

ASSESSMENT OF CRITICAL HABITAT INCLUSION IN ENVIRONMENTAL IMPACT ASSESSMENT REPORTS IN NIGERIA

ABSTRACT

EIA is among means to reduce habitat destruction and fragmentation leading to loss of biodiversity. However, non-technical revision of EIA Procedural Guidelines to address concerns of emerging areas by Federal Ministry of Environment are preventing EIA from meeting above obligation. This study evaluated extent of habitat assessment inclusion in Nigeria's EIA reports. 100 EIA reports from Manufacturing, Infrastructure, Power, Agric/Roads and Petroleum sectors were assessed using critical habitat evaluation criteria consisting of 20 attributes; adapted from International Finance Corporation's Guidance Note Six. Results show varying levels of critical habitat inclusion in the EIA reports. Majority of the reports recognised the need for conservation of biodiversity and mitigation measures for reducing habitat fragmentation and restoration in course of project development. However, majority of the EIA reports evaluated did not deepen habitat screening of project area or adopted any quantification approach. There was no adoption of avoidance as part of mitigation hierarchies nor partnership with a conservation organisation to offset residual impacts seen in any of the reports. None of the EIA reports suggested modification of project execution option(s) based on EIA outcome. Result of critical habitat inclusion evaluation amongst the sectors, shows mean inclusion scores of Power (37.2%), Petroleum (36%), Manufacturing (33.7), Infrastructure (27.8%) and Agric/Road (22.8%) with overall mean inclusion of value of 31.7%. ANOVA statistic deployed, showed no significant inclusion difference among the sectors (P -value = .103 > .05). Recommendations were made for the use of technology and training to enhance critical habitat assessment as part of EIA report in Nigeria.

Keywords: (Biodiversity loss, EIA reports, Critical habitat inclusion, International Finance Corporation, Procedural guideline, Nigeria).

1. INTRODUCTION

Worried by the skyrocketing habitat destruction and fragmentation leading to loss of biodiversity and as a result of human activities and natural disasters, the United Nations General Assembly declared 2021–2030 as decade for ecosystem restoration with actions to address this concern. The goal is to protect and revitalise ecosystems across the globe to restore natural balance for the attainment of universal and common goals and stop loss of biodiversity [1]

Habitat simply put, is where species live, which can be land, fresh, brackish or saline water area or airways conducive for assemblage of organisms. Examples include forest, grassland, meadow, seashore, sea, and woodland [2]. Thus, critical habitat is an area within a species' span of interaction and endowed with biological, physical, and structural characteristics relevant for the conservation of the species (Shell Group, 2021). However, the area may be outside the species' present reach upon a declaration that such places are crucial for the protection of the organism [3].

International Finance Corporation (IFC) [4] explained that Critical Habitat are areas suspected to possess high biodiversity value, and considered important to species survival or recovery, whether the species live in those areas presently, previously, uses such areas for movement, or for any other purpose. Such area needs evaluation for Critical Habitat qualifying features. The following five (5)

conditions or settings are listed by [5] as areas that qualify for Critical Habitats: internationally or nationally critically endangered or endangered species, Restricted-range or endemic species, Assemblage of migratory and congregatory species, Unique ecosystems and or highly threatened ecosystems. And Important or significant evolutionary processes. Apart from these five criteria, two other features that may qualify an area as critical habitat are, one, legally protected area especially by the International Union for the Conservation of Nature (IUCN) Categories I-IV) and two, high biodiversity value areas like places known for scientific relevance (UNESCO sites) or primary/virgin forests. Therefore, a place merits Critical Habitat designation by meeting any of the above listed (5+2) criteria. Further update can be obtained from [4].

1.1 What Critical Habitat is not?

It is not a magic wand to address or resolve biodiversity loss, rather a method for knowing significant biodiversity locations from national and global standpoint. It does not recognize state or local significances or values. For instance, threatened species at state or regional level are not considered as Critical Habitat. Equally, local biodiversity values such as sacred forests and iconic species, are not included as critical habitat as they cannot be identified using the standard method of critical habitat Assessment. However, a developer, should take note of local values and sensitivities through stakeholders' engagement. Critical Habitat cannot be or deployed as a stand-alone or general approach to biodiversity risk assessment [6].

IFC [5] introduced Eight (8) Performance Standards for Environmental and Social Sustainability as well as the corresponding Guidance Notes for their implementation. Performance Standard Six (PS6) and its Guidance Note (updated in 2019) stated that the aim of designating Critical Habitat is to detect and classify places highly rich in biodiversity value, where precaution would need be taken prior to developmental activities due to ecological sensitives prevalent in such locations. This concept has attracted a lot of interest from and amongst multilateral agencies, financial institutions and banks who have aligned their policies to the requisites of IFC Performance Standard Six (6). The Biodiversity Consultancy [6] noted, that more than Seventy-Five Equator-Principle-Financial Institutions have aligned their processes and commitments to IFC [5] PS6 commitments. IFC is in the business of financing private sector projects to achieve sustainable development especially in third world countries. Currently, Critical Habitat and PS6 is being adopted as a global standard for biodiversity integration in the private sector business [6].

Critical Habitat conservation considers global and national significances and stands on the bedrock of conservation principles of irreplaceability (rarity or restricted distribution) and susceptibility (degree of threat). Critical Habitats are in levels of importance, thus not all are equal (IFC, 2019).

Hanson et al, [7] Morgera, [8], Stefan et al [9] Hughes et al [10], Brauner et al, [11] provided business case for Critical Habitat Assessment, specifically to forestall further biodiversity loss, environmental degradation/catastrophes through improved business decisions for the management of developments, and supply chain impacts on biodiversity. The authors noted that businesses are now compelled by stakeholders to address biodiversity concerns and impacts in their respective production or distribution lines. This demand is exacerbated by the constant technological breakthroughs on how biodiversity integration and knowledge of ecosystem services can pose risks and opportunities to businesses and society.

Apart from the above, as prove of its global acceptance Convention on Biological Diversity, (at her 11th Conference) enjoined nations and organisations to embrace IFC [5] standards via integration into the EIA process. The Standard not only sets conditions for biodiversity integration by companies whose projects were funded by IFC, but also provides guidance for projects supported by other funding organisations otherwise called Equator Principle Financial Institutions (EPFIs). Today, IFC PS6 has global influence with its affiliates like African and Asian Development Banks, and EPFIs which cover more than eighty percent of international project financing mostly in developing countries [12]. Critical Habitat assessment and PS6 are now adopted in EIAs as global best-practice to integrate biodiversity into private sector projects [13].

As described by Mmom [14], EIA is a systematic process carried out to assess negative impacts of a proposed project on the environment with the objective of proffering measures to reduce the impacts and enhance positive ones. Nwafor [15], pointed out that since EIA existence from 1969 in the United States of America, it has matured significantly in impact identification, prediction, monitoring, and evaluation. According to the author, EIA has progressed from the implementation of multi-disciplinary and iterative approaches to the consolidation of procedures and processes to address any potential environmental concerns. Thus, by so doing, EIA has now been established as a decision making to manage project risks.

Thus, based on the above, this research assessed the level of critical habitat inclusion in the Nigeria EIA reports using the IFC [5] Performance Standard six (PS6) criteria. The objectives are to evaluate the extent of critical habitat inclusion in the selected EIA reports carried out in Nigeria. Two, to determine whether there are differences in critical habitat inclusion amongst the sample sectoral EIA reports.

2. MATERIALS AND METHODS

Materials and methods deployed for this study is to enable smooth empirical approach to the evaluation of the level of critical habitat assessment inclusion in Nigeria EIA reports. Thus, exploratory and survey methodologies were used including qualitative and qualitative techniques. It all, one hundred EIA reports from five (5) Nigeria sectors were assessed for this study.

2.1 Study Area

The EIA reports evaluated were carried out respectively across Nigeria six (6) geopolitical areas. In other words, deliberate effort was made to ensure that EIA reports used for this study had national spread (Figure 1 & Appendix A).

2.2 Selection of Sectoral EIA Reports

The selected EIA reports used for this assessment were those approved by the Federal Ministry of Environment (FMEnv). They were drawn from sectorial projects listed by Federal Environmental Protection Agency [16] requiring EIA to be carried out prior to their commencement. These projects include those from Infrastructure, Transportation, Quarries, Railways, Drainage and Irrigation, Power generation and transmission, Pipelines, Resort and Recreation, Roads, Land Reclamation, Agriculture, Industry, Housing, Forestry, Airport, Water supply Mining, Petroleum, Wastewater Treatment, Fisheries and Ports. Federal Environmental Protection Agency [16] also gave detailed description of the capacities, varieties and size of these sort of projects that qualify for the conduct of EIA.

2.3 Sample and Sampling Technique for the Sectoral EIA Report Evaluation

EIA reports carried out between years 2012 – 2022 were assessed for this study. They include 20 EIA reports each from Agriculture/Roads, Infrastructure, Power, Manufacturing and Power sectors respectively. Thus, the selected 100 EIA reports are representative EIA reports of Nigeria Projects requiring EIA to be carried out prior to their commencement.



Figure 1: Nigeria Geopolitical Map. Source: Gayawan et al [17]

2.4 Methods of Data Collection/Instrumentation.

This involves examining relevant sections of the respective EIA reports and scoring them on the Critical Habitat Assessment Worksheet adapted from IFC [5] with insight from The Biodiversity Consultancy [6]. The worksheet or questionnaire is made up of 20 questions (Appendix B). In terms of its validity, Equator-Principles Secretariat, [12] noted that IFC PS6 stipulations have attracted a lot of interest globally from amongst nations, institutions including multilateral financial institutions and banks who have aligned their policies to it.

2.5 Method of Data Analysis

Each question was scaled 0 to 1 to be selected as follows: 1 - Moderate to detailed inclusion, 0.5 - Slight to minor inclusion and 0 - No inclusion. The Researcher with support from nominated experts carried out the assessment of critical habitat inclusion in the selected EIA report as a group activity to avoid bias and improve objectivity. After the exercise and scoring the respective EIA reports, Critical Habitat Inclusion Index equation below was deployed to obtain the respective index scores.

2.6 Statistics

Critical Habitat Inclusion (CHI) formula below was adopted:

$$CHI = \frac{A + 0.5B}{N} \quad \text{Equation 2.1}$$

Where A represents number of attributes fully met, B represents number of attributes partially met and N, Number of attributes (20).

One-way Analysis of Variance (ANOVA) was further used for analysis to ascertain the level of differences in inclusion amongst the study sectors by calculating the **F-Statistic**. F represents mean sum of squares between the groups divided by mean sum of squares within groups. That is MSB/MSW. Statistical Package for Social Sciences (SPSS) software was used for the Analyses.

3. RESULTS

The results of the respective sectoral sample EIA reports on the critical habitat assessment evaluation questionnaire (Appendix B) are discussed in this section and tabulated in Appendix C. Results show total sum of responses from all the sectors on each of the twenty (20) evaluation criteria as follows:

1. Was there recognition of the need for and focus on the protection and conservation of sensitive biodiversity area in the EIA report?

Out of the 100 EIA reports evaluated across the five (5) sectors of the economy, 24 had moderate to detail critical Habitat inclusion, 41 slight to minor inclusion and 35 non-inclusion implying that minimal form of habitat assessment was included in those reports (Appendix C).

2. Were there evidence of stakeholder's consultation specifically to understand biodiversity value in the project area?

Stakeholder's engagement is foundational in the EIA process right from initiation, screening, site selection scoping, impact assessment, report compilation and reviews, environmental management plan implementation, monitoring, auditing and site closure; including other project interfaces. Understanding biodiversity and ecosystem values of an area requires good consultation and engagement. Regarding the level of consultation for this assessment, 27 responses were recorded in the moderate to detailed critical habitat inclusion, 52 slight/minor inclusion and 21 responses were recorded as non- inclusion. Results show that engagement and consultation regarding critical habitat still requires more work.

3. Were there further efforts made to deepen the assessment of sensitive project area by the engagement of local experts?

Apart from the fact that stakeholder's engagement is a continuous process, it is specifically essential to obtain in-depth information from the locals and experts in the project's area of influence. Thus, in the evaluation carried out on above, only 21 EIA reports recorded the need and value of engaging local experts in helping to scope and perform specialists' assignment on the assessment of sensitive locations. 33 EIA reports had slight/minor inclusion responses with 46 reported non-inclusion. The large number of non- inclusions may mean that the respective EIA consultants did not see the need for critical habitat assessment except were required.

4. Was there description of habitat with significant importance to critically endangered and/or endangered species in the EIA report?

Out of 100 EIA reports evaluated, 25 demonstrated moderate to full inclusion. 21 slight/minor responses and 54 non-inclusion responses. Majority of the EIA reports that had moderate to full integration were those with stint of international assessment exposure especially in the Petroleum and Power sectors projects that mostly require external funding. Majority of the EIA reports from Power and Petroleum sectors reviewed were prepared to meet international standards.

5. Were there any sort of description of habitat(s) with significant importance to endemic and/or restricted range of species in the EIA report?

Only 15 demonstrated moderate to full inclusion out of the 100 EIA report evaluated for this item. 37 tried to include it whilst the majority of 48 reports failed short of the inclusion. Explanation is similar to the response above and only buttresses the status of Nigeria EIA reports against international requirements.

6. Confirm whether there was a description or mention of habitat(s) supporting globally significant concentration of migratory species and/or congregatory species in the EIA report?

Poor reporting performance was recorded in the inclusion of this as only 8 full response was recorded out of the number evaluated. There were 15 slight/moderate inclusions and then 77 non-inclusion. This really fall short of requirements, which may mean that assessment of this item in Nigeria EIAs is suboptimal, or EIA reports evaluated have no need for it.

7. Confirm whether there was a description of highly threatened and/or unique ecosystems?

In the above instance, 14 EIA reports showed inclusion of this requirement. 25 EIA reports had partial inclusion whilst the greater number of 61 had non-inclusion reported in their favour. Higher number of non-inclusion reflects the importance placed on this requirement by IFC Critical Habitat Assessment suit of criteria.

8. Confirm the description of areas associated with key evolutionary processes?

Only 1 EIA report elaborated this whereas 3 partly mentioned it. A whole lot of 96 reports did not capture it at all. Apparently, it is either no such project area was captured in the sample EIA reports with the description or EIA report preparers did not factor the criteria in the assessment.

9. Were there description or highlight of any recognised high biodiversity values that might also support any critical habitat designation?

31 EIA reports had moderate/fully inclusion of this requirement. 29 EIA reports partially included the requirement, and 42 EIA reports did not include this. It is either this situation was not considered or there was lack of knowledge of requirements. It may have also been deemed irrelevant to be included in the EIA reports.

10. Confirm any attempt to quantify critical or endangered species in the Project area?

29 EIA report had moderate to full inclusion on this, with 34 EIA report partial/slightly including it in the EIA report. However, a greater number of 37 EIA report did not include this in the EIA report. All contributing to the lopsidedness of non-inclusive responses witnessed in the EIA reports.

11. Confirm any spatial map(s) drawn to evaluate the effects on critical habitat to enable quantification above?

Out of the 100 EIA reports assessed for this study, only 12 showed inclusion of this requirement. 18 partially met the requirement whereas a larger number of 70 of EIA reports did not capture this in the EIA report. This distribution still has the same level of non-inclusion as other responses above.

12. Were there any form of recommendation(s) aimed at cushioning impacts on biodiversity through identification of and protection of set asides?

Out of the 100 EIA reports evaluated for this study, only 11 showed inclusions of this requirement. 27 partially met the requirement whereas a larger number of 62 EIAs did not capture this inside their reports. It is insightful to state that avoidance remains the first effort in the mitigation hierarchies and expected to be given foremost consideration, but that was not demonstrated in the EIA reports evaluated.

13. Were there recommended implementation measures aimed at minimizing habitat fragmentation such as biological corridors?

Eighteen (18) EIA report moderately/partially had critical habitat inclusion in this regard whilst 44 others partially/slightly included this in their reports. However, greater number of 38 failed to incorporate this in the EIA report even as the recommendation seems to cut across all sectors.

14. Were there quantification of residual impacts on critical habitats?

Only 6 EIA reports moderately/full addressed this whilst 33 partially included it. But greater number of 61 did not embrace this in their EIA reports. The importance of quantification of residual impacts cannot be overemphasized due to its usefulness in the development of viable offsets.

15. Any recommendation for reinstating loss or impacted biodiversity to reduce risks to changes in Biodiversity to as low as reasonably practicable (ALARP)?

Even as reasonable and important this may sound, in the area of impact management, only 28 of the EIA studies reports evaluated reported its inclusion. 52 EIA report partially included it, leaving 30 reports that failed to carry this onboard (Appendix C).

16. Were there biodiversity compensation recommendations following the approaches?

Only 12 moderate/full responses were recorded from the evaluated EIA reports. 30 EIA reports partially included this whilst 60 failed to provide response on this. There were various opportunities for compensation that were not exploited, for reasons best known by the EIA report preparers.

17. Were there recommendations for restoring lost habitats during operations and /or after operations?

This is among the very essence of carrying out EIA. Twenty-one (21) EIA reports had moderate/full inclusion on this. 43 provided partial inclusion whilst 36 reports failed to incorporate this. It could be assumed that where recommendations were not made concerning this is where EIA was seen as an end and not means to an end. This was where no further action was required after securing EIA Approval.

18. Were there recommendations for partnering either by way of funding support or advocacy for nature conservation?

Only 2 EIA reports moderately/fully included this. 13 reports had partial inclusion and 85 number failed to put this in the report. Often this can be a way of offsetting residual impact, but the opportunity was not exploited by majority of the EIA reports evaluated in this study.

19. Were there recommendations to support alternative sources of income for stakeholders that depend on the habitat resources for subsistence and livelihood?

This is crucial in the application of mitigation hierarchies. This question only had one (1) moderate to full response, a partial response of 24 and non-inclusion response of 75. The rest 28 did not include this in their reports. Results showcase the extent of integration of IFC (2012) Performance Standard 6 (PS6) into Nigeria EIA reports.

20. Were there any form of recommendations made on modifications of project design and footprint based on assessment outcome?

This question attracted 3 moderate/full responses and 28 partial responses. 69 EIA reports failed to attend to it (See Appendix C). This could mean that information about that is lacking since many EIA Proponents or Project Owners contract out EIA studies without giving them full project background information. Outcome of EIA is supposed to be part of determinants for project siting including design, and execution options. Results obtained does not speak to this as it appears that sites and designs were already decided before EIAs were carried out. In a way, this is confusing because EIA is usually prepared on a firm/frozen scope and cannot be carried without a Project scope and location.

To further assess performance of the 5 sectors on Critical Habitat inclusion, Critical Habitat Index formular (noted in section 2.6) was deployed to arrive at the index score for each of sectors with results shown in Table 1. The highest critical habitat index score of 0.88 was recorded in the Power sector whilst the least critical habitat Index score of 0.1 was recorded in Agric/Road sector. However, Figure 2 below shows mean critical habitat inclusion scores of all the studied sectors. The results recorded in Figure 2 revealed that Power sector has the highest critical habitat inclusion followed by Petroleum, Manufacturing, Infrastructure sectors respectively while the Agriculture/Road sector recorded the least inclusion.

Table 1. Sectorial Critical Habitat Index scores

S/N	Power	Petroleum	Agric/Roads	Infrastructure	Manufacturing
1	0.73	0.6	0.1	0.13	0.18
2	0.43	0.3	0.1	0.28	0.15
3	0.15	0.05	0.1	0.08	0.33
4	0.18	0.35	0.15	0.2	0.28
5	0.48	0.13	0.18	0.25	0.03
6	0.1	0.08	0.08	0.05	0.63
7	0.65	0.63	0.2	0.33	0.43
8	0.13	0.62	0.3	0.5	0.43
9	0.45	0.58	0.45	0.18	0.4
10	0.23	0.58	0.18	0.18	0.08
11	0.23	0.55	0.05	0.23	0.65
12	0.1	0.45	0.3	0.4	0.55
13	0.4	0.3	0.13	0.3	0.3
14	0.63	0.08	0.4	0.7	0.1
15	0.6	0.23	0.13	0.23	0.3
16	0.18	0.23	0.8	0.3	0.5
17	0.2	0.2	0.3	0.3	0.08
18	0.25	0.3	0.1	0.2	0.4
19	0.88	0.43	0.33	0.52	0.43
20	0.43	0.5	0.18	0.2	0.4

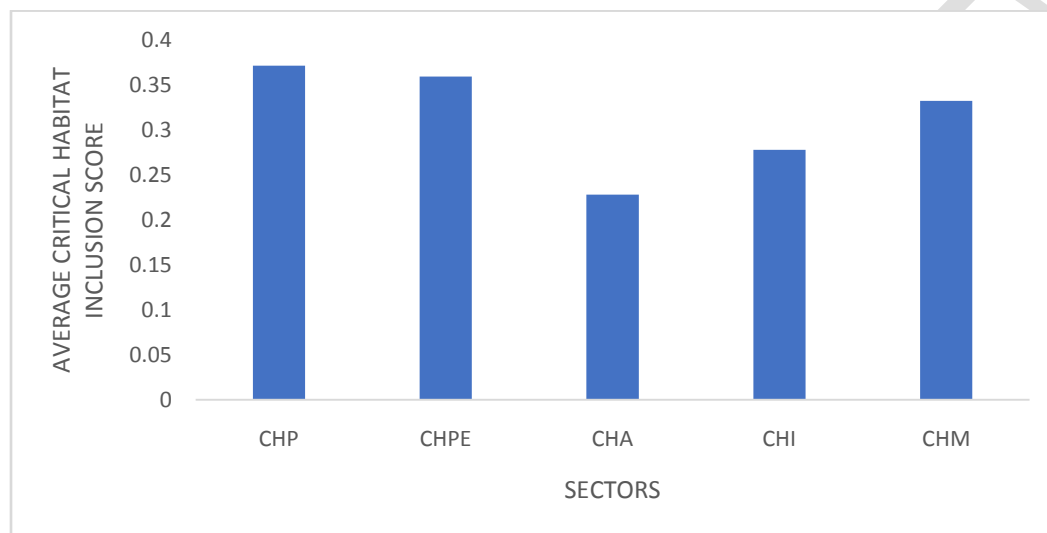


Figure 2. Mean scores of Sectoral Critical Habitat Inclusion on EIA

In a similar vein, Table.2 shows percentage Critical Habitat Inclusion in EIA Reports across the respective sectors. The overall Critical Habitat inclusion in EIA Reports in Nigeria found to be about **31.47%**.

Table 2: Percentage inclusion of Critical Habitat in Nigeria EIA Reports

S/N	Sector	Critical Habitat
1	Power	37.15
2	Petroleum	35.95
3	Manufacturing	33.65
4	Infrastructure	27.8
5	Agric/Road	22.8
Total		31.47

Following confirmation of normality of data set to be used (that is Table 1), Table 3 shows the results of the analysis of variance (ANOVA) statistics deployed to investigate whether there is a significant

difference between the critical habitat inclusion index among the five sectors considered in this study. The P-value from the Table is 0.103 which is greater than 0.05 significance level, which means there is no significance difference in the critical habitat inclusion index among the five-sector considered. Therefore, there is no need to carry out post-hoc analysis since we have already ascertained that the critical habitat inclusion indices of these sectors are similar. However, further test via homogeneity of variance still confirmed no significant difference.

Table 3: ANOVA results of the difference in Critical Habitat Inclusion Index score amongst the five sectors

	Sum of Squares	df	Mean Square	F	p-value.
Between Groups	0.288	4	0.072	1.985	0.103
Within Groups	3.448	95	0.036		
Total	3.736	99			

4. DISCUSSION

This study evaluated the extent of Critical Habitat assessment inclusion in EIA Reports executed in Nigeria, using International Finance Corporation (IFC) [5] Performance Standard (PS6) criteria. Result shows the following moderate to detail and slight to minor responses on the Critical habitat inclusion index:

1. Recognition and focus on the protection and conservation of sensitive biodiversity Project areas.
2. Stakeholder's consultation specifically to understand biodiversity value of the project area.
3. Quantification of critical or endangered species in the Project area.
4. Implementation measures to minimize habitat fragmentation such as biological corridors.
5. Recommendations for restoring habitats during operations and /or after operations.

In the same vein, the following areas were not well described in the EIA reports reviewed:

1. Further efforts made to deepen the assessment of sensitive project area by the engagement of local experts after the conduct of initial EIA study.
2. Where applicable, explication of Habitat of significant importance to critically endangered and/or endangered species.
3. Highlight of any recognised high biodiversity values that might also support any critical habitat designation:
 - Description of habitat of significant importance to endemic and/or restricted range of species.
 - Description or mention of habitat supporting globally significant concentration of migratory species and/or congregatory species.
 - Description of highly threatened and/or unique ecosystems.
 - Description of areas associated with key evolutionary processes.
4. Spatial map(s) drawn to evaluate the effects on critical habitat to enable quantification above.
5. Recommendation aimed at avoiding impacts on biodiversity through identification of and protection of set asides.
6. Quantification of residual impacts on critical habitats.
7. Biodiversity compensation recommendations following the approaches.

8. Recommendations made on modifications of project design and footprint based on assessment outcome.

The research findings show varying mean inclusion of Critical Habitat in Nigeria's sectoral EIA Reports sampled for this Study. ANOVA statistic deployed affirmed statistically that there is no significant difference in critical habitat inclusion amongst the sectors. Implication from the results is that all the sectors and by extension Nigeria EIA reports do not properly integrate critical habitat assessment in line with the evaluation criteria used for this study. However, out of the 5 sectors above, the higher performance of Power and Petroleum sectors can be attributed to their stint with Equator-Principle-Banks/Institutions who often require organisations approaching them for project financing to tailor such Project EIA reports to include critical habitat assessment and other IFC [5] requirements in order to manage associated risks.

The poor integration of critical habitat assessment in the EIA reports can be adduced to lack of knowledge, awareness on it by EIA Practitioners and Proponents. Nigeria EIA regulation and guidelines were not detailed to the requirements of critical habitat assessment. There are also cost implications to the endeavour and proponents often insist on doing what is in the regulation in place of what is even in the guidelines; tankless of doing what is in vogue.

Therefore, much is required to bring Nigeria EIA reports to global standards in the area of habitat assessments, via enabling laws and enforcements in course of project development. Critical on this are projects envisaged to have huge impact, high magnitude and widespread, crisscrossing different ecosystems and habitats.

This study supported Hughes et al [10] works on importance and relationship of biodiversity and ecosystem functions in the design of habitat restoration though the authors noted that the way biodiversity has been integrated into restoration practice remained vague but can be improved upon.

It also supported Stefan et al [9] work. Here, the authors stated that proponent or client are required to evaluate environmental and social risks on the basis of the stipulations of IFC Performance Standards one to eight. Performance Standard Six (PS6); and its Guidance Note 6 [4], concentrated on the conservation of biodiversity. The anticipated conservation goal under PS6 is to achieve no-net-loss of biodiversity value. Where a project is located in a critical habitat, a net gain in biodiversity value is essential. A thorough critical habitat assessment is required to achieve a-net-gain on biodiversity, via the adoption of mitigation hierarchies order of Avoidance > Minimization > Restoration > Offsetting [5]

5. CONCLUSION

This study, explained the critical habitats, assessments and business case for its inclusion in EIAs which provided background for the evaluation of critical habitat inclusion in the sectoral EIA reports in Nigeria. Using the Critical Habitat Inclusion Criteria adapted from the IFC (2012), and further evaluation with Critical Habitat Assessment Index, this study found that the mean critical habitat inclusion on EIA reports in Power sector is 0.3717, Petroleum 0.3595, Manufacturing 0.3325, Infrastructure 0.278 and Agric/Road 0.228. Overall mean critical habitat inclusion is 31.47% in Nigeria. ANOVA statistic deployed after confirmation of normality distribution of data set shows no statistically significant difference existing amongst the evaluated sectors in critical habitat integration. Table P-value (0.103) which was greater than 0.05 significance level confirmed this. The findings suggested that more efforts are required in Nigeria to improve and integrate Critical Habitats in EIA studies. This effort will help to reveal sensitive habitats in proposed project areas and devise mitigation strategies to protect, preserve enhance species wellbeing and their ecosystem services. It will also enable projects demonstrate no net loss of critical habitats and promote net positive impact to biodiversity.

This study recommends that Critical Habitat assessment be enshrined in the EIA process in Nigeria particularly for category 1 (One) EIAs. Training and capacity building including the use of technologies (computer tools) on Critical Habitat Assessments be organised by the FMEnv with support from expert

institutions where necessary. Above will improve biodiversity conservation to achieve sustainable project development.

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UNDER PEER REVIEW

LIST OF APPENDICES

Appendix A: Sample EIA Reports selected and evaluated for this study

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
1	150 Mega Watts Gas Powered Plant with Expansion option to 500 Mega Watts.	Qzorode, Delta State.	Power	2016	Proton Energy Limited
2	500 Mega Watt Gas Power Plant	Gauba Community, Kuje Area Council, Abuja	Power	2021	Jebata Nigeria Limited
3	Transmission Lines with Associated Substations Project (Lot 2).	Lagos and Ogun States	Power	2018	Transmission Company of Nigeria Limited
4	200km x 330kv DC Transmission Lines, Substations and Facilities Project.	Jos to Kaduna	Power	2017	Transmission company of Nigeria Limited
5	Transmission Lines with Associated Substations Project (Lot 3).	Lagos and Ogun States	Power	2019	Transmission Company of Nigeria Limited
6	Liquefied Natural Gas (Mini) and Compressed Natural Gas Plant.	Aisokuta, Kogi State.	Power	2019	Arxela Limited and Nigerian Gas Marketing
7	80 Megawatts Solar Photovoltaic Plant.	Duste LGA, Jigawa State.	Power	2016	Nova Scottle Power Development Limited
8	Field Development Project.	Enyhe, Bayelsa State	Petroleum	2018	Shell Petroleum Development Company Ltd
9	EA and EJA Fields Further Oil Development.	OML 79, Shallow Offshore, off the Coast of Bayelsa State	Petroleum	2016	Shell Petroleum Development Company Ltd
10	Modular Refinery Project.	Gbaramatu Kingdom, Delta State	Petroleum	2017	Gbaramatu Oil and Gas Producing Trust Fund
11	Iseni Wells Early Hookup to Domestic Gas Project.	Saghama and Ekeremor LGA of Bayelsa State as well as Patani LGA of Delta State.	Petroleum	2017	Shell Petroleum Development Company Limited

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
12	Umuseti and Igbuku Further Field Development.	Umuseti and Igbuku (OML 56), Ndokwa West LGA, of Delta State.	Petroleum	2020	Pillar Oil Nigeria Limited
13	Pre-Phase 1 Field Development Drilling and Production Operations	Oil Mining Lease (OML) 130, Deep Offshore	Petroleum	2020	Total "E" and "P" Nigeria Limited
14	3D Reshoot Seismic Data Acquisition Project	Adibawa - Gbarau in Bayelsa and Rivers States.	Petroleum	2015	Shell Development Limited Petroleum Company
15	Associated Gas Solution (AGS) Project	Onumara, Warri South LGA, Delta State.	Petroleum	2015	Shell Development Limited Petroleum Company
16	Field Development Project	Uzu, Yenagoa LGA, Bayelsa State	Petroleum	2018	Shell Development Limited Petroleum Company
17	NLGN Train 7 Project	Bonny, Rivers State	Petroleum	2019	NLNG, Limited.
18	Exploration and Appraisal Wells,	Bonny, Rivers State	Petroleum	2019	Shell Development Limited Petroleum Company
19	Fertilizer Blending Plant	Funtua, Katsina State	Agric/Road	2019	Greentide Agro Services Limited.
20	Okomo Palm Oil Mill Expansion Project	Ovia South-West Local Government Area, Edo State.	Agric/Road	2020	Okomo Oil Palm Company Limited
21	Rurum Farms,	Kano, Kano State	Agric/Road	2018	Kano State Government
22	Bifsam Farms	Kano, Kano State	Agric/Road	2019	Bifsam Limited Kano
23	Fertilizer Blending Plant Project	Kalambains, Wamakko, LGA, Sokoto State	Manufacturing	2021	OCF Africa Nigerian Limited

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
24	Asa North, Ohaji South Gas Development Project (Pipelines).	Ohaji/Egbema, LGA of Imo State and Ogba/Egbema/Ndoni LGAs of Rivers State.	Petroleum	2016	Shell Development Limited Petroleum Company
25	Soku Gas Plant to San Barth Manifold Pipeline Project.	Akuku Toru LGA, Rivers State	Petroleum	2013	Shell Development Limited Petroleum Company
26	NOPL to Indorama Gas Supply Tie-In Point Project.	Ukwa West LGA of Abia State, Ozigbo and Eleme LGAs of Rivers State,	Power	2020	Total E & P Nigeria Limited
27	Power Plant and Gas Pipeline Project.	Ukpanafun - Oma, Akwa-Ibom State.	Power	2016	Accugas Limited
28	Calabar- Adangba Pipeline.	Cross Rivers State	Power	2013	Niger Delta Power Holdings Company/NIPP Calabar
29	Sagamu LDZ Natural Gas Pipeline Network Construction Project.	Ibeju LGA of Ogun State	Power	2020	Transit Gas Nigeria Limited
30	Ebonyi State Ring Road.	Ebonyi State	Agric/Road	2018	Ebonyi State Govt
31	Jakara Rivers Road.	Kano, Kano State	Agric/Road	2013	Kano State Ministry of Works, Transport and Housing
32	Calabar - Ikrom - Katsina Ala Superhighway Project.	Cross Rivers and Benue States	Agric/Road	2016	Cross River State Government
33	Abuja Technology Village.	Federal Capital Territory, Abuja.	Infrastructure	2015	Federal Ministry of Industry, Trade & Investment Abuja
34	Solar Power Plant.	Kankiya, LGA, Katsina State.	Power	2015	Nova Solar 5 Farms Limited
35	Steel Manufacturing Plant and Construction of 1.3km x 132kv Power Transmission Line.	Ukwa West L.G.A., of Abia State.	Manufacturing	2016	Inner Galaxy Steel Company Limited.

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
36	Textile Recycling Plant.	Km 10, Ibadan-Abeokuta Express Road, Apata, Ibadan, Oyo State.	Manufacturing	2020	Freetown Waste Management & Recycle Limited.
37	Port Facility.	Kirikiri, Amuwo-Odofin LGA, Lagos State	Infrastructure	2020	BESTAF Marine Service Limited.
38	Automotive Biomass Ethanol Project	Okeluse, Ondo State	Manufacturing	2020	NNPC
39	National Information and Communication Technology Infrastructure Backbone (NICTIB) Project.	FCT-South-West States	Infrastructure	2015	Huawei Technologies Co., Nigeria Limited
40	Proposed Steel Pipe Threading and Valve Assembly Facilities and Related Activities.	Lekki Free Zone in Ibeju Lekki LGA of Lagos State.	Manufacturing	2020	Bell and Gas FZE
41	Pipeline Construction	OMLs 56 and 26	Petroleum	2012	Midwestern / Umugini Asset (Nigeria) Company Limited
42	Utahete Field Development by NPDC	Eastern Obollo, LGA, Akwa Ibom State	Petroleum	2020	Nigeria Petroleum Development Company
43	HI Field Development	OML 144, Shallow Offshore	Petroleum	2021	Sunlink Nigeria Limited
44	Gas Processing Facility with Liquefied Natural Gas (LNG) Plant	Gilli-Gilli Field, Ovia Northeast LGA, Edo State	Petroleum	2021	VTT LNG West Africa Limited
45	Pipeline, GPU, LPG, IPP, Petrochemical and Lube Plants	OML 143, Delta State	Petroleum	2019	Sterling Oil Exploration and Production Company Limited (SEEPCO)

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
46	Etope Refineries	OML 56, Delta State	Petroleum	2019	Etope Energy Plc
47	Edo Modular Refinery.	Edo State	Petroleum	2015	Edo Refining and Petrochemical Nigeria Limited
48	Construction & Establishment of 18" X 60km Natural Gas Pipeline Project.	Ogere - Ibadan Tollgate, Oyo State	Power	2022	NIPCO Gas Limited
49	108km Benin to Delta Transmission Line and 330kv Double Circuit Quad Conductors Project	Delta and Edo States	Power	2020	Transmission Company of Nigeria Limited & African Development Bank
50	138 km X 330kv Single Circuit Transmission Line to 330kv Double Circuit Quad Conductors	Alaaji to Onitsha, traversing Abia, Imo and Anambra States	Power	2020	Transmission Company of Nigeria Limited & African Development Bank
51	100mw Solar Independent Power Plant and 18 KM Transmission Line Project.	Ganiyuwa LGA Bauchi State	Power	2017	Nigeria Solar Capital Partners/Globeleq/ARM Harith Consortium
52	Ukanafun - Calabar Gas Pipeline	Akwa Ibom & Cross Rivers States	Power	2016	Nigeria National Petroleum Corporation (NNPC).
53	505 Gas Combined Cycle Power Plant and related infrastructure.	Ikwak, Abak LGA, Akwa Ibom State	Power	2016	Thompson and Grace Investment Limited
54	Joint Venture Power Plant	Eket LGA, Akwa Ibom State	Power	2012	Exxon Mobil
55	275 MW Power Generating Plant	Ohuyole LGA Along Lagos Ibadan Express Way Oyo State	Power	2012	Entec Power and Utilities Limited Ibadan,
56	Akure - Ilesha Road Rehabilitation Project,	Ondo State	Agric/Road	2012	Federal Ministry of Works

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
57	CICO- POLO-, Farms, Estate/Life Camp Infrastructure	Ehocha, Ogba/Idoni LGA of Rivers State	Agric/Road	2021	Polo-Cico Farming and Estate Ltd
58	Iyin/Ado/Ekiti Dual Carriageway Project.	Ado Local Government Area, Ekiti State	Agric/Road	2020	Ekiti State Government
59	Agro Processing Productivity Enhancement and Livelihood Improvement Support Project	Enugu State.	Agric/Road	2021	Agro Processing Productivity Enhancement and Livelihood Improvement Support (APPEALS) Project, Enugu State Co-ordination Office.
60	Eganyi - Isikura - Baro Rail Link Project.	Kogi, Niger States and FCT.	Agric/Road	2013	Federal Ministry of Transport
61	Construction of Agro-Cargo Terminal and Warehouse.	Bodinga, Sokoto State	Agric/Road	2022	Sokoto State Government
62	Bodo - Bonny Road Project, Rivers State	Gokana and Bonny LGAs, Rivers State	Agric/Road	2018	Federal Ministry of Works
63	Mafa Rice Mill Limited, Km 11, Hadeja Road, Kano.	Kano State	Agric/Road	2020	Mafa Rice Mill Limited
64	25km Kilometer Sijimbaki to Kyara Road/	Nasarawa State	Agric/Road	2021	Nasarawa State Govt
65	Gadon Kaya UnderPass Bridge and Roads.	Kano State	Agric/Road	2013	Kano State Government

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
66	Second River Niger Bridge across, Asaba and Onitsha.	Across Delta & Anambra States	Agric/Road	2014	NSIA Motorways Investment Company and Julius Berger Nigeria Limited, Abuja.
67	Improved Breeding, Beef, Milk Production, and Pasture Development for Enhanced Productivity of Indigenous Cattle.	Sokoto State	Agric/Road	2021	Sokoto State Government
68	Priority Value Chains of Rice, Wheat and Tomato.	Kano State	Agric /Road	2021	Agro Processing Productivity Enhancement and Livelihood Improvement Support (APPEALS) Project, Kano State Co-ordination Office.
69	Saipem Fabrication Yard, Workshop and Accommodation.	Rumuolumeni, Obio/Akpor LGA, Rivers State	Infrastructure	2014	Saipem Contracting Nigeria Limited.
70	Obudu Cargo and Passenger Airport.	Obudu Local Govt Area	Infrastructure	2020	Cross River State Government
71	Afrexim Bank Africa Trade Centre (AATC).	FCT, Abuja	Infrastructure	2020	Afrexim Bank
72	Amfani Industrial Park and Smart City, 1000Ha.	Magama LGA, Niger State	Infrastructure	2021	Hydronolis Investment Limited (HIL) /Mainstream Energy Solutions Limited (MESL).
73	Ondo Deep Sea Port	Ondo State	Infrastructure	2020	Ondo State Development & Investment Promotion Agency.
74	Bonny Deep Sea Port Project.	Bonny Island, Bonny LGA of Rivers State	Infrastructure	2020	Federal Ministry of Transportation.
75	Eko Atlantic Phase 1, Shoreline Protection and Reclamation Project.	Lagos State	Infrastructure	2012	South Energy Nigeria Ltd (SENL).

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
76	The Proposed Construction and Establishment of Multipurpose Crusade Ground.	Aseese Community, Ogun State	Infrastructure	2022	BLW Nigeria Limited
77	Lafia Cargo Airport	Gwandara, Lafia LGA, Nasarawa State	Infrastructure	2020	Nasarawa State Govt
78	Ebonyi State International Olympic Stadium	Abakiliki LGA, Ebonyi State	Infrastructure	2020	Ebonyi State Government
79	Lekki Tolaram Port and Power Plant	Lekki, Lagos State	Infrastructure	2012	Lekki Port and the Lagos Free Trade Zone (LFTZ)
80	Naho Dockyard Infrastructure Project,	Takwa Bay, Lagos	Infrastructure	2015	Naho Nigeria Limited/Dee Jones
81	Ebonyi International Airport	Erza North and South	Infrastructure	2012	Ebonyi State Government
82	ITE Airstrip	Tunga District, Awe, Nasarawa State	Infrastructure	2022	Tungly Nigeria Limited
83	Nestoil Operations Base	Abuloma, Port Harcourt City LGA	Infrastructure	2015	Nestoil PLC
84	Port Harcourt Industrial Park	Uhina, Ikwerre LGA	Infrastructure	2020	Federal Ministry of Transportation
85	Brass Island Shipyard at Brass	Brass LGA, Bayelsa State	Infrastructure	2021	Nigeria Content Development and Monitoring Board
86	Textile and Garments Industrial Park	Lekki, Lagos	Manufacturing	2020	Nigeria Export Processing Zone Authority
87	Lad Group Sheanut Factory Expansion.	Ikenna LGA, Ogun State	Manufacturing	2020	LadGroup Limited

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
88	400,000 Unites Per Annum Type 3 Composite LPG Cylinder Manufacturing Plant.	Bolaku, of Bayelsa State	Manufacturing	2020	RunGas Prime Industries
89	50,000 Liters of Oil Blending Plant	Yenagoa, Bayelsa State	Manufacturing	2021	Eraskon Nigeria Limited
90	Franemm Industries Limited	Plot 9-13 Riverview, Lagos -Ibadan Expressway Isheri in Ifo LGA of Ogun State.	Manufacturing	2020	Franemm Industries Limited.
91	Wood Processing Factory.	Sapele LGA of Delta State.	Manufacturing	2020	Woodland Nigeria Limited.
92	Bua Cement Plant Lines 4 and 5 Expansion.	Sokoto State	Manufacturing	2021	Bua Cement Plc
93	Sugar Mill	Gain Chiroma, Gagarawa, Jigawa State.	Manufacturing	2020	Great Northern Agribusiness (GNA).
94	Nakudu Tinnery Limited,	Kano, Kano State	Manufacturing	2018	Nakudu Tannery
95	Salasar Enterprises Limited, Kano	Kano, Kano State	Manufacturing	2016	Salasar Limited
96	Dangote Cement and Air Strip	Oknelle, Etsako East LGA of Edo	Manufacturing	2019	Dangote Cement PLC
97	Vee Oil Resources Limited Oil Blending Plant, Kano	Kano State	Manufacturing	2018	Vee Oil Resources Limited

S/N	TITLE	LOCATION	SECTOR	YEAR	PROPONENT
98	6000 Clinker Cement Plant with Power Plant	Nkalagu, Ebony State	Manufacturing	2016	Ibeto Cement Company Nigeria Limited
99	Industrial Complex comprising Sugarcane, Sugar, Vegetable Oil, Cassava Tuber Processing	Jamata along Lokoja - Abuja Road, Lokoja in Kogi State	Manufacturing	2016	Unicane Industries Limited
100	Proposed Agrochemical Packaging and formulation Plant.	Ibafo, Ogun State	Manufacturing	2016	Harvest field Industries Limited

Appendix B: Data Collection Instrument

Questionnaire for Evaluating Critical Habitat inclusion in Sample EIA Reports using International Finance Corporation (IFC) Performance Standard (PS6) Criteria

S/N	Description of Biodiversity Value
1	Were there recognition of the need and focus on the protection and conservation of a sensitive biodiversity Project area in the EIA report?
2	Were there evidence of stakeholder's consultation specifically to understand biodiversity value of the project area?
3	Were there further efforts made to deepen the assessment of sensitive project area by engagement of local experts?
4	Were there description of habitat with significant importance to critically endangered and/or endangered species in the EIA report?
5	Was there any sort of description of habitat(s) of significant importance to endemic and/or restricted range of species in the EIA report?
6	Confirm whether there was a description or mention of habitat(s) supporting globally significant concentration of migratory species and/or congregatory species in the EIA report?
7	Confirm whether there was a description of highly threatened and/or unique ecosystems?
8	Confirm the description of areas associated with key evolutionary processes?

- 9 Was there a description or highlight of any recognised high biodiversity values that might also support any critical habitat designation?
- 10 Confirm any attempt to quantify critical or endangered species in the Project area?
- 11 Confirm any spatial map(s) drawn to evaluate the effects on critical habitat to enable quantification above?
- 12 Was there any form of recommendation(s) aimed at dodging impacts on biodiversity through identification of and protection of set asides?
- 13 Were there recommended implementation measures aimed at minimising habitat fragmentation such as biological corridors?
- 14 Were there quantification of residual impacts on critical habitats?
- 15 Any recommendation for reinstating loss or impacted biodiversity to reduce risks to changes in Biodiversity to as low as reasonably practicable?
- 16 Were there biodiversity compensation recommendations following the approaches?
- 17 Were there recommendations for restoring lost habitats during operations and /or after operations?
- 18 Was there recommendation for partnering either by way of funding support or advocacy for nature conservation?
- 19 Was there recommendation to support alternative sources of income for stakeholders that depend on the habitat resources for subsistence and livelihood?
- 20 Were there any form of recommendations made on modifications of project design and footprint based on assessment outcome?

KEY: 0 = No Inclusion, 0.5 = Slight to minor inclusion; 1 = Moderate to detail inclusion

Appendix C

Summary of Sectoral Critical Habitat Inclusion responses

S/N	Power	Petroleum	Agric/Roads	Infrastructure	Manufacturing	Total
1	(√) 7	(√) 7	(√) 3	(√) 2	(√) 5	(√) 24
	(X) 4	(X) 9	(X) 7	(X) 10	(X) 5	(X) 35
	(P) 9	(P) 4	(P) 10	(P) 8	(P) 10	(P) 41
2	(√) 9	(√) 8	(√) 1	(√) 6	(√) 3	(√) 27
	(X) 5	(X) 5	(X) 4	(X) 3	(X) 4	(X) 21
	(P) 6	(P) 7	(P) 15	(P) 11	(P) 13	(P) 52
3	(√) 7	(√) 4	(√) 2	(√) 5	(√) 3	(√) 21
	(X) 8	(X) 6	(X) 12	(X) 10	(X) 10	(X) 46
	(P) 5	(P) 10	(P) 6	(P) 5	(P) 7	(P) 33
4	(√) 9	(√) 8	(√) 2	(√) 1	(√) 5	(√) 25
	(X) 6	(X) 9	(X) 14	(X) 12	(X) 13	(X) 54
	(P) 5	(P) 3	(P) 4	(P) 7	(P) 2	(P) 21
5	(√) 6	(√) 3	(√) 1	(√) 2	(√) 3	(√) 15
	(X) 8	(X) 10	(X) 10	(X) 9	(X) 11	(X) 48
	(P) 6	(P) 7	(P) 9	(P) 9	(P) 6	(P) 37
6	(√) 3	(√) 4	(√) 0	(√) 1	(√) 0	(√) 8

	(X) 14	(X)15	(X) 14	(X) 17	(X) 17	(X) 77
	(P) 3	(P) 1	(P) 6	(P) 2	(P) 3	(P) 15
7	(√) 5	(√) 6	(√) 0	(√) 2	(√) 1	(√) 14
	(X) 8	(X)10	(X) 13	(X) 13	(X) 17	(X) 61
	(P) 7	(P) 4	(P) 7	(P) 5	(P) 2	(P) 25
8	(√) 0	(√) 0	(√) 0	(√) 0	(√) 1	(√) 1
	(X)19	(X) 19	(X) 19	(X) 20	(X) 19	(X) 96
	(P) 1	(P) 1	(P) 1	(P) 0	(P) 0	(P) 3
9	(√) 8	(√) 8	(√) 3	(√) 5	(√) 5	(√) 31
	(X) 8	(X) 8	(X) 13	(X) 6	(X) 7	(X) 42
	(P) 4	(P) 4	(P) 4	(P) 9	(P) 8	(P) 29
10	(√) 6	(√) 10	(√) 3	(√) 5	(√) 5	(√) 29
	(X) 8	(X) 4	(X) 12	(X) 3	(X) 7	(X) 34
	(P) 6	(P) 6	(P) 5	(P) 12	(P) 8	(P) 37
11	(√) 4	(√) 2	(√) 0	(√) 3	(√) 3	(√) 12
	(X) 13	(X) 16	(X) 18	(X) 11	(X) 12	(X) 70
	(P) 3	(P) 2	(P) 2	(P) 6	(P) 5	(P) 18
12	(√) 3	(√) 4	(√) 0	(√) 0	(√) 4	(√) 11
	(X) 13	(X) 8	(X) 17	(X) 13	(X) 11	(X) 62
	(P) 4	(P) 8	(P) 3	(P) 7	(P) 5	(P) 27
14	(√) 2	(√) 1	(√) 0	(√) 2	(√) 1	(√) 6
	(X)11	(X) 13	(X) 14	(X) 15	(X) 8	(X) 61
	(P) 7	(P) 6	(P) 6	(P) 3	(P) 11	(P) 33

Key: No inclusion(X), Slightly to minor inclusion(P) and Moderate to detailed inclusion (√)

Appendix C Continues

Summary of Sectoral Critical Habitat Inclusion responses

S/N	Power	Petroleum	Agric/Roads	Infrastructure	Manufacturing	Total
15	(√) 7	(√) 3	(√) 1	(√) 2	(√) 5	(√) 28
	(X) 3	(X) 4	(X) 9	(X) 9	(X) 5	(X) 30
	(P) 10	(P) 13	(P) 10	(P) 9	(P) 10	(P) 52
16	(√) 6	(√) 3	(√) 0	(√) 1	(√) 2	(√) 12
	(X) 11	(X) 11	(X) 18	(X) 14	(X) 6	(X) 60
	(P) 5	(P) 6	(P) 2	(P) 5	(P) 12	(P) 30
17	(√) 6	(√) 4	(√) 0	(√) 4	(√) 7	(√) 21
	(X) 5	(X) 3	(X) 12	(X) 12	(X) 4	(X) 36
	(P) 9	(P) 13	(P) 8	(P) 4	(P) 9	(P) 43
18	(√) 0	(√) 1	(√) 0	(√) 1	(√) 0	(√) 2
	(X) 15	(X) 18	(X) 18	(X) 16	(X) 18	(X) 85
	(P) 5	(P) 1	(P) 2	(P) 3	(P) 2	(P) 13
19	(√) 0	(√) 0	(√) 0	(√) 1	(√) 0	(√) 1
	(X) 17	(X) 13	(X) 13	(X) 14	(X) 18	(X) 75
	(P) 3	(P) 7	(P) 7	(P) 5	(P) 2	(P) 24
20	(√) 2	(√) 1	(√) 0	(√) 0	(√) 0	(√) 3
	(X) 9	(X) 12	(X) 16	(X) 18	(X) 14	(X) 69
	(P) 9	(P) 7	(P) 4	(P) 2	(P) 6	(P) 28

Key: No inclusion(X), Slightly to minor inclusion(P) and Moderate to detailed inclusion (√)