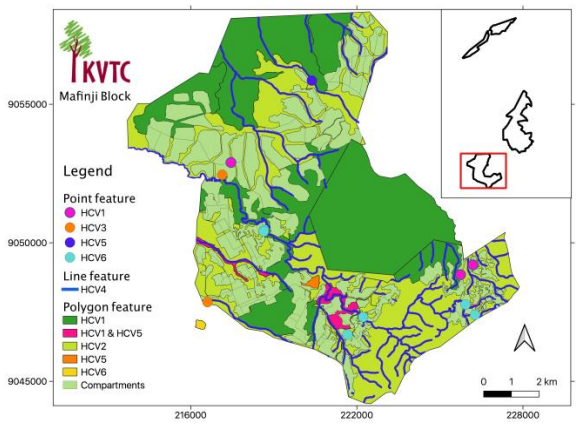
Assessment of High Conservation Value Areas on Kilombero Valley Teak Company (KVTC) landholdings



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Cover Photo and layout: Kahana Lukumbuzya facilitating a meeting/EFC Limited.

Photo credit: Isaac Malugu

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Acronyms

CBFM	Community Based Forest Management
DD	Data Deficiency
EMA	Environment Management Act
FGD	Focused Group Discussion
FPIC	Free, Prior and Informed Consent
FSC	Forest Stewardship Council
GIS	Geographic Information System
GN	Government Notice
HCVA	High Conservation Value Areas
HCV	High Conservation Values
HCVNR	High Conservation Values Resource Network
IBA	Important Bird Areas
ID	Identification
ISO	International Standard Organization
IUCN	International Union for Conservation of Nature
KFNR	Kilombero Forest Nature Reserve
KVRS	Kilombero Valley Ramsar Site
KVTC	Kilombero Valley Teak Company
MNRT	Ministry of Natural Resources and Tourism
MoW	Ministry of Water
NFSS	National Forest Stewardship Standard
NTFPs	Non Timber Forest Products
RTE	Rare, Threatened and Endangered
RWBO	Rufiji Water Basin Office
TANAPA	Tanzanian National Parks

TAWA	Tanzania Wildlife Authority
TFS	Tanzania Forest services
VGS	Village Game Scout

Executive summary

Identification and assessment of High Conservation Value Areas (HCVAs) and their Values (HCVs) was conducted in January 2023, following a request for corrective action after FSC surveillance audit to KVTC Company. KVTC is compliant with the FSC National Forest Stewardship Standard of Tanzania but is not certified due to historical conversion.

The identification of HCVAs was carried out by a team of experts, which involved participatory mapping and field assessment of the High Conservation Values areas and geo referencing them through GIS system. The identification engaged a whole range of stakeholders from local communities to high level experts and intensive review of Best Available Information (BAIs).

The KVTC land was confirmed to have all the High Conservation Values (HCVs) based on categorization by HCVRN. The six distinct categories represent high level of niche to be conserved, with all the inputs and efforts from the KVTC management and relevant stakeholders. The latter could include positively and negatively affected stakeholders, to bring about consented efforts and initiatives to save the last remaining high conservation values within KVTC land. The HCVAs will also represent the fast-vanishing representative samples around the general and unprotected forested land. The six HCVs will protect and harbour rare, threatened, and endangered species of flora and fauna, as well as provide refugia from unprotected land.

Few surveys have been done to identify invertebrate species in the valley, with only limited studies on butterflies. Likewise, small mammals and other vertebrates have not been thoroughly surveyed since the work of FRONTIER in 2011. No amphibians or reptiles from the KVTC Lands are listed as Critically Endangered, Endangered or Vulnerable under the IUCN categories. However, the one species that was listed was determined to be Data Deficient. KVTC has committed to continuing to monitor this species.

KVTC needs to put more effort in protecting HCVs, especially ASIs (in HCV 6), that are exposed to road and land clearing, and should be part of the targets within the implementation of management plans. Resources' input into HCVs activities such as staff and budget should always be allocated annually. Physical monitoring and remote sensing could also help in developing trajectories of land cover changes on KVTC land and the surrounding landscape for the next long period of time. This will help KVTC to have informed decisions on strategizing management of the key plantation crop, (i.e teak) as well as natural forests that occupy the large area under KVTC land holding

1. INTRODUCTION

The Kilombero Valley Teak Company (KVTC) is a forestry company operating in Ulanga, Mlimba and Malinyi Districts of Morogoro Region in the United Republic of Tanzania. The company manages 28,132 ha of land. About 30% of this is planted under teak and the remaining 70% (about 20,000 ha) is set aside for conservation purposes. This conservation land plays an important role in the area by acting as a wildlife corridor between the Udzungwa Mountains National Park, the newly gazetted Kilombero Game Reserve and the Selous Game Reserve (SGR), the northern part of which has been designated as the Nyerere National Park. The area also provides refuge to a significant number of animals and is of a high biodiversity value.

KVTC is certified under the ISO 14001:2015 management system and is also evaluated every year against the National Forest Stewardship Standard for compliance based on Forest Stewardship Council (FSC) certification standard and systems.

KVTC landholdings are contained entirely within the boundaries of the Kilombero River Valley, which dominates the south-western landscape of Morogoro Region. KVTC obtained leasehold rights in 1992 to practice forestry on 28,132 ha of land in Ulanga and Kilombero Districts. An additional 100 ha site was allocated to KVTC in Mavimba Village, Ulanga District for the establishment of a processing plant in 2008 and construction was completed in 2009. Since that time, Ulanga District has been divided in two with the creation of the new Malinyi District, while Kilombero District was also divided with the creation of the new Mlimba District. As a result of these administrative divisions KVTC properties are currently spread across the three rural districts of Ulanga, Malinyi and Mlimba.

1.1. Wider landscape context and significance of the Kilombero Valley area

The main feature of the Kilombero Valley is naturally the Kilombero River and its tributaries, which provide two-thirds of the total flow of the Rufiji River, Tanzania's largest watercourse. The Kilombero Valley floodplain is east Africa's largest natural wetland and contains a 7,000 km^2 Ramsar Site. The valley's seasonally flooded grasslands and surrounding Miombo woodlands formerly harboured Africa's highest density of lions and is still the home of the near-threatened Puku antelope in addition to endemic birds, plants, and fishes. The Kilombero Valley is bounded by the Udzungwa Mountains to the north and the Mahenge Range in the south, both ranges being part of the so called Eastern Arc Mountains.

A steep escarpment rising to 1,000 m forms a natural northern boundary to the KVTC land area. Undulating hills in the north give way to the flat Kilombero River floodplain, which is 10 - 20 km wide. The lower river terraces are covered by a

complex of swamps, seasonal waterways, and oxbow lakes. South of the floodplains, there are a series of low ridges of wide flat depressions that grade into hills and ridges of the Mahenge Range. South of the valley lies what was formerly the 50,000 km^2 Selous Game Reserve, which was Tanzania's largest protected area and is recognized as a World Heritage Site for its exceptional faunal diversity, numbers, and undisturbed nature. KVTC Lands have several protected areas as neighbours, including the Udzungwa Mountains National Park, Kilombero Nature Reserve, the former Kilombero Game Controlled Area, Magombera and Uzungwa Scarp Forest Reserves and the previously mentioned Selous Game Reserve, of which 30,893 km^2 in the north, were recently upgraded to national park status.

The KVTC plantation areas are divided into four management units, the Nakafulu, Mafinji, Narubungo and Ichima Blocks. Each management unit is divided into compartments of various sizes, according to age and suitability of topography for teak plantations. The non-production areas are divided into various sections for management purposes and are defined by parameters such as geographical position, conservation value and species composition. The KVTC landholdings in their entirety are surrounded by several villages in at least 7 administrative wards across the three districts. The KVTC area, as with the Kilombero Valley as a whole, is undergoing rapid change due to a variety of drivers, including rapid growth of a poor rural population dependent on natural resources, associated habitat conversion and land degradation, deforestation, grazing pressure, wildlife depletion, over-fishing, habitat fragmentation by farms and roads, water abstractions for irrigation, and possible climate change.

In order to engage positively with communities so as to encourage active participation in environmental management and to support opportunities for economic development, KVTC established the Social Fund to provide continuous support to communities that granted land to KVTC for its forestry and processing operations. Through the Social Fund, KVTC avails a sum of money on an annual basis towards community projects in each of 14 associated villages. Since 2003, projects worth about $185,000 have been funded in 11 villages surrounding KVTC. In 2002, KVTC embarked on a village outgrower project, where annually teak woodlots were established on the lands of small holder farmers in associated villages. KVTC finances the establishment and maintenance of these outgrower teak woodlots and guarantees a market at a minimum age of 15 years for the trees. The outgrower scheme grew out of the Social Fund and at one point was expanded through joint funding provided by a development partner agency that has a presence in Tanzania.

1.2. Scope of the HCV assessment of the KVTC landholdings

An assessment of High Conservation Values (HCVs) was conducted in the 28,132 ha of KVTC landholdings that are managed directly by the company. However, the HCV assessments also considered landscapes surrounding these landholdings. The

HCV assessment considered the impact of KVTC operations on various factors including, the flow and health of the Kilombero River and its tributaries; the status of habitats for various species of birds, fish and wildlife; the functions of wildlife corridors that link the Selous/Nyerere, Kilombero and Udzungwa ecosystems; and the welfare of communities that surround KVTC.

1.3. **HCV assessment process - data sources and data collection methodologies**

Principle nine of the FSC standards' ten principles requires that extra safeguards and levels of protection are employed for six recognized High Conservation Values (HCV). It is the presence of High Conservation Values that determines whether spaces such as forests are designated as High Conservation Value Areas. High Conservation Values were first defined by the High Conservation Value Resource Networks (HCVRN), and later adopted by the FSC for use in forest certification systems. More recently the concept is increasingly being used for other purposes, including conservation, natural resource planning and advocacy, landscape mapping and even in the purchasing policies of companies. The HCV terminology has recently begun to appear in the discussions and policies of government agencies and institutional donors.

According to the HCV Assessment Manual (HCVRN, 2019[1]), the six categories of HCV are listed as follows:

- **HCV 1 Species diversity**: Concentrations of biological diversity including endemic species, and rare, threatened, or endangered species (RTE), that are significant at global, regional or national levels.
- **HCV 2 Landscape-level ecosystems and mosaics**: Intact forest landscapes and large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.
- **HCV 3 Ecosystems and habitats**: Rare, threatened, or endangered (RTE) ecosystems, habitats, or areas of refugia[2].
- **HCV 4 Ecosystem services**: Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.
- **HCV 5 Community needs:** Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagement with these communities or indigenous peoples.

[1] HCVRN. 2019.

[2] Refugia can be defined as habitats or environmental factors that coupled with morphological, life history, and behavioural attributes of animals reduce the impacts of disturbance.

- **HCV 6 Cultural values:** Sites, resources, habitats, and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.

By identifying these key values in a particular forested area and ensuring that they are maintained or enhanced, it is possible to make rational management decisions that are consistent with the protection of a forest area's important environmental and social values.

The FSC standard requires efforts additional to those already provided under its principles and criteria, by requiring greater efforts to identify and assess HCVs, including environmental and social values not covered elsewhere. The assessment of HCVs must also respect the right to Free, Prior and Informed Consent (FPIC) of affected rights holders and local communities. In undertaking a HCV assessment, it is important that engagement with local communities (and/or indigenous people), all stakeholders and experts are undertaken.

2. METHODOLOGIES, ANALYSIS AND LIMITATIONS

The HCV assessment of KVTC landholdings was carried out by a team made up of three experts; (1) a natural resources management expert with extensive local and international experience implementing and auditing FSC certification processes, including developing HCV frameworks; (2) a forest ecologist with more than two decades of experience with community based and integrated natural resources management initiatives; and (3) a GIS/Mapping expert with graduate degrees in spatial ecology, forest ecology and management and more than fifteen years of experience working with rural communities to develop conservation plans for wildlife and forest protected areas.

The approach of the HCV assessment team was to use Best Available Information (BAI) approaches. BAI is typically collected from three main sources, namely data, documents and from expert opinions. There is no shortage of documented information regarding the Kilombero Valley, stemming from its special features as a major drainage basin; a Ramsar bird area of international importance; a nationally recognized wildlife migration route; and a cluster area for a major agribusiness corridor. Initially, the main task of the HCV assessment team was to properly identify and orient the specific elements and activities of KVTC within the context of the larger Kilombero Valley.

2.1. Desk Reviews

The HCV assessment team began by collecting, reviewing, and synthesizing information from literature and sorting it according to the six HCV categories. Although documents began to be sourced already in mid-December 2022, the actual formal review of literature began in mid-January 2023, subsequent to an initial meeting between KVTC and the HCV Team. Many documents were sourced from KVTC itself in the way of routinely produced monitoring reports for elements such as; Environment, Social and Governance (ESG), Areas of Special Interest (ASI) and water quality. In addition to the monitoring reports, KVTC also provided a series of FSC surveillance and 3rd party audit reports, which was supplemented by reports in connection with biodiversity surveys, hydrological studies, archaeological assessments, livelihood impact assessments and several other documents that had bearing on the HCV assessment. The HCV team were able to source additional written information from their own databases in addition to literature provided by various experts who were consulted in the course of conducting the assessment exercise.

The HCV Team conducted a rapid gap analysis that allowed them to determine which information was missing, insufficient or inaccessible. Checklists, questionnaires, and a consultation plan were then developed by the HCV Team to guide subsequent Key Informant Interviews and Focus Group Discussions.

2.2. Field consultations and observations

Over the course of the period 13th - 24th February 2023, the HCV Team conducted a field mission to the Kilombero Valley and to Morogoro Municipality. While in the Kilombero Valley, the HCV Team conducted Key Informant Interviews with key staff of district councils in Malinyi, Ulanga and Mlimba in addition to field officers of the Rufiji River Basin Office in Ifakara, Tanzania Forest Services Agency (TFS) Forest Conservation Officers at the Kilombero Nature Reserve and the district office in Ifakara, and officers of the Tanzania Wildlife Management Authority (TAWA) field office in Ifakara.

During this same period, the HCV Team also visited 12 KVTC partner or neighbouring villages and conducted participatory mapping exercises together with Focus Group Discussions with community representatives. The village communities were represented by village leadership, village game scouts, elderly and long-term village residents, women, and youths in addition to specifically identified individuals with strong associations to the lands bordering the KVTC areas. KVTC managers for Corporate Social Responsibility and for Occupational Health and Safety accompanied the HCV Team in all the village meetings. The exact number and names of villages visited was agreed with KVTC management beforehand. The criteria for selecting villages were based on a desire to involve as broad a representation as possible of KVTC adjacent villages, the time available to the HCV

team and accessibility to villages and community members. The specific schedule of field visits to KVTC adjacent villages is listed in Table 1 here below.

Table 1 List of KVTC adjacent villages visited by HCV Team 14th - 21st February 2023

	Village Name	Date visited
1	Itete-mnazini, -	14th February 2023
2	Alabama	14th February 2023
3	Madabadaba	14th February 2023
4	Namawala	16th February 2023
5	Mbasa,	17th February 2023
6	Nakafulu,	17th February 2023
7	Namhanga	17th February 2023
8	Magereza	17th February 2023
9	Kichangani	20th February 2023
10	Ikungua	20th February 2023
11	Idete A	21st February 2023
12	Idete B	21st February 2023

All four KVTC forest blocks, including Mafinji (8,212.4 hectares), Nakafulu (15,171.1 Ha), Ichima (2,636.3 hectares) and Narubungo (2,111.7 hectares) were visited by the HCV team, surveyed and potential HCV areas that had been identified through the participatory mapping exercise, and through the various BAI sources, were located and geo-referenced by the GIS expert using GPS Garmin 4 GPS.

2.3. National interpretations on HCVs

Currently there are no formal National Interpretations related to HCV in Tanzania. However, there are several informal interpretations based on national policies and legislation that are useful for assessing HCVs. The national legislations and regulations that provide guidance on some of the HCVs are listed here below:

a) ***Environmental Management Act: Sections 67 and 231*** allow the Minister responsible for the Environment to make regulations for *in-situ* and *ex-situ* biodiversity conservation or that the Minister may, in consultation with relevant sector Ministries, make regulations providing for *in-situ* conservation of biological diversity.

   Section 66 of the Act requires the Minister responsible for the Environment to strive to attain the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.

Section 51 of the Act prohibits activities which may adversely affect conservation of natural lake shorelines, riverbank, water dam or reservoir, by requiring that they will not be conducted within sixty (60) meters of such sensitive areas.

b) ***The National Forest Policy Implementation Strategy 2022 (derived from the Forest Policy 1998),*** defines **Biodiversity** as the variability among living organisms and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems

c) ***National Stewardship Standard of Tanzania (NFSS):*** *the NFSS* defines the **High Conservation Value Areas** as zones and physical spaces which possess and/or are needed for the existence and maintenance of identified *High Conservation Values*. Any of the following values:

HCV1: Species Diversity. Concentrations of biological diversity including endemic species, and rare, threatened, or endangered species, that are significant at global, regional or national levels.

HCV 2: Landscape-level ecosystems and mosaics. Intact Forest Landscapes, large landscape-level ecosystems and ecosystem mosaics that are significant at global, regional, or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.

HCV 3: Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia.

HCV 4: Critical ecosystem services. Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.

HCV 5: Community needs. Sites and resources fundamental for satisfying the basic necessities of local communities or Indigenous Peoples. (for example for livelihoods, health, nutrition, water), identified through engagement with these communities or Indigenous Peoples.

HCV 6: Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or Indigenous Peoples, identified through engagement with these local communities or Indigenous Peoples. (Source: based on FSC-STD-01-001 V5-0).

2.4 Limitations

The study was conducted in good time frame; however, a lack of national data that identifies large landscapes that cover the Kilombero Valley was one of the

limitations. The FSC identifies Tanzania as one of the countries with large landscapes and the Tanzanian national FSC standard mentions the country's' landscapes. However, it lacks specific information for the Kilombero Valley and its Ramsar Site. The national FSC definition was not specifically qualified; however, the HCVRN provided alternatives that allowed sufficient qualification of HCV 2.

Community engagement, including participatory mapping, was limited by the knowledge of community members of flora and faunal species in their vernacular languages. This resulted in delays in identifying some of the biodiversity that has been sighted by village members. The HCV Team were only partly successful in determining the common and scientific names of the species identified by villagers in the community meetings through their vernacular languages. However a few species (mostly fish) were able to be referenced through literature reviews.

2.5. Structure of the report

Following this introductory section, the report comprises the following main chapters:

- **Chapter 3** provides HCVs Categories i.e. from HCV 1 - HCV 6 with description on four areas. That is Identification (including all elements in each category), Assessments, Management strategies and Monitoring of each of the HCV.
- **Chapter 4** briefly presents the Conclusion
- Chapter 5 provides recommendations at Company level as well as Stakeholders level and at Institutional level.
- There are two separate documents associated to this report i.e. 1/ Management strategies and 2/Monitoring regimes for HCVs
- A separate report based on GIS software containing maps indicating all HCVAs and descriptions on all HCVs.

3 THE HIGH CONSERVATION VALUES

3.1 HCV 1 - Species diversity

3.1.1 Identification of HCV 1

3.1.1.1 Element 1: Concentrations of biological diversity

The KVTC Lands are dominated by Miombo woodlands as a major ecological zone. Miombo woodland areas on the alluvial fans and low hills on the edges of the Kilombero floodplain provide habitats for a range of species as well as seasonal habitat when the valley floods (Starkey et al., 2002; ERM, 2013). The biological value of the Miombo forests encompass all animal and plant groups that have been studied to date including, mammals (especially primates), birds, amphibians and reptiles, butterflies, millipedes, higher plants, ferns, etc. The Kilombero Valley is home to at least 64 mammal species, 251 bird species, 51 reptiles, 26 amphibians and 81 butterfly species (MoW, 2012). Some of the plant and mammal species of interest, i.e. IUCN categories are listed in annexes 6 and 7. KVTC Lands are part of the larger Kilombero Valley that includes the 7,967 km^2 Kilombero Valley Ramsar Site and is bounded to the north-west by the Eastern Arc Mountains. The evergreen forests of the Udzungwa Mountains, Kilombero Nature Reserve and to a lesser extent those of the Mahenge hills, form a major component in the Eastern Arc chain of mountain forest areas of exceptional biodiversity and endemism. The Kilombero Valley wetlands are used by wildlife as dry season habitat, moving out to elevated land on the perimeter (formerly miombo woodland) during the wet season when the valley is flooded.

The valley is an Important Bird Area (IBA), hosting almost 300 unique and diverse bird species on a regular basis and can hold up to 20,000 water birds during the wet season. Bird species such as the Kilombero weaver (*Ploceus burnieri*), Kilombero Cisticola and Melodious Cisticola (*Cisticola sp. nov*.), are endemic to the valley (MNRT, 2002; MoW, 2012). Two other bird species found in the valley, the Olive-headed weaver (*Ploceus olivaceiceps*) and Pale-billed hornbill (*Tockus palliddirostris*), are near endemic to Tanzania (MNRT, 2002; MoW, 2012). The gallery forests in the valley provide cold season habitats for montane and semi-montane bird species. Three bird species are found in significant numbers, namely the African skimmer (*Rynchops flavirostris*), African open-billed Stork (*Anastomus lamelligerus*), and wattled plover (*Vanellus senegallus*). Large trees in the floodplain provide roosts for many water bird species (Starkey et al., 2002; ERM, 2013). The valley is a stop-over for palaearctic birds migrating from Europe to southern Africa (MNRT, 2002; MoW, 2012). Several species of concern, such as the Kilombero weaver, hornbills, crested white eagles, hammerkops, shoebills; and other IUCN red listed bird species roost or breed in the KVTC landholdings (Annex 7).

Plant communities in the valley's swamps and gallery forests contain many unique and poorly known species but are increasingly heavily exploited by residents and incomers (Starkey et al., 2002; ERM, 2013). The Valley contains a diverse flora of around 350 species of plants, including both endemic and threatened species. Surveys have identified at least seven different sets of plant communities based on their dominance in the Kilombero Valley, including forests on the KVTC Lands (Hamza and Munishi, 2021). These communities include *(1) Diplorhynchus condylocarpon – Brachystegia spiciformis, (2) Pseudolachnostylis maprouneifolia - Combretum stuhlmanii, (3) Annona senegalensis –Dalbergia melanoxylon, (4) Vitex doniana - Pteoleopsis myrtifolia, (5) Kigelia africana – Ficus cyncomorus, (6) Cyperus papyrus – Ficus elastica and (7) Cymbopogon giganteus – Phragmites mauritianus.* These species of importance occur in abundance and are among the eighty-nine (89) plant species belonging to 31 plant families inhabiting the Kilombero Valley Ramsar Site (KVRS), several of which are located on KVTC Lands.

The Kilombero Valley is home to one of the most distinctive fish faunas amongst east African rivers. In all, 37 fish species from 12 different genera have been found in the Kilombero River (MNRT, 2009). The majority of the river's fish species are shared with the Zambezi River, other east coast rivers, and a few with the Congo Basin (MNRT, 2009). Within Tanzania, the giant tiger fish, *Hydrocynus goliath*, is restricted to the Kilombero Basin, although it also occurs in Lake Tanganyika and the Congo Basin. The peak breeding season is November - January (Hopson, 1989), with a secondary peak in March to April (MNRT, 2009). The river begins to rise in November - December with the beginning of the rains, triggering an upstream migration of fish from downstream, some of which then spread laterally across the floodplain. Species involved in this migration include the *cyprinid Labeo* (especially, *Labeo ulangensis*), the catfish Clarias, the tiger fish and the large barbell, *Barbus macrolepis. Distochodus, Citharinus, Mormyrus, Alestes*, the squeaker catfish *Synodontis* and smaller species such as *Brycinus affinis* are also involved in spawning migrations (Benno & Tamatamah, 2005). These types of fish are all known to be migratory in other African rivers, principally for spawning as well as for feeding (MNRT, 2009). Discussions with community members resulted in several fish species being identified by their vernacular names. Only two of these fish species, namely ndipi (*Hippopotamyrus dischorhynchus*) and surusuru (*Mormyrus longistrus*), were recognized by their scientific names.

Several surveys have revealed dramatic crashes in faunal population numbers over the last two decades. Of most concern is the *Puku* (*Kobus vardonii*), since this marsh-dwelling antelope has an extremely restricted range and the Kilombero Valley population is critical to the survival of the species. The valley recently harboured some 75% of the world's population of the Near Threatened antelope (MoW, 2012). The general trend for most species is that the populations are declining (MNRT, 2009), with at least 194 species at some level of threat in the Kilombero Valley, including mammals, birds, reptiles and amphibians. Indeed, ongoing monitoring of

biodiversity by the company indicates that even those species that are sighted on KVTC landholdings are in decline (KVTC, 2022).

Nonetheless, only few surveys have been conducted in order to identify invertebrate species in the valley, with only limited studies on butterflies in a selected area. Likewise, small mammals and other vertebrates have not been thoroughly surveyed (MNRT, 2009).

3.1.1.2 *Element 2: Concentrations of endemic species that are significant*

There is great local variation in the distribution of species and endemic taxa within the Kilombero landscape, including on KVTC Lands. With its favourable condition and location, the Kilombero Valley supports at least thirteen species of large mammals (Rogers 1982). Some are most significant, including a high density of elephants (*Loxodonta africana*) and buffalo (*Syncerus caffer*) that normally traverse the KVTC Lands, while the *Puku* antelope occurs on the floodplain, just off the KVTC Lands. The population of *Puku* (known locally as sheshe) is one of only two sites in Tanzania (Rodgers 1984[3]) and may be the largest in Africa. More than two-thirds of the estimated global population is now restricted to the Kilombero Valley in Tanzania (Vedantu, 2022) and IUCN (2016) regards *Puku* as 'conservation dependent' species. This floodplain wetland and the recently promulgated Kilombero Game Reserve (KGR) border the KVTC Lands to the west, close to the Nakafulu Block. The adjacent public lands, which are now fully occupied by settled communities, make for a narrow band of habitat for the *Puku* to occupy. The wetland floodplain is completely isolated from all other *Puku* sites, and only receives low to medium levels of protection from the Tanzania Wildlife Authority (TAWA). However, with the new upgrade in designation from game-controlled area to game reserve status, there is hope that the authorities will intensify management of these species.

As stated earlier, the valley is an Important bird area, harbouring the globally threatened Kilombero weaver (*Ploceus burnieri*), which is strictly endemic to the valley, and two other birds, the Kilombero cisticola (*Cisticola sp. nov*.) and the melodious cisticola (Cisticola sp. nov.), which are endemic to the valley.

At least two fish species, *mgundu – local vernacular name (Alestes stuhlmannii)*, and *mbala – local vernacular name (Citharinus congicus)*, are endemic, being confined to the Kilombero system where they have evolved (MNRT, 2002; MNRT, 2009a). Two fish species, *Distichodus petersii* (ndungu – local vernacular name) and *Oreochromis pangani (perege – local vernacular and common name in KiSwahili)*, appear on the 2012 IUCN Red List as “vulnerable” and “critically endangered” respectively (www.iucnredlist.org).The butterfly *Sallya pseudotrimeni*, found in the valley, is endemic to Tanzania (MNRT, 2009).

[3] Status of Puku (Kobus vardoni Livingstone) in Tanzania - RODGERS - 1984 - African Journal of Ecology - Wiley Online Library. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2028.1984.tb00685.x

3.1.1.3 *Element 3: Concentrations of rare, threatened, or endangered species*

KVTC monitors Rare, Threatened and Endangered (RTE) species on a regular basis as part of complying with FSC principles and criteria. Village Game Scouts as well as KVTC field staff have been issued with ID Kits for reporting on any sightings through the incident reporting system. The ID Card System was most recently displayed in the report on Cites and red data species present on KVTC land (KVTC, 2022).

Elephant, leopard, lion, Puku antelope, hippopotamus, African wild dog, African mahogany, shoebill, Martial eagle, African skimmer, Kilombero weaver, African crowned eagle, southern ground hornbill, and white-backed vulture are all mammal, bird or plant IUCN species listed as vulnerable, endangered or near threatened and that have been located on KVTC Lands in its most recent reporting period (KVTC, 2022, Annexes 6 - 9). No amphibians or reptiles from the KVTC Lands are listed as Critically Endangered, Endangered or Vulnerable, according to IUCN categories. However, one species is listed as DD (Data Deficient) (IUCN 2006). This is Rees's Toad, *Amietophrynus reesi*, a species of toad in the family *Bufonidae*, endemic to southern Tanzania and where it is only known from the Kihansi – Ulanga River floodplain[4] (Annex 9).

The Kilombero landscape holds several species of global, regional and national importance. Some species, included in Annexes 6, 7, 8 and 9, have been identified as species that are, or may be, at risk of becoming extinct on a global or regional level. For example, the Kilombero Valley may contain Tanzania's only viable population of Puku. The population of Puku has more recently been confirmed in counts with a total figure of 56,600 animals (Vedantu, 2022). The main *Puku* population, to the north of the site of the old Madadaba Village, does have extensive available dispersal habitat. Smaller populations are found to the south-west of the new Magufuli Bridge, where there is a more abrupt boundary between the floodplain and the Miombo woodlands, and this is close to Nakafulu Block. However large herds of cattle from livestock keepers have occupied the edge of the Nakafulu Block and some do graze (illegally) in the KVTC Lands.

3.1.2 Assessments for HCV 1

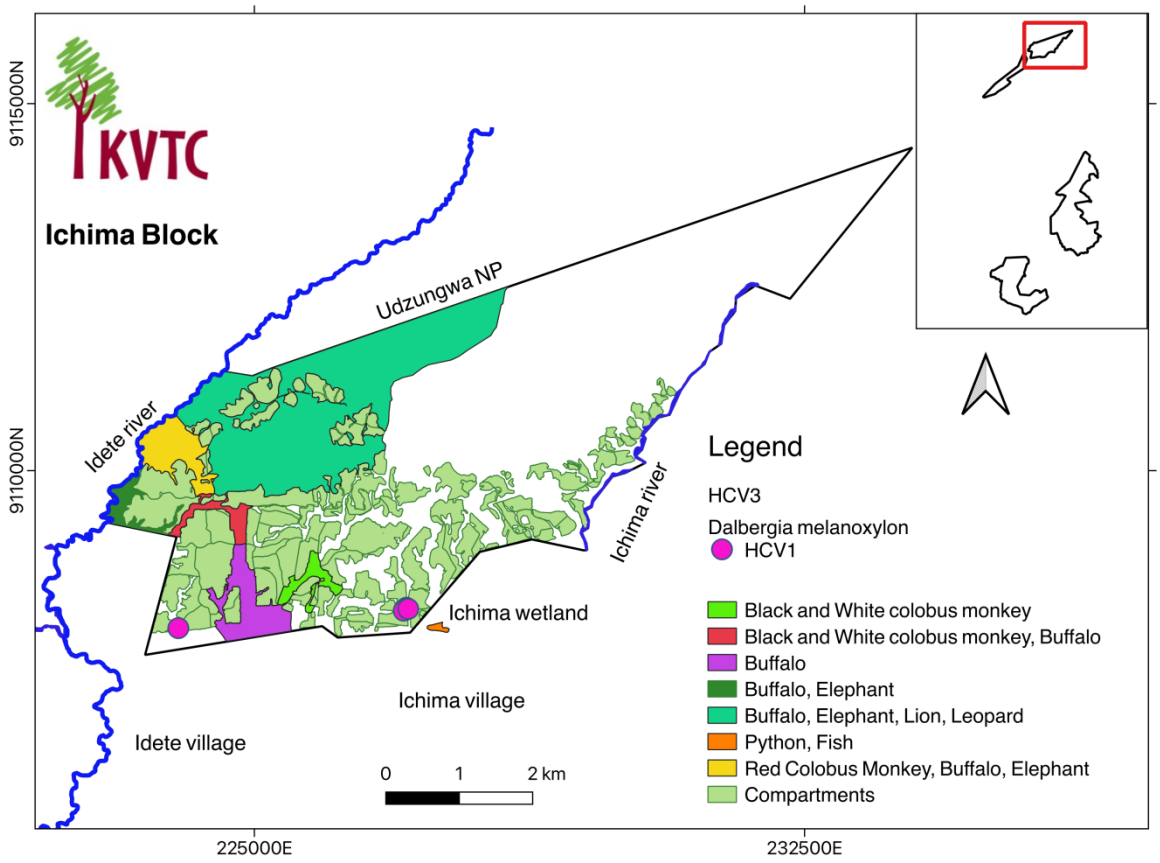
Assessment of HCV 1 was conducted through participatory approaches by engaging with local communities. Expert opinion and best available information were also reviewed. The team undertook thorough reading of literature from different researchers, including from local university professors.

A participatory mapping exercise was conducted at community level, basing on the traditional knowledge of community members and combined with the knowledge of KVTC village game scouts that routinely conduct patrols in the KVTC Lands. The

[4] https://www.bing.com/search?q=Amietophrynus+reesi&cvid=219ebec5efb742cea8d107715535e37d&aqs=edge..69i57.2044j0j4&FORM=ANAB01&PC=U531. Retrive don 28th April 2023.

latter had a better understanding of areas with concentrations of species (flora and fauna) and were able to indentify specific teak compartments that were then used as proxy locations for adjacent areas of natural forests.

The GIS mapping expert together with the KVTC GIS officer were able to trace their proxy points on a large base map. The GIS mapping team conducted ground truthing by visiting the KVTC blocks and associated areas of natural forest, capturing the coordinates of relevant areas where occurrences of HCV1 were observed (Map 1 – HCV 1 – for Nakafuru, Mafinji, Ichima and Narubungo Blocks, also see the GIS software layers).

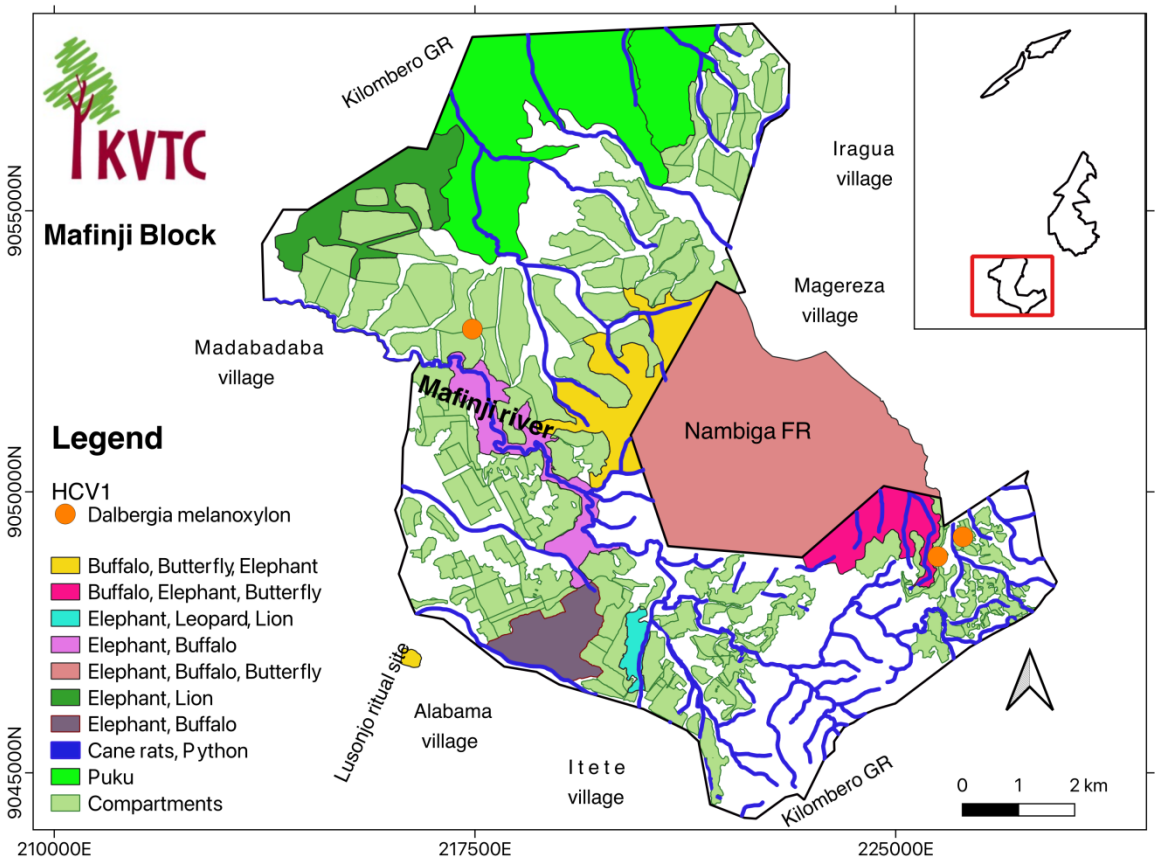


Map 1, Ichima Block - HCV 1

The Ichima Block, situated to the north west of the Kilombero River, borders the villages of Idete A, Idete B and Ichima to the south of the block. It also borders the major protected areas of the Udzungwa National Park and the Kilombero Nature Reserve. The block offers perfect natural vegetation reflecting high biodiversity of both flora and fauna.

Among the key species that were identified and represent HCV 1 are: black and white colobus monkey (*Colobus guereza*), several other species of monkeys, including the Udzungwa red colobus (*Piliocolobus gordonorum*); African buffaloes (*Syncerus caffer*), elephants (*Loxodonta africana*), Lions (*Panthera leo*), leopards

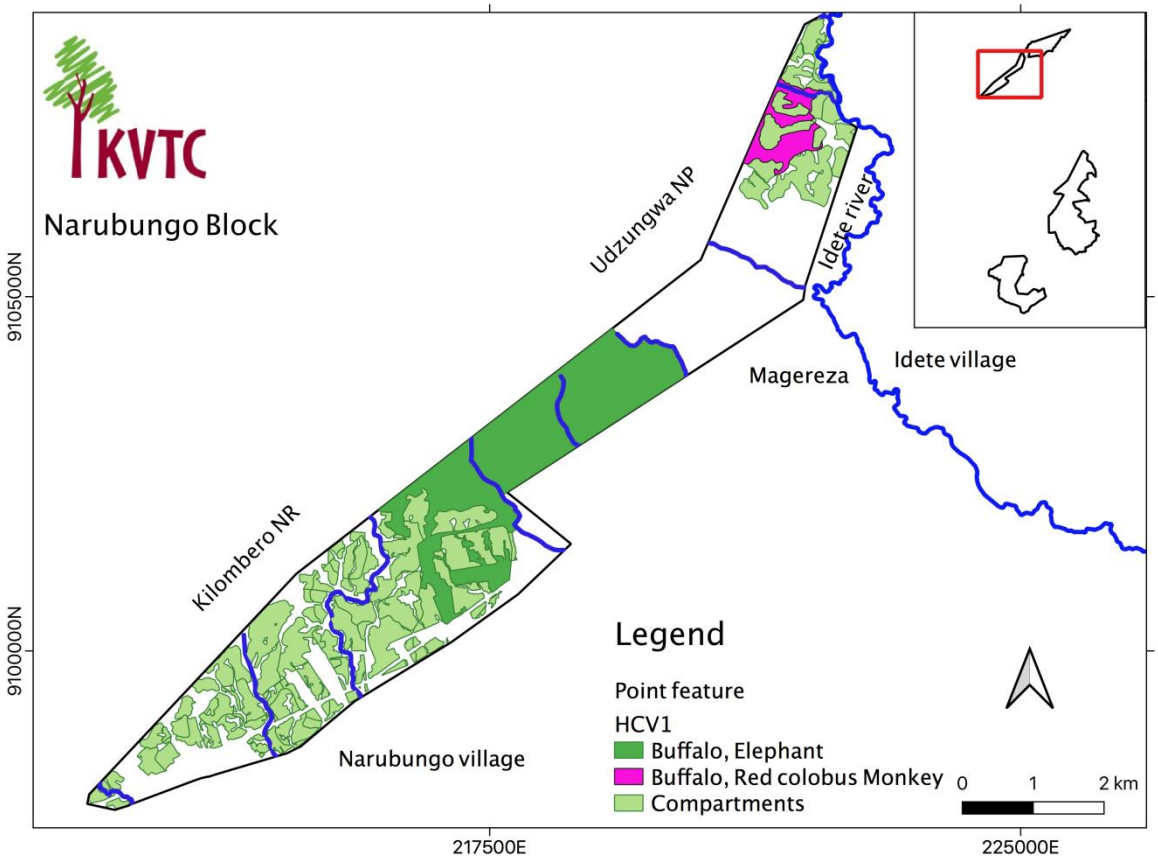
(*Panthera pardus*), Python (Python spp*)* and several fish species along the rivers and swamps. The most important protected floral specie is the African Blackwood (*Dalbergia melanoxylon*), which is concentrated in the sites located on Map 1.



Map 2. Mafinji Block - HCV 1

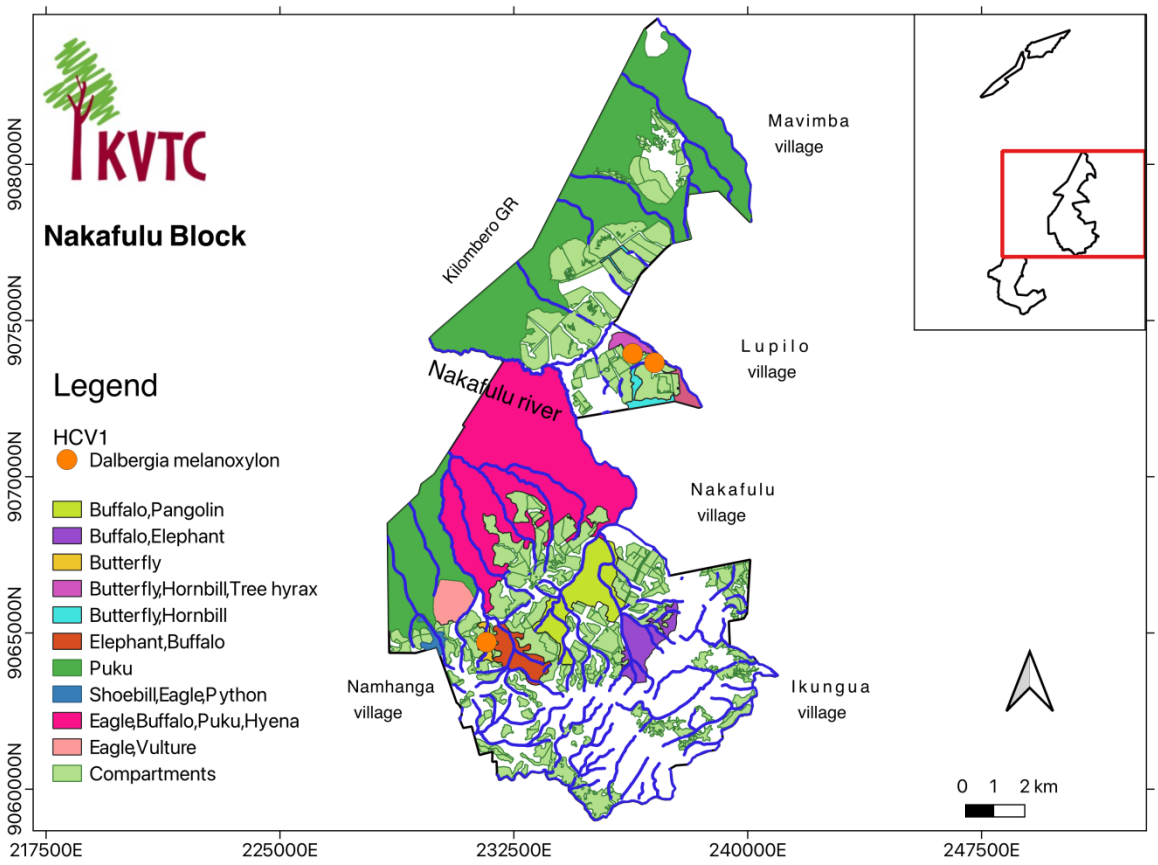
Mafinji is one of the largest and biologically diverse blocks. The block is situated to the south-east of the Kilombero River, in Ulanga District, across the river from Kilombero District. The block is rich in biodiversity with several occurrences of elephants wandering in its dense natural forests. This is the block where Puku are sighted most often, usually at the edges of the block and the floodplain. Community members referred to seeing several fauna of global, regional and local significance including, lions, buffaloes, as well as pythons and small insects of interest such as the butterfly (*Ampittia kilombero*[5]*)* of the family *Hesperiidae,* a species found in the Kilombero Valley.

[5] According to this website that enlist butterfly of interest in the Kilombero valley: https://www.nic.funet.fi/pub/sci/bio/life/insecta/lepidoptera/ditrysia/hesperioidea/hesperiidae/hesperiinae/ampittia/



Map 3. Narubungo Block - HCV 1

Being positioned close to large protected areas in the Kilombero Nature Reserve (KNR) and Udzungwa Mountains National Park, the Narubungo Block acts as a buffer between populated villages on its south-east border and the protected areas that stretch across the north and north-west of the block. The block is also home to large mammals such as elephants and buffalos which travel between the Ruipa Corridor and lowland to the floodplain going by the Namwai Forest and Kilombero Nature Reserve and further down along to the Magereza area. This “corridor’ has been heavily degraded, but is still used by large mammals. It is also believed that the mammals cross the river across the Nakafulu Block, on their way to the Nyerere National Park. There is no recent study that explains the status of wildlife corridors as impacted by several settlements and paddy fields that have been established along the known wildlife corridors from the past time.



Map 4. Nakafulu Block - HCV 1

The Nakafulu, is another one of the larger blocks, harbouring large amounts of flora and fauna. The block is surrounded by Namhanga, Ikungua, Nakafulu, Lupilo and several other villages, while bordering Kilombero Game Reserve in the lowlands. A number of key species including, birds of importance such as palm-nut vultures, shoebills, hammerkops, hornbills and several others can be found in the natural forest and wetland areas of the block. Map 4 provides a legend that indicates where key species including hyena, elephants, lions, buffalos, pangolins, tree hyrax and *puku* were observed within the block.

3.1.3 Threats to HCV 1

There is increasing threat to biodiversity in KVTC Lands, as in other parts of the country, due to several natural and human drivers. The main threat to HCV1 is habitat loss on the wider landscapes adjacent to the blocks and deforestation by conversion to other land uses. Other threats include establishing settlements, agriculture, grazing, overexploitation of plant and animal species, introduction of non-native species (e.g. teak) and climate change. Other human activities, such as poaching and deforestation further threaten the status of HCV 1. This leads to greater fragmentation of landscape and lower connectivity of KVTC land holdings within areas outside of it.

a) Illegal hunting of key species – especially puku, which grazes at the edges of the valley and wanders around the upland during flooding seasons. This was confirmed in Idete A Village in one of the consultative meetings, where some community members admitted to having consumed bush meats, including puku. This practice was also previously confirmed in the Frontier Woodland Survey (Frontier, 2011);
b) Illegal timber harvesting has been one of the major threats occurring within KVTC Lands. In recent times, incidents of charcoal harvesting have also been occurring, mostly in the south-eastern blocks (i.e., Mafinji and Nakafulu);
c) Large numbers of livestock have been grazing on KVTC Lands, mostly in areas at the edges of the floodplain, during dry season;
d) Degradation and deforestation of open forests that are not protected is occurring partly due to the increased human populations along and adjacent to the KVTC blocks. Poor management of land management and uses has exacerbated land degradation, mostly through cultivation;
e) Fragmentation and loss of connectivity of habitats of species. Loss of habitats and connectivity is a major threat to HCV 1.

3.1.4 Strategies for Maintaining and Enhancing HCV 1

Strategies for management of HCV 1 include:

a) KVTC policies and procedures ensure that a safe habitat for all species living on company property is protected, whether they are at risk or not. This is achieved by limiting conversion of natural woodland to teak plantation only to areas where the impacts will be small and where mitigation is possible (such as leaving substantial natural corridors linking large habitat areas);
b) Implementation of the management plan that outlines the intent to protect all biodiversity within KVTC land;
c) Intensify management of critical geo-referenced points for HCV1 as identified through the specific HCV maps and GPS coordinates;
d) Community engagement with KVTC adjacent villages, through culturally appropriate consultations and raise awareness on HCV1, especially on the IUCN Red listed category species;

e) Liaise with conservators and promote corridors with adjacent protected areas including with, Udzungwa National Park, Kilombero Nature Reserve, Kilombero Game Reserve, Kilombero Ramsar site and Nyerere National Park to allow free movement of various species of fauna;
f) KVTC should implement the Management Plan with its set forward goals that promote species conservation and management options should consider protection of HCV 1;
g) During harvesting operations, a comprehensive pre-felling assessment should be taken into account to consider all fauna and flora aspects of a particular area or compartment. The process must ensure that all species present continue to live safely on KVTC land.
h) Improve management of natural habitats through wildfire preventions, curbing illegal logging and poaching and in some cases promote restoration of critical habitats with rare, threatened, and endangered species.

3.1.5 Monitoring for HCV 1

The HCV1 entails concentration of biological diversity that is of global, regional or national importance and rare, threatened and endangered species. The goal of monitoring is to track and measure whether the management goals are being met. The following are suggested monitoring aspects:

a) KVTC must regularly provide, quarterly or annually, information on potential impacts of operations on HCV1;
b) KVTC should identify possible approaches for avoiding, mitigating or compensating for negative impacts on HCV 1, on a quarterly or annual basis;
c) KVTC to conduct field operations through Village Game Scouts (VGS) on regular basis to identify and describe different threats, which should be reported. KVTC will thereafter analyse all the threats that are related to HCV 1;
d) As per FSC principle and criteria, KVTC will monitor Rare, Threatened and Endangered species on an ongoing basis. In the case of KVTC the Village Game Scouts as well as Field Staff have been issued with ID Kits for CR, EN, VU, NT species as per categories listed above. Therefore any sightings are reported through the incident recording systems. The ID Card System that is currently used by KVTC should also be used along with incident report and RTE Species Observation Sheet. KVTC can develop these simple ID checklists;
e) KVTC continuously assesses its database and periodically update the Red Data Species list for any/new additions or changes in IUCN Classification

3.2. HCV 2 - Landscape-level ecosystems and mosaics

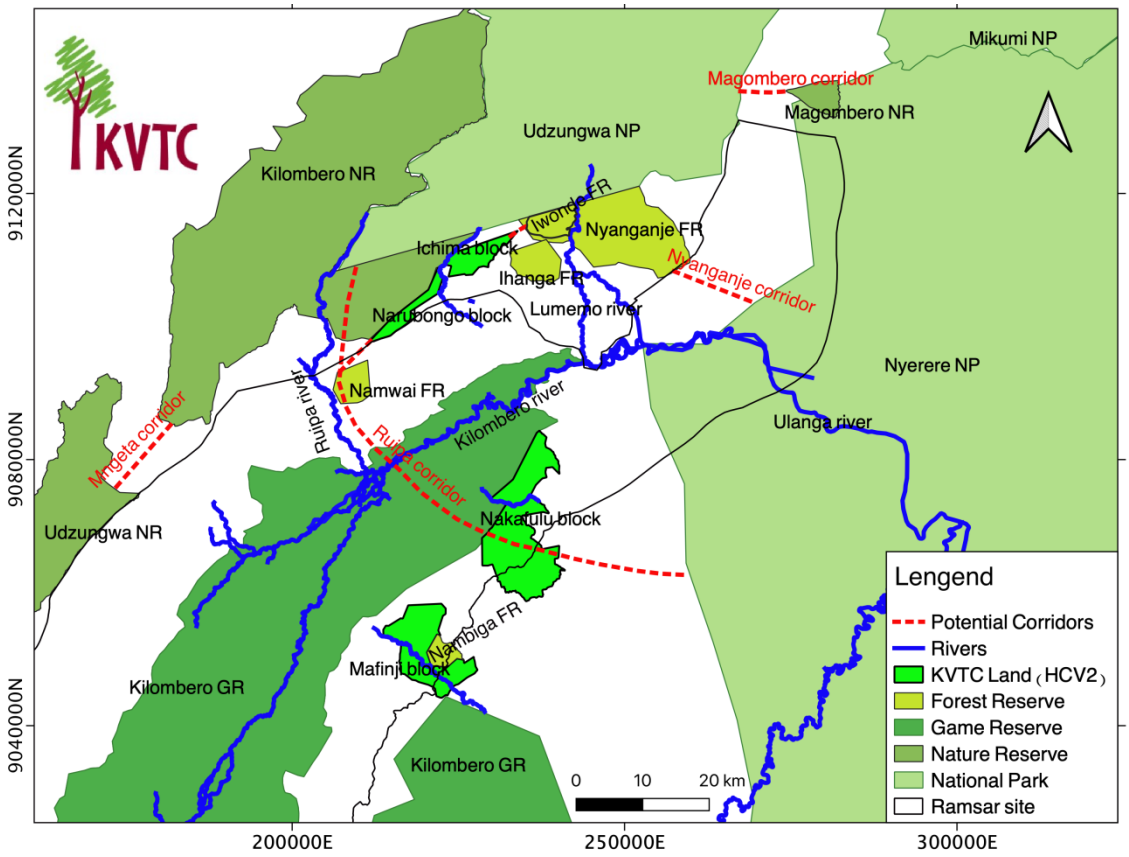
3.2.1 Identification of HCV 2

3.2.1.1 *Element 1. Intact forest landscapes*

A key component of managing for HCV 2 is addressing Intact Forest Landscapes (IFLs). IFL is defined as any remaining large, un-fragmented areas of forest, undisturbed by roads or other significant human infrastructure. IFL patches can also be defined as unbroken expanses of natural forest ecosystems greater than 500 km^2. Being the last remaining large, un-fragmented, forested areas in the world, IFLs are valued for their environmental, social, and intrinsic worth.

The Kilombero Valley contains the largest area of wetlands in Tanzania (796,700 ha) and is a designated Ramsar Site (Ramsar, Frontier, 2011). It once also supported a significant amount of Miombo woodland. Increasing encroachment into formally undisturbed areas due to human activities has reduced the intact forest landscapes into an estimated quarter of the original size. Remaining IFL are found mostly in protected areas that are not contiguous anymore. A combination of factors led to habitat loss, including due to cultivation, settlements, grazing and general deforestation. These human induced activities are the key drivers of the loss of pristine, intact forests of the Kilombero Valley woodlands.

Although KVTC Lands cover more than 20,000 ha, they are presumed to have been part of the once contiguous Miombo woodlands up until in the late 1980s-1990s. They provide key landscape functions such as connectivity and buffering (i.e. protected area buffer zone or a corridor linking protected areas or high quality habitats together). They are considered as HCV 2 in this case as they play a vital role in maintaining larger areas in the wider landscape and movement of key flagship species, such as elephants. In the north-west of the KVTC Lands, the Ichima and Narubungo Blocks border the Udzungwa National Park and the Kilombero Nature Reserve thereby creating a vital elephant corridor to and from the Nyerere National Park via the Nakafulu Block (See Map 5. HCV 2 – presenting all four Blocks, also see the GIS software layers).



Map 5.Landscape level ecosystem and mosaics for HCV 2 - including KVTC land

3.2.1.2. *Element 2. Ecosystem mosaics that are significant at global, regional or national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance*

KVTC objectives are focused on minimising the impact of planting teak in order to maximize the conservation value of the land. Only 30% of the land was planted with teak while the rest of the land (70%) was left unplanted for conservation purposes. The planting patterns were planned in a mosaic pattern that allowed plantation compartments to intertwine with evergreen natural Miombo woodlands (see blocks Map 2). The Miombo woodlands are relatively homogenous in structure, ecology, and species composition. They are relatively similar in all blocks. Katety and Hamza (2021), have identified vegetation and Miombo species of the Kilombero valley. Some of the dominant Miombo species along the Kilombero Valley include, *Diplorhynchus candilocarpon, Pseudolachnostylis maprouneifolia, Brachystegia speciformis, Annona senegalensis, Vitex doniana, Pteolleopsis myritifolia* and *Achiranthes aspera.*

3.2.1 Assessments for HCV 2

The assessment of HCV 2 was carried out by visualizing the large map at a landscape scale. The GIS mapping expert acquired block maps that were visualized at larger topo map scale. The adjacent landscapes, including protected areas, were overlaid to locate the four blocks (i.e., Mafinji, Nakafulu, Ichima and Narubungo). The

adjacent protected areas, such as the Kilombero Nature Reserve, Udzungwa National Park, Nyerere National Park and the recently proclaimed Kilombero Game Reserves were geo-referenced (see Map 2 Landscape level ecosystem and mosaics for HCV 2 - including KVTC land)

*3.2.1.2. **Threats***

A few threats are foreseen at the landscape level that could impact on HCV 2 in future. These include:

- Fragmentation of open land and unreserved areas that provide a buffer between protected areas and KVTC natural forests. This is due to increased opening of once intact landscapes for cultivation and settlements by the increasing population in the Kilombero Valley;
- Loss of migratory routes that were used by large mammals, especially elephants and buffaloes, e.g., Ruipa and Mngeta Corridors. Again, this has been exacerbated by blockage of these corridors by human settlements and cultivation;
- Some of the community forests that were set aside as Village Land Forest Reserves are being excised and no longer forming landscape connectivity. A combination of governance failures and a lack of tangible benefits from Community Based Forest Management (CBFM)[6] has led to weak enforcement of forest protection bylaws and the poor implementation of forest management plans by communities;
- Intensive cultivation and grazing in the valley around KVTC Lands is reducing the landscapes connectivity. Immigration of large herds of livestock from many parts of the country have been moving uncontrolled into the valley;
- Refugia for HCV2 are still respected but with high pressure for grazing, the threat of greater fragmentation and habitat loss is increasing. Furthermore, the youth are in less contact with the cultural norms of their ancestors, which would have passed on a respect for nature;
- Encroachment through paddy cultivation, a highly lucrative business, will continue to pose serious threat of degradation and habitat loss of floodplain and wetland areas of the landscape.

3.2.1 Strategies for Maintaining and Enhancing HCV 2

HCV 2 category of the KVTC Lands is a somewhat secured by the presence of large, protected areas. However, this will not be possible if the management of these landscapes is not intensified, given the pressure for land in the valley. Nonetheless, a set of management strategies are proposed here below:

[6] Is a form of Participatory Forest Management (PFM) which is carried out on Village Lands, because of this CBFM forest resources are owned 100% by the villagers

a) Liaise with government agencies such as TANAPA, TFS and TAWA for continued support on the protection of KVTC Lands. These include law enforcement and regular patrols;
b) Implement KVTC management plan and associated policies on conservation of natural habitats and ecosystems;
c) Work with communities to promote connectivity of habitats through land use plan management and ensure corridors for wildlife are maintained;
d) Consider the establishment of Joint Forest Management on KVTC Lands in combination with promotion of, and support to, CBFM in villages that surround the company's lands.

3.2.1 Monitoring for HCV 2

HCV2 are considered in the context of relatively large landscapes. However, some stand - alone points were considered as HCV2. These include important refugia of national concern that were identified from field consultations. The refugia forest of Lusonjo ritual site (Annex 1. Mafinji Block) was believed to be a place for cultural worship and several communities (or indigenous people) used it for rituals. To date, the forest patch is still intact and was observed to harbour natural trees of interest to communities. As the land around these refugia is quickly cleared, it is important to monitor its presence over time.

The protected areas are highly secured by government agencies that possess para-military units, and therefore it is believed that their existence will continue to be assured for a number of years.

Regular monitoring of illegal grazing in the KVTC Lands should be intensified. This will reduce all unauthorised illegal activities, including grazing, so as not to disturb the HCV2 status of the KVTC forested lands. Guides for monitoring regimes and management strategies' for HCV 2 are presented in the second part of this report.

3.2. HCV 3 – Ecosystems and habitats. Rare, threatened, or endangered ecosystems, habitats or refugia

3.2.1 Identification of HCV 3

3.2.1.1. *Element 1: Rare, threatened, or endangered ecosystems*

The rare, threatened, and endangered ecosystems include areas of special importance because of their rarity or the level of threat that they face. The HCV 3 category was identified in all KVTC blocks with more areas in Mafinji and Nakafulu Blocks (Map 2 and 3). These include areas that had critical habitats that are used by flagship species like elephants and Puku. Some areas that had caves in Ichima Block where most leopard sightings had occurred were mapped as HCV 3.

3.2.1.2. *Element 2: Rare, threatened, or endangered habitats*

The RTE habitats include place or type of site where a population or organism occurs (and is therefore essential for species level management). Habitats may be synonymous with ecosystems as defined above, or be defined at a smaller scale – (e.g. some rocky outcrops are key habitat for rare or localised plants within a forest ecosystem, and seasonal wetlands are crucial for some insect or reptile species within KVTC Lands).

HCV 3 were mapped in all blocks, with point and polygon geo-referenced coordinates. The wetland in Nakafulu which was critical for snakes, such as pythons, was indicated as HCV 3, while the critical points for birds and large mammals were again indicated as HCV 3 in combination with HCV 1.

3.2.1.3. *Element 3: Refugia*

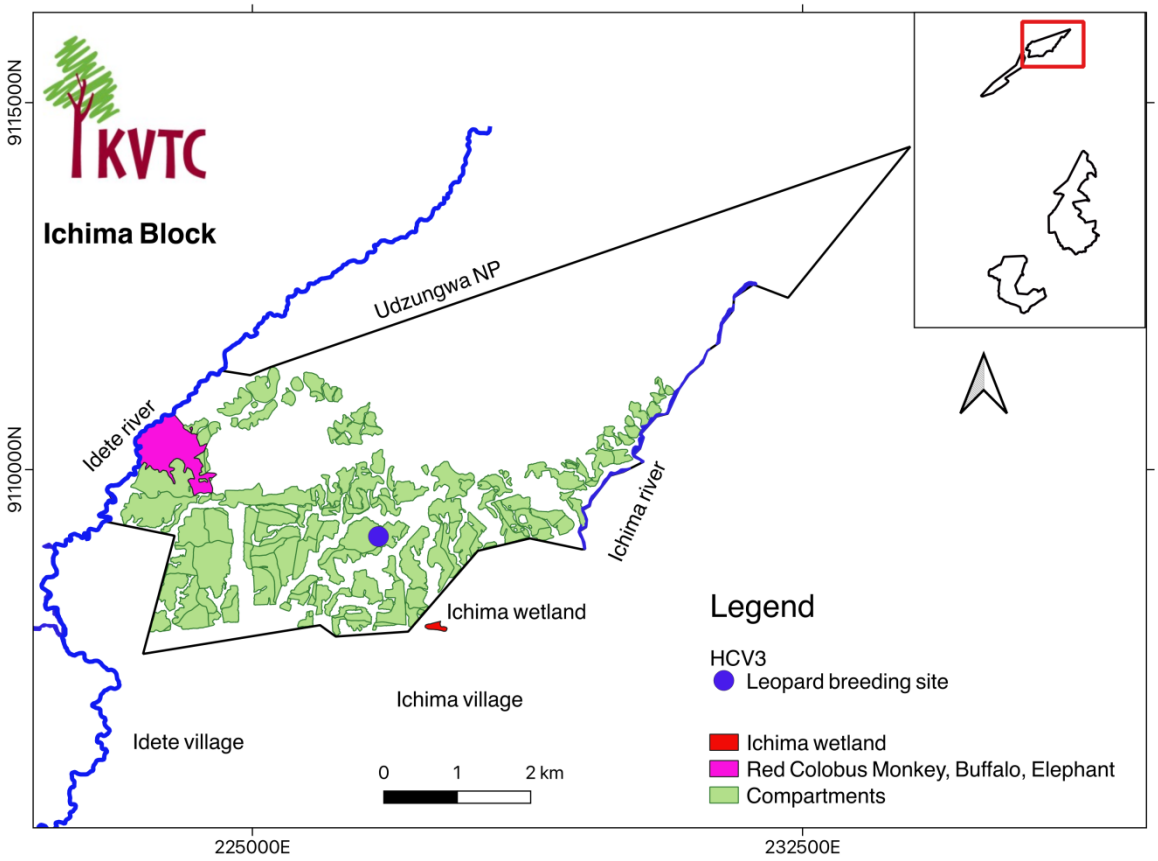
The sacred forest near Mafinji Block, commonly known as Lusonjo ritual site, was considered to be refugia. The isolated forest with approximate 0.5 acre had an intact forest, with concentration of biodiversity including bird species. The sacred forest is adjacent to KVTC Lands and has remained isolated in the midst of cultivated land. It is believed that plants and fauna that occur in the KVTC Lands may be surviving in this refugia.

3.2.2 Assessments for HCV 3

A practical approach was to use vegetation classifications which are easily recognizable in the field as well as satellite images and topographic maps that were provided by KVTC, Rufiji Water Basin Office (RWBO) and the management of the Kilombero Nature Reserve (KNR). A few remote sensed imageries at a very large scale were collated in order to locate the KVTC Lands which were otherwise almost invisible.

Combined with participatory approach, the information that were obtained from key informants and focused group discussions provided information that led to allocate signatures on the GIS system that qualifies for HCV 3. Furthermore, the sighting of

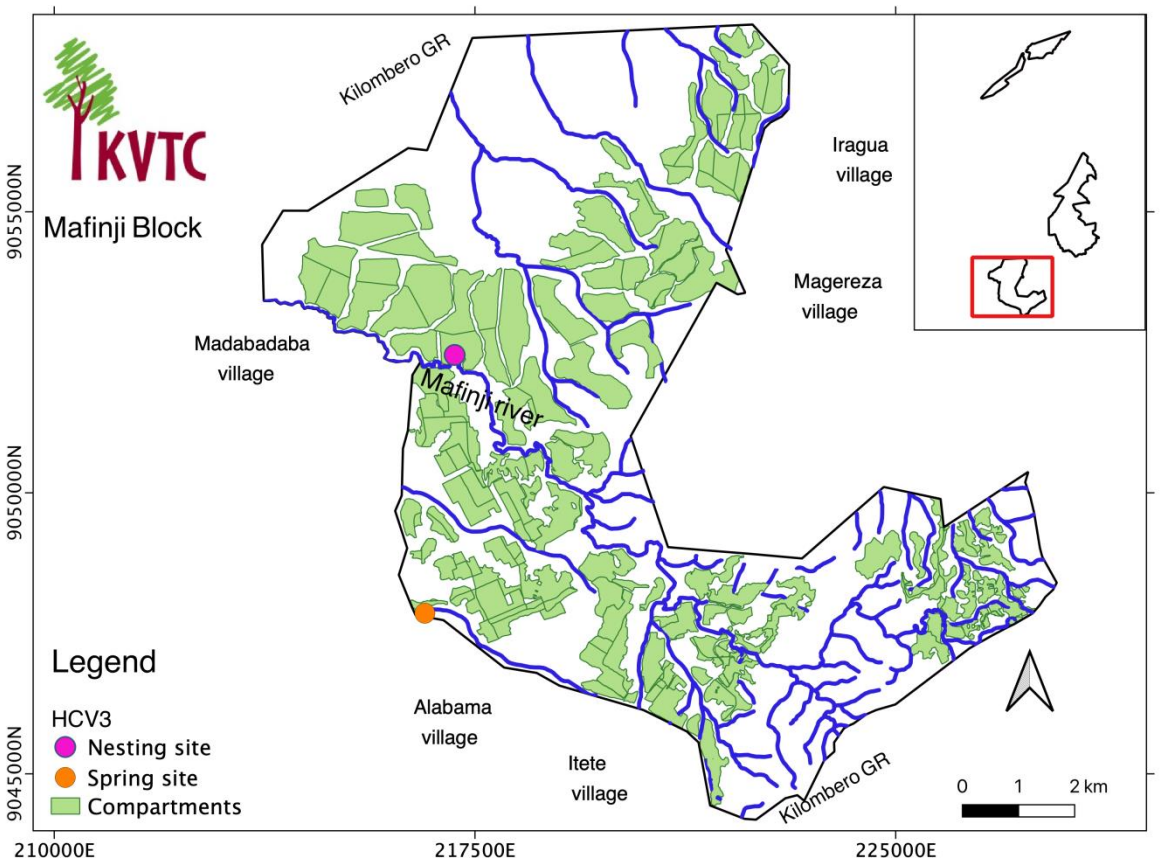
RTE species such as elephants and puku – qualifies to be proxies for presence of HCV3 in Mafinji and Nakafulu Blocks, while tracks of evidence sighting of buffalos and leopards in the Ichima and Narubungo Blocks also qualified with HCV 3 (see Map 3 for HCV3, also see the GIS software layers).



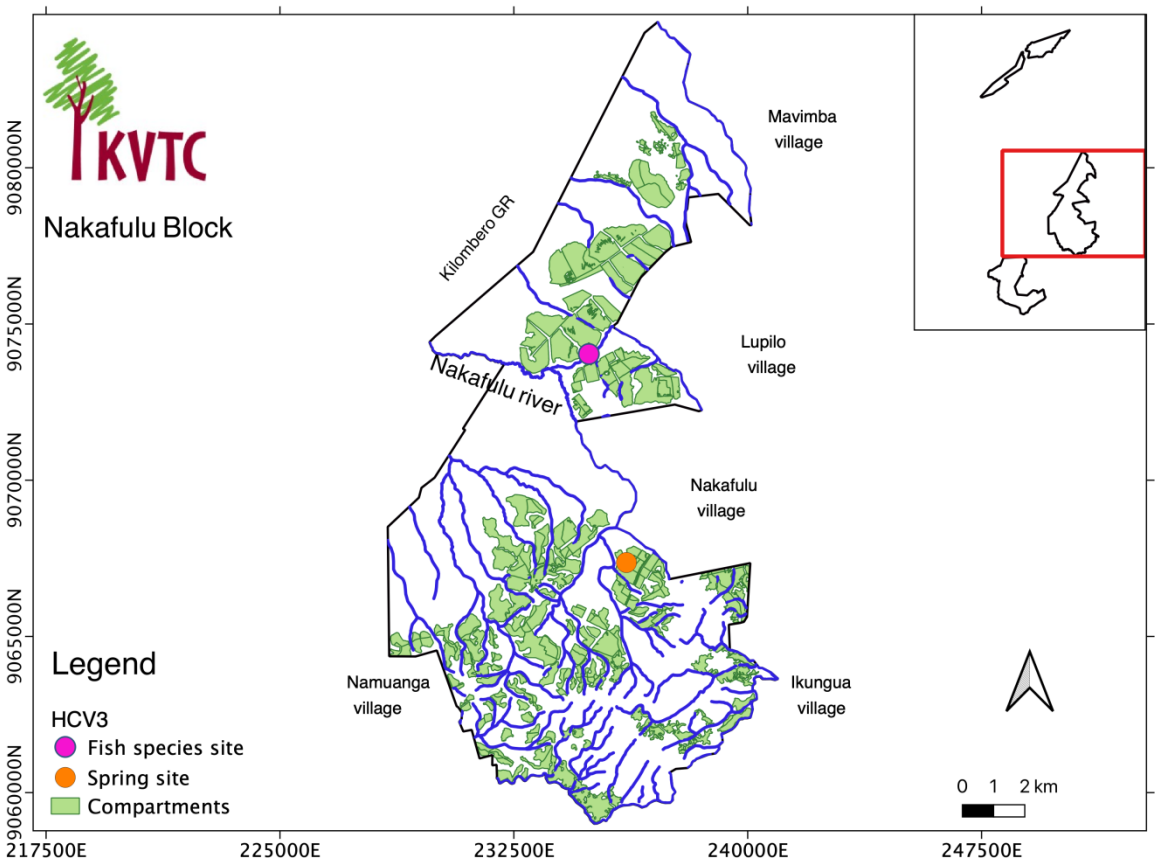
Map 6. Ichima Block - HCV 3

The Ichima wetlands attract several fauna with its lush green vegetation. Large mammals – elephants and buffaloes - are often sighted at this wetlands. Being at the edge of KVCT lands, it also attracts wildlife from the landholdings to graze and roost at this wetland. Illegal fishing is also done frequently on this wetland as well as grazing of cattle.

Further to the north, the Ichima Block, which border**s** the Kilombero Nature Reserve, has a high number of red colobus monkeys, including the endemic Udzungwa red colobus monkey (Map 6). The concentration of nesting sites for hammerkop birds are located in the west of the block (Map 6).

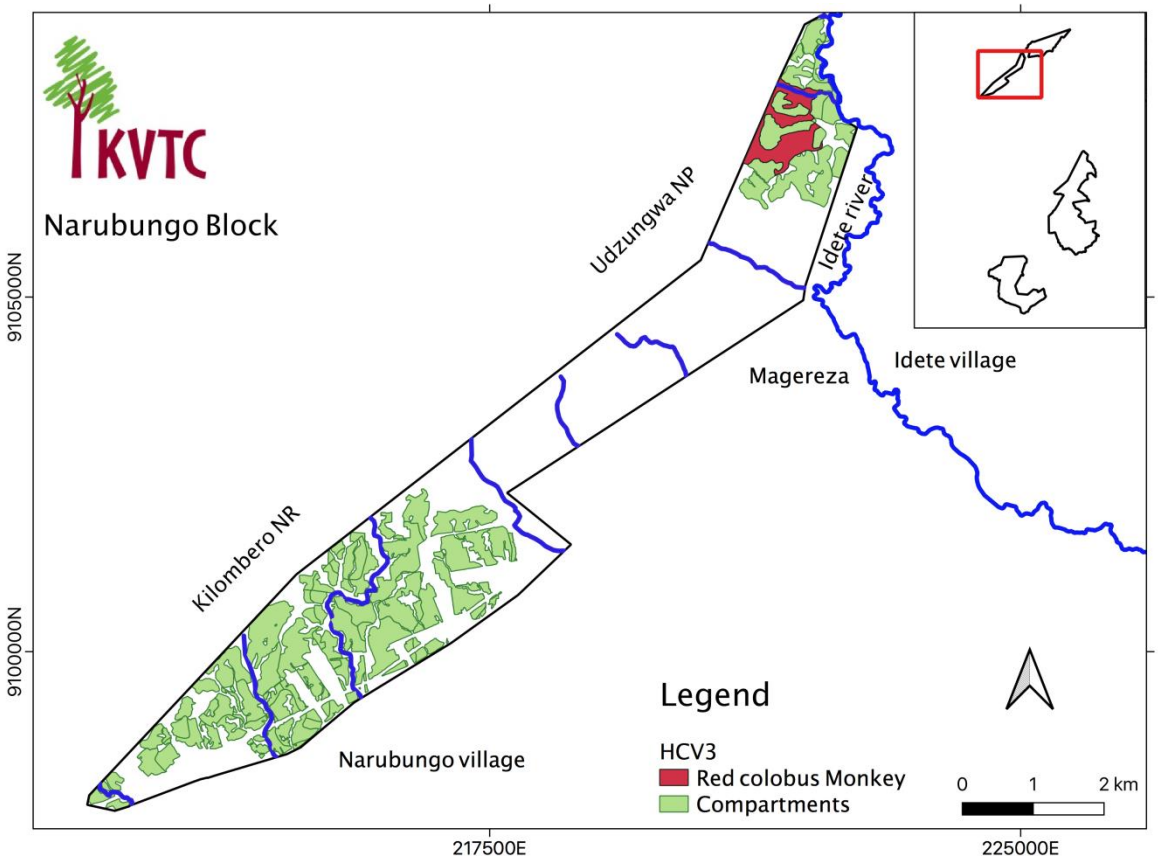


Map 7. Mafinji Block - HCV 3



Map 8. Nakafuru Block - HCV 3

The Nakafuru River attracts several fish species that follow the river's upper segments; especially during the wet season. Common species include ndipi (*Hippopotamyrus dischorhynchus*) and surusuru (*Mormyrus longistrus*),



Map 9. Narubungo Block - HCV 3

The Narubungo Block harbours quite a large number of important species in its northern sections. This is an area that borders a protected area (i.e. Udzungwa National Park) where wildlife move freely across the boundaries. While there are a significant number of red colobus monkeys, including the endemic Udzungwa red colobus, the block also harbours significant numbers of key species, such as elephants and buffaloes.

3.2.2.1 Threats

Threats for HCV 3 are listed below:

- Increased fragmentation due to cultivation and grazing of livestock on open woodlands. Some of the villages have Land Use Plans but their implementation has been seriously ignored;
- Human population growth in the Kilombero Valley is pushing people closer to previously secured areas, including KVTC Lands. In the Kilombero Valley population growth is due to both natural factors lso as well as immigration from other parts of the country;
- Soil erosion will to siltation and land degradations. Intensive cultivation and the use of agro chemicals may threatenthe HCV3;
- Increased surface water runoff that creates soil gullies and seasonal streams. This could partly be caused by intensification of agriculture and unplanned land uses;
- Climatic conditions that naturally affect the HCV 3 status.

3.2.3. Strategies for Maintaining and Enhancing HCV 3

The following are suggested for managing and enhancing of the HCV3 category in all four blocks. These include:

a) Implementation of management Plan according to KVTC policies, vision, and mission;
b) Undertake monitoring of critical habitats e.g., sensitive soils, water catchments and water sources;
c) Undertake proper harvesting operations and in accordance with approved Harvesting Plans;
d) Undertake monitoring of RTE species, especially the flagship species;
e) Collaborate with government authorities within the adjacent protected areas, including TANAPA, TAWA, and TFS to share information and to undertake patrols.

3.2.4. Monitoring for HCV 3

The monitoring regimes for HCV 3 are quite similar to HCV 1. The regular monitoring by Village Game Scouts, as well as, monthly patrols by plantation managers serve as key monitoring regimes for HCV3. Similar to HCV 1, a set of monitoring schedule applies to the HCV3.

3.4. HCV 4 – Critical ecosystem services

3.4.1. Identification of HCV 4

3.4.1.1. Element 1. Water catchments in critical situations

The KVTC Lands with all its four blocks is traversed by rivers, streams and small water catchments that supply water into major rivers such as Nakafulu, Lumemo, Ruipa and Idete. Permanent and seasonal rivers traverse all four blocks. All these represent the category HCV 4. The Mafinji and Nakafulu Blocks have more rivers (Map 11 and 12), than Ichima and Narubungo Blocks (Map 10 and 13).

Below is a summary of stream flow effects for particular catchments in the KVTC plantation blocks (Scott, 2002)

i. *Ichima Block:* Virtually no perennial streams rise on this block, though water drains off it in small channels and flows southwards a short distance to the floodplain. The significance of stream flow effects will depend on future settlement patterns in the narrow strip of land between the plantations and floodplain.
ii. *The Idete stream* rises in wetter country to the north and is largely unaffected by a very small contribution from the teak plantations.
iii. *Narubungo Block:* This long but narrow block of forestry lies across the drainages of many small streams, draining south-eastwards to the floodplain. The plantations are so close to the floodplain that stream flows from this area.
iv. The high ridge to the northwest of Narubungo is the most important source of stream flow in the area, feeding users in Namawala Village.
v. *Nakafulu Block:* this large block is fairly diverse. The northern and western two-thirds generate its own small streams that drain north-westwards to the floodplain, there being no downstream settlements.
vi. A small southerly drainage feeds the larger Namhanga River, which rises further east. Again, there are no downstream users that could be affected negatively although this may change with increasing population and settlements.
vii. The one potentially important hydrological conflict of the entire KVTC operation is that of the Nakafulu stream that rises partially from a small area of high ground in the south-central part of Nakafulu Block. This stream flows through the middle of Nakafulu Village and is likely to be used by the villagers. Significant reductions in the flow in the Nakafulu stream could negatively affect villagers if groundwater sources of water are not available.
viii. The south-eastern corner of the block drains northwards into the larger local drainage of the Luli stream.
ix. *Mafinji Block:* The Mafinji Block is probably the wettest and most promising HCV 4 area available to KVTC. The Mafinji River rises in the Mahenge Mountains to the east. Downstream use is important for direct drainage to the floodplain, which then flows into the Kilombero River. Communities benefit

from ecosystem services from the river, especially paddy cultivation and water for livestock. An example is Madabadaba Village, whose residents graze their livestock in the floodplain and at the edge of the Nakafulu River, as well as undertaking intensive cultivation of paddy.

x. The northern half of the block drains into a small and unnamed stream that rises in the neighbouring Nambinga Forest Reserve. The stream drains to low flat terrain adjacent to the floodplain and is not thought to be used as a local water source.

Almost all the rivers drain to the Kilombero River, which is the main river that feeds into the Nyerere Hydropower Dam. A number of HCV 4 areas were indicated as line features on maps. Furthermore, buffers of 60 meters were marked as provisionally indicated in the Environmental Management Act, 2004. For small streams, the KVTC management plan provides buffer strips of between 20 and 50 metres, depending on the width from the centre of the stream (see the GIS software layers).

3.4.1.2. Element 2. Control of erosion of vulnerable soils and slopes in critical situations

The KVTC plantations were established on suitable soils and level slopes. Vulnerable soils in critical situations, such as, slopes with more than 45 degrees, were not planted with teak. These areas are prone to soil erosion and its gradients are left with vegetation cover to mitigate against erosion.

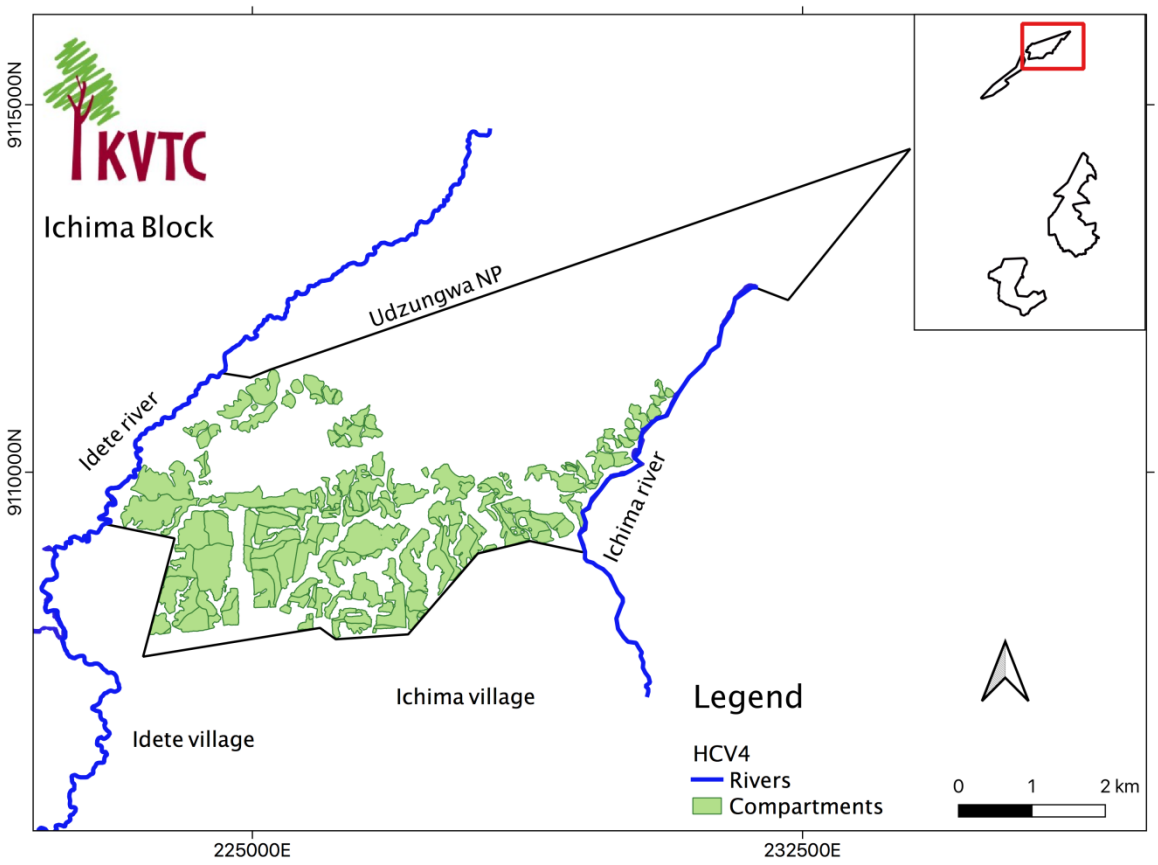
3.4.1.3. Element 3: Other ecosystem services in critical situations

Other ecosystems services include new water sources that have been recently discovered in Nakafulu Block, named after the plantation manager, *Maganga water source*. The geo-reference of the water source was marked and feeds water into the Nakafulu River. A few wetlands areas in Nakafulu and Mafinji are in critical situation as the grazers and cultivators use them during dry season. Of course, it is all done illegally but as long as climate variability persists, these wetlands will remain in a critical situation.

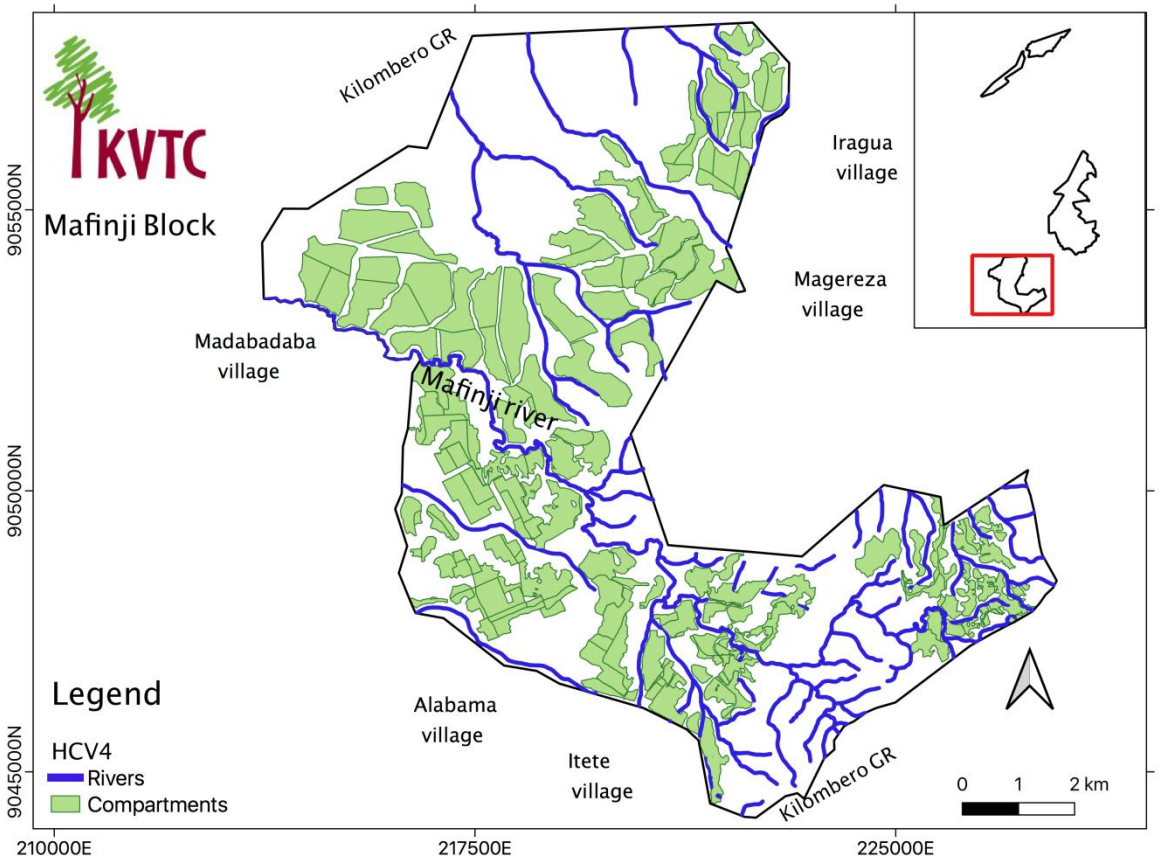
3.4.2. Assessments for HCV 4

The GIS mapping was used to locate all critical ecosystem points and line features in all four Blocks. Reference points were acquired from the hydrological maps and from the Rufiji Water Basin Office. The Rufiji RWBO is the authority which possess all the hydrological maps for the KVTC catchment areas.

Major rivers were referenced while the water courses and streams were geo-referenced in the field. The knowledge of the village game scouts and managers added to the capacity to map the HCV 4 within all blocks. The assessment team, together with local communities, gathered information for critical water sources that were under threat as well as the on water sources depended on by communities (Map 4 – HCV 4, also see the GIS software layers).

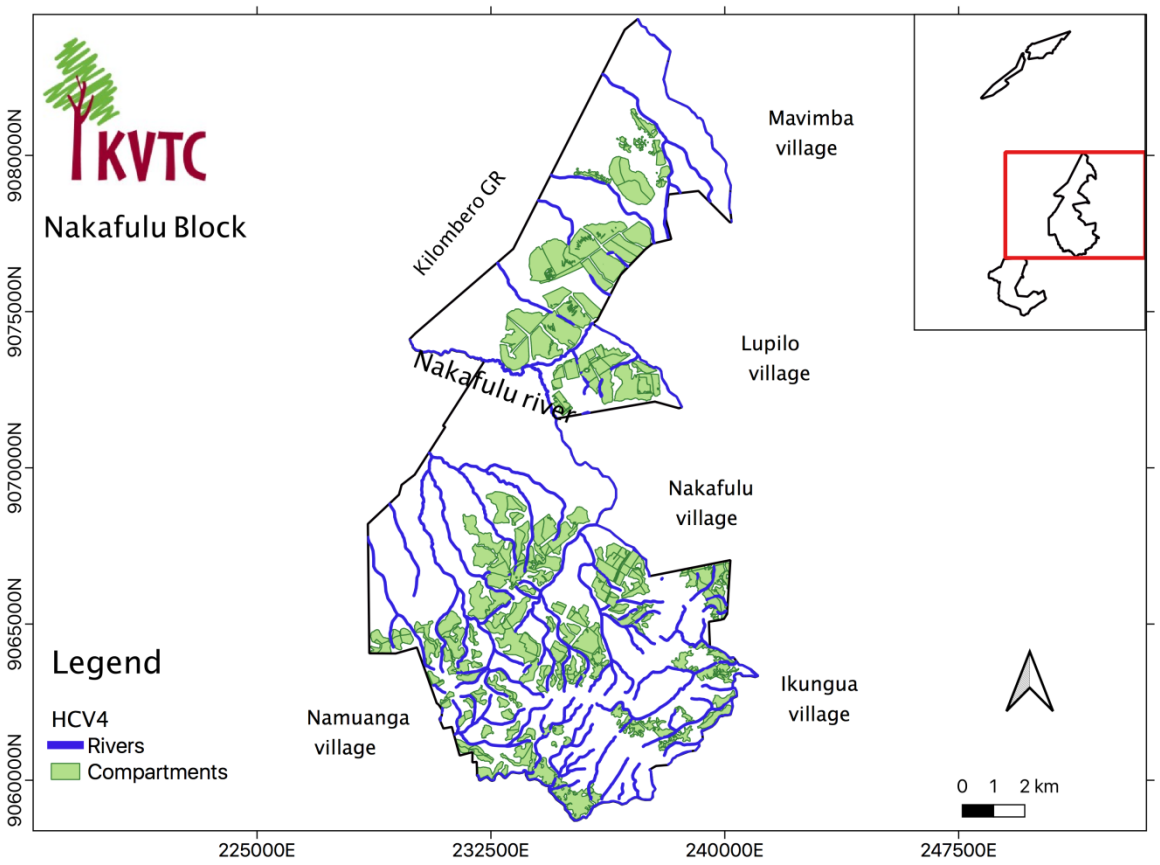


Map 10. Ichima Block - HCV 4



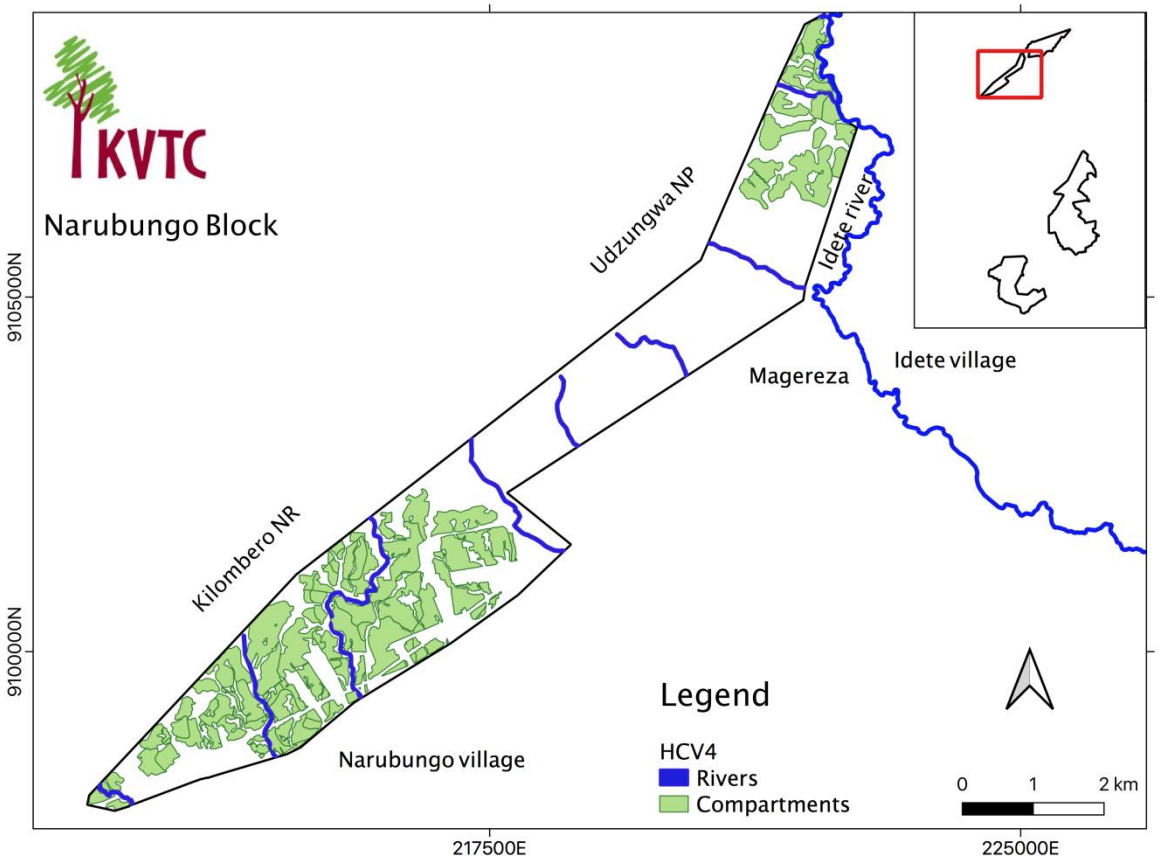
Map 11. Mafinji Block - HCV 4

Mafinji Block is one of the wettest blocks, as indicated in Map 11. This qualifies as HCV 3, containing supporting and regulating ecosystem services. The examples include flood regulation - providing a function in regulating the flow of water within a catchment. Water purification - considered as critical for adjacent communities who are dependent on the river waters for drinking. Other functions include, climate regulation, protection of aquatic genetic resources, soil erosion and formation, nutrient cycling and primary agricultural productions.



Map 12. Nakafuru Block - HCV 4

The Nakafulu River and numerous streams that feed into the main river, play an important role for regulation of water catchments where these water supplies are critical for the flow of the Kilombero River, for the Nyerere Hydropower Dam, as well as, human uses including, drinking water, cooking, washing and fishing. All these critical rivers and tributaries are presented in Map 12.



Map 13. Narubungo Block - HCV 4

One important river is Idete, which represents a major HCV 4. Teak planting had observed the sixty metre-rule and river banks flourished within the block. The Idete River supplies a significant amount of water for irrigation systems by the Maregereza Prison Camp and Kilombero missionary convent at Mbingu Village. The sisters' convent contains a min-hydropower plant that supplies power to its compound and a few adjacent neighbouring households.

3.4.2.1. Threats

There was a range of threats to HCV 4 that were identified during the field mission. These include:

a) Large herds of livestock that in search of water and grazing during the dry season. Within KVTC Lands there are several undisturbed wetlands that occasionally attract illegal grazing during the dry season;
b) Seasonality combined with climate variability which causes long dry spells causing some water sources and catchments to dry out;
c) There is unprecedented cutting of trees along the edges of major rivers that flow near cultivated lands such that cause siltation and increased surface runoff;
   The HCV 4 areas (mostly in open community areas) are the main catchment for the Kilombero River. However, these areas lack proper management to conserve water to feed the main river.

3.4.3. Strategies for Maintaining and Enhancing HCV 4

Several management strategies can be proposed here, however for the case of KVTC Lands the following applies:

a) Maintain implementation of the Management Plan that elaborates the management of rivers and catchment in accordance with EMA 2004
b) Protect the wetlands areas by restricting the access by livestock to the KVTC Lands.

3.4.4. Monitoring for HCV 4

Monitoring of HCV 4 has been done by KVTC continuously since 2000. The monitoring regime has been mostly on quality using the mini-SASS methodology that is widely used. The system has been used successfully since KVTC adopted it in 2000. Furthermore, several other methodologies were tried, including through the RWB on major rivers. The following monitoring regime is recommended.

a) Due to the national interest for monitoring water quantities for the Nyerere Hydropower Dam, KVTC should collaborate with RBWO to install automatic gauges that measure on regular basis the quantity (and quality) of water in major HCV 4 segments of the KVTC Lands.
b) The monthly mini-SASS that is used to monitor the quality of HCV4 in KVTC land should continue as scheduled.
c) The frequent and regular patrols that are conducted by VGS should continue to monitor the invasion by livestock of wetland areas and water points.

3.5. HCV 5 – Community needs

3.5.1. Identification of HCV 5

3.5.1.1. Element 1. Sites and resources fundamental for satisfying the basic necessities of local communities (for livelihoods, health, nutrition, water, etc.)*

The establishment of KVTC was agreed between the government of Tanzania and private investors, but with the participatory engagement of communities adjacent to the investment land. KVTC has since its establishment signed agreements with communities that involve them in certain monitoring activities as well as certain uses of the forests on KVTC Lands. This includes use of pathways, collection, subject to permits, of non-timber forest products such as mushrooms, grasses, wild vegetables, bamboo, wild fruits, gravel and honey as well as the collection of poles and firewood from teak thinnings and harvesting.

The identification of sites and resources that are fundamental to communities was conducted through group discussions in partner villages and participatory mapping, where communities themselves identified their key needs that are sourced from, or located on, KVTC Lands. While they were fully aware of the village agreements' requirements between them and KVTC, still a range of demands were listed. Villagers confirmed that access by communities to forests on KVTC Lands is governed by a series of memoranda of agreements between individual villages and the company. In some of the villages it was clear that community members were benefitting from resources that were obtained by special permission provided by KVTC management. These benefits include, using footpaths, collection of off-cuts and firewood from harvested and pruned teak compartments.

A range of forest products and services were listed by communities as being used to satisfy their basic needs. The most frequently cited benefits include, firewood, medicinal plants, mushrooms, bushmeat, poles, thatch, fish, charcoal as well as services like fresh water for domestic use. Some community members from partner villages illegally grazed their livestock on KVTC Lands.

Among the most frequently cited community benefits were the different types of mushrooms and wild fruits that were identified by communities by using their local vernacular names. The collection of various types of fish species and their seasonal availability in several rivers, streams, gullies and ponds within the KVTC Lands were also described by several of the communities (See Maps 14, 15, 16 and 17). Community members were largely aware that for the most part the mushrooms, fruits and fish were illegally sourced. In one village visited there was an admission of the occasional consumption of puku bushmeat. This community were also fully aware that puku bushmeat was an act of poaching and is prohibited by national law.

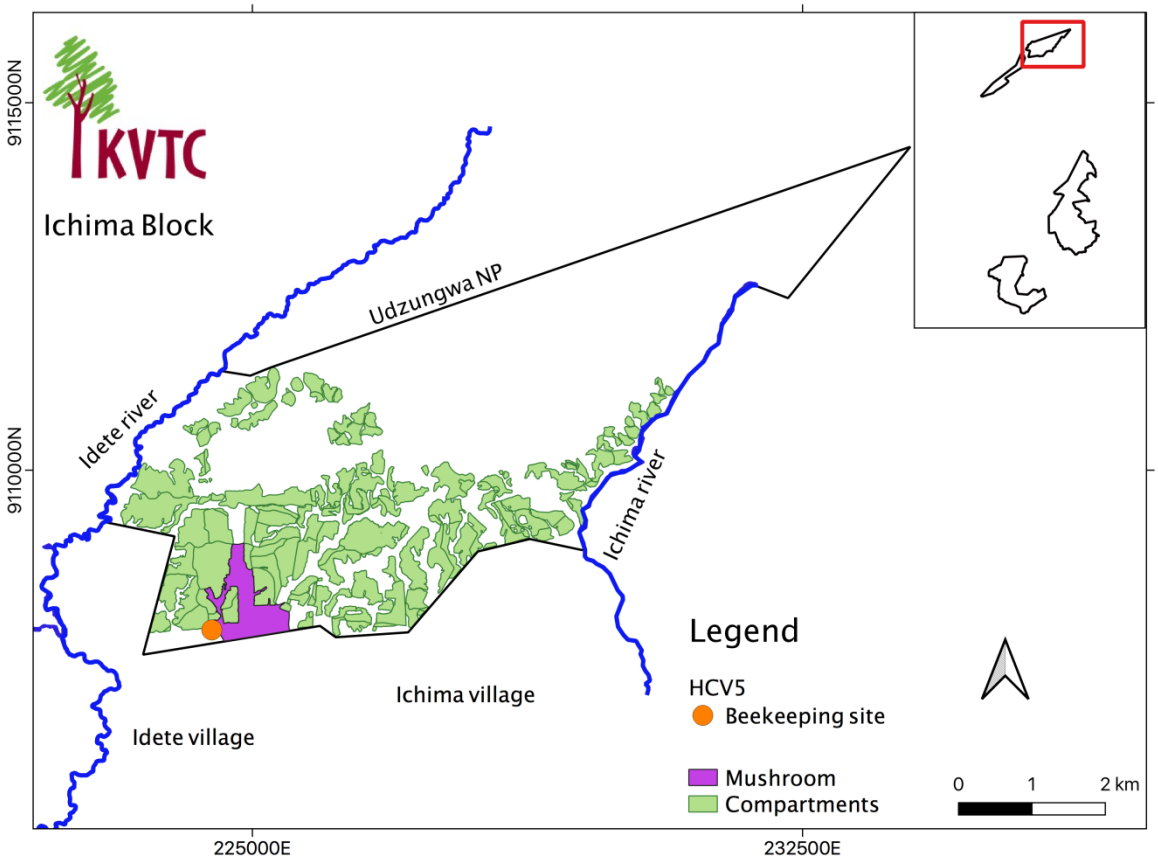
3.5.1.2. Element 2. Sites and resources fundamental for satisfying the basic necessities of Indigenous people (for livelihoods, health, nutrition, water, etc.

Legislation in Tanzania does not recognize the presence of indigenous people among Tanzanian society.

3.5.2. Assessments for HCV 5

Assessment for HCV5 involved several approaches including, Focused Group Discussions (FGD) and Key Informants Interviews (KII) as well as participatory mapping. Participants in village meetings were selected from all segments of the community focusing on the presence of elderly people, women and youth and forest adjacent households, long term village residents and VGS in particular. The discussions aimed towards obtaining information about community needs in terms of resources and ecosystem services that are derived from the KVTC Lands.

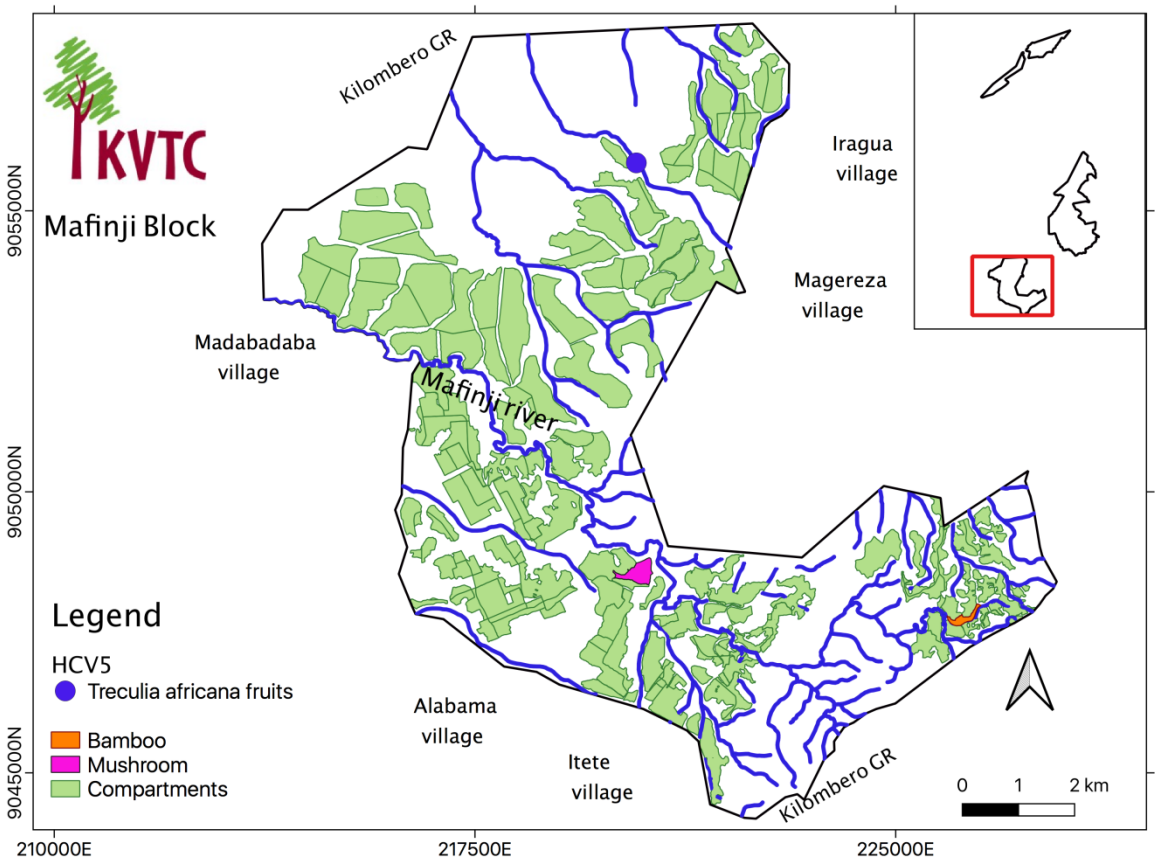
All community demands that qualified for HCV 5 were mapped across all four blocks (Map 5. HCV 5 Community needs, also see GIS software layers).



Map 14. Ichima Block - HCV 5

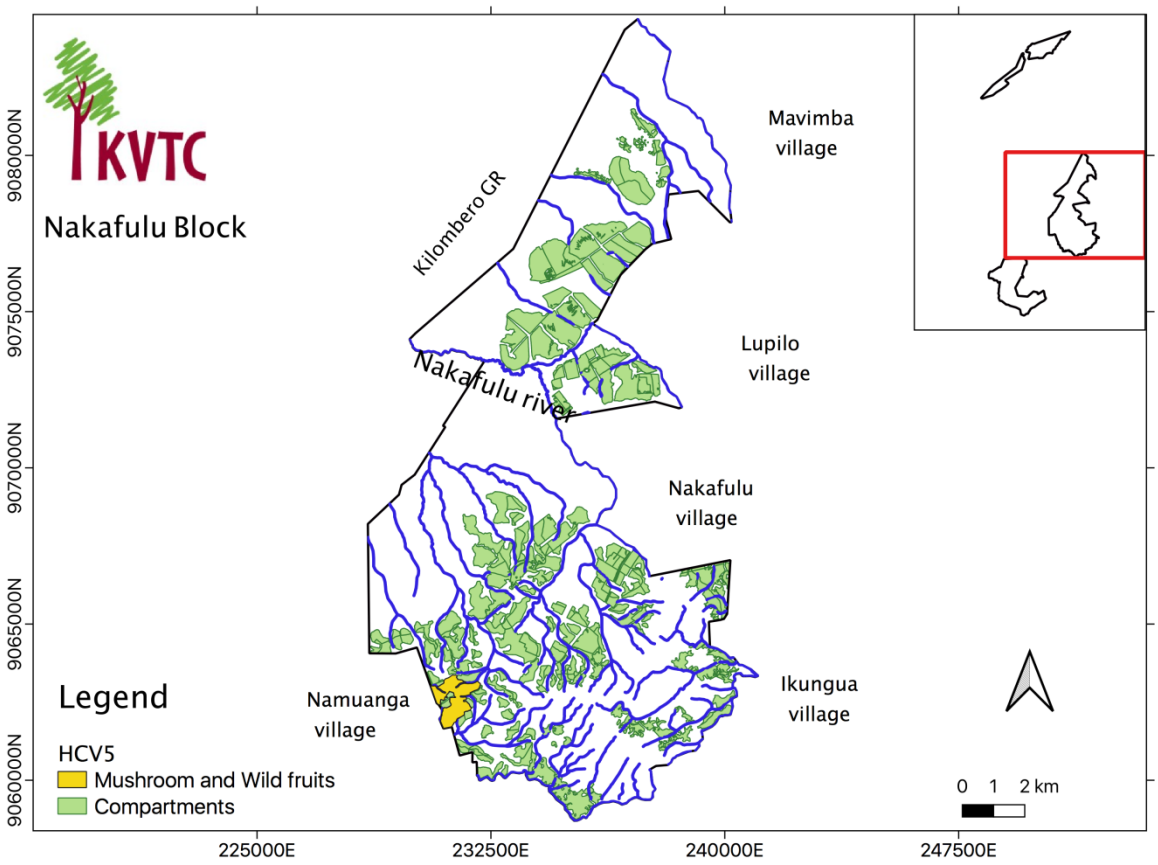
HCV 5 in Ichima Block is largely in the area indicated in Map 14, and is fundamental to satisfying the mushroom needs of local people. Consultations conducted in Idete A, Idete B and Ichima Villages were used to characterise the level of community dependence on Ichima Block. This information enabled the team to develop

management strategies regarding how to mitigate against the negative impacts of losing these benefits to local people's livelihoods.



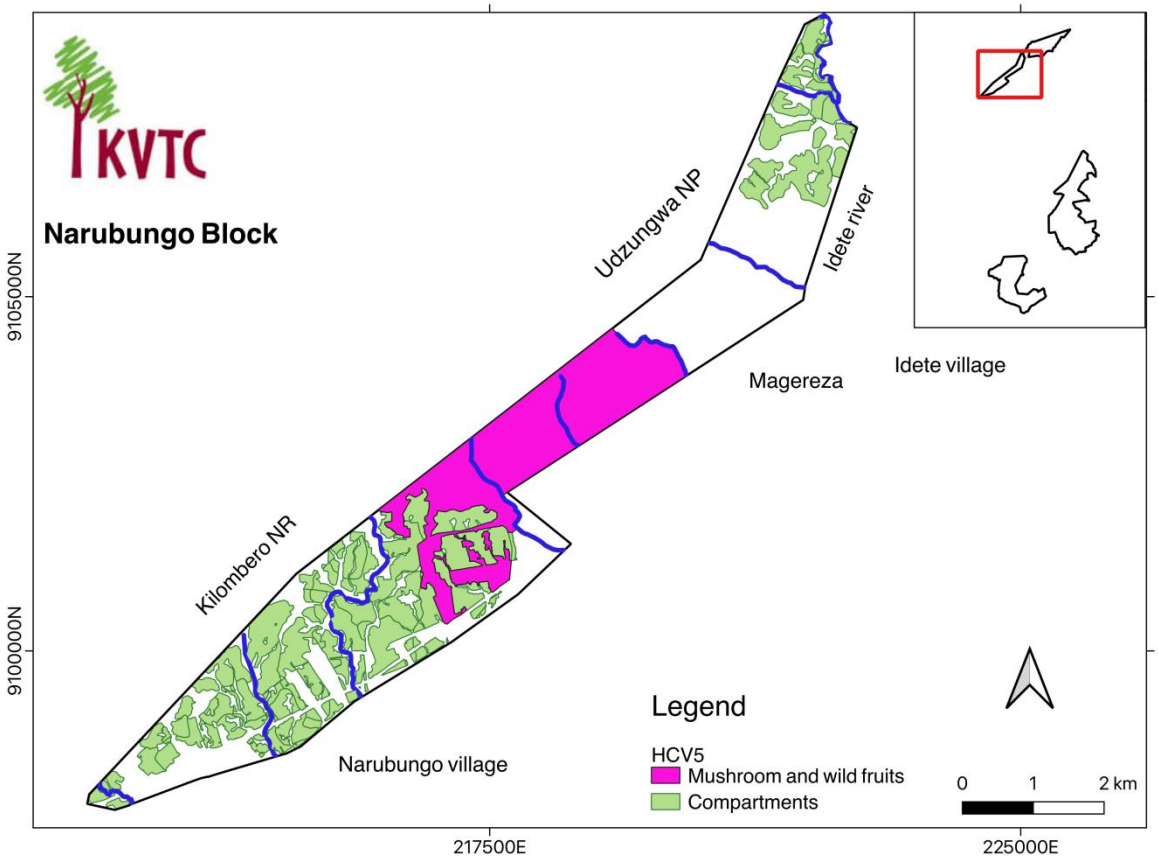
Map 15. Mafinji blok - HCV 5

In Mafinji Block two critical areas that are critical for satisfying community needs for mushrooms and bamboo were mapped. The area close to Nambinga Forest (Map 15), was found to be very rich in mushrooms and hence communities often accessed these areas, mostly illegally. Illegal bamboo harvesting was discovered to be happening on the eastern side of the block, but very occasionally and perhaps only when VGS were not patrolling those areas.



Map 16. Nakafulu Block - HCV 5

In Nakafulu Block, the collection of wild fruits, mostly *Screlocarya birrea*, *Vitex spp* (fulu – local vernacular name) and several other forest fruits, which are only known by their vernacular names, were collected in this area (Map 16). Along with fruits, a variety of mushrooms were reported to be harvested at this site. Once again, all this harvesting activity was deemed to be illegal and had no prior permission from KVTC management.



Map 17. Narubungo Block - HCV 5

All these areas in the Narubungo Block, indicated in Map 17, were favoured by communities for the collection of mushrooms. Villagers in Nakafuru Village, which was the nearest village to the block, informed the HCV team about the regular illegal harvesting of mushrooms and wild fruits, although the Memoranda of Agreement do not authorize the free collection of any non-timber forest products (NTFPs).

3.5.2.1. Threats

To a large extent, all human activities and community needs are the major threats to HCV5, if not properly managed and sustainably utilized. Any unsustainable use will lead to destruction and degradation of HCV5 and all HCV. Currently, KVTC has signed Memoranda of Agreements with several villages that are located adjacent to KVTC Lands. The MoA have defined permitted uses and unauthorised use of KVTC forests, however several incidents of illegal use have been reported in almost all blocks. For example, illegal timber harvesting, teak-timber theft, charcoal making, grazing, cultivation and setting of snares for bushmeat are some of the activities reported.

3.5.3. Strategies for Maintaining and Enhancing HCV 5

Several strategies should be considered for maintaining HCV 5.These must address community needs that will potentially be sourced from KVTC land but also are still available on communal lands. Although the scale and level of these resources to be harvested from village lands are getting smaller, this puts pressure on KVTC Lands as the only remaining intact landscape. Some of the strategies include:

a) Pursuing the Joint Forest Management (JFM) combined with CBFM approach that was previously proposed when testing a model where the private and public sectors could work together to promote a JFM based Private-Public Partnerships (PPP).
b) Continue the use of VGS and incentivize the communities to be custodians of the forests on KVTC Lands by promoting JFM and CBFM.
c) Law enforcement in collaboration with government agencies like TAWA, TANAPA and TFS.

3.5.4. Monitoring for HCV 5

All monitoring schedules that are included in the community agreements are relevant to HCV 5 and applicable all the time. Continuous and appropriate engagement of communities should be nurtured between KVTC management and the local communities. All beneficiaries of the KVTC investment should also be considered in all planning regardless whether they are affected or interested in KTVC lands.

3.6. HCV 6 – Cultural values. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance

3.6.1. Identification of HCV 6

3.6.1.1. Element 1: Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance

The Areas of Special Interest (ASI) database of KVTC is a register of all locations that warrant special attention. These include mostly areas of environmental, archaeological, historical, cultural or research interest. Each ASI is described in the ASI register and where necessary, management prescriptions are put in place. ASI monitoring is being carried out in compliance with the FSC and ISO 14001 requirements. Monitoring sites are in all KVTC landholdings i.e., Block A (Ichima), Block B (Narubungo), Block C (Nakafulu) and Block D (Mafinji and Mgombalenga). In order to ensure that ASI's are maintained according to prescriptions and changes are recorded, annual monitoring is performed. The most recent monitoring period for which a report was available was for November 2021(KVTC, 2021).

The KVTC Lands do not harbour sites, resources, habitats and landscapes of global or regional importance. Archaeological sites are locations where debris from the activities of previous inhabitants provides evidence to us of how our predecessors lived and worked. Some of these remains date back to thousands or hundreds of thousands of years ago. The remnants of these sites indicate prehistoric life that needs to be researched for further documentation. A wealth of archaeological sites was discovered during the intensive assessments carried out by the company during the site selection phase, as many of the archaeological sites were discovered during the scoping procedure which precedes conversion of land to plantation (KVTC, 2012).

3.6.1.2. Element 2: Sites, resources, habitats and landscapes of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities

A range of archaeological sites were identified on KVTC landholdings. A total of 47 sites were identified in all four blocks, some being quite newly discovered, whereas others were identified during establishment of the plantations. Several of these sites date from ancient times.

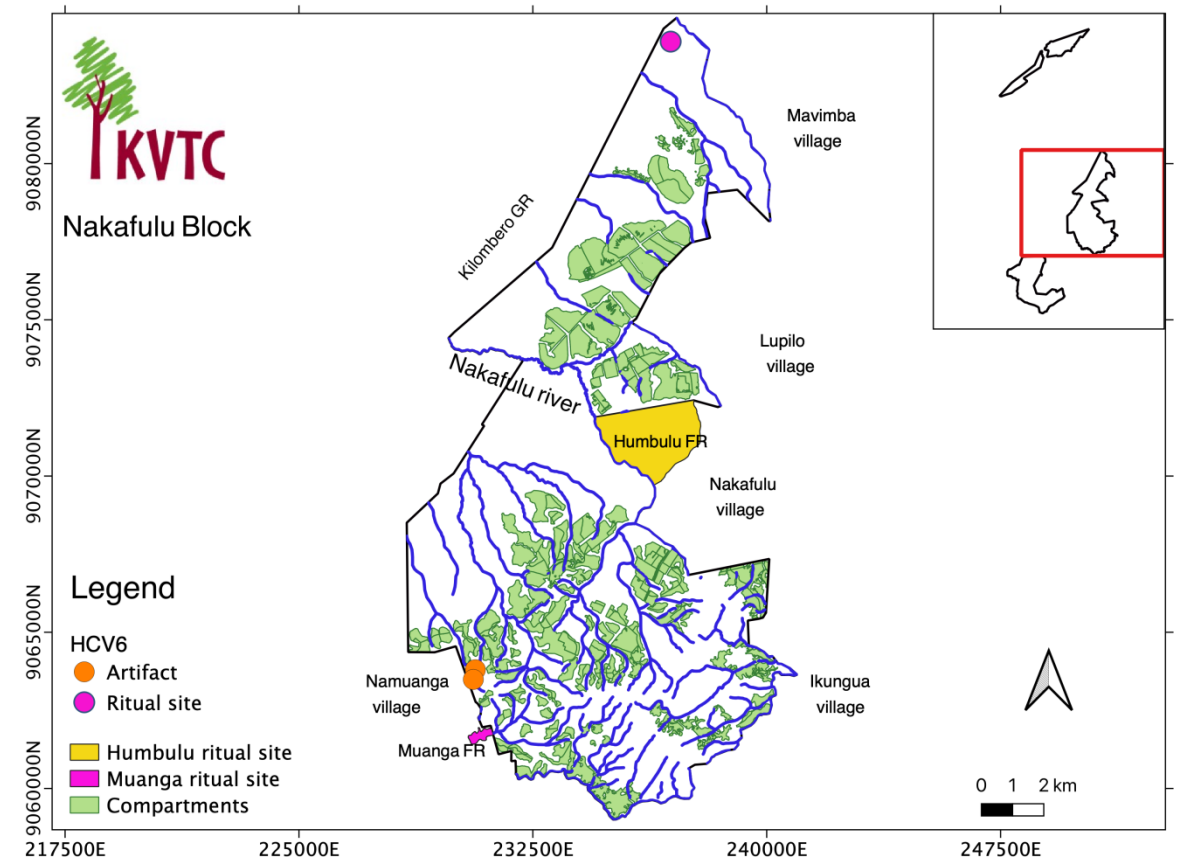
Although the Nakafulu Block yielded the most archaeological sites with, eleven such sites, carrying the designation "site of high significance", one site in the Mafinji Block was found to possess stone age-Pleistocene artefacts with high conservation value (KVTC, 2012).

3.6.1.2. *Element 3: Sites, resources, habitats and landscapes of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of Indigenous Peoples*

Various archaeological sites were identified in all blocks. These sites were of critical importance to local communities for cultural, economic, and sacred reasons. Some of the sites are still in use for sacred and traditional religious purposes by adjacent communities. Through participatory engagement and mapping, communities were able to identify and locate the sites on draft maps and to describe large and observable landmarks that contained HCV 6.

3.6.2. Assessments for HCV 6

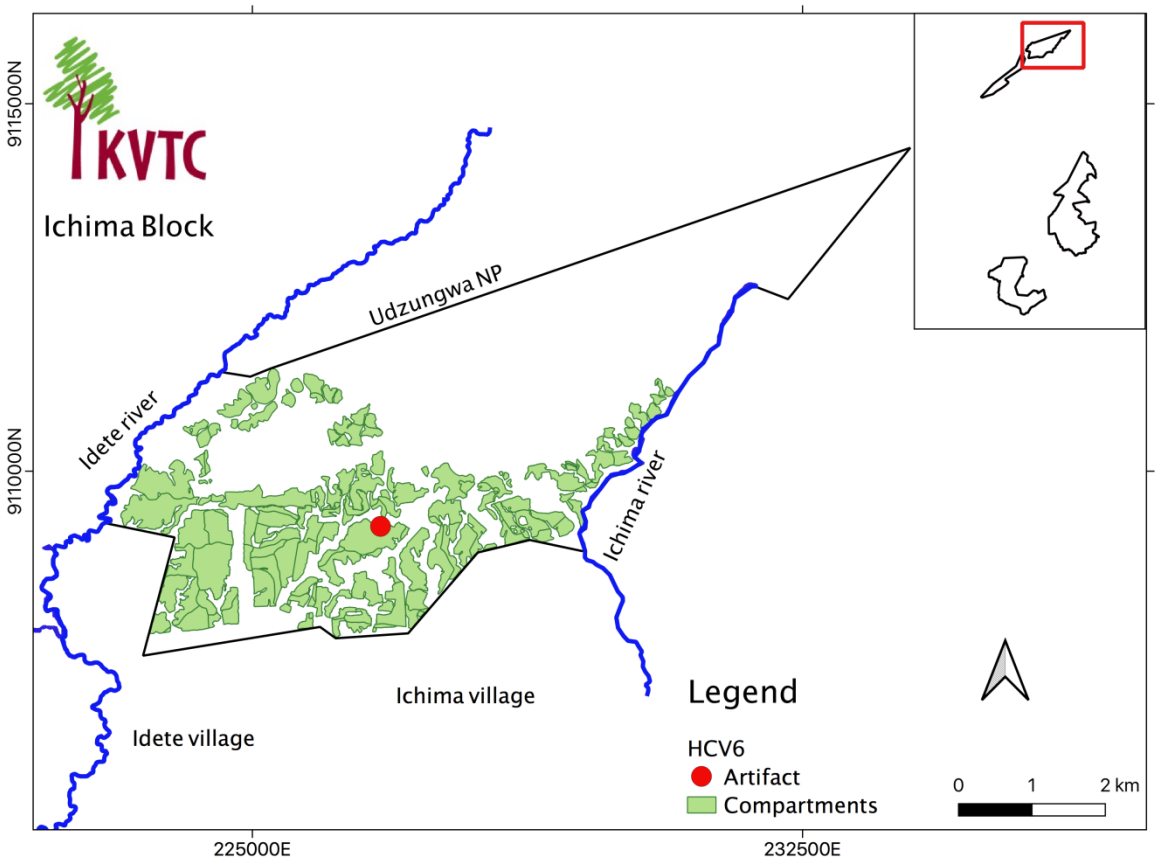
Assessments were conducted jointly with local communities, who possessed knowledge about areas and sites that existed in all blocks. The sites were located and geo-referenced using GPS. The field team were able to locate several new sites through indigenous knowledge of the communities. All these sites were grouped as HCV 6 as indicated in all of the block maps (Map 6 on Cultural values, see also GIS software layers).



Map 18. Nakafulu Block – HCV 6

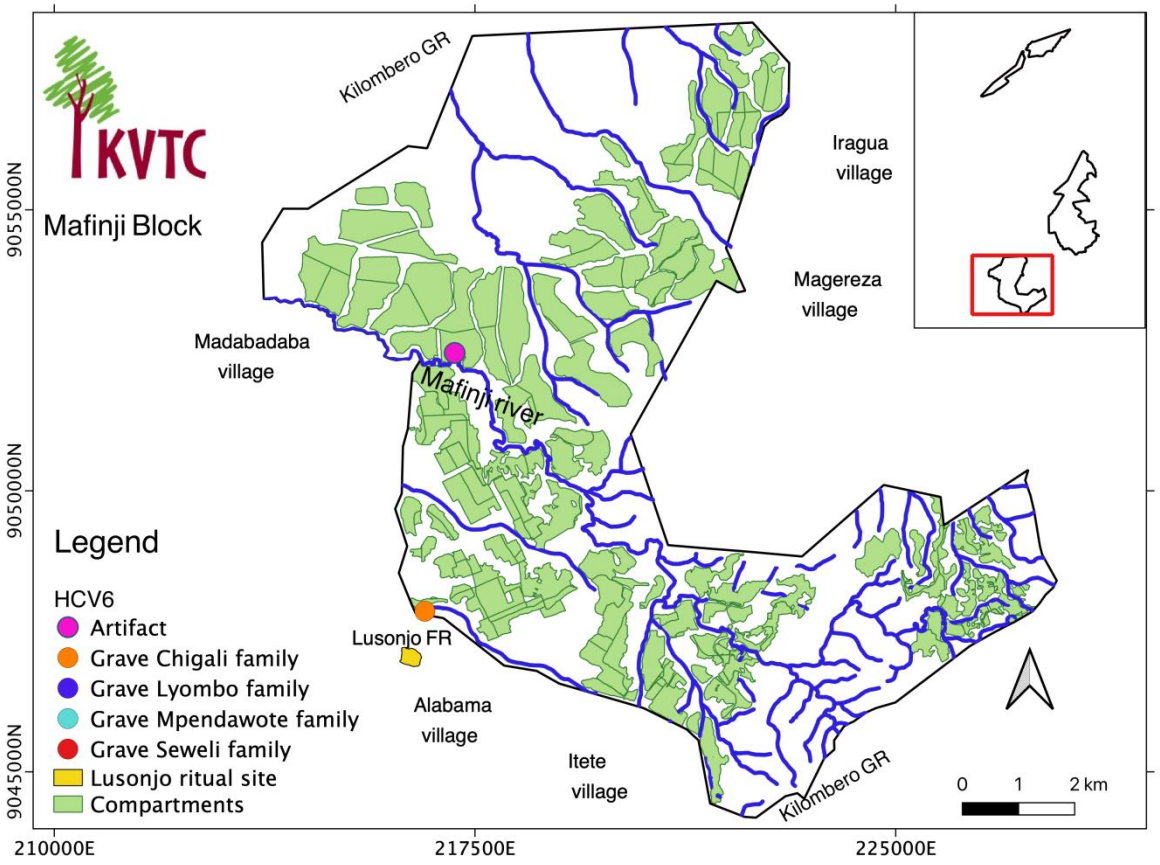
Nakafulu Block contains two areas with special purposes, i.e. ritual sites for the Wadamba and WaBena tribes within communities in four villages that border the block. Humbulu ritual site is located just adjacent to the border with KVTC Lands,

and is believed to be an area of ‘refugia’ for various fauna. The Namhanga ritual site, which is the largest that exists in the KCVTC lands. The ritual site has been mapped as an ASI and has formal procedures for its access under the prescribed Memorandum of Agreement between KVTC and the block adjacent communities.



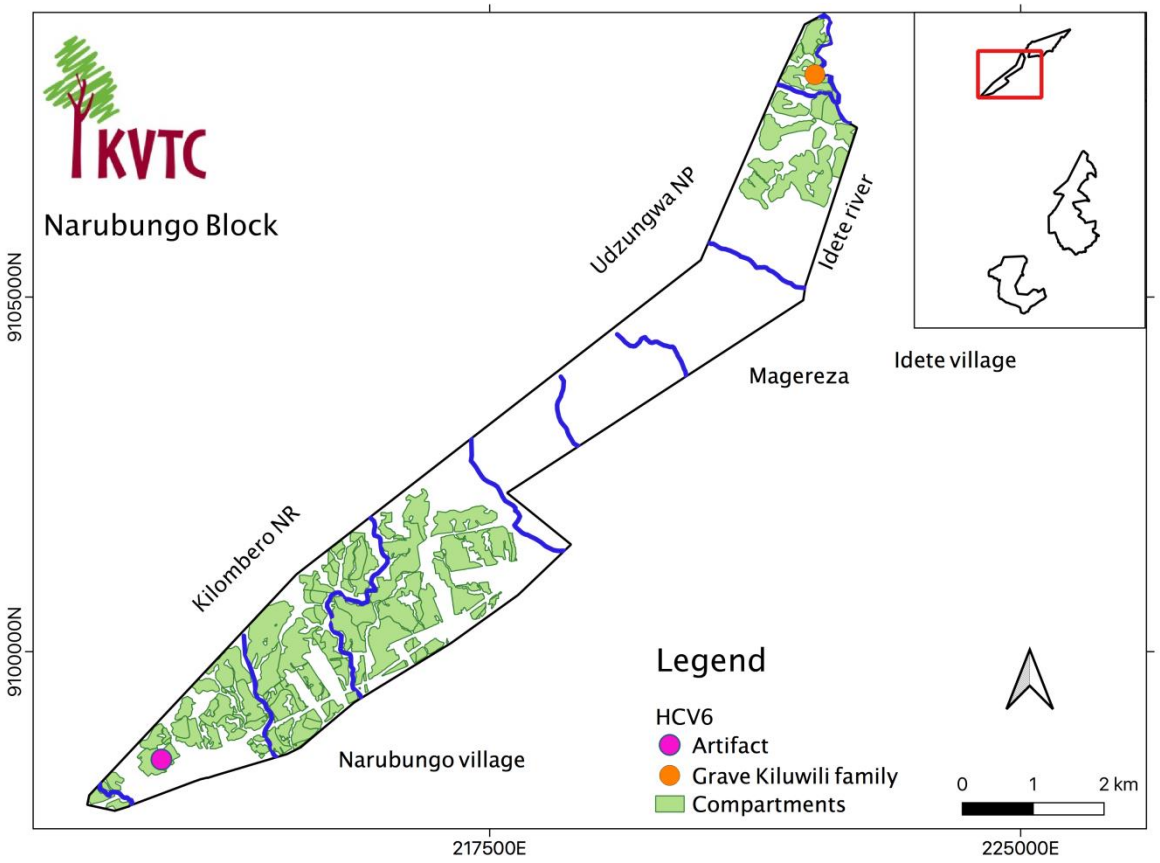
Map 19. Ichima block - HCV 6

At the mid of the Ichima Block, (refer coordinates in GIS software and Map 19), there are artefacts, which include porcelain remains which are believed to have been used by prehistoric communities. Carbon dating of the artefacts by qualified scientists is still pending.



Map 20. Mafinji Block – HCV 6

One ritual site (i.e. Lusonjo isolated site), which is located just outside of the Mafinji Block, is said to be the last remaining site of critical importance to local communities. Several gravesites of the Chigali, Lyombo and Mpendawote Clans were mapped as HCV 6 in Mafinji Block (Map 20). One area containing artefacts was also mapped within the Mafinji Block (refer GIS software coordinates for locations).



Map 21. Narubungo Block - HCV 6

The two important sites in the Narubungo Block were mapped (Map 21, and reference to the GIS software coordinates). One site with remnants of blacksmithing activities was identified at the far southern tip of the block, while the Kiluwili Family grave was discovered in the north-east of the block.

3.6.3. Threats

Similar to HCV 5, most of the threats are human related activities, which include mishandling or illegal removal of artefacts. KVTC's harvesting operations and land preparation for planting can seriously damage the sites and objects under HCV 6 if not carefully planned. Movement of heavy machinery like skidding, loading and transportation of logs, during harvesting and post harvesting can be detrimental to HCVs.

3.6.4. Strategies for Maintaining and Enhancing HCV 6

Strategies for managing HCV 6 are presented below and include the following:

a) Protecting HCV 6 sites that are at peripheral locations with fencing and or permanent marks that will prevent destruction through edge effects.
b) Implement management plan with compliance with protecting areas of special interest (ASI)
c) Careful planning before harvesting is done in all compartments where HCV 6 exist.
d) Implement harvesting plans with consideration of areas of special interest (ASI). Harvesting should not be done on these sites, at least 10 metres around an ASI.

3.6.5. Monitoring for HCV 6

A monitoring regime for HCV 6 should be aligned with other monitoring schedules for HCV 5. This is because some of ASI relate to HCV 6 that are needed by local communities. Some of the suggested monitoring regimes are listed below:

a) Regular monitoring that are conducted by VGS through routine patrols.
b) Quarterly checks on the status of ASI and their existence especially in areas where illegal grazing is happening. These include Mafinji and Nakafulu Blocks which are the most affected by illegal activities.

4. Conclusions

The KVTC land was confirmed to have all the High Conservation Values (HCVs) based on categorization by HCVRN. The six distinct categories represent high level of niche of biodiversity and ecosystems including ecosystems services to be conserved. KVTC and stakeholders have the duty to manage the HCVs and other remaining forest and nature assets in the wider landscape of the Kilombero Valley. The HCVAs will remain as the representative sample areas around the general and unprotected forested land. The HCVAs will protect and harbour rare, threatened, and endangered species of flora and fauna, as well as provide refugia from fast varnishing unprotected forests habitats.

Village Game Scouts are participating effectively in patrols and in monitoring biodiversity. However, many VGS are young whereas there is a wealth of knowledge about biodiversity and habitats that is held by elderly members of the community. An ability to identify flora and fauna by vernacular names will help to better understand and monitor changes in species numbers.

Few surveys have been done to identify invertebrate species in the valley, with only limited studies on butterflies. Likewise, small mammals and other vertebrates have not been thoroughly surveyed since the work of FRONTIER in 2011. No amphibians or reptiles from the KVTC Lands are listed as Critically Endangered, Endangered or Vulnerable under the IUCN categories. However, the one species that was listed , the Merara, or Rees', toad (*Sclerophrys reesi)*, was determined to be Data Deficient[7].

KVTC needs to put more efforts in protecting HCVs, especially ASIs (in HCV 6), that are exposed to road and land clearing, and should be part of the targets within the implementation of management plans. Resources' input into HCVs activities such as staff and budget should always be allocated annually. Physical monitoring and remote sensing could also help in developing trajectories of land cover changes on KVTC land and the surrounding landscape over the next period of time. This will help KVTC to make informed decisions on strategizing the management of teak, the key plantation crop, as well as HCV that are located across large areas under KVTC landholdings.

[7] https://www.iucnredlist.org/species/54746/107349642. Retrived on 28th April 2023.

5. Recommendations

The following recommendations are suggested at three levels, i.e., at KVTC level, at Stakeholders level and at Institutional level

At KVTC company level

a) Provide commitment to protecting and managing HCVs, by aligning set of action within the Forest Management plan.
b) Assign a dedicated staff for monitoring HCVs status.
c) Update surveys to determine presence of amphibians, reptiles, and invertebrate species.
d) Regular field monitoring should be undertaken especially for sensitive HCVs 4, 5 and 6
e) Training village game scouts on regular and routine checking of identified HCVs, especially 5 and 6.
a) An exercise be arranged to identify a more comprehensive list of species of flora and fauna by their vernacular names representing ethnic groups in the Kilombero Valley. Develop a glossary of vernacular terms for species of flora and fauna.
b) Develop internal Standard Operation Procedures (SOPs), which will focus on protecting and managing HCVs.

f) Continue monitoring of HCV 4, using the min-SASS tools and other observation tools including the automatic water meter that will be provided by RWBO (see stakeholders' level).
g) Monitoring using technology (remote sensing, GIS) of all HCVs should be prioritized and updated regularly.
h) Undertake internal HCVs audits, before main external audits are about to happen. This will go along with updating GIS maps for any changes that may happen on HCVs status.

At Stakeholder level

a) Collaborate with government authorities that are involved in managing resources within the landscapes. These include TAWA, TANAPA, TFS, RWBO, Local Government Authorities (lands and natural resources departments).
b) Collaborate with Local Government authorities to manage the landscape-based HCVs and promote better management of natural resources.
c) Collaborate with Law enforcement authorities and response units, where need arises.
d) Collaborate with Rufiji Water Basin Office (RWBO) to monitor water quality and quantity (as part of HCV 3).

e) Promote joint forest management in combination with CBFM as part of good neighbourhood with communities and achieve public-private partnerships in forest management (see at Regulatory level).
f) Continue and innovate corporate social responsibilities with local communities and co-create programmes that support livelihoods of the people adjacent to KVTC landholdings.
g) Promote a tree growing culture for local communities, with technical support (if needed for teak growing schemes). This also includes raising awareness on forest management (natural forests and plantations) from school children and adults through public events, radio and other media.
h) Investigate other ecosystem services from the forests and their value chains (beekeeping, aquaculture, climate smart agriculture, etc). This will encourage forest protection and management and probably halt the unprecedented rate of deforestation and degradations.

At Institutional level

c) Develop joint forest management in combination with CBFM as provided by the MNRT JFM and CBFM guidelines and use opportunity on the recent GN 63. This will protect much of the HCVs threats due to human disturbances.
d) KVTC to keep watching for any new government gazettement, for possible opportunities or threats that may favour or jeopardize the existence of the HCVs.
e) Participate, if invited, in providing opinions when developing regulations for the newly gazetted Kilombero Game Reserve.
f) Collaborate with regional and government levels to address high level issues including land use planning and management along Kilombero Valley lands adjacent to KVTC land holdings.

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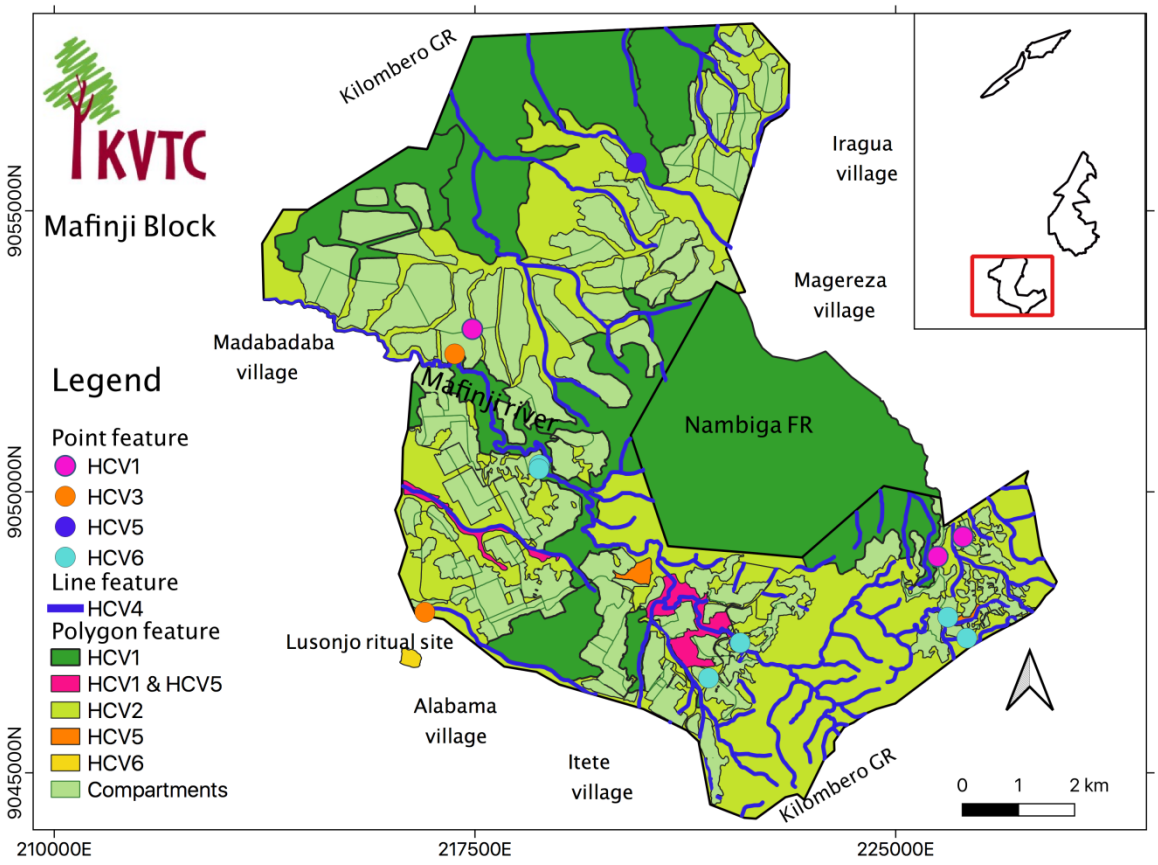
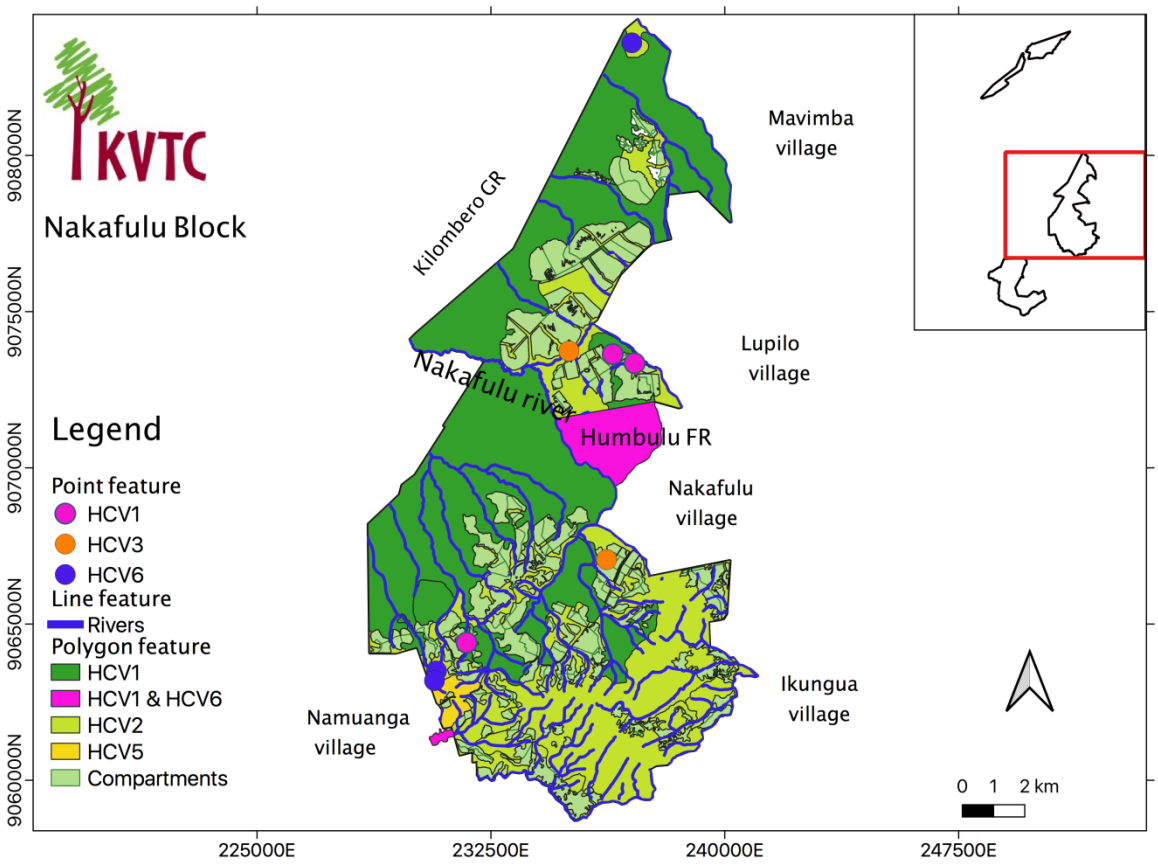
7. Annexes

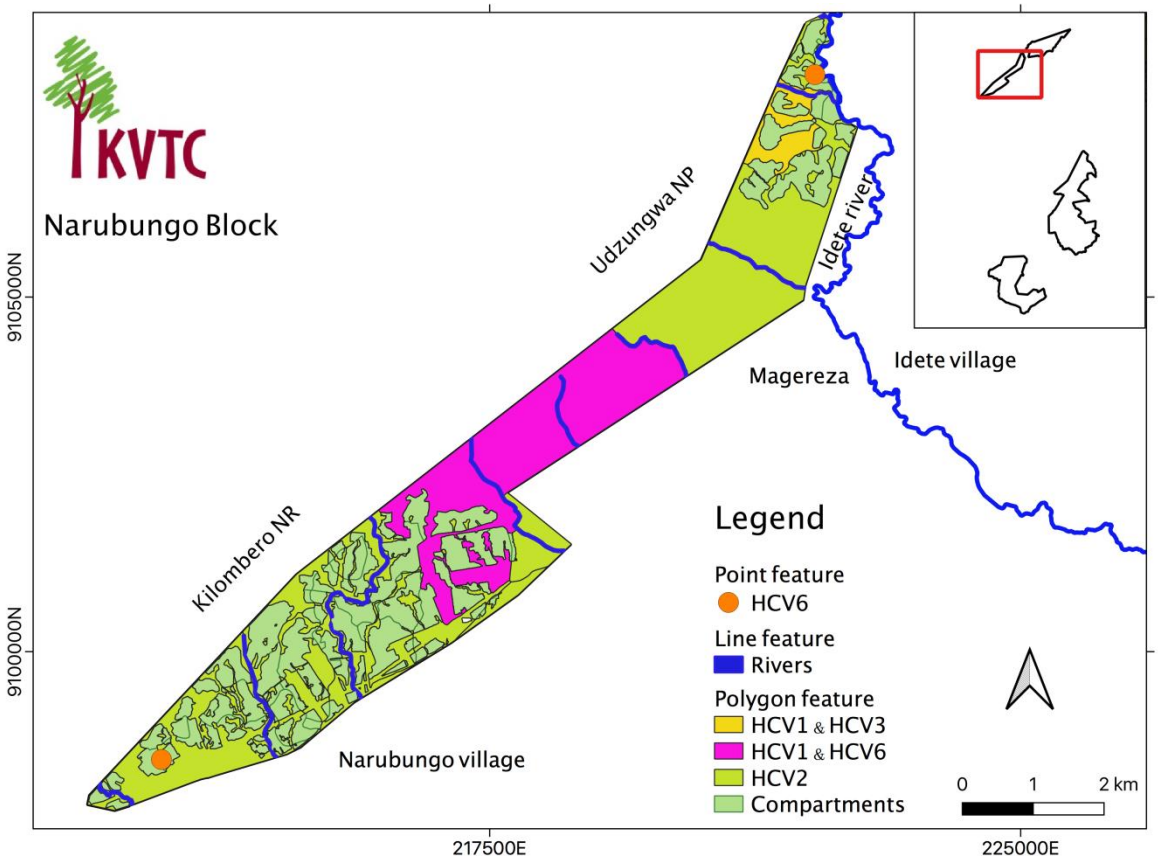
Annex 1 Mafinji Block - All HCVs



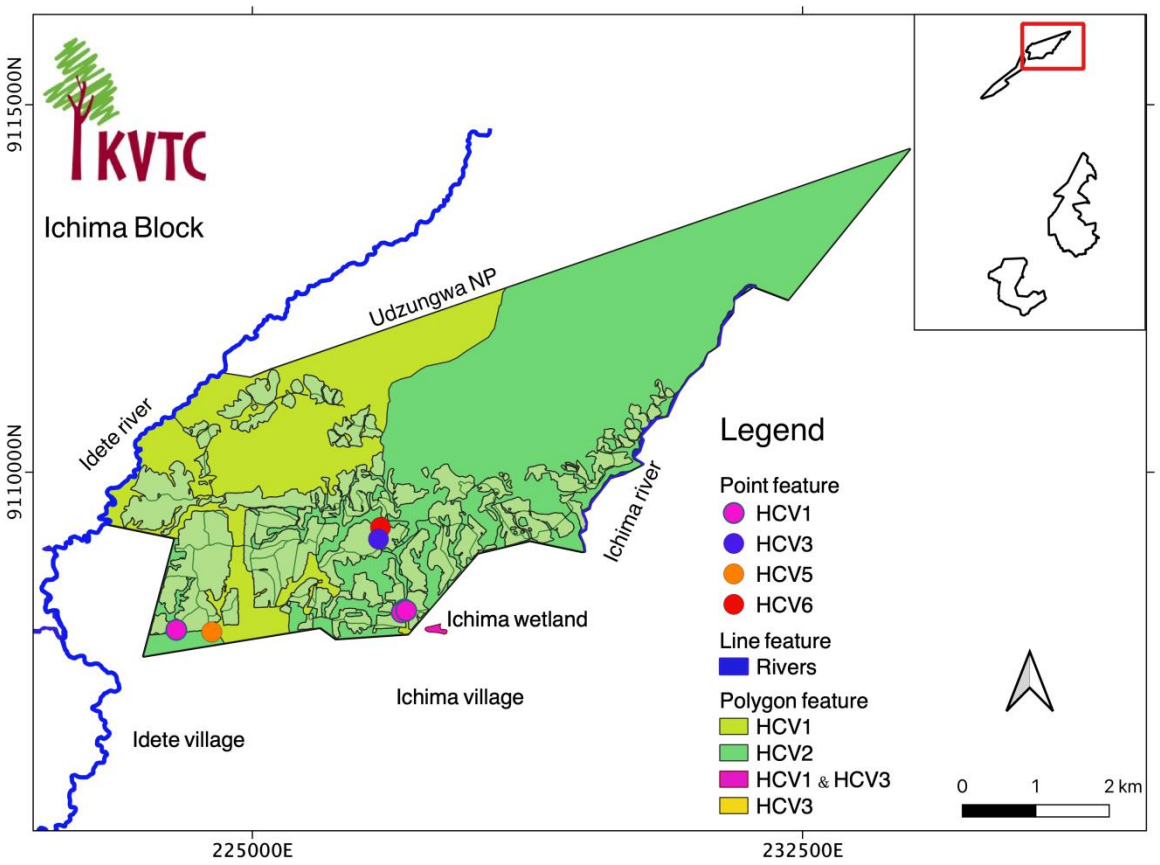
Annex 2 Nakafulu Block - All HCVs



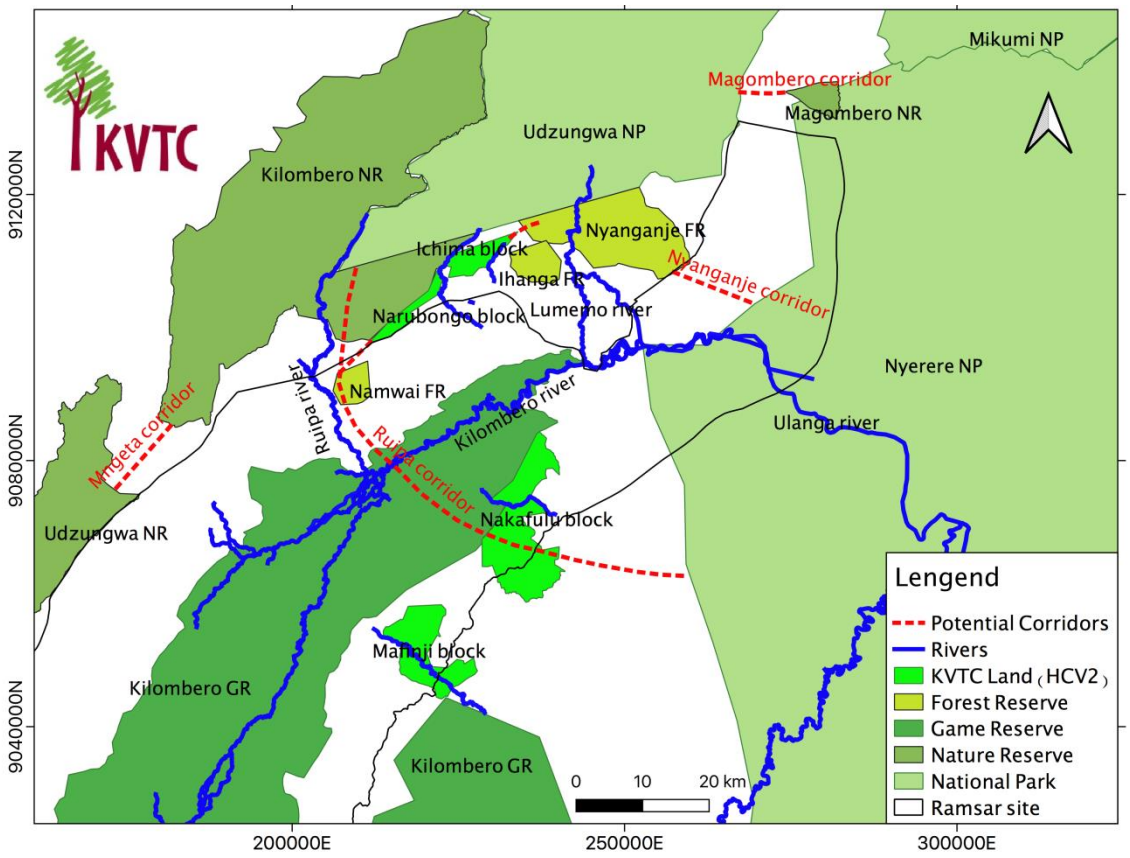
Annex 3 Narubungo Block - All HCVs



Annex 4 Ichima Block - All HCVs



Annex 5 Landscapes and Mosaics



Annex 6: Mammal species

Species		Cites list	IUCN Classification	PopulationTrend
Latin name	Common Name			
Orycteropus afer	Aardvark	No	LC	Unknown
Papio cynocephalus	Yellow Baboon,Nyani	Yes	LC	Stable
Cercopithecus mitis	Blue monkey	Yes	LC	Decreasing
Syncerus caffer	Buffalo, Nyati	No	LC	Decreasing
Tragelaphus scriptus	Bushbuck	No	LC	Stable
Madoqua sp	Dik dik	No	LC	Stable
Cephalophus harveyi	Harvey's Duiker	No	LC	Decreasing
Taurotragus oryx	Eland	No	LC	Decreasing
Loxodonta africana	Elephant, Tembo	Yes	VU	Decreasing
Crocuta crocuta	Spotted hyena	No	LC	Decreasing
Panthera pardus	Leopard, Chui	Yes	NT	Decreasing
Hystrix cristata	Porcupine	No	LC	Unknown
Redunca redunca	Reedbuck	No	LC	Stable
Hippotragus niger	Sable	Yes	LC	Stable
Phacochoerusaethiopicus	Warthog, Ngiri	No	LC	Stable
Kobus ellipsiprymnus	Waterbuck	No	LC	Decreasing
Kobus vardoni	Puku antelope	No	NT	Decreasing
Equus quagga	Zebra, Pundamilia	No	LC	Stable
Panthera leo	Lion, Simba	Yes	VU	Decreasing
Redunca arundinum	Southern Reedbuck	Yes	LC	Stable
Civettictis civetta	civet	No	LC	Unknown
Hippopotamus amphibius	Hippopotamus	No	VU	Decreasing
Sylvicapra grimmia	Bush Duiker	No	LC	Stable

Genetta tigrina	Blotched Genet	No	LC	Unknown
Ichneumia albicauda	White-tailed Mongoose	No	LC	Stable
Atilax paludinosus	Marsh Mongoose	No	LC	Decreasing
Genetta angolensis	Blotched Genet	No	LC	Unknown
Lycaon pictus	African Wild Dog	Yes	EN	Decreasing
Smutsia temminckii	Temminck's Ground Pangolin	Yes	LC	Decreasing

Annex 7: Plant species

Species		Cites list	IUCN Classification	Population Trend
Latin name	Common Name			
Dalbergia melanoxylon	African blackwood, Mpingo	No	LR/nt	unknown
Dombeya rotundifolia	Mfukuluu	No	LR/lc	unknown
Khaya anthotheca	Mkangazi, African Mahoganoy	No	VU	unknown
Pterocarpus angolensis	Mninga, African teak	No	LR/nt	unknown

Annex 8: Bird Species

Species		Cites list	IUCN Classification	Population Trend Latin name
Latin name	Common Name			
Balaeniceps rex	Shoebill	Yes	VU	Decreasing
Macherumphus alcinus	Bat hawk	No	LC	Stable
Polemaetus bellicsus	Martial eagle	No	VU	Decreasing
Rhynchops flavirostris	African skimmer	No	NT	Decreasing
Poicephalus meyeri	Meyer's parrot	Yes	LC	Stable

Typo alba	Barn owl	Yes	LC	Stable
Asio capensis	Marsh owl	Yes	LC	Stable
Srix wosfortii	African wood owl	No	LC	Stable
Apalderma narina	Narina trogon	No	LC	Stable
Bycanistes bucinator	Trumpeter hornbill	No	LC	Stable
Bycanistes brevis	Silvery cheeked hornbill	No	LC	Stable
Campethera abigoni	Golden tailed woodpecker	No	LC	Stable
Campithera caulliautii	Green backed woodpecker	No	LC	Stable
Dendropicos frusescens	Cardinal woodpecker	No	LC	Stable
Dendropicos namaguus	Bearded woodpecker	No	LC	Stable
Ploceus burnieri	Kilombero weaver	No	VU	Decreasing
Harpyhaliaetuscoronatus	African Crowned Eagle	No	EN	Decreasing
Bucorvus leadbeateri	Southern ground Hornbill	No	VU	Decreasing
Gyps africanus	White-backed Vulture	No	EN	Decreasing

Annex 9: Amphibian and Reptile species

Species		Cites list	IUCN Classification	PopulationTrend
Latin name	Common Name			
Crocodylus niloticus	Nile Crocodile	Yes	LR/lc	Unknown
Chameleo dilepis	Flap-Necked Chameleon	Yes	LC	Stable
Amietophrynus reesi,	Rees's Toad	No	DD	Unknown