km Aol boundary (an accurate count was not conducted). Subsequent population estimates from the estuary failed to observe similar numbers, until a survey in October of 2019 that observed 600 individuals.

In addition, royal terns have been observed only rarely during monitoring of the shoreline Aol in the 36 months of monitoring during and post construction – only two individuals being recorded in February 2018 and a further two individuals in February 2020. Royal tern are present within the AOI in numbers that exceed 1% of its global population and therefore triggers Critical Habitat requirements as per Criterion iii: habitat supporting globally significant concentrations of migratory species and/or congregatory species.

Sanderling (non-breeding) (LC)

Sanderlings are long-distance migrants that breed in the High Arctic and have a world-wide non-breeding distribution (Ntiamoa-Baidu *et al.*, 2014). The ultimate factors underlying differential migration are still largely unknown but may include differences in foraging conditions, predation risk, and level of competition for food sources. The Amansuri wetland serves as both a final destination and as a stop-over point for species seeking better feeding grounds. Seasonal populations are considered to be more stable (less inter-season variability) in preferred sites, while greater population variation has been observed at less favourable non-breeding locations (Ntiamoa-Baidu *et al.*, 2014).

This species has been recorded from the Aol, and a congregation of at least 1000 individuals was estimated at Amansuri estuary at a point east of the 5km Aol boundary during the pre-construction bird survey with a further 901 individuals were recorded at the Ankobra estuary (CRC/FoN 2011). An important site for sanderlings also exists at Esiam, east of the project Aol (Ntiamoa-Baidu *et al.*, 2014). The broader Amansuri IBA is reported to contain at least 4,250 individuals (BirdLife DataZone) and is one of two species for which Global IBA status was conferred to Amansuri Wetland. This species is long-distance migrant and breeds in the high arctic from June to July (BirdLife data zone).

Sanderlings are known to forage along the shoreline within the project Aol and particularly in close proximity to the project boundary. The pre-construction Bird Survey (November 2015) reported foraging at a density of 45.3 individuals/km on a coastal transect from Amansuri estuary to the project boundary (see Figure 2.1). As a one off observation, such abundance was not observed at any time during the monitoring conducted. It is difficult to confirm what factors may have contributed to this reduction, however this species is known to aggregate in large numbers at stopover sites. Sanderling are present within the AOI in numbers that exceed 1% (3.5% utilise the AOI) of its bioregional population and therefore triggers Critical Habitat requirements as per Criterion iii: habitat supporting globally significant concentrations of migratory species and/or congregatory species.

Hooded vulture (CR)

Although widely distributed throughout sub-Saharan Africa, data and observations of varying coverage and quality from various parts of its range suggest that the species is undergoing a rapid decline (mean 62%; range 45–77%) in its global population (Ogada and Buij 2011, Ogada et al. 2015). The major threats include loss through poisoning, illegal trade for traditional medicine and bush-meat. As a carrion feeder (scavenger), vultures also suffer from declines in other species upon which they would normally feed, and as a consequence are often attracted to scavenging human food waste.

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). The species is often associated with human settlements, but is also found in open grassland, forest edge, wooded savannah, desert, and along coasts (Ferguson-Lees and Christie, 2001). It occurs up to 4,000 m, but is most numerous below 1,800 m.

In West Africa and Kenya, the hooded vulture breeds throughout the year, but especially from November to July and in Ghana breeding is concentrated in the months of February, March and April. It is an arboreal nester and lays a clutch of one egg. Its incubation period lasts 46-54 days, followed by a fledging period of 80-130 days. Young are dependent on their parents for a further 3-4 months after fledging (Ferguson-Lees and Christie 2001).

In Ghana, hooded vultures are known to favour large coconut palms in the vicinity of villages for nesting. Large coconut palms are plentiful near fishing villages in the project area of influence, and abundant suitable habitat exists for this species, although occurrence of nesting in the project area of influence was not confirmed until recently. Roberts (2013) noted the dependence of the birds on large trees, and stated that protection of large trees was vital for maintaining suitable habitat and also stated that disease was spreading among coconut trees in the area.

It is reported (FFI Field Survey, 2016; Roberts, pers comm) that vultures in the region are occasionally hunted as bush meat and a significant driver of hunting is the demand for vulture parts for traditional medicine in Nigeria and Cameroon (McKean et al, 2013)

Hooded vultures were reported in the Pre-Construction Bird Survey from 8 discrete locations within the project AoI including a group of two adult birds as well as a mixed group of four birds containing both sub-adult and adult birds. Additional field studies in March, 2015 confirmed their presence at additional sites, including a group of 10 birds at a site on the Eastern boundary of Krisan village where they are reported to have bred in the past, but not at present (FFI community engagement, 2016). Subsequent monitoring across 10 village locations during the development period has established that hooded vultures are permanent residents within the study area but no breeding sites were identified within the AoI and monitoring shows no clear evidence of their population decline (GWS, 2019). Hooded vulture do not trigger critical habitat requirements as they are not found to be ‘critically dependant’ on the habitat within the AOI nor is it expected that they will be impacted by the project. The project will however, be required to demonstrate no net loss of this species.

Other Avian Species of Concern

Eurasian oystercatcher (Non-breeding) (NT)

Eurasian oystercatchers breed from Iceland and Scandinavia east to north-west Russia, south through U.K. to north-west France, with isolated populations in the Mediterranean, and winters on coasts south to West Africa. Main threats include overfishing of benthic shellfish, and there is some evidence (Owusu, *pers comm.*) to suggest direct persecution in the project area.

The species were recorded in the Pre-construction bird survey, as well as the follow-up survey by FFI in March, 2016, it has been observed to forage along the coastal zone within the project AoI, and the pre-construction Bird Survey reported a foraging density of 2.1 individuals/km on a coastal transect from Amansuri estuary to the project boundary (see Figure 2.1).

Bar-tailed-Godwit (Non-breeding) (NT)

Bar-tailed godwits breed in Northern Europe through Siberia to Alaska and the Ghanaian population of *Limosa lapponica* (subspecies *taymyrensis*) winters in west and South-West Africa, and is thought to be declining. During the winter they are more commonly found in intertidal areas along muddy coastlines, estuaries, inlets, mangrove-fringed lagoons and sheltered bays (del Hoyo et al. 1996) with tidal mudflats or sandbars (Johnsgard 1981). Potential oil and gas extraction activities and commercial and industrial development are listed as threats to non-breeding grounds in West Africa (Leyrer et al. 2014)

Development phase monitoring of the shoreline transect has picked up this species in March 2018 (3 individuals), September 2018 (1 individual) and September 2019 (1 individual). Monitoring at Amansuri Estuary monitoring has showed the species more frequently, with 11 individuals observed in 2017, 11 individuals in 2018, and 2 individuals so far in 2020 (none observed at the estuary in 2019). Interestingly, four of these observations were made between May and July, outside peak season for shorebirds in Ghana.

African grey parrot (EN)

Although typically inhabiting dense forest, they are commonly observed at forest edges, clearings, gallery forest, mangroves, wooded savannah, cultivated areas, and even gardens (Juniper and Parr 1998). In West Africa, the species makes seasonal movements out of the driest parts of the range in the dry season. It is highly gregarious, forming large roosts at least historically containing up to 10,000 individuals (Juniper and Parr 1998). Feeding takes place in smaller groups of up to 30 birds and the diet consists of a variety of fruits and seeds, while the nest is in a tree cavity 10-30 m above ground (Juniper and Parr 1998). Nesting is usually solitary, but can take place in loose colonies, for example in Principe, while the breeding season varies across the range (Juniper and Parr 1998).

It is one of the most popular avian pets in Europe, the United States, and the Middle East due to its longevity and unparalleled ability to mimic human speech and other sounds. Demand for wild birds is also increasing in China, and increased presence of Chinese businesses in central Africa (particularly for mining, oil and logging) may increase illegal exports of this species (F. Maisels *in litt.* 2006, H. Rainey *in litt.* 2006). A recent study (Annorbah et al, 2016) estimates that 90-99% of the population in Ghana has been lost due primarily to a loss of large trees important for nesting and roosting and trapping for commercial trade. Development phase monitoring has not observed this species in the AoI subsequently.

The 2015 pre-construction bird survey reported grey parrots (2 individuals flying) in one location (GPS point 423⁶) within the AoI. The observers could not determine if these species occupied a specific habitat within the ORF concession, although they will inhabit both primary and secondary lowland forest. In addition, the 2016 Flora Conservation Plan (Appendix E of the BMP) did not identify suitable nesting habitat (large trees with hollows) within the proposed clearance area, which consisted or predominantly modified habitat. Despite the uncertainty over this species presence within the ORF concession, it remains a species of interest and restoration activities may create suitable habitat for it, since this species will utilise artificial nest boxes in captivity .

Copper-tailed glossy-starling (NT)

The OCTP pre-construction bird survey recoded a single observation of this species in swamp forest habitat within the AoI designated. Ongoing deforestation for agriculture and timber is suspected to be driving a moderately rapid population decline. In Ghana, it appears common and widespread but may occur in moderate numbers only, with only small flocks of 5-10 individuals recorded in a series of surveys conducted in the 1990s (Holbech 1992, 1996). The species nests in holes in dead trees and branches, and the clutch-size may be three.

⁶ Located along the GNCC Pipeline north of the eni concession, approximately 250m east of the tie in.

Observations suggest breeding activity between August and February (Fry et al. 2000). Development phase monitoring has not observed this species in the AoI subsequently.

Yellow-bearded greenbull (VU)

Forest loss and increasing fragmentation are significantly reducing the range of this species and driving a decline, it is therefore classified as vulnerable. Although not recorded in the pre-construction bird survey, BirdLife International range maps indicate that this species probably occurs in the AoI, and expert opinion (L. Fishpool, pers comm) confirms this likelihood. Its nearest confirmed from a location about 30km north of the OCTP site (Roberts, pers comm), but further surveys are needed to confirm its usage of the AoI and surrounding areas. Development phase monitoring has not observed this species in the AoI.

2.2. Baseline and ongoing monitoring



Figure 2-1. Locations of priority bird species recorded by ERM, Ghana OCTP Block Pre-construction bird survey as well as FFI field survey (vultures only) in March, 2016 (Amansuri Estuary at the south-eastern extent of the map)

The baseline population estimates used in this BAP have been taken from the pre-construction bird survey conduct by ERM in November of 2015. Following this survey, a team from FFI visited the site in March 2016 and although avian surveys were not conducted they did note the presence of hooded vulture at several locations. Further to this, a contractor for Eni Ghana conducted avian monitoring (shoreline, estuary, forest birds and vultures) from 2017 – 2020 following the schedule suggested in the 2016 Avian BAP.

2.2.1. Pre-construction bird survey

The avian pre-construction survey was conducted in November 2015, using a mix of transects and point counts within the ORF concession along the shoreline and at the Amansuri River Estuary. Single surveys at each location aimed to build upon existing screening studies to identify the diversity of avian species within the direct AoI of the ORF, and provide a general estimate of peak season abundance for migratory shorebirds triggering the IBA status. The results of the preconstruction bird survey conclude that the area of influence (AoI) for the onshore receiving facility (ORF) supports a ‘rich and diverse avifauna’, but due to their limited time scale, it is not certain how representative the findings are of “normal” conditions. This is particularly true of shorebirds, which are highly mobile, and a number of factors, such as feeding conditions and tidal state can affect avian abundance at any moment in time.

For this reason, baseline data collected by the pre-construction bird survey is able to provide and initial indication of potential abundance, but needs to be augmented with additional data to avoid the current challenge of comparing subsequent monthly monitoring counts and peak season averages with a single count, given the natural inter and intra-year variability of shorebird site usage.

2.2.2. Avian Monitoring during the development phase (2017-2020)

Eni Ghana contracted GWS to undertake regular monitoring of shorebirds, vultures and forest birds during the development construction phase of the operation from April 2017 to March 2020.

Shorebird monitoring was conducted along the shoreline within the AoI and within the Amansuri River Estuary ([see south-eastern extent of Figure 2.1](#)) – an important congregation site – located outside of the AoI. Results of these surveys have been collated in annual reports produced by GWS, up to the point at which their contract ended. Monthly reports were also reviewed by technical specialists from Fauna & Flora International.

Future monitoring will be conducted by ESL Ltd, and environmental consultancy with significant technical expertise in biodiversity monitoring.

2.2.2.1. *Shoreline (shorebirds)*

Monthly monitoring of all migratory shorebirds commenced in April 2017 and 28 months of data have been collected to March 2020, covering both the peak migration season (September-April) as well as the low season (May-August). Monitoring consisted of a single day count, in two locations: at shorebird foraging habitat across an 8km shoreline transect covering the Area of Influence (AoI) directly “in front” of the ORF facility, and at the shorebirds “preferred” roosting habitat at the Amansuri River Estuary, approximately 7.5 km east of the ORF facility, and outside of the expected AoI. Surveys were conducted during the receding tide for the transect count, and low tide at estuary location.

The average monthly population naturally vary considerably through the year, so the assessment uses peak season monthly average to compare abundance over the three peak seasons (those with multiple months of data) since monitoring commenced in earnest. Results are assessed in the context of a pre-project baseline taken from observations conducted in November 2015, noting that a single monitoring event and a monthly average across a season are not statistically comparable and that landfall construction activity was concentrated between April 2018 and January 2019.

Analysis of the shoreline surveys conducted within the AoI show that sanderlings are by far, the predominant species observed along the shoreline. A decrease in the total number of shorebirds, including sanderlings were observed utilising the 8km beach transect in the year following completion of landfall construction activities (18/19), indicating other factors may also be affecting shorebird numbers. In addition, the sanderling count in all monitoring periods has been lower than the total recorded during the baseline in November 2015, suggesting that the baseline was an exceptional observation.

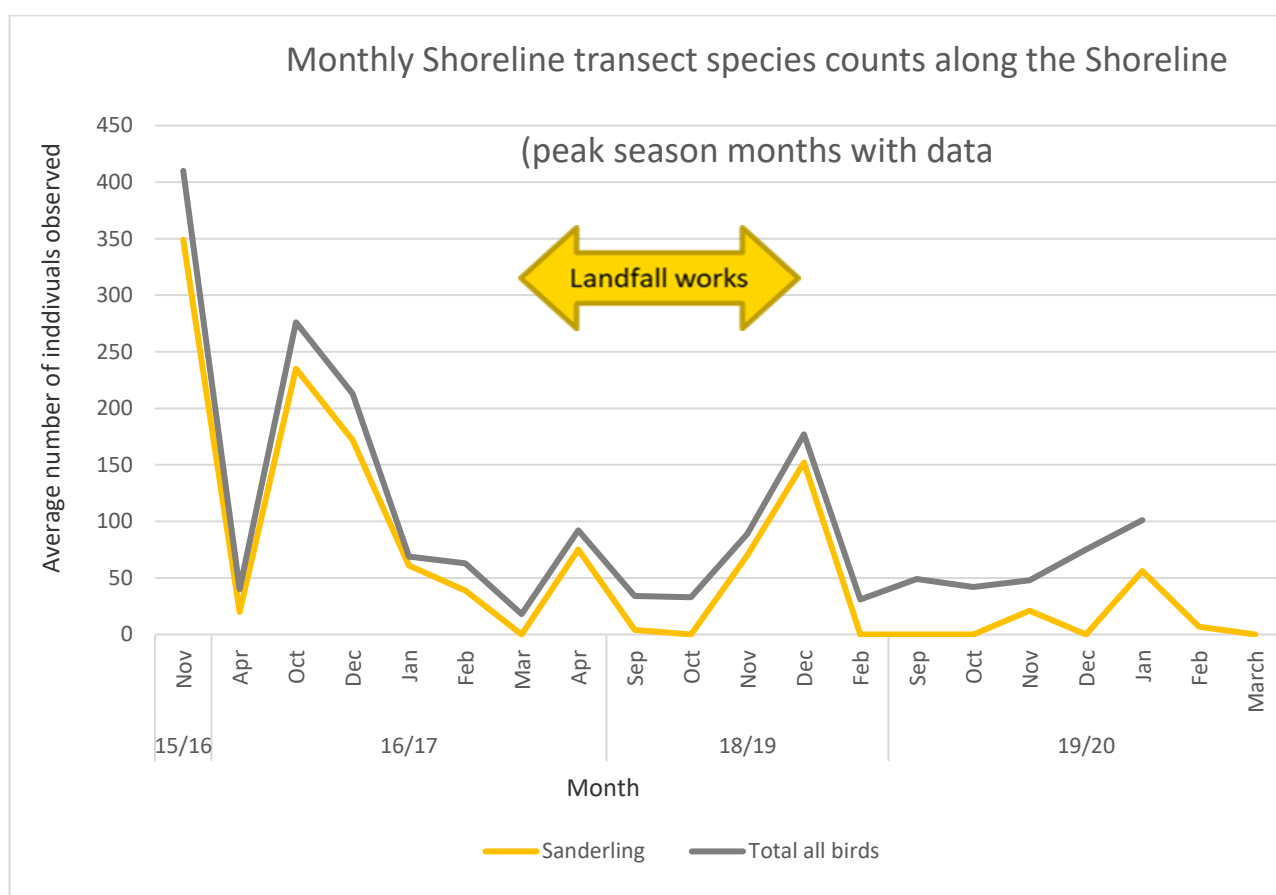


Figure 2-2. Shoreline Sanderling population trend (peak months Sep-Apr). *Missing data Sep 17, Nov 17, Jan 19, Mar 19, Apr 19 have been excluded from the graph. (Nov 2015 and April 16/17 are single counts and April 2020 is missing due to the Sars-Cov2 lockdown)

Average peak season monthly density for sanderlings ranged from 0 to 29.4 individuals/km, with an average of 6 birds/km within the 8km shoreline Area of Interest (AoI). Observations were highest during the 2017/18 migration season, before landfall construction or post trenching had commenced. Observations declined in the subsequent two years and were lowest in the 2019/20 season, although no construction activity ongoing at the time, and corresponding increases in observation at the estuarine location were recorded. In all years, the monthly averages have lower than the November 2015 baseline observation (42 birds/km). No flocks of this size have been recorded since this time. Disturbance monitoring report suggests that coastal fishing and motorbike transportation along beach has increased over the monitoring period. Changes in food availability along the coast and at the estuary have not been monitored, but is a recommendation for similar projects, as this species is highly mobile and occurrence is linked to feeding opportunities.

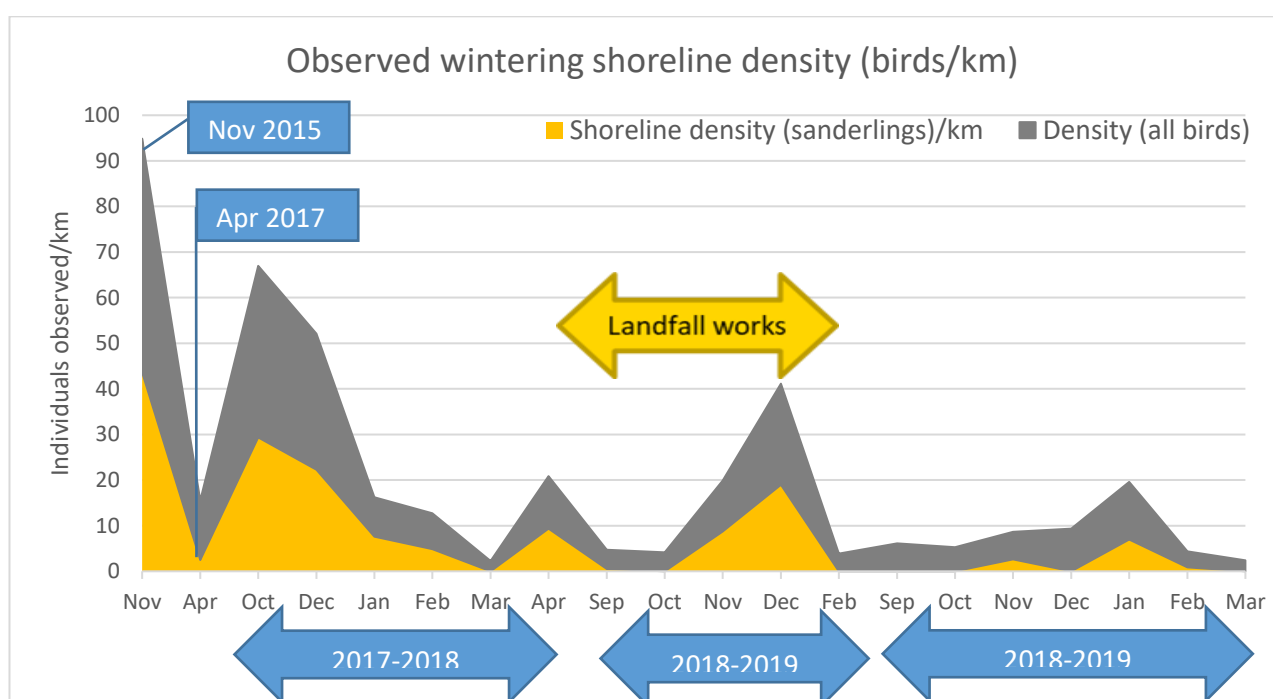


Figure 2-3. Peak wintering density of sanderling from September to April⁷ *Missing data Sep 17, Nov 17, Jan 19, Mar 19, Apr 19 have been excluded from the graph. (Nov 2015 and April 16/17 are single counts and April 2020 is missing due to the Sars-Cov2 lockdown)

While the variability in count data and availability of only three full seasons of data make calculating trends difficult for absolute numbers of birds observed, data for the density (birds/km) of the shoreline transect do show a statistically significant (p value of 0.013 at a

⁷ Pre-construction baseline data (single count from November 2015)) and monitoring data from 2016 (only one month of data) have been excluded from this analysis. Royal tern have been excluded from this analysis as the shoreline numbers are insignificant in this representation (3 at baseline, 2 in 18/19 and 2 in 19/20).

95% confidence interval) declining trend (slope of -0.011) in shorebird density when baseline observations are included.

Disturbance observations conducted during the data collections suggest that the beachfront is increasingly occupied by fishermen and motorbikes travelling between coastal villages, particularly at low tide, which is also the preferred foraging time for shorebirds. The increase in both these activities is consistent with population growth related to the increase in economic activities along this stretch of coastline and may displace foraging to quieter locations along the coastline. Due to cumulative nature of this impact, a collaborative effort targeting mitigation actions in core use areas, such as estuaries is likely to be the most cost effective approach to reducing industrial pressures on shorebird species.

It is important to note that three full seasons of monitoring data is insufficient to make assumptions about shorebirds trends and that 2020 monitoring activities have been disrupted by the Sars-Cov2 pandemic which may impact the trend presented.

Royal terns are uncommon along the shoreline with only two sightings during the monitoring period. This species is more common at the estuarine location where their peak season average abundance has been recorded at 66.6 birds per observation. Although lower than baseline observations, the observed populations have steadily increased each year of monitoring since 2017/18. The stretch of shoreline in front of the ORF is not significant for this species and the project has not impacted this species in any observable degree.

2.2.2.2. Estuary (shorebirds)

At the Amansuri River estuary, the recorded population of both priority shorebirds, (sanderlings and royal terns) has been consistently lower during the development phase monitoring period than estimates provided in the pre-construction survey (Figure 2-4). It is relevant to note that the tidal coefficient during the pre-construction survey was listed as 'very high' at 103⁸ and this may have concentrated shorebirds to roost in trees and higher ground at the estuary. Shorebird populations are mobile and populations at a site can vary significantly across several days and even within a single day.

GWS suggest that the observed reduction within the estuarine location may be due to an increase in general disturbance as the population of local villages has increased. They have also observed an increase in fishing activities, sand mining, and motorised boats and motorbikes along the shorefront, passing through the estuary. The combined direct and indirect impacts of multiple development project may have displaced individuals to other less-disturbed areas along the coast. This suggests the need to broaden the surveyed area and for a co-ordinated industry response.

⁸ <https://tides4fishing.com/af/ghana/takoradi> data for 24th - 26th November, 2015

Species richness (number of species sighted during surveys) has remained fairly consistent throughout the monitoring period.

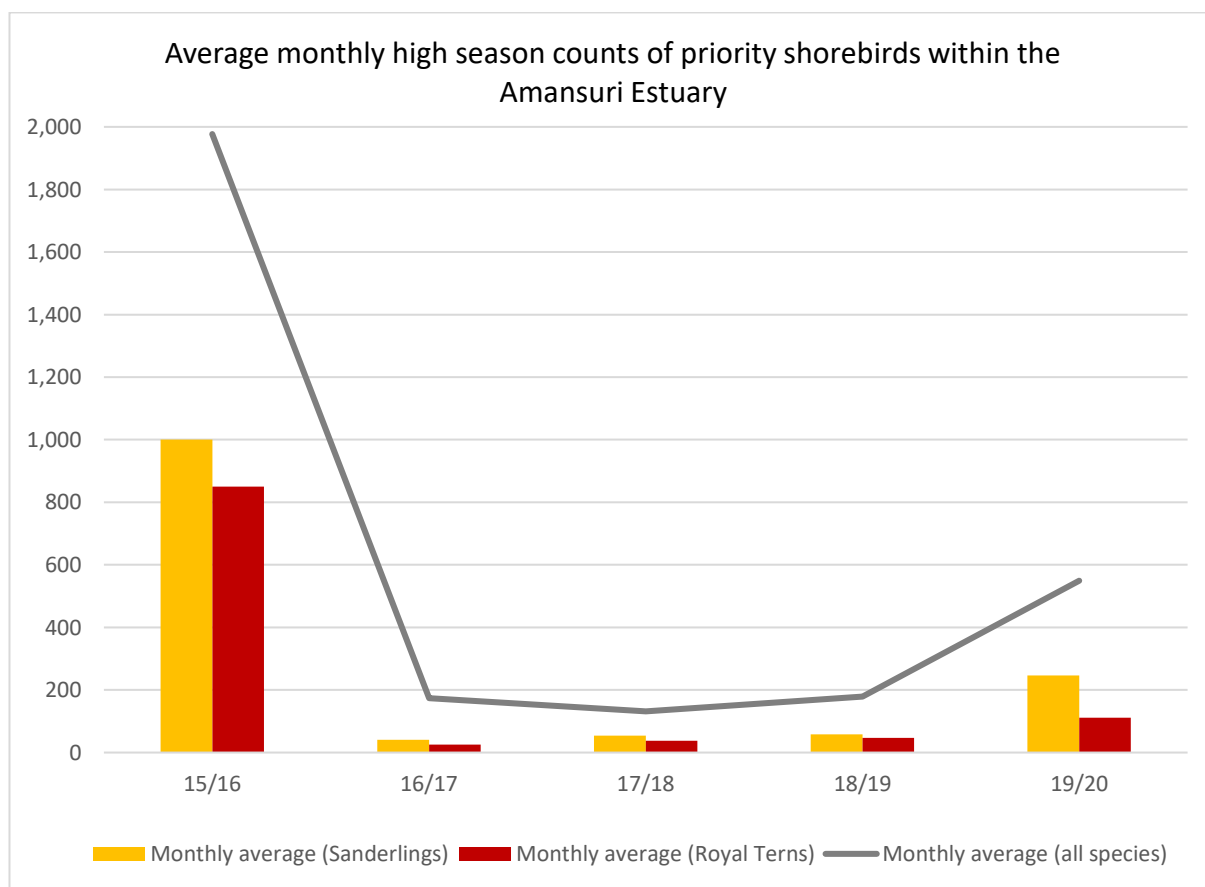


Figure 2-4. Average monthly count of priority shorebirds at the Amansuri Estuary per season in pre-construction (15/16) and construction phases. Note that Amansuri Estuary was identified during the ESHIA as a preferred foraging and roosting site for shorebirds, although at approximately 7.5km from the ORF concession, it was outside of the Area of Influence of the project.

2.2.2.3. Vultures

Vulture surveys during the construction period did not identify nesting or foraging sites within the direct footprint of the ORF concession area. Data collected on foraging and nesting in 10 nearby villages do not show a statistically significant change in the population of foraging or nesting vultures across the survey area broadly. However, the monitoring contractor reported significant declines at Asasetre (outside the AoI), in the June 2018 vulture report noting this may be due to a refuse dump being cleared. It must be noted that there was a change in monitoring frequency from monthly to bi-annual in Jan 2019. In addition, refuse dump counts are known to be highly variable⁹ and conclusions cannot therefore be made on the significance of that data.

⁹ Dr. Steffen Oppel, pers. Comm (10/06/2020)

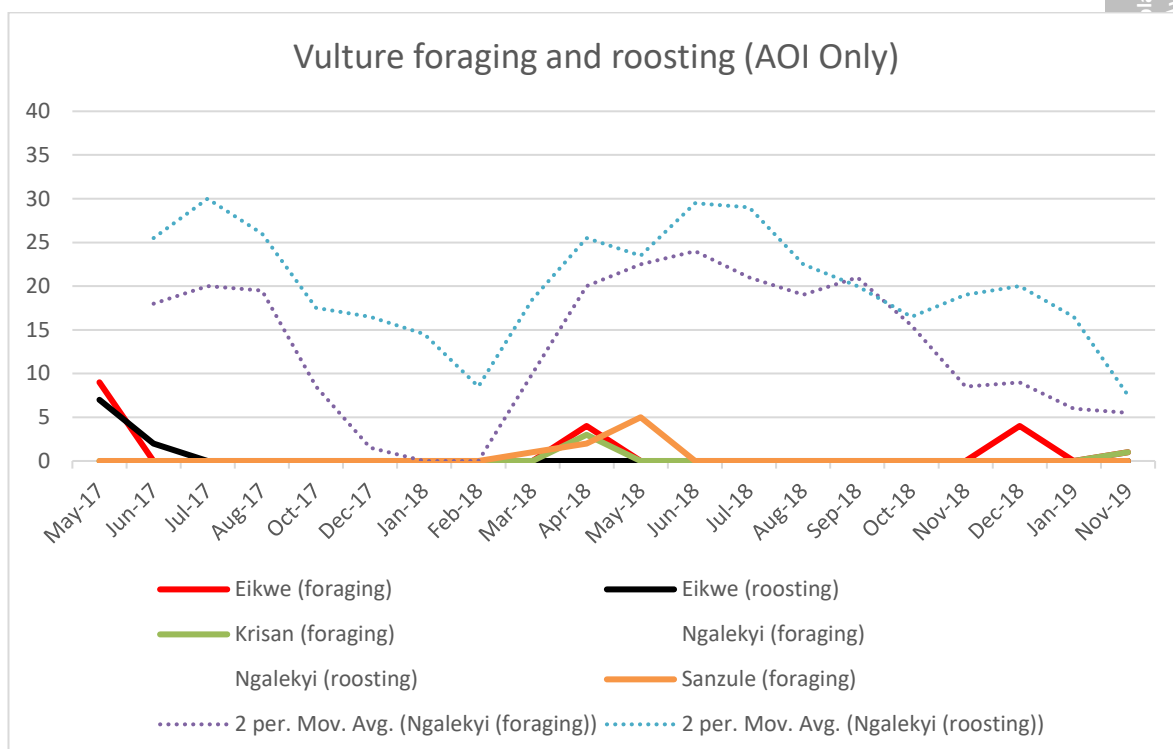


Figure 2-5. Vulture population monitoring results (sum of all locations) – data are insufficient to make assumptions on the general population trend but trendlines within AOI suggest stable population

Vulture data from foraging and roosting surveys have been combined for all locations within the AOI to show broad trend across the survey areas. There is insufficient data at the village level to make reasonable assumptions on trends, particularly given the high variability of populations using refuse sites.

In the Aol, vulture numbers appeared to peak during summer months and drop during winter (breeding season). Literature (Reading et al, 2018) confirms that foraging ranges decrease significantly during breeding as both males and females participate equally during the 52 day incubation period and the 60-80 days required for chicks to fledge.

It is worth noting that although no nests were observed, monitoring data revealed a large number of juveniles indicating that nesting occurs in/near the Aol.

2.2.2.4. Forest birds

A survey conducted by Accra-based consulting company Envaserv in December 2019, which produced a report titled 'Post Development Biodiversity Assessment and No Net Loss Quantification' included a bird survey (Section 3.5). This survey found that in total, 63 species (44%) were recorded in both the baseline pre-construction and post-construction surveys with a relatively high Sorensen's Similarity Index¹⁰ of 62%. Interestingly, the post construction

¹⁰ A measure of similarity between two samples.

assessment recorded more habitat sensitive species than the preconstruction survey - 25 of the 56 species exclusive to the post construction survey are Guinea-Congo Biome Restricted species. While these results may be attributed to improved accessibility of the area resulting in enhanced chance of encounter with species and ease of detection, they indicate that the population structure of forest birds has not changed significantly from pre-construction levels.

2.2.3. Limitations of data collection

The pre-construction avian survey suggested that the baseline survey effort was inadequate to have identified all avian species, based on species accumulation charts (Figure 2-6). This conclusion is supported in the subsequent monitoring, which identified 16 shorebird species, of which only seven (44%) were recorded in the baseline. This was further supported by a post-construction survey conducted by Envaserv Research Consultants on 22nd November to 25th November 2019 which recorded an additional 56 (or 40% greater) species – although improved access was noted as a possible contributing factor. In addition, only one forest bird survey was conducted, a limitation acknowledged in the pre-construction bird survey report (2015).

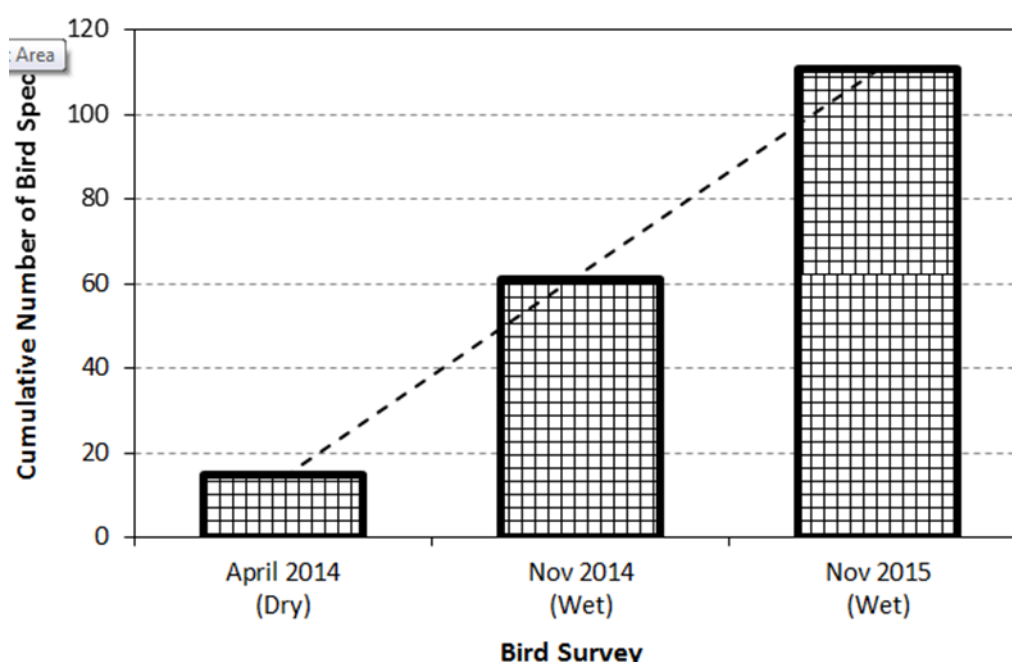


Figure 2-6. Species Diversity Accumulation Curve over Successive [pre-construction] Surveys within the Aol (source: Eni Ghana OCTP block Preconstruction Bird Survey Report (2016). Note the cumulative number of species identified does not begin to tail off with additional surveys, suggesting that not all avian species were identified prior to construction)

Limited survey effort was also an issue for the shorebird baseline; the pre-construction baseline conducted over 2 days in November 2015 did not allow for a seasonal average to be determined. Records from a 20-year dataset show September to October to be the peak

occupancy period (Ntiama-Baidu et al, 2014). However, monitoring performed by the project indicated that peak periods may vary (for example, the peak month in 2017 and 2018 were October and December respectively). This limitation reduces scope for comparative analysis, particularly as flock sizes observed at both locations in the 2015 baseline have never been observed since.

Disturbance data was not collected regularly nor did it follow standardised protocols – this was a significant issue as actions for net gain on shorebirds, as they currently stand, largely rely on reducing disturbance. In addition shorebird populations are highly mobile and vary naturally on an annual basis – disturbance data is therefore a useful proxy for abundance. This issue has now been resolved and the new BAP contractor is collecting quantitative disturbance data.

2.2.4. Summary of Threats

The existing threats and possible impacts to the Amansuri IBA and the target species in the Aol region include:

General threats:

- Vehicle traffic was observed on the beach and/or back beach during the baseline and monitoring surveys including vehicles/motorcycles driving on the beach during low tide. This disturbance can have knock-on effects and impact the onward migration of migratory shorebirds which have limited time to feed.
- Hunting of vultures in and around the IBA (FFI Field Survey 2016, GWS 2016), with the Pre-construction Bird Survey reporting that *‘The area is exposed to considerable subsistence hunting in parts of the Aol with local hunters going out at night with torches’*;
- Hunting of shorebirds along the coastal zone and at Amansuri estuary (FFI Field Survey, 2016);
- Ongoing trapping for commercial trade (primarily focused on grey parrot)
- General rubbish such as plastic bottles is prevalent throughout the Aol. Debris (e.g., rope, fishing line, fishing nets, plastic, and Styrofoam), recreational and work equipment and other obstacles have the potential to entangle shorebirds such as sanderling, impede foraging, and be ingested (micro-plastics) leading to starvation,

Possible project impacts related to the production operations phase include:

- Disturbance to natural habitats for priority species within the project area (during operation, e.g. vehicular use along access road).
- Lightspill associated with security lighting may attract or cause distraction for migratory birds
- In-migration and related impacts (direct and indirect) on habitat and species

2.3. IBA pressures, state and response monitoring

The project’s location within an IBA has triggered the need for species monitoring described in the previous section. In addition to species monitoring, however, the broader “health” of the IBA is an ongoing concern that affects avian populations more broadly, as well as other taxa within the IBA. The IBA monitoring framework developed by BirdLife International provides a standardised way to assign scores for the threats to IBAs (‘pressure’), the condition of IBAs (‘state’) and conservation actions taken at IBAs (‘response’)¹¹. The scoring system makes it possible to integrate a wide range of information, which may often be qualitative rather than quantitative. Ideally, all IBAs should be regularly monitored once every four years¹².

GWS conducted regular assessments of the IBA State, Pressure and Response throughout the construction period¹³. A summary of the findings of these assessments are shown in table 2-1. GWS surveys were conducted within the Aol of the project, including within the concession area. Following discussions with the projects technical partners, it was decided that surveys during the operational phase should be the broader IBA extent as suggested in the IBA monitoring methodology, and be conducted on an annual basis, ideally in November, which is considered as the peak season for shorebird presence.

Table 2.1 Summarised highlights of the IBA State, Pressure, Response Monitoring from 2017-2018 from within the project Aol (GWS internal reports, Jan 2017 – July 2018)

IBA Area	Summary of GWS reporting of the Pressure, State and Response monitoring.
Pressure	The pressure assessment was based on threats that affect or have the potential to affect ‘trigger’ species as well as knowledge about the site as a whole. Key pressures (threats) to shore birds included: human presence (beach fishing), vehicle movements (especially during low tide), sand mining within communities, and beach littering. These threats were considered minimal and affect less than 10% of the IBA. Reports from the monitoring surveys also suggest that disturbance has been increasing.
State	The “state” of the beach is reflected in the results monitoring for sanderlings and royal terns, which showed a decline from the pre-construction baseline in 2015 (see section 2.2.1) within the Aol, (shoreline) and at the Amansuri Estuary. However these results are annually variable and measures in other locations within the IBA are not available for comparison. GWS also reported on the extent of habitat available for the trigger species as surrogate method representing the state of the IBA. From an 8km transect, (between Eikwe and the

¹¹ [BirdLife International \(2006\) Monitoring Important Bird Areas: a global framework. Cambridge, UK. BirdLife International. Version 1.2](#)

¹² See BirdLife International ‘*State of the world’s birds*’ website <http://www.birdlife.org/datazone/sowb>

¹³ GWS third work order “BiAP-5.2: Monitor and report IBA state, pressure and response annually within the contract period”. These reports only assessed conditions within the Aol.

	Amansuri Estuary), 7.5km was considered to the available shoreline for shorebirds (93.75%). GWS also reported that <i>“but for a few unsustainable activities including sand mining and beach littering by the community members, the shoreline is in good shape for the migrant visitors”</i> ¹⁴)
Response	Despite its status of an Important Bird and Biodiversity Area (IBA), no part of the Amansuri IBA has been formally designated for biodiversity conservation (given protected area status). Furthermore the Amansuri region is not one of five recognised Ramsar sites in the country. Non-government organisations, including GWS, have been active implementing community-based conservation activities. GWS has been implementing a community nature reserve and conducting community awareness raising among communities (including with support of Eni Ghana). GWS also collaborated with the Royal Society of the Prevention of Birds (RSPB) in the implementation of the “Save the Seashore Birds” public awareness campaign. However these interventions are often constrained in scope and limited in duration. In addition, both the University of Ghana and the Centre for African Wetlands (CAW) have been conducting shorebird monitoring and research (see stakeholder section) in nearby locations (including Esiam beach).

¹⁴ GWS BiAP 5.2. June 2018

3. STAKEHOLDER ENGAGEMENT

Eni Ghana has engaged with local stakeholders and maintained an ongoing healthy relationship with local stakeholders, governmental and non-government organisations (NGOs) and all affected or interested members of the public in proximity to the project. Eni Ghana through the BAP contractor maintains contact with the local communities local community members may be engaged to assist with the monitoring activities. Eni Ghana is an active participant in a regional Cumulative Impact Co-Management Platform. This Platform includes relevant industry and government departments and meets biannually.

A summary of recent stakeholder engagement relevant to avian is outlined in **Error! Reference source not found.** below.

Table 3-1 Relevant stakeholders in avian conservation

Date	Stakeholder	Relevance to Avian BAP	Outcomes of engagement
09/10/2020	University of Ghana	They run a monitoring programme on shorebirds that overlaps with that of Eni Ghana	Potential collaboration on monitoring to increase the range and data points of Eni Ghana
09/10/2020	Centre for African Wetlands (CAW)	CAW run a research project at Esiam beach covering the BAP target species, and hold data on key areas for shorebirds based on prey density.	Potential collaboration and data sharing to inform the Avian BAP, particularly on areas of high prey density
10/06/2020	RSPB	RSPB run a roseate tern project in Ghana, and also worked on the 'Save the Seashore Birds' public awareness campaign in the 2000s	Possible collaboration with their roseate tern project in Ghana
13/03/2016	Ghana Wildlife Society (GWS) Dr. Erasmus Owusu (Board Member of Ghana Wildlife Society in Accra), Mr. Japheth Roberts (Manager, Biodiversity Conservation Research)	GWS is the BirdLife International Partner in Ghana, creating and maintaining survey data for the Amansuri Wetland IBA. GWS has an ongoing bird monitoring programmes in Ghana, and have an organizational mandate to	GWS was selected to be the initial monitoring contractor

		conserve Amansuri IBA and priority species.	
13/032016	Wildlife Division of the Forestry Commission	The Wildlife Division of the Forestry Commission is mandated to deal with 'regulation of utilization of forest and wildlife resources, the conservation and management of those resources and the coordination of policies related to them'.	Input on BAP regarding ongoing threats
12/03/2016	Local community (including, but not limited to, Sanzule, Bakanta, Krisan, Eikwe, Atuabo, and other coastal communities within the Aol)	Local community members in the Project Aol and broader DMU represent both opportunities and threats to avifauna. Community members have been identified as a threat to shorebirds through direct hunting, but this threat is reported to have decreased (Owusu, pers comm).	Input on BAP regarding ongoing threats
12/032016	Local fishermen	Fishermen in the project area are frequent users of the coastal zone, storing boats and fishing equipment and bringing large nets to shore to land catches. These activities may disturb shorebirds, but reports indicate shorebirds attracted to nets have also been trapped and/or killed (Owusu, pers comm).	Input on BAP regarding ongoing threats

Stakeholder Engagements performed in March 2016

This Section details the stakeholder engagement activity undertaken during the fauna pre-construction survey in March 2016. During the interviews outcomes also related to the avian species present in the area were collected. Two types of engagement activities were performed during the fauna pre-construction survey: Focus Groups and Key Informant Interview.

The field survey included one Focus Group Discussions (FGDs) with 6 local community members to determine target wildlife species, including avian species, that previously and currently inhabit the area.

Table 3-2 Summary of stakeholder engagement activities (March 2016)

No.	Organisation/Group	Date	Location	Attendees
1	Local Community members	12-03-2016	Public Place- Sanzule Cemetery	• Veronica Kpodo (Farmer) • Samuel Ezua (Farmer) • James Awuah (Farmer/ Hunter) • John Blay (Livestock keeper) • Agnes Ahete (Farmer) • Joseph Sepah (Elder)
2	ESL Fauna Experts, from Ghana Forestry commission	13-03-2016	Tenak Hotel	• James Biney (ESL Bird Expert)

Respondents were asked to select from several displayed photos which animals they have encountered in the area and over what time frame they encountered those animals. The views of respondents on the threats to wildlife in the area were also inquired. Selection of interviewees was mainly based on availability and was done through the community focal person. Respondents were both selectively and randomly chosen from the local communities around the project area. Hunters, as well as individuals who have farms within the project area were selected while other respondents (e.g. fishermen) were randomly selected based on their availability at the time the survey was scheduled.

The objective of the Key Informant Interview with the officials from the Ghana Forestry Department was to collect information mainly with regards to regulation policy for bush meat in Ghana, typology of bush meat and market commonly found in the whole country and in particular in the Project area.

4. CONSTRUCTION AND OPERATIONAL IMPACTS

This section provides a summary and discussion of potential impacts to the target avian species from the operation (i.e. production phase) of the onshore pipeline and ORF. Residual impact have been summarised in Section 4.3 below.

Direct impacts are linked to disturbance in the coastal zone habitat, notably beachfront which can reduce foraging time and efficiency for shorebirds, and the loss of roosting habitat for vultures and forest birds. Both of these direct impacts are not anticipated during the operational phase of the project.

Indirect impacts are those that result from other activities (which are not part of the Project) but which arise as a consequence of the Project. A prominent indirect impact is ‘induced migration’ whereby the presence of a project accelerates the influx of people to, and economic activity within the area in the form of job seekers and small business that are attracted by the potential economic benefits. The increase in population can subsequently increase pressures on natural resources (including species) directly (particularly through habitat loss) as well as increasing the disturbance within feeding or breeding areas. Different bird species may respond to anthropogenic disturbances differently, depending on factors such as, food availability, the extent of suitable habitat available and competition for resources within the group. Some species of bird are highly resilient to human activities (i.e. gulls).

In-migration is further increased by the presence of other developments in the region i.e. cumulative impacts, and in extreme cases may require a dedicated management and mitigation plan.

4.1. Direct impacts

4.1.1. Construction Phase

Increased vehicular movement and construction activity may have caused temporal disturbance and loss of access to foraging habitat for shorebirds in the ROW, particularly during landfall construction activities directly at the shoreline. Construction of the pipeline/direct beach disturbance, initially planned to occur outside of the peak shorebird usage, was delayed and continued between November 2018 – January 2019. This timing overlapped with the peak wintering shorebird usage. These construction activities may partly explain the observations within the monitoring data, which showed a decrease in the number of birds along the beach front foraging areas within the AoI during that period. However, numbers were equally low the following year (19/20) in the absence of any operational activities along the sealine.

4.1.2. Production Phase

With the construction phase now completed, Eni Ghana anticipate that no further activity (not even planned maintenance) is scheduled on the beach. Furthermore, project vehicles are restricted to inside the ORF during the production phase. Therefore, during the production phase, no direct operational impacts to shorebirds utilizing the Sanzule beachfront are expected. While no residual impacts from direct disturbance are anticipated during operations, the company will continue to monitor shorebird populations along the shore line and at the estuary, and shall be taking actions to achieve net gain, though the implementation of additional conservation actions (ACAs).

The extent of residual impacts from the construction phase are assessed section 5. Eni Ghana shall, through engagement with local NGO conservation research activities and awareness creation, support Additional Conservation Actions (ACAs), as detailed in section 6.4. The aim of these shall be to make a positive contribution to improvements in the species habitat (reduced disturbance) and population numbers and in doing so, fulfil the net gain performance requirement.

4.2. Indirect and cumulative impacts

Indirect impacts are related to third-party pressures that increase as the result of the presence of an industrial project. Indirect impacts are difficult for a project to manage because effective mitigation is often outside of the direct management control of the project itself, and often rely on the cooperation of government stakeholders as well as local communities themselves to moderate or change behaviours that are damaging towards biodiversity. In-migration can increase pressures on biodiversity in several ways, including:

- Increased disturbance to natural habitats for priority species within the project area e.g. GWS have noted an increase in motorbike traffic along the beach during low tide, increased demand for sand (sand-mining) and an increase in fishing activities. These disturbances can have knock-on effects and impact the onward migration of migratory shorebirds which have limited time to feed.
- Increased pressure on natural resources and ecosystem services such as poaching of vultures for traditional medicine (*juju*).
- Hunting of vultures in and around the IBA has been recorded (FFI Field Survey 2016, GWS 2016), with the Pre-construction Bird Survey reporting that ‘The area is exposed to considerable subsistence hunting in parts of the AoI with local hunters going out at night with torches. This will be exacerbated by in-migration and increased demand for wild meat and *juju* (traditional medicine);
- Hunting of shorebirds along the coastal zone and at Amansuri estuary has been recorded (FFI Field Survey, 2016), although it is not thought to be as significant as vulture poaching;

- Use of beachfront as open toilet facilities has also been noted, and is consideration a potential source of disturbance for shorebirds (Angela Lamptey, University of Ghana, pers comm).
- General rubbish such as plastic bottles is prevalent throughout the Aol. Debris (e.g., rope, fishing line, fishing nets, plastic, and Styrofoam), recreational and work equipment and other obstacles have the potential to entangle shorebirds such as sanderling, impede foraging, and be ingested (micro-plastics) leading to starvation,

Social assessments completed by Eni Ghana have shown that the influx of people into the four villages nearest to the ORF, has been negligible during the production phase. However, GWS anecdotally reported an increase in human disturbance/presence along the beach during surveys, potentially interfering in feeding time and efficiency for shorebirds.

Indirect impacts are increased further by the presence of other developments in the region, which together may result in measureable cumulative impacts. Other development activities in the area are shown in Figure 4-1



Figure 4-1 Overview map identifying other major oil and gas developments and activities in the study area and extending to the west. Recent industrial facilities include A. The Ghana gas accommodation camp; B. The Ghana gas batching plant (left) and processing facility (right); C. Quantum gas facility, and; D. The Ghana Gas Export pipeline (red).

Associated with these new development is the additional vehicle traffic along the coastal road. The cumulative effects of these developments may displace feeding activities further east and west into less disturbed areas.

Section 6.2 outlines several mitigation measures that aim to address these impacts in the Aol and the broader Amansuri Estuary IBA.

5. Residual impact Assessment

5.1. Overview

Published literature and expert consultation between 2015 and 2020 confirm that the stretch of beach within the AoI is of relatively (as compared to Esiam beach and Amansuri Estuary for example) low priority to sanderling and royal tern. Monitoring data collected in this period shows that the beachfront within the AoI is of low importance to royal tern, with a total of 4 sightings. Peak season (September-April) sanderling counts were variable (an average of 60% variation between years) but the maximum count was 582 in this period, as compared to maximum counts of over 4000 individuals at Esiam beach.

Vulture surveys identified several areas of local importance to vulture populations within the AoI. These have been prioritised for mitigation activities in the form of targeted awareness campaigns. However improved waste management has influenced the distribution of vultures throughout the AoI and this is reflected in the location monitoring.

Data from this monitoring programme has been used to estimate the residual impacts of the project and design mitigation measures. The loss-gain metrics used were:

- (Shorebirds) Availability of suitable foraging habitat
- (Shorebirds) Abundance in the AOI
- (Shorebirds) Disturbance level
- (Vultures) Availability of suitable foraging habitat
- (Vultures) Abundance in the AOI
- (Forest birds) Availability of suitable habitat and abundance in the AoI which are covered in the NNL strategy

Considering that no significant residual impacts are expected to occur, and taking into account the existing data challenges summarised in Section 2.2.3 above, the actions towards NNL and NG are focussed on supporting additional conservation actions. This is consistent with IFC PS6 Guidance notes, specifically GN90 which states that ‘In instances where a biodiversity offset is not part of the client’s mitigation strategy (i.e., there are no significant residual impacts), net gains may be obtained by supporting additional opportunities to conserve the critical habitat values in question. In these cases, qualitative evidence and expert opinion may be sufficient to validate a net gain.’

5.1.1. Shorebirds:

As discussed in section 2.2, field data recorded during the pre-construction survey baseline (2015) and construction period monitoring surveys (2017-2020) has demonstrated the shoreline study area within the AoI, is a low density feeding beach for both sanderlings and royal terns, particularly when compared to priority sites identified in external studies (Ntiamoa-Baidu et al, 2014), which identified populations of up to 4000 sanderlings along

Esiama Beach. Average monthly observations along the shoreline monitoring results are shown in **Error! Reference source not found.** below. These results indicate that sanderlings represent the majority of shorebirds observed, except when sanderling numbers are low, when other species are more prevalent. The lowest observations did not correlate to the specific construction activities at the LTE site (April 2018-March 2019). Lower numbers were observed both prior to and after construction, suggesting that other factors may have greater influence over sanderling (and other species) numbers observed annually.

This data indicates that royal terns rarely utilise the shoreline in front of the ORF. It also suggests that the baseline measured during a single observation in November may have been an exceptional count and is not representative of normal conditions.

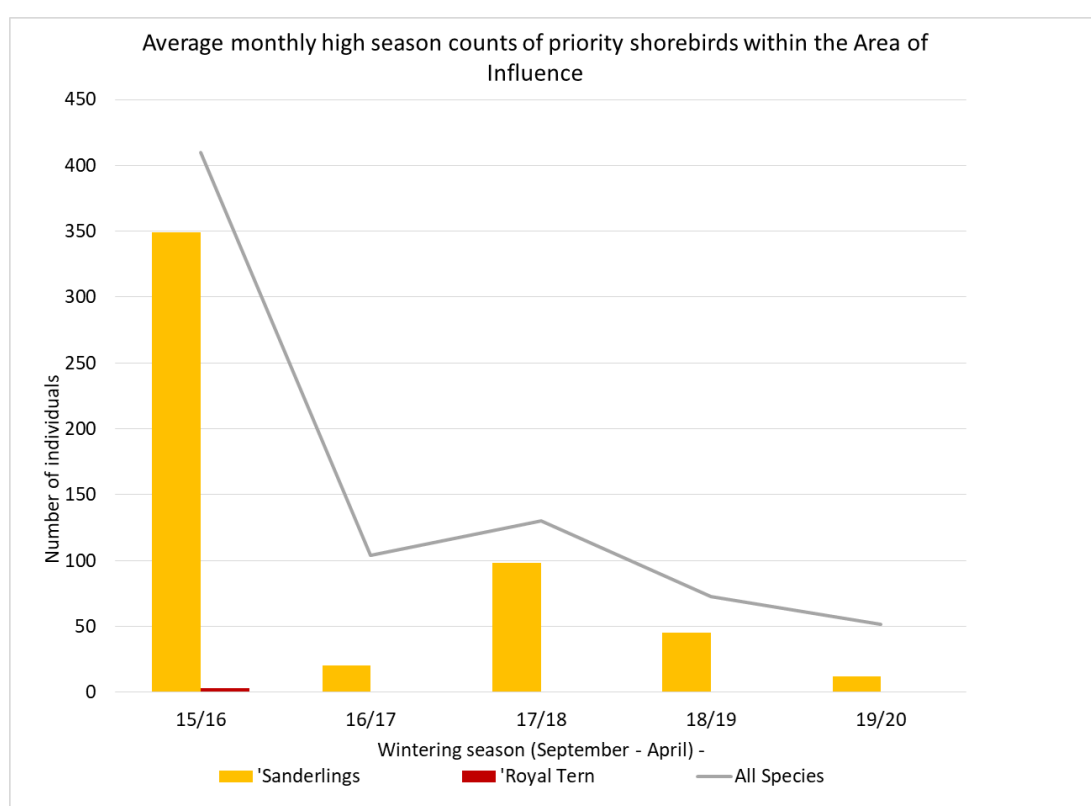


Figure 5-1 Average monthly count of priority shorebirds per season in pre-construction (15/16) and construction phases. Note that construction at the LTE (shorefront) did not commence until the 2018/2019 season and was fully completed before December 2019.

Field data has been used to estimate the residual impacts on shorebirds (Section 5.2).

Abundance in the AOI

Visualising total numbers of the target shorebirds within the AOI, and discounting the 2015 baseline counts (which appear to be an exceptional count), the broad trend of abundance across the AOI appears to be increasing slightly (reflecting national-level data). Some level of double counting cannot be ruled out for sanderling (but can for royal tern). This data does not indicate any long term population level impact.

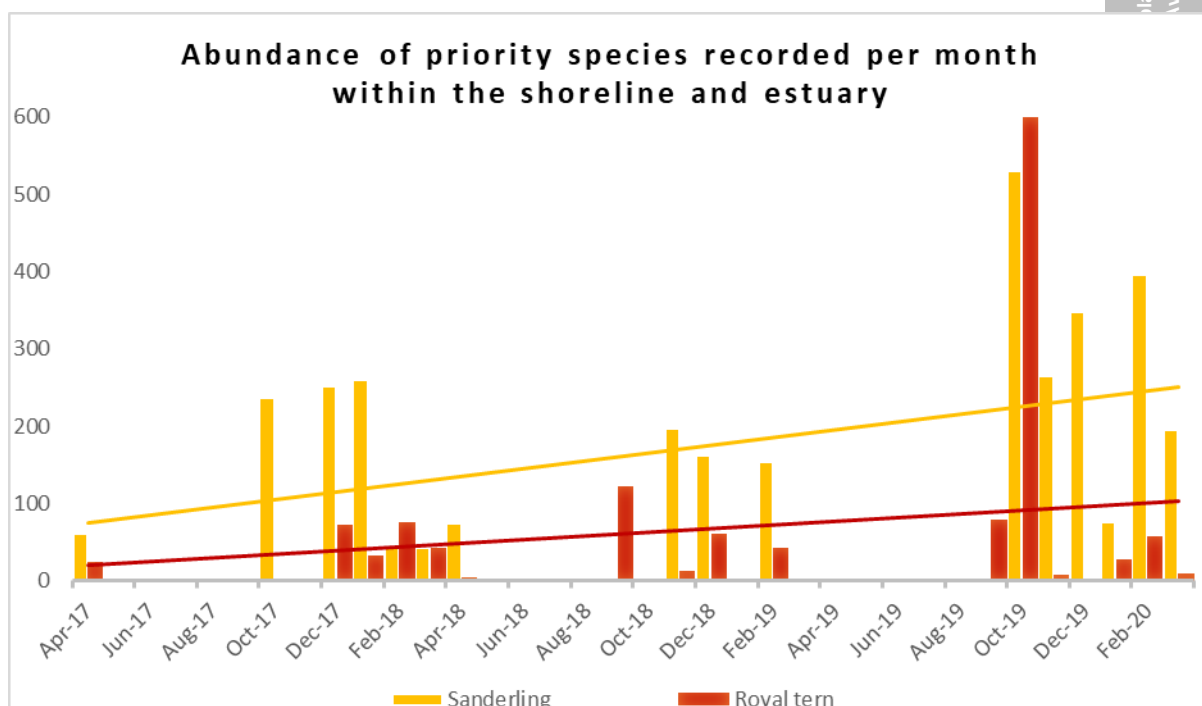


Figure 5-3. Total counts of shorebirds (excluding baseline count)

Construction of the pipeline/direct beach disturbance was planned to occur outside of the peak shorebird usage however, construction was delayed and continued between 2018/2019 peak wintering season. This had the potential to cause temporary displacement of shorebirds from the vicinity of the ORF to other locations. However observations during this season were not the lowest recorded along the shoreline (if fact, were lower in both the preceding and subsequent years in the absence of construction activity on the beach). Combined observations (shoreline and estuary locations) indicate a progressive increase over the 3 year period during which construction took place (2017/2018 to 2019/20).

Availability of suitable foraging habitat.

Sanderlings forage on bivalves and other marine invertebrates, primarily during low tide. Royal terns tend to prefer fish, crabs and marine invertebrates and prefer to forage in estuaries, lagoons and tidal creek habitats. This preference was confirmed by monitoring data showing that the estuarine location regularly supporting and higher number and greater diversity of species.

Construction of the Land Terminal End (LTE) at the coastal fringe (Figure 5-2) commenced in April 2018, and extended in to the 2018/2019 peak season for shorebirds, before concluding in January 2019). These activities were limited to a physical extent of less than 200 of the coast over the single migration season. This may have caused some temporary disturbance, however this was not clearly evident by the overall abundance recorded.

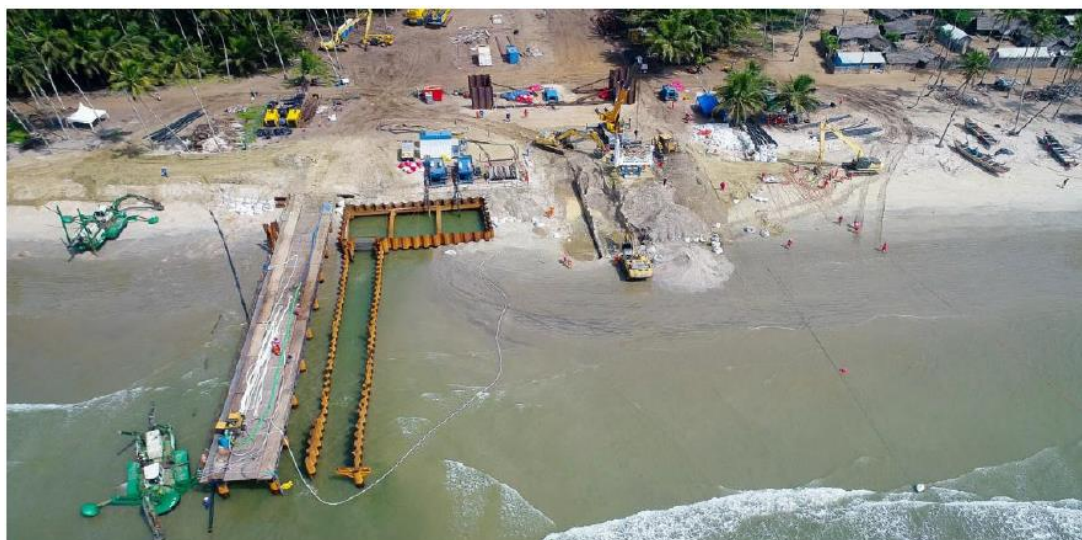


Figure 5-2. Aerial view of post lay trenching activities in December 2018 (source: Offshore Cape Three Points Environmental and Social Monitoring Report, May 2019).

The geomorphology of the beach has been fully restored (Figure 5-3), and vegetation restoration plots have also been established



Figure 5-3. Image of the LTE beach front after restoration (source Eni Ghana 2020)

Both Royal tern and sanderling numbers have been observed roosting in internationally significant numbers at Amasuri estuary outside the Aol (Figure 2-4). The project has not disturbed the estuarine habitat in any way, although other threats, particularly fishing have been persistent in this area. Actions to reduce maintain the condition of foraging habitat at the estuary therefore represents an opportunity for additional conservation actions.

Other anthropogenic disturbances

Construction phase monitoring reports suggest that other anthropogenic disturbance activities as having increased during the construction phase. Unfortunately disturbance data was not collected systematically during these survey, and thus disturbance levels are not quantified in way that supports analysis. This oversight has been corrected for the operational phase monitoring and the new BAP contractor is collecting disturbance data in a quantitative manner. External pressures (disturbance data) is an important measure of habitat condition, and a useful proxy for abundance where species are highly mobile and species abundance fluctuates annually.

Actions identified to achieve net gain on shorebirds, as they currently stand, largely rely on reducing disturbance from their current levels, but without clear baseline conditions it may be difficult to set objectives for these that are related to the pre-project condition. The pre-construction Avian baseline (ERM 2016) identified the following anthropogenic disturbances along the shoreline:

- Fishing activities from the beach during all daylight hours
- The accumulation of plastic waste, washed ashore from the ocean.

Since this time, we also know that vehicle use along the shoreline and sand mining is believed to have increased. Identifying ways to mitigate these threats is considered a legitimate conservation action.

5.1.2. Hooded Vultures

Biannual monitoring of roosting and foraging vulture has continued in 10 communities both within and outside of the project area of influence (Table 5-1).

Table 5-1. Location of vulture foraging and roosting conducted.

Survey type	Villages surveyed
Foraging	Asasetre, Azuleloanu, Eikwe, Esiana, Krisan, Ngalekyi, Nkroful, Sanzule, Teleku Bokazo, Asasetre Nvuma, Awonakrom, Ngalepolly, Bakanta
Roosting	Asasetre, Eikwe, Esiana, Ngalekyi, Ngalepolley

Abundance in the AOI

No roosting individuals or nests were observed within the concession area during the avian pre-construction survey. Therefore, the construction activities are not considering to have directly impacted hooded vulture populations.

Nevertheless, the presence of juveniles suggests that some nesting is occurring within or near to the AoI (most sightings in Ngalekyi). Hooded vulture abundance has been observed to be seasonal (Figure 2-5), so individuals are moving in and out of the area from unconfirmed locations. As the species is noted to be dependent on refuse dumps, improvements in management of solid waste may displace hooded vultures and declines were observed in villages where municipal authorities cleaned up open refuse dumps. The broad trend appears to show a slight decline over the monitoring period, possibly due to improved waste management in Nkroful for example. Recent community engagement has also recorded that vultures are reported to be killed in Esiam for food, sales and use in traditional medicine. However, these impacts are not thought to be related to the project as census surveys conducted by Eni Ghana in 2019 show that the overall population has not increased significantly.

5.1.3. Forest birds

The diversity of bird species is has been monitoring within the Concession area throughout the construction period, and upon conclusion of the construction activities. A small number of species require a closed forest canopy habitat for their continued persistence; these are referred to as “forest-birds”. Of particular focus are those species with a globally Threatened¹⁵ or Near Threatened (NT) category, listed in table Table 5-2.

Table 5-2. List of forest Birds of conservation importance (i.e. with a threatened or near-threatened status)

Species name	IUCN threat category	Presence in avifauna surveys		
		Pre-construction (ERM 2015)	Monitoring (GWS 2017-2019)	Post construction assessment (Envaserve 2019)
Grey Parrot (<i>Psittacus erithacus</i>)	VU	Observed flying over concession ¹	Not Observed (NO)	NO
Copper-tailed glossy starling (<i>Hylopsar cupreocauda</i>)	NT	Single sighting	NO	NO
Yellow-Bearded Greenbull (<i>Criniger olivaceous</i>)	VU	NO	NO	NO
Green-tailed bristlebill <i>Bleda eximius</i>)	NT	NO	NO	NO
Total number of species observed		86 species	78 species	119 species from 28 families ²

¹⁵ IUCN Red List “Threatened” categories include: Vulnerable (VU), Endangered (EN) and Critically Endangered (CR)

Notes:

1. This observation does not infer residence within the concession
2. Study area included the Concession area and transects within one-kilometre radius.

Monitoring throughout the construction period and in post-construction failed to identify any of the target species. The results of the pre-construction baseline were similar; observing one pair of parrots in flight and a single Copper-tailed glossy starling. The Grey Parrots were not considered resident because of their flight behaviour. A pair of Copper-tailed glossy starlings were observed as recently as June 2020¹⁶. The skill of the observer is among several factors that can significantly influence the results of avian surveys. It is worth noting that ESL observers (specifically James Biney) was also present on both occasions that the Copper-tailed glossy starlings has been detected.

The absence of these priority species in all phases, pre and post construction signifies a biodiversity concern. Opportunity therefore exists for Eni Ghana to enhance the suitability of the existing habitat within the ORF concession for forest-dependant species, for example, through the installation of interventions such as specific nesting boxes to improve nesting choices within the forest reserve areas. Further discussions with ESL ornithologists and local biodiversity experts should explore other enhancement opportunities.

Limitations

The following challenges were encountered whilst analysing the data and completing the residual impact assessment:

- Uncertainty in the timing of surveys; shorebird behaviour may vary considerably according to tidal and other atmospheric conditions. .
- An absence of data that may support evaluation of abundance. Future monitoring activities for shorebirds should also seek to collect data on food availability, as observed numbers appear to be poorly correlated to project activities.
- Only one season of baseline data was collected during a 2 day period. Data available prior to this to understand multi season trends is taken from the nearby Esiam beach. It suggest populations are growing, however the data may be outdated.
- There are natural variations in arrival and departure to feeding grounds year by year. Additional future survey effort will continue to improve understanding these natural variations versus anthropogenic threats (project and non- project related) in the study area.

¹⁶ ESL 2020. Result of the June 2020 forest bird monitoring.

5.2. Loss and gain calculations

The key results of the residual impact estimate are summarised in Table 5-3.

Based on information available to date, no significant direct residual impacts have been observed on the extent or condition of the physical nesting beach habitat, shore bird or vulture species observed. Furthermore, no physical injury/mortality/entrapment has been recorded as a result of Project activities in proximity of the landfall area.

Table 5-3. Estimated residual impacts to shorebirds and vultures within the Aoi

Feature	Loss-Gain Metric	Description	Significant Residual Impact? (Y/N)
Sanderlings and royal terns	Abundance in the AOI	In the period corresponding to the construction of the simplified shore approach and demobilisation, numbers may have been reduced but there is no evidence of displacement towards the estuary, since observations here were also quite low. Furthermore, when observations between the shoreline and the Estuary (to account for species mobility), and the exceptional baseline observations are excluded, overall numbers appear to be increasing, which is in line with broader estimates for shorebird population trends	No
	Availability of suitable foraging habitat	Approximately 200m of beach front habitat was occupied by construction activities during the 2018/19 season. Given the overall extent of the beach and the lack of evidence of displacement, this is not considered significant	Minor temporary residual impact (sanderlings only)
	Disturbance level	Although anecdotal evidence exists for increased disturbance. Quantitative monitoring of disturbance has only begun in 2020.	Uncertain. Activities to reduce disturbance are included as ACAs
Hooded vulture	Abundance in the AOI	No vulture nests or roosting sites were disturbed during construction or operation phase. Hooded Vultures are known to be associated with human settlements foraging on meat, vegetables, and rubbish and fluctuation within the AOI is most likely linked to changing solid waste management	Uncertain. Activities to reduce persecution are included as ACAs

Feature	Loss-Gain Metric	Description	Significant Residual Impact? (Y/N)
		Monitoring data within the AOI currently show seasonal variation with a minor decline.	

6. MITIGATION STRATEGY

This section outlines how Eni Ghana apply the mitigation hierarchy as required by IFC PS6 when operating in Natural and/or Critical Habitat¹⁷. The mitigation hierarchy is a planning framework involving a series of steps designed to assist developers to plan and take action to limit the adverse impacts of development projects including direct, indirect and cumulative impacts. The mitigation hierarchy stipulates a strict order of preference of types of actions (avoid, minimise, restore and offset) to achieve Net Gain or NNL outcomes for Natural and Critical Habitat, respectively.

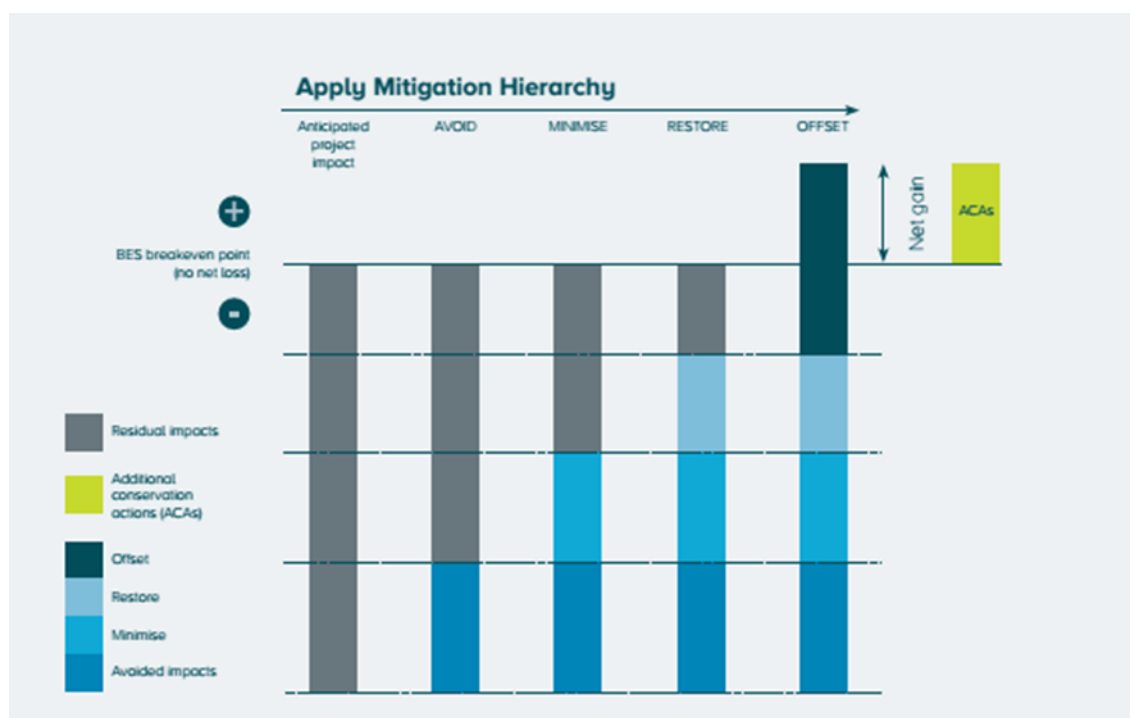


Figure-6-1. Diagram of the Mitigation Hierarchy (Fauna & Flora International (FFI), 2017)

6.1. BAP Objectives

The overall objectives of the Avian BAP are to compensate for project impacts during construction and operation and achieve NG and NNL as required, in accordance with IFC PS6. This report outlines an action plan for Eni Ghana to mitigate the possible impacts on avian biodiversity resulting from the OCTP project onshore activities and infrastructure. The BAP aims to avoid where possible, and reduce impacts to birds and their habitats to as low as reasonably practicable and design/implement measures to achieve no net loss or a net gain as required. The following objectives and associated targets are aligned with the IFC PS6 performance requirements:

¹⁷ IFC PS6 Para 14 and 18

Objective 1: Demonstrate Net Gain, for priority shorebird species (sanderling and royal tern), primarily by ensuring a net decrease in disturbance.

Objective 2: Actions for hooded vultures and forest birds to ensure>NNL

Objective 3: Support actions to reduce pressure and improve state and improve conservation responses within the Amansuri IBA

These objectives will be achieved through a combination of:

- Operational controls (including bushmeat management plan and traffic management plan), and updates to other standards including the reinstatement and restoration plan)
- Integration with internal processes (training of staff, and contractors)
- Collaboration with external stakeholders (cumulative impact forum, Additional Conservation Actions)

6.1.1. Previous commitments made under the BAP

This BAP targets the impacts from both construction activities as well as operational activities anticipated during the production operations phase. Previous versions of the BAP have outlined mitigation actions performed within the construction phase (2016-2019). These are contained in Annex 1.

6.2. Actions to achieve the objectives

Following the development of objectives and targets, a series of mitigation actions was generated with the goal of achieving the targets. Some mitigation measures have previously been described in various project documentation including the ESHIA and preconstruction bird survey report, have been developed based on the project documentation as well as expert opinion. Mitigation measures and additional conservation actions identified in the BAP are outlined in Table 5.1 - Table 5.3.

Each action includes:

- Description of the activity and Action source
- Mitigation type
- Action target (based on 'SMART' methodology)
- Indicator measure
- Responsible person(s) for ensuring the action is implemented and tracked as planned
- Resources Required, (internal or external, contracted (budget approved) or in progress (budget to be agreed))
- Action Progress and Due date for completion

6.3. Performance Monitoring and evaluation

Monitoring is necessary to determine whether mitigation and management actions are sufficient to achieve the stated performance targets (Net Gain or No-Net Loss) for each species or species group. Details of monitoring activities are outlined in section 7 of the BAP. In summary monitoring activities include:

- Continued monitoring of shore birds and disturbance within the Aol in order to assess recover and monitor progress towards no net loss and net gain requirements;
- Continued monitoring vulture populations to ensure>NNL
- Continued monitoring of forest birds towards demonstration of no net loss in species richness and as an indicator of natural habitat quality and extent in the Aol.

Performance against the progress of the objectives and targets will be assessed as part of the BAP review process. Existing targets will be amended and/or additional actions developed, to ensure long-term and continual conformance with objectives and targets.

6.3.1. Objective 1. Demonstrate Net Gain, for priority shorebird species, primarily by ensuring a net decrease in disturbance

Table 6-1. Ongoing and planned actions to demonstrate Net Gain for priority shorebird species (sanderling and royal tern), primarily by ensuring a net decrease in disturbance

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Awareness and training for ORF staff Source: WBG	Continue induction programs for staff, contractors and associated personnel to raise awareness of the potential threat to shorebirds and other birds and understand Eni commitments to conserving birds	Unintentional disturbance to shoreline habitat	Minimisation	Include in the induction programme awareness on target bird species importance and on Eni commitments to birds conservation	Inclusion of the topic during induction	Eni HSEQ Manager and site supervisor Resourcing: Internal	Sessions performed in 2017 and 2018.	Ongoing
Support external action to reduce threats and mortality to Avian species” Source: plan ms hse 019 Eni Ghana “Biodiversity	Targeted awareness and threat reduction Using prey density data from CAW, pinpoint areas of key importance to sanderling and other shorebirds in project AOI and Esiam beach. Work with University of Ghana and GWS to redevelop shorebird education/awareness materials	Indirect impacts: shoreline disturbance for feeding and roosting shorebirds, reduce waste disposal along beaches.	ACA	Reduce disturbance of shorebirds at key areas	Completed awareness materials, quarterly and annual program reports	Eni HSEQ Manager Resourcing: External Contractor	Not started,	Ongoing

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Management Plan” rev.01 ESHIA Phase 2 Annex G Section G.4.8.3	used by the Save the Seashore Birds project • Conduct targeted education and awareness activities at these key sites. Priority attention shall be to the IBA trigger species, royal tern (<i>Thalasseus maximus</i>) and sanderling (<i>Calidris alba</i>).							
FFI	Eni Ghana through its contractor (ESL) to work with CAW to carry out leg flagging activities for sanderling and royal tern to quantify interaction between Sanzule and Esima populations	Indirect impacts: shoreline disturbance for roosting shorebirds, deforestation, water pollution, waste management.	ACA	Understand local/regional movement of BAP target shorebirds	Annual (end of season) progress reports	Eni HSEQ Manager Resourcing: External Contractor	Not started,	5 yr programme to initiate in 2021
Eni Ghana	Continue plastic waste recycling programme – see Objective Statement 3							

6.3.2. Objective 2: Actions for hooded vultures and forest birds to ensure NNL

Table 6.2 Ongoing and planned actions for Hooded vultures and forest birds to ensure NNL

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Mitigate Mortality of Wildlife Source: plan ms hse 019 Eni Ghana - “Biodiversity Management Plan” rev.01 ESHIA Phase 2 Annex G Section G.4.8.3 WBG PS 6	The hunting for bush meat (including vultures for medicinal purposes) will be strictly prohibited. Maintain and enforce bush meat action plans to prevent all activities of staff and contractors related to the trade in animal protein and live specimens. Prohibit possession of vulture carcasses in the project area for employees & contractors. This should be communicated in employee induction (along with protected species).	Consumption of vultures for food and traditional medicine.	minimisation	No vultures killed by employees or contractors No incidence of possession of vulture parts discovered during searches	Number of staff found in possession of vulture parts	HSE site supervisor All Project Personnel Internal	ongoing	Project lifecycle

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Community education, awareness and conservation initiative Source: FFI	Work with University of Ghana and GWS to develop education/awareness materials on vultures. Conduct bi-annual education and community awareness targeting key messages for Vulture conservation in 5 communities where vultures are most abundant (Asasetre, Ngalekyi, Esiam, Eikwe, Nkroful).	Consumption of vultures for food and traditional medicine (within the community)	ACA	5 awareness activities completed	75 community members participate each awareness sessions.	Eni HSEQ Manager Resourcing: External Contractor	Not started	Ongoing, annual
Improve suitability of habitat within the ORF for forest-birds. (source: No Net Loss strategy for natural wetlands)	Restoration (with specific species favoured by forest birds), and enhancement of habitat features for forest birds (artificial nesting, etc).	Loss of natural habitat during construction phase. Decline in habitat quality or suitability within the ORF	Minimisation Restoration	Increase the diversity of forest-habitat dependent birds identified within the ORF concession	Improvement over the baseline and post-construction report At least 1 priority species identified in each survey	Eni HSEQ Manager Resourcing: External Contractor	Not started	Dec '21

6.3.3. Objective Statement 3: Support actions to reduce pressure and improve state and improve conservation responses within the Amansuri IBA

Table 5.3. Objective Statement 3: Support actions to reduce pressure and improve state and improve conservation responses within the Amansuri IBA

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Provide training in identification and management of threatened birds to priority contractors Source: BMP	Provide training to relevant NGOs, to ensure accurate collection of data	Disturbance or poaching of BAP trigger species	Minimisation	All participants able to accurately identify species and have knowledge of nesting requirements and life cycles stages	Capacity subjectively assessed in the field Pre-and post-training knowledge evaluation	Eni HSEQ Manager Avian specialist	Completed	
Encourage the Cumulative impact co-management forum to address biodiversity issues (covered in sea turtle BAP)	Address cumulative impacts on biodiversity through the establishment of a cross-industry group including relevant regulatory bodies	Cumulative impacts of Eni and other developers within the AOI	Minimise/ Additional conservation action	Have the issue of cumulative impact management included within the agenda of a suitable forum and make a presentation about biodiversity changes and how companies could	Agenda item accepted Presentation made/	Eni HSEQ Manager Resourcing: internal (agreed)	Meetings held 26 Feb, 2019 4 Dec, 2019 28 Feb, 2020 23 April, 2020 26 May, 2020	Ongoing

Action	Action description	Impact Addressed	Mitigation type	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
Source: FFI/WBG				information share on monitoring and management approaches.				
Plastic waste recycling initiative Source: Eni Ghana	An integrated Community Plastic Waste Collection/Recycling Project to collect, dispose and recycle plastic waste in the Communities (Eikwe, Bakanta, Krisan and Sanzule) of the Project Area of Influence.	Contribute to conservation of BAP trigger species	Additional Conservation Action	Four (4) Communities (Eikwe, Bakanta, Krisan and Sanzule)	Volume of waste collected Volume of waste recycled	Eni HSEQ Manager Resourcing: External (contracted)	Awareness and Engagement to Working groups. 3 rd December, 2019 Formulation of Enterprise, 31 st January, 2019 Distribution of plastic waste recycling items to Enterprise on 31 st July, 2020	Ongoing

6.4. Implementation of additional conservation actions

Additional conservation action are interventions intended to be positive for avian species, the impacts of which may be difficult or costly to quantify (CSBI 2015). No significant residual impacts to sanderlings or royal tern are anticipated from the construction phase or during the production phase, and the ACAs planned within this BAP are intended to deliver a range environmental benefits necessary and sufficient to meet IFC compliance for a net gain and no net loss. They target locations where avian threat reduction can be maximised, and subsequent evaluation will identify outcomes including measurable gains for shorebird species.

These additional conservation actions have been suggested by technical advisers to the project; FFI, ERM, GWS and Bird Life International in developing the first version of the BAP (2016) and have been updated following stakeholder consultation conducted in October 2020. These actions underpin and support specific actions related to managing project impacts and will help ensure the long-term success of conservation measures and stakeholder engagement around meeting BAP, WBG/IFC and internal Eni biodiversity targets, including contributing to Net Gain targets for IBA trigger species and the No Net Loss target for hooded vulture. Building on several years of monitoring data this list has been narrowed down to those actions which are considering feasible and in support of the objectives of this BAP, during the production phase of the project.

6.4.1. Engage with ongoing local NGO research and awareness initiative to reduce threats to the habitat and key species.

Eni Ghana, through its contractor ESL, will work with Centre for African Wetlands to pinpoint areas of key importance to sanderling and other shorebirds in project AoI and Esiam beach. They will then work with University of Ghana and GWS to redevelop shorebird education/awareness materials used by the Save the Seashore Birds project. These materials will be used to conduct targeted education and awareness activities at these key sites for an initial period of five years, and outcomes will be reviewed in order to guide further implementation. This will include Amansuri Estuary, a key habitat for avian species. At present, no part of the Amansuri IBA is formally protected, with the exception of a Community Nature Reserve at Amansuri Estuary initiated by GWS. The freshwater lagoon at Amansuri Estuary is fished by the Nzulenso community and fishing is regulated by a wide range of well-enforced taboos, aimed at ensuring sustainability and preventing pollution of the lagoon waters so a cultural basis for further conservation of this site exists. The targeted location, within the IBA, shall be based on the key areas for species of conservation concern in the IBA (that is estuarine locations) and in consultation with GWS. Priority attention shall be to the royal tern and sanderling, however broader messaging on the need for sustainable management of natural resources shall also be emphasised.

6.4.2. Research on regional sanderling movement

Eni Ghana through its contractor (ESL) will work with CAW to carry out leg flagging activities for sanderling and royal tern to quantify interaction between Sanzule and Esiam populations as the two

areas are close enough for regular and free exchange of shorebirds – this monitoring will enable Eni Ghana to understand whether there are declines in the Sanzule population or simply temporary displacement to Esiama. This is an ongoing activity, likely to be with a three year programme, that is carried out on a small-scale by CAW and will benefit from sustained resourcing.

6.4.3. Plastic Waste Recycling Initiative

An integrated Community Plastic Waste Collection/Recycling Project was initiated in January, 2019 to collect, dispose and recycle plastic waste in the Communities (Eikwe, Bakanta, Krisan and Sanzule) of the Project Area of Influence. This action will contribute similar outcomes to that of the one-off Clean Beach initiative – removing plastic waste that shorebirds may otherwise mistakenly consume.

6.4.4. Engage and contribute to community-based Vulture conservation programme

This action will build on community engagement already conducted and focus on 5 communities where vultures are most abundant (Asasetre, Ngalekyi, Esiama, Eikwe, Nkroful).

Subjects for bi-annual awareness raising (to coincide with vulture surveys) will be carried out for an initial period of five years and focus on

- Role that vultures play in nature; consuming dead and decomposing carcasses, promoting healthy living environment.
- Killing of vultures is an illegal activity in Ghana
- Potential dangers of using vulture parts in traditional medicine
- Introduce Eni supported (if applicable) or other health opportunities

6.4.5. “Clean beach” initiative

Eni Ghana organized a Beach Cleaning Initiative in the AoI on the 31 January 2019. This was completed in collaboration with local governmental institutions and a Waste Management Contractor, other contractors and members of the communities within the direct AoI to collect all plastic and other waste from the beaches. During the day, 60 community members participated and collected over 11,300kg of waste including over 500kg of plastic.

An additional outcome of this exercise involved the formulation of the Plastic Waste Recycling Initiative. This was established in collaboration with local governmental institutions and a Waste Management Contractor to facilitate the collection and recycling of plastic waste from the communities within the AoI. The Plastic Waste Recycling initiative creates a mechanism for individuals to be financially compensated for their effort in collecting recyclable materials within the communities and along the beach and depositing this at a centralised depot for onward collection by a waste management company.

Plastic pollution can have significant negative impacts on birds including poisoning or starvation caused by birds mistaking plastic as a prey item and cannot digest it. Beach clean ups and plastic collection activities can remove some of the plastic in coastal areas, reducing the potential for ingestion by a number of species.

7. AVIAN MONITORING AND EVALUATION

Following on from surveys conducted prior to and following the ESHIA, a clear set of species and habitat priorities have been identified based on the WBG performance standards and actions developed to meet the required conservation targets, which include; sanderlings, royal terns and hooded vultures. Compared to the pre-construction baseline, ongoing avian monitoring shows reduced number of sanderling utilising the shoreline in the AoI with a statistically significant reduction in foraging density (birds/km), it also shows lower numbers of sanderling and royal tern utilising the estuary area outside the AoI for roosting. The overall trend for vultures within the AoI appears stable after accounting for seasonal variations. Numerous factors may be contributing to this reduction including tidal conditions during the surveys and natural variability in population numbers (particularly the possibility that the baseline observation may have been an unusual event). Even accounting for this however, by excluding baseline survey from the analysis, there is still a small decline, most noticeable in the 2019/2020 season, despite the fact that no activities took place on the beach that year.

Further monitoring during the production phase is therefore important to contribute the analysis of impact from the development phase. For example, if recovery in observed numbers eventually comes back up to pre-construction survey levels, this may suggest that construction caused temporary disturbance.

Forest bird monitoring will also continue as a means of measuring the restoration of natural habitat function within the concession area. Further details are provided in the NNL strategy for Natural Habitats.

7.1. Objectives

The objectives of the monitoring and evaluation programme are to:

- Assess changes in abundance of on priority avian species in the AoI.
- Assess the effectiveness of biodiversity management actions (including Additional Conservation Actions) and inform corrective management actions as part of an adaptive management approach.
- Demonstrate how the Project is progressing towards lender requirements which are NNL for hooded vulture and net gain for sanderling and royal tern.

7.2. Study area

Shorebird surveys are completed along 8 km transect of beach front in order to cover the AoI of the landfall works (Figure 2.1). This study area is consistent with the pre-construction/baseline study area which allows comparison of results with the baseline. Shorebirds surveys are also conducted as

point counts at Amansuri Estuary.

Vulture surveys are conducting within the Aol and at several settlements outside the Aol, focusing on refuse dumps important for hooded vulture foraging, these settlements are Asasetre, Azuleloanu, Bakanta Eikwe, Esiana, Krisan, Ngalekyi, Nkroful, Sanzule, Teleku Bokazo, Asasetre Nvuma, Awonakrom, and Ngalepolly.

Surveys for forest birds should follow, as close as possible, the transect and point count locations used in the pre-construction survey and subsequent GWS monitoring during the development phase.

7.3. Indicators (metrics)

The Project has developed a practical set of indicators for target avian species. Indicators are defined as a variable that provides a simple and reliable means to measure achievement, to reflect changes connected to a management action, or to help assess the performance of a development actor (OECD, 2002).

Monitoring and evaluation for avian species is based on a “state-pressure-response” indicator framework which uses three monitoring indicator types (Sparks *et al.*, 2011):

- *State indicators*: monitoring of the status and/or condition of relevant biodiversity values (e.g., sanderling, royal tern and hooded vulture)
- *Pressure indicators*: monitoring the extent, intensity and/or trends of threats to biodiversity, including from Eni Ghana (eg. Disturbance levels in the shoreline transect).
- *Response indicators*: monitoring the implementation (and therefore effectiveness) of mitigation measures and management controls designed to reduce biodiversity loss (e.g. Beach patrolling)

Biodiversity indicators must also be sufficiently sensitive to provide a warning of change before irreversible change occurs (The Energy & Biodiversity Initiative, 2003). For each indicator the BAP outlines the baseline, desired Project target, warning threshold, critical threshold, methodology, staff responsible, frequency and potential corrective actions. The development, choice and use of indicators (and thresholds) is an iterative and continual process – validation, review and revision are essential elements of fine-tuning the process moving forward (The Energy & Biodiversity Initiative, 2003).

7.4. Biodiversity targets (No net loss)

Two priority avian species, sanderling and royal tern and associated habitat are assigned a NG target, and one priority avian species, hooded vulture, is assigned>NNL target (see Table 1-1). These biodiversity targets are outlined in column 6 of the monitoring plan below (referred to as the ‘BAP target’) against each of the indicators. Where technically feasible, the biodiversity targets and thresholds have been defined in quantitative terms based on the Project’s biodiversity baseline (2015) and ongoing monitoring (2017 – 2020).

7.5. Thresholds for adaptive management

Preliminary warning thresholds have been defined for all state, pressure and response indicators as required by IFC PS6 GN 52 (IFC, 2018). These are intended to provide an early warning system of the need for corrective management responses to avoid compromising achieving NNL or NG targets. These thresholds have been developed based on the best available site knowledge but will require revision as site monitoring data is collected and improves the Project understanding. Thresholds for shorebirds and hooded vulture population indicators take into account the large variability in populations and site usage.

Table 7-1 Description of threshold implications

Threshold levels	Management response or action
Below threshold	No management/corrective action is required as the Project is not having any measurable adverse effect. The result is consistent with past monitoring events. Eni Ghana to report annually to WBG on progress of BAP implementation.
Warning threshold	For state indicators: Project activities may be having or contributing to a measurable adverse effect on the state or condition of a feature and is outside the expected limits of variation. i.e. significant decline in number of a species. For pressure indicators: a change in threat level has been observed which is likely to affect the state or condition of a feature. i.e. noticeable increase in disturbance activities. The threat may or may not be related to the presence or activities of the project, so analysis of causation and contribution is necessary. For response indicators: a failure to implement required management measures that could affect the state or condition of a feature. The Environmental Coordinator or HSE Manager needs to be made aware of the threshold breach immediately. This result may indicate that the Project is not tracking towards the intended NNL target and corrective adaptation is required. Required actions include: 1. Investigate why the threshold has been breached. 2. Consider if monitoring methodology/baseline information or threshold values require updating or amendment. 3. Increase or adapt the management/corrective response activity¹⁸ 4. Amend the residual impact calculation/compensation requirement as required. 5. Report to WBG of warning threshold conditions and planned next steps

¹⁸ IFC PS6 Para 7

	(investigation, corrective actions)
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7.6. Monitoring plan

The outcomes of the monitoring shall be reported through the combination of monthly and annual BAP monitoring reports, following templates agreed with the BAP contractor. Issues pertaining to internal management actions shall be reported through Eni Ghana internal management reporting protocol.

Table 7-2 outlines the method, monitoring indicators, baseline, BAP target and warning thresholds.

Table 7-2 Avian monitoring plan

Survey method	Indicator description (metric)	Indicator type	Baseline condition	BAP target (NG/NNL)	Warning (orange) threshold
Shorebird Beach Transect and Estuary monitoring	Density/km of target species (sanderling) in peak wintering period (September to April every year) <i>Calculation: Average Monthly (peak season)(September-April) Count / transect length (km)</i>	State/ outcome	2017/18 – 12.253 sanderling/km (pre-landfall) 2018/19 – 5.6 sanderling/km 2019/20 – 1.5 sanderling/km	Maintain higher average peak count density than the pre-landfall construction peak count (2017/18)	Insufficient data - Threshold to be developed on completion of 20/21 monitoring period
	Number of target species recorded in Amansuri estuary	State/ outcome	2017/18 – 54 sanderlings and 38 royal terns 2018/19 – 59 sanderlings and 47 royal terns 2019/20 – 247 sanderlings and 111royal terns	Target species are recorded in similar order of magnitude (accounting for some variation) annually as pre-construction baseline	Estuary outside of Aol, therefore no warning thresholds apply. Observations at this location support the analysis of observations along the shoreline, in that shoreline birds roost in the estuary
	Disturbance level ¹⁹ recorded during peak wintering months (Sanzule transect)	Pressure	Baseline not established (to be established in 2020)	Continuous improvement in the reduction of seasonally monitored	Any increase in disturbance

¹⁹ The mean number of people, vehicles, and dogs observed per km surveyed

Survey method	Indicator description (metric)	Indicator type	Baseline condition	BAP target (NG/NNL)	Warning (orange) threshold
				pressure level commencing from baseline established in 2020/21	
Vulture Population Monitoring	Monitoring populations and site usage, focus on nesting and use of feedings areas Conduct standard disturbance assessment in tandem with surveys	State	Ngalekyi – peak season average of 25 Eikwe – peak season average of 5 Sanzule – peak season average of 5	No measureable decline in observed numbers in targeted location, unless accompanied by clear reasoning. Any vultures found roosting within ORF concession area (forest reserve) should be allowed if safe to do so.	Average of 50% decline in one year Average 25% decline over 2 years.
Monitor IBA State, Pressure, Response	Annual IBA monitoring - change in state, pressure and response	SPR	IBA State (coast 3, forest 1) ²⁰ Pressure (coast 1, forest 2) ²¹ Response (1 both) ²²	No target for NNL, improve state of forest inside of the concession and reduce pressure	Any change in state or pressure
Eni Ghana internal reporting	Number/percentage of staff received environmental induction training including content relevant to key avian species and Eni commitments to these	Response	n.a.	100% of Eni and contractor staff receive induction training	Less than 75% of new staff receive training

²⁰ State score of 3 (good) = >90% of habitat remaining, 2 (moderate) = 70-90%, 1 (poor) = 40-70%, and 0 (very poor) = <40%

²¹ Pressure score of 0 (low) = 0 impact score, -1 (medium) = 3-5 impact score, -2 (high) = 6-7 impact score, -3 (very high) = 8-9 impact score see footnote http://datazone.birdlife.org/userfiles/file/IBAs/MonitoringPDFs/IBA_Monitoring_Framework.pdf page 18 for impact score calculations and page 22 for action score calculations

²² Response score of 3 (high) = action score of 8-9, 2 (medium) = action score of 6-7, 1 (low) = action score of 2-5, 0 (negligible) = action score of 0-1

Survey method	Indicator description (metric)	Indicator type	Baseline condition	BAP target (NG/NNL)	Warning (orange) threshold
ACA – Community awareness and education (BAP table 5.2)	Number of community members involved in education and awareness programmes	Response	n.a	At least 75 community members from 5 communities participate in awareness raising	Less than 50 participants

7.7. Species Monitoring within AoI

The avian monitoring shall continue for during the commencement of production operations phase in a manner that is consistent with the development phase. The aim of this phase of avian monitoring program continue surveys in order to monitor for any change in population numbers directly following the completion of construction activities, which can aid in the analysis of previous phase results and quantification of impact levels and significance. The continuation of a consistent methodology enables survey results to be comparable between seasons, study sites, and observers.

The BAP, and in particular the estimation of project loss and gain, is an iterative process that will require adaptive management determined by the outcomes of the monitoring programmes and additional baseline information as this becomes available. The following species details should be monitored for establishing annually, over as long a period as possible, a robust estimate of residual impact.

7.8. Methodology

The ESHIA suggested an Environmental AoI of 5 km radius for monitoring impacts to avifauna and the previous BAP contractor (GWS) has established a series of point count locations and survey transects which should be maintained for consistency of monitoring.

Survey transects should be established to complement Owusu et al, 2007 and those used in the development phase surveys.

In order to establish a cost-effective monitoring program that obtains data during peak times of shorebirds usage, nesting season for vultures and other species, and in a format that fits with regional initiatives such as the African – Eurasian Waterbird Agreement (AEWA) International Waterbird Census (IWC). Survey effort for the production operations phase is suggested as follows:

Shorebirds

- Conduct monthly counts along shoreline transects (already established by GWS) at low rising tide and at the Amansuri River Estuary roost site at high tide following International Waterbird Census (IWC)-compatible count methodologies;
- Monitor the occurrence of ringed/tagged birds and provide data from observations to appropriate organisations; and
- Collaborate with in-country specialists to analyse data and review results on an annual basis.
- Development phase surveys used an approximately 8km transect from Amansuri Estuary to Sanzule, but Sanzule to the Estuary could be more efficient, allowing observers to reach the Estuary at high tide to then perform the roosting survey

- Collaborate with University of Ghana to harmonise monitoring protocols and share data
- FFI will conduct a monthly review and quality control of monitoring results, survey methodology and reporting

Vultures:

- Biannual wet and dry season surveys (recommended June and November).
- Record locations of vulture sightings as per previous phase:
 - Note group size;
 - Note numbers and locations of juvenile and immature birds;
 - Note activity based on standard classes (feeding, roosting, breeding etc); and
 - Record any evidence and locations of nesting behaviour.
- Collaborate with in-country specialists to analyse data and review results on an annual basis.
- Consolidate/reduce the survey by eliminating locations where no individuals observed over course of the monitoring, sites that can be removed include Azuleloanu, Teleku Bokazo
- Retain key locations in Aol (i.e. Ngalekyi) and one control site (Esiama).
- Development phase surveys used a 7.9 km transect cutting through all the seven communities (Ngalekyi, Ngalepolly, Ekwei, Krisan, Sanzule, Awonakrom and Bakanta) including surveying all refuse dumpsites within each of the communities between 7:00 am and 3:00 pm. The survey for foraging vultures was extended to include some communities (Azuleloanu, Kamgbunli, Esiama and Asasetre).
- FFI will conduct an annual review and quality control of monitoring results, survey methodology and reporting
-

Forest birds:

- Establish monitoring sites and transects as per construction phase monitoring;
- Conduct wet and dry season survey (recommended June and December) every year commencing 2020.
- Collaborate with in-country specialists to analyse data and review results on an annual basis to assess diversity, abundance, persistence of presence, local movements

- Use the diversity/abundance of forest birds as an indicator of Natural Habitat health (% of forest bird species present) and health of new forest restoration areas.
- Development phase surveys used three transects, Transect 1 is along the Ghana Gas pipeline route, Transect 2 is characterized by old oil palm plantation that is regressing to tertiary forest and a freshwater swamp forest heavily dominated by *Raphia* palm. The transect ends at a coconut plantation in Anwolakrom community close to the LTE. Transect 3 starts from previously mined laterite field through freshwater swamp forest dominated by *Raphia* palm and into an oil palm plantation.
- FFI will conduct an annual review and quality control of monitoring results, survey methodology and reporting

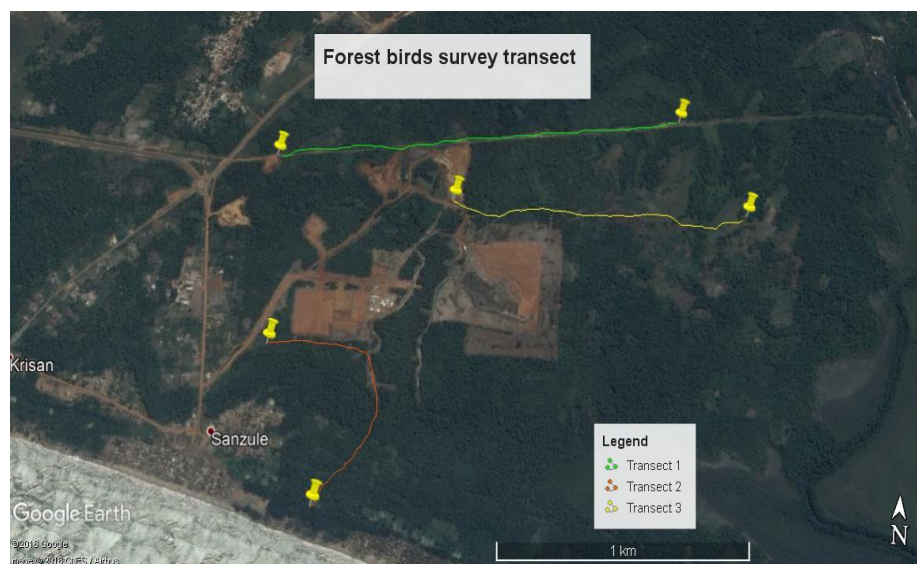


Figure 6.1 Forest bird transects used by GWS

7.9. Personnel Requirements

Shorebird, vulture and general bird surveys require at least two experienced ornithologists with proven experience in ornithological surveys following standard methodology, to be present during all surveys. CVs will be reviewed and approved by Eni Ghana with FFI.

Equipment – standardised data sheets, writing implements, digital camera to confirm species identification or unusual findings, GPS.

Eni shall investigate the use of avian survey applications for data capture, for example [e-bird](#); a collection software or explore the use of a bespoke survey using the similar to that developed by FFI for sea turtle monitoring.

7.10. Review and adaptive management

The BAP design process is an iterative process to allow for a continuously improving action plan, which will evolve over time as information and understanding of the biodiversity features of the landscape improve.

Survey monitoring requirements and effectiveness of mitigation measures is assessed after every year of monitoring, based on annual reports, by FFI as biodiversity partner for Eni.

Performance against the actions in the BAP are internally assessed on an annual basis and reported to the HSEQ Manager. At a minimum, the review should include the following:

- Progress against each specific action included in the BAP relevant to the operation;
- Status of additional action items to be incorporated into the BAP;
- Significant changes to the biodiversity setting of the operations (e.g. sudden changes to land use or reclassification of species or habitat, etc.); and
- Reasons for not complying with the requirements of the BAP, and suggested amendments to the BAP based on current operating conditions.

7.11. Overview of Avian Baseline Data

Current data sources include:

- Surveys by ornithologist from the Ghana Wildlife Society from 2017 – March 2020
- Field visit undertaken by FFI/ERM/ESL, March 2016 although not undertaken by an ornithologist, this visit was able to confirm the presence of Hooded vulture in additional areas in the Aol;
- ESL/ERM Ghana OCTP Block Pre-construction bird survey, November 2015;
- Surveys by E.H. Owusu, E.H. in 2007, published as The Ornithological Importance of the Amansuri Community Nature Reserve in the Western Region of Ghana “Journal of Science and Technology Vol. 27 (3) pg. 72-85 Available: <https://www.ajol.info/index.php/just/article/view/33060>;
- Data from Yaa Ntiama-Baidu Source: Ardea, 102(2) : 131-138 Published By: Netherlands Ornithologists' Union URL: <https://doi.org/10.5253/arde.v102i2.a3>
- BirdLife Species Fact Sheets, www.birdlife.org/datazone/species.

Table 7-3. Monitoring and reporting schedule

Action Ref	Action	Action description	Action Target	Performance Indicator	Responsibility	Action Progress	Date for completion
1	Monitor shorebird populations and disturbance levels	Survey of shoreline within AoI and Amansuri estuary (both in 1 day) to double effort from existing methodology Conduct standard disturbance surveys in conjunction with shorebird monitoring programme counting numbers of people, dogs, vehicles during each survey Collaborate with University of Ghana to harmonise methodologies and share data to increase effective monitoring coverage	Conduct surveys twice every month including quantitative assessment of disturbance	Monthly submission of monitoring reports	Eni Ghana	Ongoing	December 2020
2	Monitor IBA	Monitoring and report IBA State, Pressure and Response annually.	Undertake yearly update to SPR of IBA	Data uploaded in BirdLife IBA database	Eni Ghana	Action performed last year and remains ongoing	Ongoing,
3	Monitor vulture populations and disturbance levels	Monitoring populations and site usage, focus on nesting and use of feedings areas Conduct standard disturbance assessment in tandem with surveys	Biannual surveys in June and November	survey reports	Eni HSEQ Manager Contractor (ESL)	Monitoring annually 2017, 2018, and 2019	Ongoing
4	Monitor forest bird population and habitat	Conduct dry (December) and wet (June) species counts at point locations established in the ESHIA using comparable methodology every 2 years (biannually) commencing 2020	Biannual surveys in June and December	survey reports	Eni HSEQ Manager Contractor (ESL)	Monitoring annually 2017, 2018, and 2019	Ongoing
5	Report on BAP implementation and monitoring results	QMR: BAP progress, status and highlights on significant changes and issues such as warning thresholds exceeded AMR: assessment of survey monitoring outcomes and requirements; assessment of effectiveness of mitigation measures; assessment of performance against the targets in the BAP and corrective actions	Quarterly (QMR) and annually (AMR)	Inclusion of topics in the QMR and AMR	Eni Ghana	Ongoing	Since the next report

8. INTEGRATION AND IMPLEMENTATION

A new monitoring contractor has been appointed in May 2020, integration and implementation will remain the responsibility of Eni Ghana and will be performed as per Eni guidance.

Continuation of this engagement shall be reviewed in the course of implementing this phase of the BAP.

8.1. Training requirements

All staff undertaking avian monitoring and/or carrying out activities under the broader IBA conservation programme should be fully trained prior to conducting surveys on their own.

Table 7.1 Training Requirements

Position (from all companies involved)	Training Topic	Action Progress	Date for completion	Frequency
HSE Site Personnel	BAP requirements and role-specific responsibilities.	Ongoing	Annually	Once
Contract staff (BAP implementation)	BAP requirements specific to – - Monitoring and recording of effort and observations - Data management - Data analysis and reporting IBA conservation plans	Ongoing	As and when required	Ongoing

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ANNEX 1. COMMITMENT REGISTER

Date	Action description	Action target	Objective	Commentary
2016	Avoid laying pipeline during peak shorebird usage	Construction of the pipeline within the nearshore and beach area preferably to take place out of the peak shorebird usage	Temporal avoidance of peak shorebird usage	COMPLETED. Pipeline construction commenced in June 2018. Post trenching continued until 31 December 2018 and demobilization conducted in January 2019. This timing overlapped with the shorebird wintering period. This action is no longer applicable and has been removed.
2016	Pre-construction survey and avoidance of roosting areas/trees	These surveys offer the opportunity to identify important vulture roosting and nesting sites and to avoid removal of these as far as possible.	Spatial avoidance and minimisation of impacts to vultures.	COMPLETED, action removed.
June 2019	Compile baselines	Collect, collate existing baseline	Population and disturbance baseline	PARTIALLY COMPLETED. Disturbance

		population data on target species Collect data on disturbance levels	established for monitoring programme	baseline has not yet been established and is retained as an action.
June 2019	Spatial map of key threats	Develop a spatial map of key threats to the target species and integrate this with the key areas map	Spatial maps of key areas overlaid with threats to species of conservation concern	COMPLETED, action removed
June 2019	Mitigate Mortality of Wildlife	Eni to collaborate with GWS/BLI with regards to the Amansuri Wetlands IBA, with special attention to its trigger species, <i>Thalasseus maximus</i> and <i>Calidris alba</i> , both present in the area during the boreal winter months (mainly in the beach and more coastal margin of the IBA).	Develop programme to improve state and reduce pressure at Amansuri Estuary	This action has now been replaced by more specific ACAs.
June 2019	Protect and monitor	Assess possible NGO partnership to monitor estuary shorebird roosting sites to ensure no direct	Understand avian threats and design actions to reduce	COMPLETED. GWS contract ended in May 2020 but GWS to remain a key stakeholder in

		or indirect disturbance, additional specific actions may need to be implemented if additional threats emerge		future conservation plans.

ANNEX 2. Attendance sheet from recent staff training (11 September 2020)



eni ghana exploration & production ltd.

ORF PLANT- SANZULE

BIODIVERSITY REFRESHER TRAINING

ATTENDANCE SHEET.

Delivered by: ANDREWS AGYEKUMHENE Date: 11-09-2020

No	Name	Company	Position	Signature
1	Bernard K. Sackey	ENI	HSE SPR	
2	Amudameli Danuwa	ENI	CRO	
3	FREDERICK DANUWA	ENI	PLANT JV	
4	Lawrence Kernal	ENI	QSA Spr.	
5	GEORGE LOCHER	ENI	CIVIL ENG	
6	Kendrick D. Matis	Eni	Rotating m/c SPE	
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Outline

- ▀ Birds and Ecology
- ▀ Aspect of Bird's Ecology
- ▀ Bird's Distribution
- ▀ Ecological Roles of Birds
- ▀ Human Bird's Relationship
- ▀ The worrying statistics (IUCN Red List)
- ▀ UN Recommendations
- ▀ Companies/Organization/Individual's Roles

