



**Identification and Distribution of Non-Formally Protected Areas in Benue State, Nigeria**

**Adaje Patience Onyeche<sup>1\*</sup>, Shomkegh Simon Alyegba<sup>2</sup>, Ikyaagba Emmanuel Tertsea<sup>1</sup>, Jadot Catherine<sup>3</sup> and Verinumbe Ioryisa<sup>1</sup>**

<sup>1</sup>Department of Social and Environmental Forestry, College of Forestry and Fisheries, Joseph Sarwuan Tarka University Makurdi Benue State, Nigeria.

<sup>2</sup>Centre for Innovation in Procurement, Environment and Social Standard, Federal University of Agriculture, Makurdi, Nigeria.

<sup>3</sup>Elemental Solutions Caribbean, United States of America.

\*Corresponding Author: [adajepat@mail.com](mailto:adajepat@mail.com), (0000-0002-1134-6870) +2347030558030

**ARTICLE HISTORY**

Received: 10/06/2025

Accepted: 14/07/2025

Article Type:

Research Paper

Volume: 13

Issue: 1

Pp: 95 – 112

**ABSTRACT**

The Non-Formally Protected Areas (NFPAs) in Benue State, Nigeria, are under significant pressure from anthropogenic activities, contributing to forest fragmentation. Despite this, some small patches persist as sacred groves and community forests due to strong local religious and cultural beliefs. Using the 2010 Benue State gazette as a baseline. Field surveys, key informant interviews, and direct observations were conducted across 13 Local Government Areas (LGAs) to identify and classify 114 NFPAs. Of these, 45% of NFPAs were disturbed, 17% were undisturbed, 3% were extinct, while 35% were not visited/unknown due to security situation in the area at the time of this study or were unknown to both community members and DFOs. Okpokwu and Vandeikya LGAs had the highest number of disturbed NFPAs. The study found that community members highly value NFPAs for cultural heritage, shade, soil fertility, and protection. However, land-use changes and other activities threaten their conservation status, with some areas already extinct before being recognized for protection. The study highlights farming, fire, logging, and forest conversion as major challenges, recommending urgent conservation actions. Undisturbed NFPAs offer opportunities for biodiversity conservation, climate change mitigation, and REDD+ initiatives.

**Keywords:** Assessment, Heavy metals, Contamination and Wetlands

**INTRODUCTION**

The rapidly expanding human footprints and global forest biodiversity loss poses a significant threat to ecosystem services and human well-being underscoring the need for detailed biological data to inform conservation decisions (Cardinale *et al.*, 2012; Carlos and Dale, 2006; Xu *et al.*, 2017). Forests in Benue State are being depleted due to anthropogenic activities (Dagba *et al.*,

2017). The main known drivers of biodiversity loss are anthropogenic activities such as land use changes, which result in the loss and fragmentation of natural species' habitats and pose a challenge to the integrity of natural ecosystems (Newbold *et al.*, 2015; Wilson *et al.*, 2016; Jin and Fan, 2018; Xu *et al.*, 2017). Non-Formally Protected Areas (NFPAs) play a crucial role providing

essential ecosystem services despite the challenges posed by land use changes and habitat fragmentation (Neugarten *et al.*, 2018). NFPAs are landscapes of defined geographical space recognized, dedicated, and managed under IUCN category VI and type D of protected area management (Dudley 2008). Nigeria, akin to most West African countries, have ratified international agreements including the Paris Agreement and committed to achieving the Sustainable Development Goals by 2030 (Fada *et al.*, 2022; UNDP, 2020). Notably, Nigeria adopted the five goals of the Global Strategic Plan for Biodiversity 2011-2020 in its National Biodiversity Strategy and Action Plan (NBSAP), 2016-2020 to achieve the Aichi Target 11 with specific actionable goals for marine and terrestrial area (UNDP 2021; FGN 2020). The plan seeks to integrate biodiversity conservation into national planning policies, emphasizing the enhancement of conservation within protected areas in Nigeria by 2020 (Akindele *et al.*, 2021; Anwadike 2020). The NBSAP Target 4 affirmed that, by 2020, at least 10% of Nigeria's national territory will be sustainably managed in conservation areas at varied levels of authority, with representation of all ecosystem types, aligned to both the Convention on Biological Diversity's (CBD) Strategic Plan for Biodiversity 2011–2020 and its Aichi biodiversity targets that attempt to stop the loss of forest biodiversity (FGN 2020; IPBES, 2019; Waldron *et al.*, 2017). Relatedly Subsections 6.6 sought to document and map the indigenous and local communities' conservation areas and strengthen their management plan (UNDP, 2021). Local people play vital roles in the conservation of forests, as the preservation of forest resources depends on their knowledge of the environment (Tee *et al.*, 2015).

Benue State, with its unique position within Nigeria's Guinea Forest Savanna, contributes 5% of the country's 14 Terrestrial Ecoregion Protected Area coverage, encompassing a protected area of 30,383.4 km<sup>2</sup> (UNDP, 2021). Similar to NFPAs, lands managed and/or controlled by Indigenous Peoples

encompass 726,321.0 km<sup>2</sup>, with 628,388.0 km<sup>2</sup> situated outside formal protected areas (UNDP 2021). The NFPAs within Benue State are not formally gazetted (Benue State of Nigeria Gazette, 2010). The lack of proper documentation hinders the effective identification, estimation of flora and fauna species within these NFPAs, and the quantification of their contributions to the national conservation agenda. (Kandari *et al.*, 2014). Identifying and understanding the status, distribution, challenges and conservation values of the NFPAs over which local peoples exercise traditional rights is central to the implementation of several global conservation and climate change agreements as this has generated research interest in many parts of the world in recent times (Kandari *et al.*, 2014).

In Benue State, previous research has examined land-use and forest-cover changes in several non-formally protected areas (NFPAs), explored indigenous conservation practices and local utilization of tree resources, and assessed drivers of forest conservation and their effects on adjacent rural livelihoods (Ancha *et al.*, 2021; Dagba *et al.*, 2017; Ikyaagba *et al.*, 2020; Shomkegh *et al.*, 2019; Yakubu *et al.*, 2019; Zaku & Moor, 2022). Even with notable advances in remote sensing (Fassnacht *et al.*, 2024; Nandasena *et al.*, 2023), artificial intelligence and big data application (Banzhaf *et al.*, 2022), and improved access to open-source analytical tools (John & Francis, 2023; Essien *et al.*, 2023), there have been limited efforts to systematically incorporate NFPAs into conservation frameworks in Benue State to fully achieve both local and global environmental goals. Additionally, studies on identification, validation and documentation of existing NFPAs are lacking in Benue State (Tee *et al.*, 2015).

This research aims to map and document the NFPAs in Benue State, using the Benue State of Nigeria Gazette (BSN) of 2010 list of NFPAs as a baseline data. This document was obtained from the Department of Forestry, Ministry of Water Resources and Environment in Benue State. Additionally, to

validate NFPAs, an inventory was conducted to ascertain the existence, status (disturbed and undisturbed), challenges and contributions of NFPAs to forest conservation in Benue State and Nigeria. Overall, the study presents an updated comprehensive list of NFPA's distributions in Benue State which can be useful in collaborative partnerships involving local people, conservation practitioners, Non-Governmental Organizations, and government agencies to yield significant benefits for conservation of forest landscapes and ecosystems for future generations.

## MATERIALS AND METHODS

### The Study Area

Benue State is situated in derived savannah belt between the tropical rainforest of southern Nigeria and the open grassland savannah vegetation of northern Nigeria (Tee *et. al.*, 2015). It is located between latitude 7°08'34" – 7°10'45" N and longitude 7°49'16" – 7°51' 29" (Shomkegh *et. al.* 2019). The State has two different seasons: the dry season, which runs from October to March, and the rainy season, which runs from April to September (Mdzuami *et. al.*, 2018). As cited by Akpa *et. al* (2022), Benue State has a total land mass of 30,955 km<sup>2</sup> with a projected population of 6,141,300 million people. It is characterized by temperatures of 28 °C, but can occasionally go as high as 37°C and rainfall between 12,000 mm to 20,000 mm of is typical (Mdzuami *et. al.*, 2018). It derives its name from River Benue, the second largest river in the country and borders Nasarawa State to the north, Taraba to the northeast, Cross River to the south, Enugu to the southwest, Ebonyi to the west, and Kogi State to the northwest (Tee *et. al.*, 2015; Zaku and Moor, 2022), (see Figure 1). Administratively, there are 23 Local Government Areas (LGAs) within the state (Tee *et. al.*, 2015). However, for purpose of this research, only 11 LGA's, including Guma, Gwer West, Gwer East, Oturkpo, Gboko, Oju, Ado, Okpokwu, Vandeikya, Ushongo, and Kwande, were selected based on the availability of NFPAs.

### Data Collection and Analysis

The study made use of both primary and secondary data. Data collection was collected from October 2020 to January 2021. Secondary data were obtained from the Department of Forestry, Benue State Ministry of Water Resources and Environment, and the list of NFPAs in the BSN Gazette, 2010. Primary data were obtained from interviews carried out with key stakeholders, such as community members, District Forest Officers (DFOs), and other staff in LGAs where NFPAs are located, to validate information and accessibility to the forest areas. From the eleven (11) LGAs visited, the DFOs in each LGAs were systematically selected and eleven interviews were conducted. This was completed by 25 interviews from community leaders and forest guards across the LGAs visited. The interview aimed to solicit information pertaining to the location and status of the NFPA, challenges and overall contributions NFPAs play in forest conservation. Eleven other Focus Group Discussions (FGD) were conducted with community members to obtain information on other NFPAs in their community not listed in the Gazette, and the contribution of NFPAs to forest conservation. Other data collection techniques such as direct observation was employed to assess on-going anthropogenic activities within the NFPAs.

To ascertain the status of each NFPA, the study employed Osuri *et. al.*'s (2014) classification of protected areas. Following, the NFPAs were classified into three (3) categories: a) disturbed sites, i.e., areas with evident human disturbances such as farmlands, open canopy, exposed bare ground, and invasions of non-native species; b) undisturbed sites, i.e., areas with no or little human disturbance, closed canopy tree cover, native species; and c) extinct areas, i.e., sites under forest conversion (farm lands, buildings, or construction works). To analyze the objective of the contribution of NFPAs to forest conservation in Benue State, a Likert scale was presented, from which respondents chose the one that best aligned with their view

or belief (Ansong and Roskaf, 2011). The five-point response categories used were: 5 strongly agree (4.21–5), 4 agree (3.41–4.20),

3 neutral (2.61–3.40), 2 disagree (1.81–2.60), and 1 strongly disagree (1–1.8).

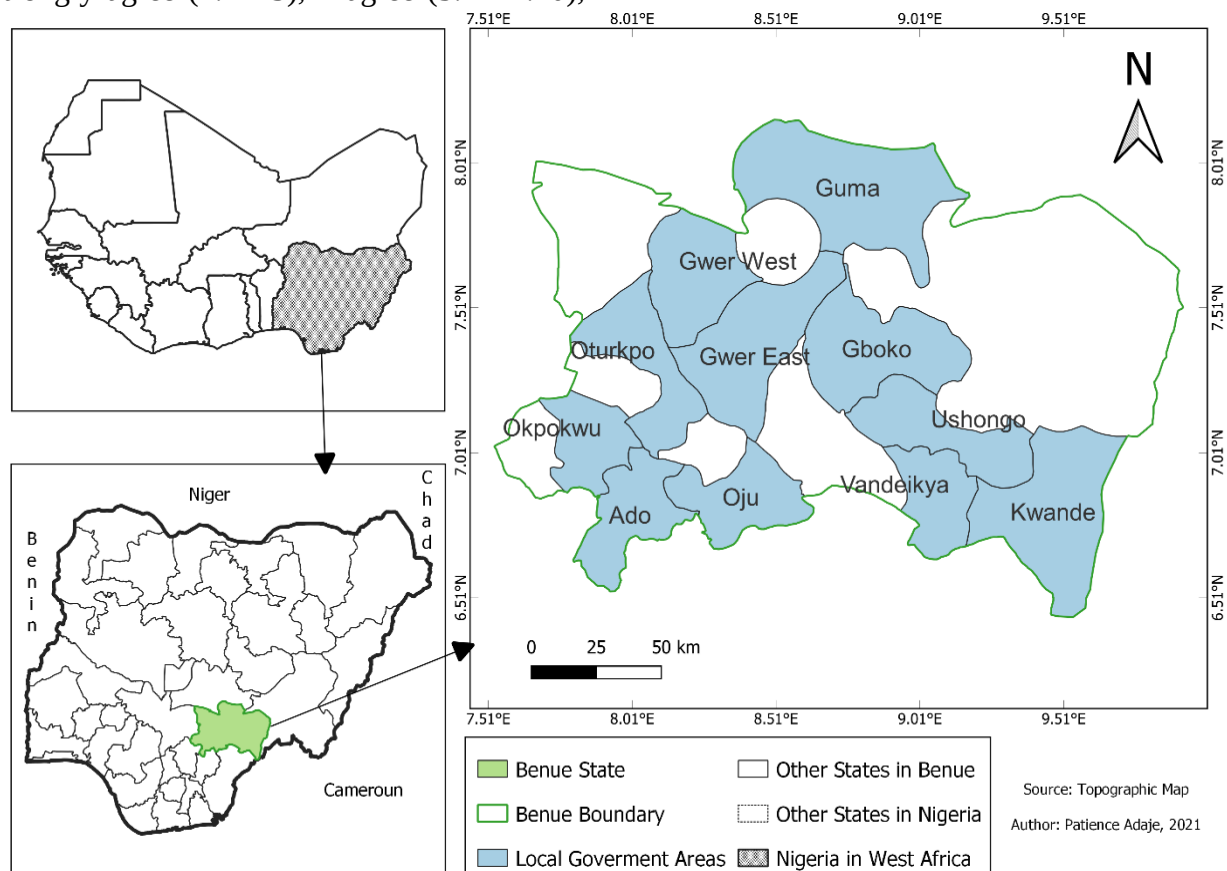


**Figure 1: Map of the Study Area**

Source: Topographic Map (2025)

### Data Collection and Analysis

The study made use of both primary and secondary data. Data collection was collected from October 2020 to January 2021. Secondary data were obtained from the Department of Forestry, Benue State Ministry of Water Resources and Environment, and the list of NFPAs in the BSN Gazette, 2010. Primary data were obtained from interviews carried out with key stakeholders, such as community members, District Forest Officers (DFOs), and other staff in LGAs where NFPAs are located, to validate information and accessibility to the forest areas. From the eleven (11) LGAs visited, the DFOs in each LGAs were systematically selected and eleven interviews were conducted. This was completed by 25 interviews from community leaders and forest guards across the LGAs

visited. The interview aimed to solicit information pertaining to the location and status of the NFPAs, challenges and overall contributions NFPAs play in forest conservation. Eleven other Focus Group Discussions (FGD) were conducted with community members to obtain information on other NFPAs in their community not listed in the Gazette, and the contribution of NFPAs to forest conservation. Other data collection techniques such as direct observation was employed to assess on-going anthropogenic activities within the NFPAs.

To ascertain the status of each NFPAs, the study employed Osuri *et. al.*'s (2014) classification of protected areas. Following, the NFPAs were classified into three (3) categories: a) disturbed sites, i.e., areas with evident human disturbances such as

farmlands, open canopy, exposed bare ground, and invasions of non-native species; b) undisturbed sites, i.e., areas with no or little human disturbance, closed canopy tree cover, native species; and c) extinct areas, i.e., sites under forest conversion (farm lands, buildings, or construction works). To analyze the objective of the contribution of NFPAs to forest conservation in Benue State, a Likert scale was presented, from which respondents chose the one that best aligned with their view or belief (Ansong and Roskaft, 2011). The five-point response categories used were: 5 strongly agree (4.21–5), 4 agree (3.41–4.20), 3 neutral (2.61–3.40), 2 disagree (1.81–2.60), and 1 strongly disagree (1–1.8).

RESULTS AND DISCUSSION

Identification of NFPA

The BSN gazette consists of a list of 76 NFPAs across 12 local government areas (LGAs). The list provided information on the location and forest area of some of the NFPAs. It must be hinted that from the baseline data, three LGAs—Katsina-ala, Logo, and Konshisha—were not visited due to security concerns within these areas at the time of study. Similarly, certain NFPAs within LGAs, such as Guma, were not visited for similar security-related reasons. Additionally, Otukpo and Ado LGAs were added to the existing LGAs listed based on the presence of NFPAs from the reconnaissance survey. Furthermore, in some LGAs, new NFPAs were identified and documented, which was not captured in the BSN gazette list (Tables 1, 2,3, and 4).

Table 1: Non-Formally Protected Area Distribution in Benue State

| S/N | Local Government Area | No. of NFPAs | Area (ha) |
|-----|-----------------------|--------------|-----------|
| 1   | Gboko                 | 14           | 1,176.64  |
| 2   | Guma                  | 2            | 571.28    |
| 3   | Gwer East             | 1            | 87        |
| 4   | Gwer West             | 4            | 3,530     |
| 5   | Katsina Ala           | 4            | 771.54    |
| 6   | Konshisha             | 14           | 354.55    |
| 7   | Kwande                | 6            | 143.34    |
| 8   | Logo                  | 1            | 53        |
| 9   | Oju                   | 2            | >12.80    |
| 10  | Okpokwu               | 1            | 100       |
| 11  | Ushongo               | 13           | >502.78   |
| 12  | Vandeikya             | 14           | 4,066.1   |

Source: Field Work (2024)

Classification and Distribution of Non-Formally Protected Areas in Benue State

The results presented in Appendix I, II and III represent an updated comprehensive list of NFPAs across LGAs in Benue State. A total of 114 NFPAs were identified in 14 LGAs in Benue State. Non-formally protected areas in Benue State were classified into three categories: disturbed, undisturbed, and extinct. Figure 2 revealed that 45% of NFPAs were disturbed, 17% were undisturbed, 3% were extinct, while 35% were not visited/unknown due to security situation in the area at the time of this study

or were unknown to both community members and DFOs.

Disturbed, Undisturbed and Extinct Non-Formally Protected Areas in Benue State

The percentage distribution of disturbed NFPAs across the LGAs under study are presented in Figure 3. Vandeikya LGA, had the highest percentage of disturbed NFPAs (25%), followed by Okpowu LGA (19%) while Guma had the least disturbed NFPAs (2%).

The study revealed that undisturbed NFPAs in Benue State, 37% in Oju LGA, and 5% in Ushongo and Vandeikya LGAs (figure 3),

which were notably sacred grooves, were either privately owned by families or individuals, or owned by the community. Forest conservation is not only crucial for climate change but also critical for improving the livelihoods of community members (Bempong *et al.*, 2023). However, in Vandeikya and Gboko LGAs, 50% each of NFPAs were extinct (Figure 3).

### Contributions of Non-Formally Protected Areas to Forest Conservation in Benue State

The result in Table 2 presents the contributions of NFPAs to forest conservation in Benue State on a five-point Likert scale from six selected communities. Community members of Mbagyaji-mbagwa in Ushongo LGA, Oyinye in Oju LGA, Akwete-Akpa in Otukpo LGA, Igumale (Ai-adaka) in Ado LGA, Ankar in Vandeikya LGA, and Mbalumun Nanev in Kwande LGA strongly agree with NFPAs contributions for cultural heritage (4.54) and shade (4.62), soil fertility (4.61), and soil protection (4.41).

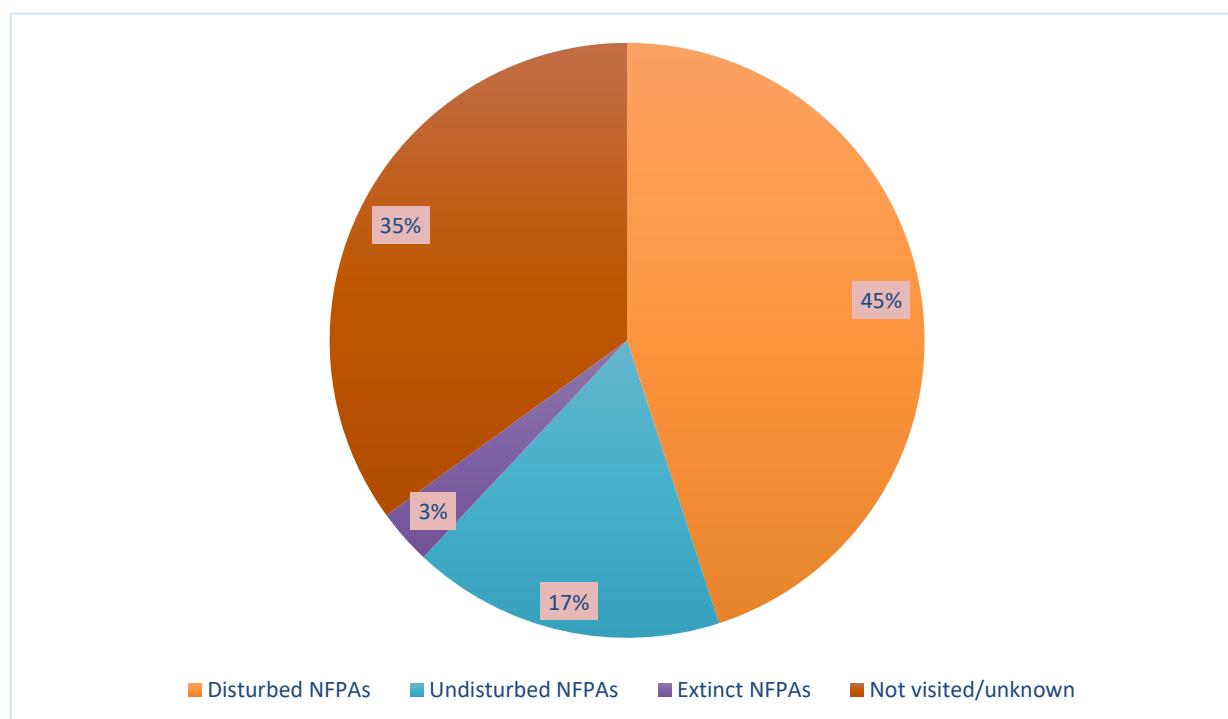


**Figure 2: Status of Non-Formally Protected Areas in Benue State**

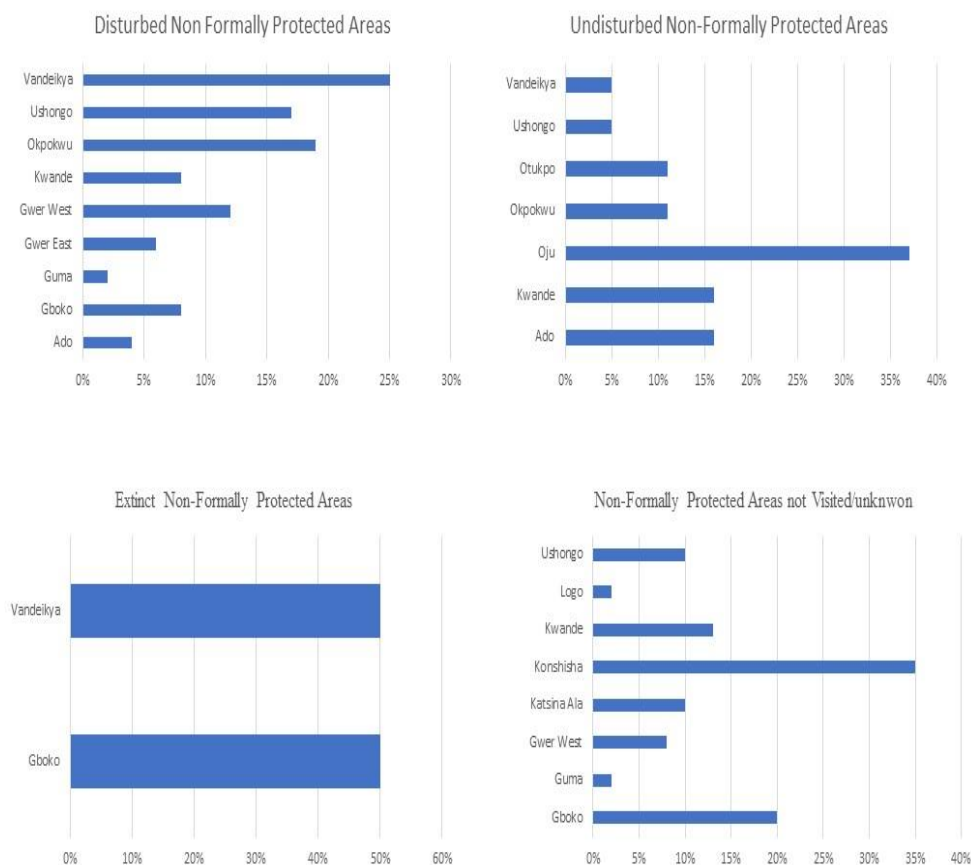


**Figure 3: Distribution of Non-Formally Protected Areas Across Local Government Areas in Benue State**

**Table 2: Contributions of Non-formally Protected Areas to Forest Conservation in Benue State Nigeria**

| Variable                            | N   | Minimum | Maximum | Mean | Std. Deviation |
|-------------------------------------|-----|---------|---------|------|----------------|
| Soil protection                     | 120 | 3       | 5       | 4.41 | .601           |
| Soil fertility                      | 120 | 4       | 5       | 4.61 | .490           |
| Fresh water / water conservation    | 120 | 3       | 5       | 4.38 | .609           |
| Detoxification / water purification | 120 | 3       | 5       | 4.36 | .646           |
| Climate regulation                  | 120 | 3       | 5       | 3.97 | .709           |
| Disease control                     | 120 | 3       | 5       | 3.89 | .754           |
| Windbreak                           | 120 | 3       | 5       | 4.36 | .547           |
| Shade                               | 120 | 3       | 5       | 4.62 | .537           |
| Religious/Spiritual                 | 120 | 3       | 5       | 4.36 | .671           |
| Cultural heritage                   | 120 | 3       | 5       | 4.54 | .564           |
| Recreation / Tourism                | 120 | 1       | 5       | 3.78 | .780           |
| Aesthetic                           | 120 | 3       | 5       | 4.20 | .705           |
| Education / Scientific studies      | 120 | 1       | 5       | 3.45 | .720           |
| Employment                          | 120 | 1       | 5       | 4.16 | .778           |
| N                                   | 120 |         |         |      |                |

Likert Scale: 5 strongly agree (4.21- 5), 4 agree (3.41 – 4.20), 3 neutral (2.61 -3.40), 2 disagree (1.81 – 2.60), Strongly disagree (1- 1.8)

**Challenges of Non-Formally Protected Areas in Benue State**

Anthropogenic activities observed in some NFPAs which were threats to the forest cover were farming, charcoal production, buildings, quarry, and bricks making (Table 6).

The study provides valuable insights into the role of non-forest protected areas (NFPAs) in forest biodiversity conservation in Benue State, Nigeria, offering a detailed inventory crucial for conservation evaluation. These areas were characterized by anthropogenic activities such as logging, farming, fuelwood collection, and local brick making, particularly in disturbed NFPAs. Additionally, the presence of exotic tree species and remnants of forest patches, especially at the boundaries, further underscores the ecological disturbance observed. For example, in Mbaakon (Tse Gare) in Vandeikya LGA, part of the forest was converted to private land and developed with buildings after a family legally claimed ownership, although other parts remained relatively undisturbed. In Usar NFPA, Kwande LGA, traditional conservation

practices deteriorated following the loss of two custodians, leading to deforestation. Similarly, in Mbaniange NFPAs in Guma LGA, farmland expansion and fuelwood harvesting were notable disturbances. Vandeikya and Kwande LGAs also showed evidence of rampant logging during the study period.

In contrast, undisturbed NFPAs were dominated by native tree species and dense canopy cover. These included sacred groves such as Ipinu-Igede in Oju LGA and Kotobo in Akwete-Akpa, Otukpo LGA, which were governed by community-based rules. These traditional management systems emphasized cultural values and sustainable harvesting practices. For instance, in Ipinu-Igede, a ten-year regeneration rule was enforced before selective harvesting, while in Otukpo, the forest was divided into three zones, with the core zone preserved strictly for religious worship, thereby limiting forest resource extraction.

**Table 3: Anthropogenic Activities Observed in NFPAs in Benue State**

| Category                                      | Anthropogenic activities observed                           |
|-----------------------------------------------|-------------------------------------------------------------|
| Private Owned NFPAs<br>(Individual or family) | logging                                                     |
| Community Owned NFPAs                         | Farming                                                     |
|                                               | Fuel wood extraction                                        |
|                                               | Conversion of forest areas to other land use e. g. building |
|                                               | Farming                                                     |
|                                               | Logging                                                     |
|                                               | Conversion of forest areas to other land use e. g. building |
|                                               | Fire                                                        |
|                                               | Hunting                                                     |
|                                               | Quarry                                                      |
| Sacred groove                                 | Charcoal production                                         |
|                                               | Bricks production                                           |
|                                               | Logging                                                     |
|                                               | Hunting                                                     |
| Extinct NFPAs                                 | Fire                                                        |
|                                               | Conversion of forest area to school                         |
|                                               | Conversion of forest area to farmlands                      |
|                                               | Conversion of forest area to church                         |
|                                               | Conversion of forest area settlement                        |

These findings align with Vijayan (2023), who emphasized the effectiveness of community-based conservation practices that are deeply rooted in cultural traditions.

This research corroborates the assertion by Ormsby (2011) that community-managed sacred forests serve as vital reservoirs of biodiversity. Benue State's sacred NFPAs, also found in Okpokwu, Ado, Kwande, and Vandeikya LGAs, demonstrate how traditional institutions and taboos contribute meaningfully to biodiversity conservation. In Ankar NFPA, Vandeikya LGA, however, ownership by a religious group has resulted in the depletion of mature trees, and in Gboko LGA, the conversion of Mbawa 1 and Mbawa 2 NFPAs to a market and a school, respectively, illustrates the threats posed by land pressure. This aligns with Emma et al. (2023), who noted that the increasing demand for land to accommodate population growth has resulted in significant forest landscape loss.

Forest biodiversity conservation is a key global objective, and the role of NFPAs is central to this effort (Bempong et al., 2023; Mahabaleshwarkar et al., 2023). Nigeria, like many nations, has committed to the “30 by 30” target of the Kunming-Montreal Global Biodiversity Framework (Dimitrakopoulos & Jones, 2021), aiming to protect 30% of its land and water resources by 2030. Despite this, NFPAs in Benue State continue to face multiple threats, including farming, charcoal production, construction, quarrying, and brickmaking. The study identifies that achieving the 30 by 30 goals requires stronger integration of NFPAs into national conservation strategies. This includes enhancing governance structures, recognizing community stewardship, and implementing monitoring programs. The diversity in NFPA ownership and management—ranging from private to community-led models—demonstrates the potential of localized strategies to address disturbances and promote sustainability (Li et al., 2023). Prioritizing conservation actions is essential to prevent species loss and ecosystem degradation, especially in cases where listed NFPAs in

official gazettes, such as those in Gboko LGA, were either unknown or degraded due to land use changes.

This study emphasizes the need to bridge traditional conservation practices with modern policy approaches. Integrating biodiversity into spatial planning and environmental governance—across local, national, and international levels—provides an inclusive pathway for conserving biodiversity-rich landscapes (Sayer et al., 2023; Venegas-Li et al., 2023). However, as Schröter et al. (2023) point out, there remains a gap in effectively incorporating ecosystem services into spatial planning, which is essential for achieving Target 1 of the GBF. NFPAs are essential for maintaining biodiversity and providing vital ecosystem services such as carbon sequestration, water purification, and climate regulation. Bishaw (2021) emphasizes that these landscapes play critical roles in stabilizing local climates, conserving species habitats, and protecting watersheds. Their conservation potential is amplified when local communities are empowered through co-management plans, financial support mechanisms, and enhanced awareness programs.

Finally, the condition of NFPAs in Benue State serves as a benchmark for biodiversity assessment and policy development. They contribute not only to soil protection and fertility but also uphold cultural heritage values. The identification, mapping, and legal recognition of these forests will ensure their legacy for future generations while contributing meaningfully to Nigeria's commitments under the Convention on Biological Diversity.

## **CONCLUSION**

The study identified and investigated the contributions of NFPAs to forest biodiversity conservation in Benue State, Nigeria. It presents a comprehensive list of NFPAs in Benue State for conservation assessment, as these forest landscapes serve as a repository of the flora and fauna of Benue State. The study also indicates that other LGAs contain NFPAs but are not on the BSG list, while

other NFPAs on the list are extinct. The study also indicates that some NFPAs were privately owned and others were community-owned or managed. Sustainable forest conservation exists in some of the NFPAs; this can be a guide to effective local conservation strategies for the disturbed NFPAs in Benue State. Additionally, local sustainable conservation efforts towards achieving this could significantly support the Kunming-Montreal Global Biodiversity Framework (GBF) for 2030, which necessitates updating these commitments to align with its goals, particularly in enhancing protected area coverage and integrating biodiversity conservation into national policies. Land use changes, evident through anthropogenic activities in disturbed NFPAs, will clearly outpace conservation of NFPAs, and practitioners and conservationists must augment traditional practices with new approaches to sustain forest landscapes. New approaches such as open data, big data, remote sensing, and other initiatives are currently being practiced to achieve specific actionable conservation agendas and goals. The study provided a baseline strategy on how to evaluate the effectiveness of protected areas, their accomplishment of conservation objectives, and their relevance to international agreements and treaties. From the study, it is evident that working with local communities to develop sustainable management plans, providing financial support for conservation initiatives, and raising awareness of the importance of NFPAs for forest biodiversity should be the focus of government, practitioners, and researchers alike. To substantively provide support for Benue's contributions to land degradation neutrality targets, sustainable development goals, and other international and national strategies. There is a need to identify gaps and develop the requisite NFPA monitoring programs as mitigation actions to achieve conservation goals.

## ACKNOWLEDGEMENTS

We are thankful to the department of forestry, ministry of environment and water resources for making the baseline data available in the Benue State Gazette of 2010. We are also grateful to the district forest officers and community forest guards for genuinely sharing information, without which this research would not be possible.

## REFERENCES

- Ancha, P. U., Ikyaagba, E. T., Egwunatum, A. E., Origbo, B. I., and Sunday, L. M. (2021). Assessment of Forest Products and Services Utilization as Sustainable Livelihood Options Among Households in Okpokwu Local Government Area, Benue State. *Journal of Agriculture and Sustainability*, 14(ISSN 2201-4357), 1–22.
- Akpa A. A, Onuh S. S, Kabuk V. E, and Julian C. I. (2022). An Assessment of the Impact of Round Wood Collection on Deforestation in Benue State, Nigeria, *Journal of Environmental and Geographical Studies*, ISSN 2958 – 4116, Vol.1, Issue 2, pp 1 – 13, 2022, <https://gprjournals.org/>.
- Cardinale, B. J., Emmett Duffy, J., Gonzalez, A., Hooper, D. U., Perrings, C., Venail, P., Narwani, A., MacE, G. M., Tilman, D., A. wardle, D., Kinzig, A. P., Daily, G. C., Loreau, M., Grace, J. B., Larigauderie, A., Srivastava, D. S., and Naeem, S. (2012). Correction: Corrigendum: Biodiversity loss and its impact on humanity. *Nature* 2012 489:7415, 489(7415), 326–326. <https://doi.org/10.1038/nature11373>
- Carlos Carrol, and Dale G. Miquelle. (2006). Identifying Corridors among Large Protected Areas in the United States \_ Enhanced Reader. *Journal of Applied Ecology*, 46, 1–1.
- Dagba, B.I, Azeez, I. O., & Ancha, P. U. (2017). Assessment of Community Based Forest Management Practices in Benue State, Nigeria. *IOSR Journal of Environmental Science*, 11(9), 68–75.

- <https://doi.org/10.9790/2402-1109016875>
- Dudley, N. (Editor) (2008). Guidelines for Applying Protected Area Management Categories. Gland, Switzerland: IUCN. x + 86pp. WITH Stolton, S., P. Shadie and N. Dudley (2013). IUCN WCPA Best Practice Guidance on Recognising Protected Areas and Assigning Management Categories and Governance Types, Best Practice Protected Area Guidelines Series No. 21, Gland, Switzerland: IUCN
- Dimitrakopoulos, P. G., & Jones, N. (2021). Protected areas in forest conservation: Challenges and opportunities. In *Forests* (Vol. 12, Issue 4). MDPI AG. <https://doi.org/10.3390/f12040488>
- Ikyaagba, E. T., Jande, J. A., & Abiem, M. K. (2020). Effects of Land Use and Land Cover Change on Tse Gavar Forest Reserve, Vandeikya Local Government Area, Benue State, Nigeria. *East African Journal of Forestry and Agroforestry*, 2(1), 34–46. <https://doi.org/10.37284/eajfa.2.1.127>
- Kandari L. S, Bisht V. K, Bhardwaj M, and Thakur A.K. (2014). Conservation and management of sacred groves, myths and beliefs of tribal communities: a case study from north-India, *Environmental Systems Research* 3:16 <http://www.environmentalsystemsresearch.com/content/3/1/16>
- Mdzuami Adelusi, S., Tersoo Ada, R., and Omudu, E. (2018). *Diversity and Abundance of Insects Species in Makurdi, Benue State, Nigeria. Prevalence of Sickle Cell among patients attending Immunogenetic Diagnostic Laboratory Akwanga, Nasarawa State Nigeria*. View project. <https://www.ijntr.org/diversity-and-abundance-of-insects-species-in-makurdi-benue-state-nigeria>. Accessed 14<sup>th</sup> September, 2024
- Neugarten, R. A., Langhammer, P. F., Osipova, E., Bagstad, K. J., Bhagabati, N., Butchart, S. H. M., Dudley, N., Elliott, V., Gerber, L. R., Gutierrez Arrellano, C., Ivanić, K.-Z., Kettunen, M., Mandle, L., Merriman, J. C., Mulligan, M., Peh, K. S.-H., Raudsepp-Hearne, C., Semmens, D. J., Stolton, S., & Willcock, S. (2018). Tools for measuring, modelling, and valuing ecosystem services: guidance for Key Biodiversity Areas, natural World Heritage sites, and protected areas. In *Tools for measuring, modelling, and valuing ecosystem services: guidance for Key Biodiversity Areas, natural World Heritage sites, and protected areas*. IUCN, International Union for Conservation of Nature. <https://doi.org/10.2305/iucn.ch.2018.p.ag.28.en>
- Newbold, T., Hudson, L. N., Hill, S. L. L., Contu, S., Lysenko, I., Senior, R. A., Börger, L., Bennett, D. J., Choimes, A., Collen, B., Day, J., de Palma, A., Díaz, S., Echeverria-Londoño, S., Edgar, M. J., Feldman, A., Garon, M., Harrison, M. L. K., Alhousseini, T., ... Purvis, A. (2015). Global effects of land use on local terrestrial biodiversity. *Nature*, 520(7545), 45–50. <https://doi.org/10.1038/NATURE14324>
- Shomkegh, S. A., Ancha, P. U., & Onuche, P. (2019). Socio-economic Factors Influencing Utilization of Forest Resources at Odoba Forest Reserve, Benue State, Nigeria. *Journal of Agriculture and Ecology Research International*, 1–9. <https://doi.org/10.9734/jaeri/2019/v18i430068>
- Tee, F., Agbidye, F., & Ogwuche, J. (2015). Indigenous forest conservation practices in Benue state, Nigeria. *Journal of Agriculture, Forestry and the Social Sciences*, 12(1), 182. <https://doi.org/10.4314/joafss.v12i1.20>
- Wilson, M. C., Chen, X. Y., Corlett, R. T., Didham, R. K., Ding, P., Holt, R. D., Holyoak, M., Hu, G., Hughes, A. C.,

- Jiang, L., Laurance, W. F., Liu, J., Pimm, S. L., Robinson, S. K., Russo, S. E., Si, X., Wilcove, D. S., Wu, J., & Yu, M. (2016). Habitat fragmentation and biodiversity conservation: key findings and future challenges. *Landscape Ecology*, 31(2), 219–227. <https://doi.org/10.1007/S10980-015-0312-3/FIGURES/1>
- Xu, W., Xiao, Y., Zhang, J., Yang, W., Zhang, L., Hull, V., Wang, Z., Zheng, H., Liu, J., Polasky, S., Jiang, L., Xiao, Y., Shi, X., Rao, E., Lu, F., Wang, X., Daily, G. C., & Ouyang, Z. (2017). Strengthening protected areas for biodiversity and ecosystem services in China. *Proceedings of the National Academy of Sciences of the United States of America*, 114(7), 1601–1606. [https://doi.org/10.1073/PNAS.1620503114/SUPPL\\_FILE/PNAS.1620503114.ST07.DOCX](https://doi.org/10.1073/PNAS.1620503114/SUPPL_FILE/PNAS.1620503114.ST07.DOCX)
- Yakubu, D. H., Eduno, O. T., Shuaibu, H., Muhammad, M. B., Oduhie, T. C., & Mamman, M. (2019). Perceived Effects of Farmer Participation in Utilization and Conservation of Forest Resources in Otukpo Local Government Area of Benue State. *Asian Journal of Agricultural Extension, Economics & Sociology*, 1–9. <https://doi.org/10.9734/ajaees/2019/v35i430230>
- Zaku, S. S., & Moor, V. (2022). Contributions of Indigenous Knowledge to the Conservation of Forest Resources in Benue State, Nigeria. In *FUW Trends in Science & Technology Journal*, [www.ftstjournal.com](http://www.ftstjournal.com) e-ISSN (Vol. 7, Issue 1). [www.ftstjournal.com](http://www.ftstjournal.com)
- Kandari, L. S., Bisht, V. K., Bhardwaj, M., & Thakur, A. K. (2014). Conservation and management of sacred groves, myths and beliefs of tribal communities: a case study from north-India. *Environmental Systems Research*, 3, 1-10.

**Appendix I: List of Non-Formally Protected Areas in Zone A Benue State, Nigeria**

| S/No | Non-Formally Protected Area | Local Government Area | Area (Hectares) | Coordinates                | Status      |
|------|-----------------------------|-----------------------|-----------------|----------------------------|-------------|
| 1    | Tor Donga                   | Katsina-Ala           | 147.00          | -                          | Not visited |
| 2    | Harga                       | Katsina-Ala           | 519.60          | -                          | Not visited |
| 3    | Mbadiev Tongov              | Katsina-Ala           | 36.68           | -                          | Not visited |
| 4    | Sai                         | Katsina-Ala           | 68.26           | -                          | Not visited |
| 5    | ***Uma 1 & 2                | Konshisha             | 143.40          | -                          | Not visited |
| 6    | ***Mbashia                  | Konshisha             | 44.00           | -                          | Not visited |
| 7    | ***Mbakpor                  | Konshisha             | 8.24            | -                          | Not visited |
| 8    | ***Mbavaar 1                | Konshisha             | 25.50           | -                          | Not visited |
| 9    | ***Mbangur 5                | Konshisha             | 2.25            | -                          | Not visited |
| 10   | ***Mbangur 6                | Konshisha             | 11.06           | -                          | Not visited |
| 11   | ***Mbaimon 1                | Konshisha             | 5.40            | -                          | Not visited |
| 12   | ***Mbaimon 2                | Konshisha             | 6.00            | -                          | Not visited |
| 13   | ***Mbaimon 3                | Konshisha             | 14.50           | -                          | Not visited |
| 14   | ***Mbaimon 4                | Konshisha             | 13.60           | -                          | Not visited |
| 15   | ***Mbaimon 5                | Konshisha             | 21.00           | -                          | Not visited |
| 16   | ***Mbaiker                  | Konshisha             | 6.30            | -                          | Not visited |
| 17   | ***Iwarev Kendev            | Konshisha             | 17.50           | -                          | Not visited |
| 18   | ***Zev                      | Konshisha             | 35.80           | -                          | Not visited |
| 19   | Terev Tiev                  | Kwande                | 42.68           | -                          | Not visited |
| 20   | Apipo                       | Kwande                | 21.00           | -                          | Not Visited |
| 21   | Ajio                        | Kwande                | 45.90           | -                          | Not visited |
| 22   | Usar                        | Kwande                | 13.40           | N06° 54.280' E009° 13.464' | Disturbed   |

|    |                                          |           |        |                            |             |
|----|------------------------------------------|-----------|--------|----------------------------|-------------|
| 23 | Mbajor Kwase                             | Kwande    | 10.12  | -                          | Not visited |
| 24 | Mbaikuna                                 | Kwande    | 10.24  | -                          | Not visited |
| 25 | *Gyande Nor Ahav Forest, Mbakosu, Naney. | Kwande    |        | N06° 52.028' E009° 17.190' | Disturbed   |
| 26 | *Apera Forest, Mbalumun, Naney           | Kwande    |        | N06° 51.812' E009° 16.809' | Disturbed   |
| 27 | *Mbaaki Forest, Mbalumun, Naney.         | Kwande    |        | N06° 51.481' E009° 15.834' | Undisturbed |
| 28 | *Laadi Mbatur Forest, Mbalumun, Naney.   | Kwande    |        | N06° 52.186' E009° 15.423' | Undisturbed |
| 29 | Nkon hill                                | Kwande    | -      | N06° 57.708' E009° 60.327' | Undisturbed |
| 30 | *Iwanev-Anwase Nyievya                   | Kwande    | -      | N06° 69.518' E008° 55.737' | Disturbed   |
| 31 | Anyiin                                   | Logo      | 53.00  | -                          | Not visited |
| 32 | Mbazer                                   | Ushongo   | 189.33 | N07° 04.640' E009° 02.972' | Disturbed   |
| 33 | Mbamile                                  | Ushongo   | 23.00  | N07° 03.113' E009° 08.604' | Disturbed   |
| 34 | Adigbande                                | Ushongo   | 152.00 | -                          | Not visited |
| 35 | Mbakor 1                                 | Ushongo   | 20.80  | N07° 03.455' E009° 08.009' | Disturbed   |
| 36 | Mbakor 2                                 | Ushongo   | 25.60  | N07° 03.369' E009° 09.140' | Disturbed   |
| 37 | Wo Ushongo                               | Ushongo   | 30.35  | N06° 58.783' E009° 15.485' | Disturbed   |
| 38 | Iko Asagh                                | Ushongo   | 27.80  | -                          | Undisturbed |
| 39 | Ate Kombo                                | Ushongo   | 15.00  | N07° 02.046' E009° 05.809' | Disturbed   |
| 40 | Iko Azenda                               | Ushongo   | 18.90  | N07° 02.204' E009° 15.488' | Disturbed   |
| 41 | Aaigbande                                | Ushongo   | -      | -                          | Not visited |
| 42 | Mbadagbera                               | Ushongo   | -      | -                          | Not visited |
| 43 | Mbajoho/Mbawuangi                        | Ushongo   | -      | -                          | Not visited |
| 44 | *Ikyor Ugase                             | Ushongo   | -      | -                          | Disturbed   |
| 45 | Anwo                                     | Ushongo   | -      | N06° 57.230' E009° 15.218' | Disturbed   |
| 46 | Tse Mker                                 | Vandeikya | 20.70  | -                          | Disturbed   |
| 47 | Gbaagbande                               | Vandeikya | 320.05 | N06° 58.523' E009° 08.405' | Extinct     |
| 48 | Mbaakon (Tse Gare)                       | Vandeikya | 371.00 | N06° 53.582' E009° 08.289' | Disturbed   |

|    |                    |           |        |                            |             |
|----|--------------------|-----------|--------|----------------------------|-------------|
| 49 | Ibeev (Mbakange)   | Vandeikya | 330.00 | N06°45.261' E009°02.694'   | Extinct     |
| 50 | Ankar (Mbakange)   | Vandeikya | 369.00 | N06°44.022' E009°01.815'   | Disturbed   |
| 51 | Mbaakune 1         | Vandeikya | 220.00 | -                          | Disturbed   |
| 52 | Mbaakune 2         | Vandeikya | 152.00 | -                          | Disturbed   |
| 53 | Mbaigbianatsor     | Vandeikya | 200.00 | -                          | Disturbed   |
| 54 | Mbakuogh           | Vandeikya | 450.00 | N06°59.767' E009°03.693'   | Disturbed   |
| 55 | **Mbajor           | Vandeikya | 370.00 | -                          | Disturbed   |
| 56 | Mbakase            | Vandeikya | 381.00 | -                          | Disturbed   |
| 57 | Anhyula            | Vandeikya | 201.05 | -                          | Disturbed   |
| 58 | Ushe Uba           | Vandeikya | 341.00 | N06°40.537' E 009°07.386'  | Disturbed   |
| 59 | Ankaa (Mbajor Uma) | Vandeikya | 321.00 | -                          | Disturbed   |
| 60 | *Mbayongu (Maaki)  | Vandeikya | -      | -                          | Undisturbed |
| 61 | *Tse-Kpum (Ute)    | Vandeikya | -      | N06° 51.615' E 009°07.006' | Disturbed   |

**Source: Field Work (2024)**

Key: \* = New NFPAs to the list, \*\* = unkown NFPAs by community members and forest officers, \*\*\* = unsafe NFPAs

**Appendix II: List of Non-Formally Protected Areas in Zone B Benue State, Nigeria**

| S/No | Non-Formally Protected Area | Local Government Area | Area (Hectares) | Coordinates                | Status      |
|------|-----------------------------|-----------------------|-----------------|----------------------------|-------------|
| 1    | Mbatyerev                   | Gboko                 | 32.37           | -                          | Disturbed   |
| 2    | Mbawav 1                    | Gboko                 | 0.63            | -                          | Extinct     |
| 3    | Mbawav 2                    | Gboko                 | 10.53           | -                          | Extinct     |
| 4    | Mbagbanya                   | Gboko                 | 14.18           | -                          | Disturbed   |
| 5    | **Mbawaa                    | Gboko                 | 52.25           | -                          | Not visited |
| 6    | **Mbaiku                    | Gboko                 | 137.00          | -                          | Not visited |
| 7    | Mbanache                    | Gboko                 | 19.85           | -                          | Disturbed   |
| 8    | **Mbatseve 1                | Gboko                 | 23.00           | -                          | Not visited |
| 9    | **Mbatseve 2                | Gboko                 | 49.00           | -                          | Not visited |
| 10   | **Mbaloso                   | Gboko                 | 181.00          | -                          | Not visited |
| 11   | **Mbawange                  | Gboko                 | 51.00           | -                          | Not visited |
| 12   | **Ukonge                    | Gboko                 | 277.00          | -                          | Not visited |
| 13   | **Gangabe                   | Gboko                 | 262.00          | -                          | Not visited |
| 14   | Mbasur                      | Gboko                 | 66.83           | -                          | Disturbed   |
| 15   | Yandev                      | Guma                  | 25.48           | N07°54.903' E008° 31.309'  | Disturbed   |
| 16   | Mbasaan                     | Guma                  | 545.80          | -                          | Not visited |
| 17   | Mbasombo (Tse-Kuhe)         | Gwer East             | 87.00           | N07° 32.890' E008° 33.104' | Disturbed   |

|    |                       |           |         |                             |             |
|----|-----------------------|-----------|---------|-----------------------------|-------------|
| 18 | *Mbasombo (Anchiha)   | Gwer East | -       | N07° 34.779' E008° 33.051'  | Disturbed   |
| 19 | *Ikwe-gbanyam (Igbor) | Gwer East | -       | N07° 26.918' E 008° 35.478' | Disturbed   |
| 20 | ***Mbapa              | Gwer West | 460.00  | -                           | Not visited |
| 21 | ***Udam               | Gwer West | 990.00  | -                           | Not visited |
| 22 | Ikyagher (Tse-Awuna)  | Gwer West | 520.00  | N07° 30.348' E008° 10.760'  | Disturbed   |
| 23 | ***Agbadum            | Gwer West | 1560.00 | -                           | Not visited |
| 24 | *Sengev               | Gwer West | -       | -                           | Disturbed   |
| 25 | *Gyaluwa              | Gwer West | -       | -                           | Disturbed   |
| 26 | *Ucha                 | Gwer West | -       | -                           | Disturbed   |
| 27 | *Mbakyoendu           | Gwer West | -       | -                           | Disturbed   |
| 28 | *Saghev               | Gwer West | -       | -                           | Disturbed   |

**Source: Field Work (2024)**

Key: \* = New NFPAs to the list, \*\* = unkown NFPAs by community members and forest officers, \*\*\* = unsafe NFPAs

**Appendix III: List of Non-Formally Protected Areas in Zone C Benue State, Nigeria**

| S/No | Non-Formally Protected Area | Local Government Area | Area (Hectares) | Coordinates                | Status      |
|------|-----------------------------|-----------------------|-----------------|----------------------------|-------------|
| 1    | *Onyoduma                   | Ado                   | -               | N06° 55.994' E008° 03.467' | Undisturbed |
| 2    | *Odo                        | Ado                   | -               | N06° 55.649' E008° 04.482' | Undisturbed |
| 3    | *Akpam                      | Ado                   | -               | N06° 55.940' E008° 06.646' | Undisturbed |
| 4    | *Igede                      | Ado                   | -               | N06° 47.130' E007° 59.531' | Disturbed   |
| 5    | *Adaka                      | Ado                   | -               | N06° 47.955' E007° 59.338' | Disturbed   |
| 6    | Ipinu Igede                 | Oju                   | -               | N06° 48.028' E008° 26.042' | Undisturbed |
| 7    | Ogori                       | Oju                   | 12.80           | -                          | Undisturbed |
| 8    | *Ipinu Uwokwu               | Oju                   | -               | N06° 45.036' E008° 21.006' | Undisturbed |
| 9    | *Idelle                     | Oju                   | -               | -                          | Undisturbed |
| 10   | *Ohuma                      | Oju                   | -               | -                          | Undisturbed |
| 11   | *Obibagwa                   | Oju                   | -               | -                          | Undisturbed |
| 12   | *Ohuma                      | Oju                   | -               | -                          | Undisturbed |
| 13   | Itete                       | Okpokwu               | 100.00          | N07° 09.411' E007° 47.604' | Disturbed   |
| 14   | *Ejege                      | Okpokwu               | -               | N07° 11.086' E007° 47.797' | Disturbed   |
| 15   | *Aokpe                      | Okpokwu               | -               | N07° 13.010' E007° 48.371' | Disturbed   |
| 16   | *Aibeda                     | Okpokwu               | -               | N07° 13.297' E007° 47.434' | Undisturbed |
| 17   | *Ondo                       | Okpokwu               | -               | N07° 11.813' E007° 46.556' | Disturbed   |
| 17   | *Okugaga                    | Okpokwu               | -               | N07° 09.162' E007° 46.099' | Undisturbed |
| 19   | *Idogodo                    | Okpokwu               | -               | N07° 05.905' E007° 46.836' | Disturbed   |
| 20   | *Ishaku                     | Okpokwu               | -               | N07° 09.760' E007° 49.667' | Disturbed   |
| 21   | *Olanyega                   | Okpokwu               | -               | N07° 09.890' E007° 51.411' | Disturbed   |
| 22   | *Ogbodo Amejo               | Okpokwu               | -               | N07° 09.341' E007° 52.893' | Disturbed   |
| 23   | *Ekeh Olengbecho            | Okpokwu               | -               | N07° 08.701' E007° 54.783' | Disturbed   |
| 24   | *Ogblega                    | Okpokwu               | -               | N07° 09.379' E007° 53.100' | Disturbed   |
| 25   | *Akwete (Okotobo)           | Otukpo                | -               | N07° 02.526' E008° 05.110  | Undisturbed |
| 26   | *Egbla                      | Otukpo                | -               | N07° 02.717' E008° 04.649  | Undisturbed |

**Source: Field Work (2024)**

Key: \* = New NFPAs to the list, \*\* = Unkown NFPAs by community members and forest officers, \*\*\* = unsafe NFPAs