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Biodiversity and Tropical Forestry (FAA 118/119) Assessment

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ACRONYMS

AHADI	Agile Harmonized Assistance for Devolved Institutions
ASAL	arid and semi-arid lands
AVCD	Accelerated Value Chain Development
BMU	Beach Management Unit
CCPSIP	Community Conservancy Policy Support and Implementation Program
CDAP	Community Development Action Plans
CDC	Community Development Committee
CDCS	Country Development Cooperation Strategy
CFA	Community Forestry Association
CIDP	County Integrated Development Plan
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMP	Conservation Measures Partnership
CSO	civil society organizations
DO	Development Objectives
EAC	East African Community
EBC-LICC	Effective Biodiversity Conservation and Livelihood Improvement by Community Conservancies
ECMA	Environment Management and Coordination Act
EEZ	Exclusive Economic Zone
FAA	Foreign Assistance Act
FCMA	Forest Conservation and Management Act
FIRM	Financial Inclusion for Rural Mircoenterprises
FTF	Feed-the-Future
GDP	gross domestic product
GIS	geographic information system
GDL	Global Development Lab

GoK	Government of Kenya
GVA	gross value added
ha	hectare
HIV	human immunodeficiency virus
INL	International Narcotics and Law Enforcement Affairs
IR	intermediary result
ITAP	International Technical Assistance Program
IUCN	International Union for the Conservation of Nature
KADP	Kenya Accountable Devolution Program
KAVES	Kenya Agricultural Value Chain Enterprises
KCDP	Kenya Coastal Development Project
KEFRI	Kenya Forestry Research Institute
KFS	Kenya Forest Service
Kg	kilogram
KiWASH	Kenya Integrated WASH
km	kilometer
KMFRI	Kenya Marine and Fisheries Research Institute
KWCA	Kenya Wildlife Conservancies Association
KWS	Kenya Wildlife Service
KWTA	Kenya Water Towers Agency
LAPSSET	Lamu Port-South Sudan-Ethiopia-Transport
MCS	monitoring, control and surveillance
MENR	Ministry of Environment and Natural Resources
mm	millimeter
MMWCA	Maasai Mara Wildlife Conservancy Association
MT	Metric Ton

NA	Necessary Action
NEMA	National Environment Management Authority
NFP	National Forest Programme
NGOs	non-governmental organizations
NLC	National Land Commission
nm	nautical mile
NRT	Northern Rangelands Trust
PEER	Partnership for Enhanced Engagement in Research
PES	payment for ecosystem services
PFM	participatory forest management
PREPARED	Planning for Resilience in East Africa through Policy, Adaptation, Research and Economic Development
RAPID	Resilient Arid Lands Partnership for Integrated Development
RCMRD	Regional Centre for Mapping of Resources for Development
REGAL-AR	Resilience and Economic Growth in the Arid Lands—Accelerated Growth
REGAL-IR	Resilient Arid Lands Partnership for Integrated Development
SMART	Spatial Monitoring and Reporting Tool
TNC	The Nature Conservancy
UNDP	United Nations Development Programme
WASH	water, sanitation, and hygiene
WCMA	Wildlife Conservation and Management Act
WILD	Wildlife Information Landscape Database
WRMA	Water Resources Management Authority
WRUA	Water Resource Users Association
WTP	Water Tower Climate Change Resilience Project
WWF	World Wildlife Fund

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EXECUTIVE SUMMARY

This biodiversity and tropical forestry assessment (the Assessment) supports the USAID/Kenya Mission in its ongoing implementation of its 2014-2018 Country Development Cooperation Strategy (CDCS), as well as strategic planning and prioritization for the next CDCS (anticipated to begin in/around 2020). The Assessment includes an evaluation of biodiversity and tropical forest management within Kenya and proposed programmatic scope of responsibility; a review of strategic plan components within the context of environmental threats; and identification of potential negative impacts of proposed activities to biodiversity and tropical forests. This assessment also identifies issues and opportunities for adding value to those plan components through environmental considerations; and in doing so, complies with Sections 118 and 119 of the Foreign Assistance Act (FAA) of 1961, as amended, and Agency guidance on country strategy development under ADS 201 and ADS 204.

STATUS OF TROPICAL FORESTS AND BIODIVERSITY

Low plains form Kenya's north and extend southeast to the coast. In the center, south and southwest of the country the plains rise into fertile highlands. The Great Rift Valley, running north to south, bisects the western half of the country. The major ecosystem of the highlands is montane forest, while the arid and semi-arid lowlands are comprised primarily of woodland, brushlands, savannah and grassland. Closer to the coast, there are discontinuous but significant patches of dryland forests. The coast is divided between sandy areas and mangrove forests, while offshore Kenya has abundant seagrass beds and a coral reef system. Kenya's freshwater resources are divided between lakes, notably Lake Victoria and Lake Turkana, and several rivers.

NATIONAL BIOLOGICAL DIVERSITY

Kenya is endowed with tremendous biodiversity. The country has approximately 25,000 species of animals, including 1,133 birds, 315 mammals, 191 reptiles, 180 freshwater fish, 692 marine and brackish fish, and 88 amphibians, as well as 7,000 species of vascular plants and more than 2,000 fungi and bacteria. 1,100 species of vascular plants, 14 mammalian species, and eight bird species are endemic to the country.[i] One-hundred and three species of bird, 51 mammals, eight amphibians and reptiles, and 26 fish species are endangered or threatened (see Annexes C and D).

Unfortunately, there has been a precipitous decline in Kenya's wildlife populations. These declines have been driven by numerous factors, elaborated in Section 6, and include agricultural expansion, habitat fragmentation, settlement encroachment, and poaching for both meat and trophies. Extensive surveys covering 88 percent of the country found wildlife populations declining by an average of 68 percent between 1977 and 2016. Several once-common species such as warthog, lesser kudu (*Tragelaphus imberbis*), Thomson's gazelle (*Eudorcas thomsonii*), eland, oryx, topi (*Damaliscus korrigum*), hartebeest

[i] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*, 2015, <https://www.cbd.int/doc/world/ke/ke-nr-05-en.pdf>.

(*Alcelaphus buselaphus*), impala (*Aepyceros melampus*), Grevy's zebra (*Equus grevyi*) have declined 72–88 percent threatening their population viability.[ii]

NATIONAL PROTECTED AREAS

Protected areas in Kenya are composed of National Parks, Reserves, and Sanctuaries, administered by the Kenya Wildlife Service (KWS), as well as gazetted Forest Reserves, which are managed by the Kenya Forest Service (KFS). The KWS-administered areas are protected for wildlife conservation and comprise eight percent of the country. Gazetted Forest Reserves comprise another two percent of the country. Eighty-eight percent of these forests are natural, while the remainder are plantations. Despite this allotment of protected land, about 70 percent of the nation's biodiversity resources are found outside protected areas and remain vulnerable to exploitation and degradation.[iii]

CONSERVANCIES

In addition to National Protected Areas, Kenya boasts more than 140 conservancies, which cover more than 6 million hectares of land (approximately 11percent of Kenya's land area). Kenya's conservancies have been established on both private and community lands. In some cases, small parcels of congruent, privately-owned land were amalgamated to create conservancies.

Conservancies play a critical role of securing the migratory routes and dispersal areas for many of Kenya's fauna—particularly its large mammals such as the elephants, wildebeests, and zebras, among others—by protecting connectivity between protected areas and/or critical habitats. This is an essential function, as Kenya's National Parks and Forest Reserves cover a very small portion of the elephant range, meaning they rely on conservancies and community lands.

Further, in areas such as Laikipia and northern Kenya, conservancies on both private and community lands serve as refuge for the endangered and critically endangered species such as the Grevy Zebra {about 90 percent (2546) of the global population is found in Kenya, and 60 percent on community lands}; and the Hirola (over 70 percent of the global population), in addition to harboring a significant proportion of the national populations of endangered species such as the lions, cheetahs, and wild dogs.

Recent legislation, such as the Wildlife Management and Conservation Act (WMCA) of 2012, formally empowered community-level wildlife conservation and management, by treating it as an eligible form of land use, from which the land user can reap the benefits.

IMPORTANT BIRD AREAS

Important Bird Areas (IBAs) are sites designated based on their value as habitat (permanent or temporary) for threatened or important migratory species. Birdlife International classifies sites as IBAs if they serve host to one or more of the following categories of bird species: (i) globally threatened

[ii] Ogutu et al 2016 Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes? https://doi.org/10.1371/journal.pone.0163249

[iii] ibid.

species; (ii) birds with highly restricted distributions; (iii) bird species characteristic of only a particular biome; or (iv) exceptionally large numbers of flocking birds.[iv]

There are 66 IBAs in Kenya, 30 of which are formally protected within gazetted forests and national parks. The other 36 IBAs do not have formal protection. Efforts are ongoing to identify additional IBAs, promote increased protection for IBAs that do not currently have protected status, and monitor the status of existing IBAs. Annex E lists the current IBAs in Kenya and their basis for classification.

Sections 3, 4, and 5 of the Assessment provide a more detailed overview of status of Kenya's biodiversity and tropical forests, the overarching legal and institutional setting operating in biodiversity and tropical forest conservation and management, and discussion on the valuation of Kenya's myriad ecosystem services.

[iv] BirdLife International (2017) Country profile: Kenya. Available from http://www.birdlife.org/datazone/countrykenya.

DIRECT THREATS, DRIVERS, AND NEEDS

Section 6 of the Assessment documents the direct threats om each ecosystem considered, as well the underlying direct and indirect drivers. Building from that, Section 7 then captures the primary needs in those ecosystems. These needs are then batched into the overarching set of Necessary Actions, against which the Extent to Which analysis is conducted in Section 8. For this executive summary, a consolidated table showing only the direct threats, direct drivers, and needs is provided, followed by a separate table summarizing the Necessary Actions.

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
MONTANE FORESTS		
Deforestation from: • Legal and illegal forest excisions • Illegal charcoal production • Forest clearing/land conversion for agricultural production • Unsustainable utilization (e.g., pastoral encroachment) • Increased prevalence of extractive industry (mining, quarrying, logging)	• Urban and peri-urban expansion • Increased small-holder and commercial agriculture • Increased industrialism and related activities • Tourism (e.g., construction, mask production) • Furniture production • Infrastructure development (e.g., transportation corridors) • Increasing fuelwood demand for energy • Weak enforcement of legal mandates for both protected and non-protected areas • Lack of an effective benefit sharing framework (e.g., for CFAs) • Lack of alternative livelihoods that promote or rely-upon sustainable forest management • Lack of alternative energy/electricity/fuel sources	• Realign existing and new plans to the climate change adaptation and mitigation plans • Enhance of carbon stocks through reforestation, afforestation, and minimization of fire risks • Strengthen forest monitoring, reporting, and verification (MRV) capability to assess effect of REDD+ strategy on GHG emissions, livelihoods, and other benefits • Promote sustainable utilization of forests by developing alternative energy sources to charcoal and fuel wood • Align development to the National Forest Programme and the FCMA of 2016 • Strengthen forest law enforcement and governance • Review participatory forest management rules and strengthen CFAs • Promote multiagency ecosystem planning approach • Promote fire risk and control • Support mapping and rehabilitation of degraded areas and hotspots • Promote alternative livelihoods • Develop and implement grazing plans

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Loss of biodiversity and habitat degradation from: • Invasive species, new pests, and diseases (e.g., *Psygium Quajava* and *Ocotea* in Mt Kenya) • Harvesting of sandalwood *(Oscillis lanceolate)* • Overgrazing • Expansion of human settlements • Illegal hunting/poaching • Fires (for land clearing, hunting)	• Weak enforcement of legal mandates for both protected and non-protected areas • Weak implementation framework for County Wildlife Compensation Committees • Collapse of grazing plans (e.g., Baringo, Laikipia) • Human/wildlife conflict • Increased water scarcity leading to increased food scarcity • Increased migration to urban and peri-urban areas • Infrastructure development	• Develop a benefits-sharing framework • Promote ethical use of forests as part community participation and environmental education • Support valuation of ecosystems, especially water towers • Coordinate and harmonize various planning models (i.e., forest management plans, sub-catchment management plans etc.) • Harmonize gazettment of protected area (i.e., nature and forest reserves) • Harmonize CFA's and WRUA'S • Strengthen governance structure (i.e., forest conservation committees, environmental committees, sub-catchment committees)
WOODLAND-BRUSHLAND		
Landscape-scale Ecosystem Degradation from: • Large-scale Development (e.g., LAPSSET, Nairobi-Mombasa Rail/Road Corridor, Dams, etc.) • Increase in rearing of camels and goats • Overgrazing, soil compaction, erosion • Fencing off of high-productivity grazing areas by landowners • Poorly regulated/illegal charcoal making	• Lack of integrated land/resource Planning • Conflicting or overlapping roles and responsibilities for governmental entities • Insufficient long-term funding and staffing for national and community conservation • Human population growth • Limited community/county conservation education, extension, and training programs • Increased water scarcity • Poor land and water use and management	• Restoration of ecosystems and ecosystem productivity • Discourage shift from cattle/sheep to reliance on camel/goat herds that is causing accelerated ecosystem deterioration • Support and/or provide extension services to improve livestock production, herd reduction, and marketing (central and county government, Northern Rangelands Trust (NRT), Kenya Wildlife Conservancies Association (KWCA), CFAs, etc.) • Provide alternative agricultural strategies, products, and revenue sources in times of drought • Integrated water systems development and management, including sub-catchment management, rainwater harvesting • Landscape-scale data collection and management, standardized throughout the country • Dissuade population increases and settlements in arid/semiarid lands
Decline and loss of wildlife populations (distribution, abundance) from: • Fencing and other movement control measures • Human/wildlife conflicts	• Disproportionate responsibility placed on local communities for wildlife conservation • Often limited tangible, direct benefits to communities for conservation • Decline in tourism and revenue discouraging upkeep of community-based tourism initiatives	• Improve field level funding/staffing of KWS and KFS management of parks, forests protected areas, etc. • Re-establish presence and management of "paper" protected areas. • Support KWS, KFS and conservation NGO/PVO • Technical and law enforcement support for private and community held lands.

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
• Agricultural expansion into key wildlife habitat areas • Reduced land availability and carrying capacity • Hunting for bushmeat • Illegal wildlife hunting/trafficking	• Demand for bush meat • Lack of alternative livelihoods • Drought • Lack of wildlife restocking programs on private lands • Loss of dry season water access • Lack of economic incentives for conservation (revenue sharing, controlled hunting, taxes) • Economic value of illegal hunting/trafficking • Lack of national/county/private enforcement staff • Over-reliance on tourism stunting generation and promulgation of alternative forms of incentivizing landowners to support conservation	
Deforestation and Loss of Forest Biological Diversity from: • Conversion of woodlands to other uses on private lands (e.g. kasigau corridor, LAPSSET proposals) • Agricultural encroachment (legal and illegal) • Invasive species (e.g Psygium Quajava, Ocotea) • Forest fires	• Increased populations and settlements in woodland areas • Local demand for woodland products (lumber, furniture, poles, tree/plant species) • International demand for high-valued tree species (sandalwood, acacia gum-Arabic) • Lack of KFS forest and CFA management plans • De facto abandonment of unprofitable forests and forest reserves • Understaffed KFS and CFA areas • Strong/increasing market for charcoal production • Lack of alternative energy sources • Lack of alternative forest-related revenue sources in times of crop failure or jobs (e.g. downturn in tourism)	• Secure tenure for all ranches • Build capacity of land owners on leadership and governance • Strengthen security engaging rangers • Conduct resources surveys and develop management plans • Develop a profile of investment opportunities and convene investors forum • Determine the economic cost of wildlife to communities and private land owners • Provide economic incentives for forest and wildlife management (revenue sharing, tax incentives, etc.) on private and community lands • Identify critical geographic areas for conservation association and CFA support (wildlife corridors, water towers, etc.) • Develop clean, sustainable alternative energy sources to reduce demands on charcoal
COASTAL DRYLAND FOREST		

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Deforestation from: • Agricultural expansion • Excision and encroachment for settlement and infrastructure development • Charcoal production and fuel wood collection • Unsustainable logging and commercial timber expansion • Forest clearance for cultivation	• Poverty/livelihood seeking • Decreased productivity of agricultural land • Land degradation • Water scarcity • Increase access to international markets (e.g., via ports) – includes road development, port development, power infrastructure • Demand for tourism facilities in coastal "resort cities" (like those in Diani, Kilifi, and Lamu) • Inadequate and poorly enforced land use planning • Insufficient uptake of new technologies like high efficiency cook stoves and solar panels • Increased demand for energy • Increasing prices of energy alternatives • Increase in local construction demand	• Develop agroforestry initiatives (e.g., intercropping native forest products with drought resistant maize) in the buffer zone of reserve areas—particularly around Arabuko-Sokoke and Shimba Hills • Introduce interventions to promote family planning to try to decelerate rate of population growth in increasingly resource scarce areas • Re-invigorate, with improved approaches, alternative livelihoods activities that have had some past success (e.g., beekeeping, butterfly gardens) • Promote tree nurseries in support of afforestation efforts, commercial sale, and household use. (E.g., non-invasive fruit trees, native tree forest products, etc.)
Land Degradation from: • Uncontrolled fires / burning • Destructive mining practices • Overgrazing • Increased livestock raising • Altered hydrology (e.g., sedimentation of existing surface waterbodies, deforestation, mangrove reduction)	• Poverty and livelihood seeking • Increased access for fuelwood and charcoal merchants • Increased urbanization and industrialization • Commercial value of products in international markets • Tourism (e.g., mask production, hotels, and attractions) • Natural or accidental wildfires • Increased demand for mineral deposits • Government-approved access to international mining companies • Weak or non-existent integrated resource management planning • Increases in ground water salinity • Over-abstraction • Road and infrastructure development, increasing access	• Develop hydrologically appropriate water supply systems • Build capacity and provide technical assistance for county-level, community-level governance systems/structures/individuals • Build capacity and provide technical assistance to water resource management associations/governance systems • Conduct additional studies/analyses on catchment and county-level ecosystems to inform catchment and county-level decision-making • Introduce climate-smart agriculture initiatives, including improved/drought tolerant seed/crop varieties and associated behavior/culture change programming (e.g., to consume millet instead of the more common maize) • Support agricultural value chain development activities in coastal areas (e.g., Kwale, Kalifi, Malindi) for both current agricultural value chains (e.g., maize) and alternative (e.g., millet and other dryland crops)

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Loss of biodiversity and keystone species from: • Deforestation • Loss of migratory corridors • Game hunting / wildlife trafficking • Bush meat hunting • Poaching	• Expansion of agricultural activity • Increased development of transportation and industrial infrastructure • Human/wildlife conflict • Increased local demand for game meat and products • Increase in demand for bush meat products • Low agricultural productivity • Lack of viable alternative livelihoods	• Introduce/boost eco-tourism initiatives (e.g., Dabaso Creek Conservation Group crab farming initiative under the Kenya Coastal Development Project, Malunganje Elephant Sanctuary) through supporting business/management capacity; improving marketing capacity, and support development/creation of linkages with potential public and private partners (e.g., creation of Community-Public-Private Partnerships) • Provide technical assistance and capacity building for proven alternative livelihoods in the coastal region (e.g., coral reef restoration/planting via KCDP, seaweed gardening) • Increased economic benefit realized for community conservancies to continue to incentivize community-led conservation efforts • Availability of alternative livelihoods and increased food security to reduce need for/dependence on local fauna as food source or source of income
FRESHWATER LAKES, RIVERS, AND WETLANDS		
Habitat modification, fragmentation and destruction from: • Eutrophication of the lake waters • Water pollution • Presence of the water hyacinth • Loss of habitat connectivity and refugia • Altered hydrology	• Expanding agricultural activities and livestock grazing • Unplanned expansion of towns and cities • Power generation and upstream water abstraction • Decreased productivity of agricultural land • Land degradation • Lack of integrated land/resource planning • Upper watershed deforestation • Water scarcity • Reduced river flows and lake volumes from increased incidences of drought • Over-abstraction • Soil erosion and sedimentation	• Planting of fast growing trees as a source of fuel and timber • Promote affordable energy (e.g., efficient cook stoves, solar energy) • Provide incentives for local communities to protect wetlands • Explore opportunities that sustainably utilize wetland resources and implement poverty alleviation activities (e.g., ecotourism, basket weaving, beekeeping) • Lobby county governments to protect wetlands • Promote sustainable agriculture practices and rehabilitate catchment areas • Strengthen water resource user's associations (WRUAs) and CFAs • Reforest gazetted and non-gazetted areas • Construct fire bricks and fire surveillance/monitoring capabilities • Support implementation of the Tana Delta Master Plan • Secure land tenure and demarcation of wetlands

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Water pollution from: • Effluent discharge • Poor solid waste management • Biomagnification of heavy metals in the water	• Inadequate infrastructure for solid and liquid waste management • Weak enforcement of existing laws regulating industrial water waste treatment (e.g., from breweries, tanning factories, paper mills, fish processers, sugar refineries, coffee washing stations, abattoirs, and mining operations) • Urban runoff, soil erosion, fertilizer, and other agrochemicals, and atmospheric deposition • Nutrient and residue inflows from poor agriculture practices • Increased small-holder and commercial agriculture • Pesticide and fertilizer residue from farmlands, car washing, sedimentation	• Investment in sewerage infrastructure • Improved solid waste management • Strengthen capacity of local authorities to manage solid and liquid waste • Invest in soil and water conservation practices in the catchment • Rehabilitate the hills around Lake Victoria • Support efforts to manage water hyacinth • Improve infrastructure for management of effluents and solid waste management from urban centers within the catchment areas of Lake Victoria • Strengthen water quality and quantity monitoring capabilities • Improve water supply systems • Ensure industries and factories have and operate wastewater treatment plants
Overfishing from: • Increased domestic demand for fish • Use of illegal fishing gear and introduction of more harmful and efficient technologies (Mono filament)	• Limited opportunities for livelihoods • Youth unemployment • Inadequate policing/patrols • Unregulated cage fishing culture • Traditional practice	• Promote alternative livelihoods with special focus on youth (e.g., tree nursey establishment, beekeeping) • Investment in additional vocational training opportunities (e.g., boat building) • Promote fish farming and cage culture • Develop guidelines and regulations for cage fishing culture.
Loss of biodiversity from invasive Species from: • Sedimentation from upstream agricultural activities (water hyacinth) • Introduction of exotic species (e.g., Nile perch and non-native tilapia)	• Nutrient and residue inflows from poor agriculture practices • Soil erosion • Upper watershed deforestation • Lack of coordinated control measures • Poor preparation in government departments	• Develop a national inventory of invasive alien species that currently or potentially impact the ecological character of wetlands, especially Ramsar sites • Promote actions to prevent, control or eradicate such species in wetland systems through targeted harvesting.
COASTAL AND MARINE RESOURCES		

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Habitat destruction and degradation from: • Sedimentation • Pollution • Degradation of benthic habitats (i.e., coral reefs and seagrass beds) • Coastal tourism and Industrial development • Unsustainable fishing practices • Sedimentation of shallow coastal waters • Conversion of mangrove forest areas to other uses such as aquaculture, salt ponds and infrastructure development such as ports and roads	• Poor agricultural practices within river catchment areas and areas surrounding mangrove forests • Diversion/reduced flow of freshwater supplies to mangrove forests • Improper disposal of both solid and liquid waste particularly within mangrove forests close to populated centers such as Kibarani in Mombasa • Negative impacts of climate change (rising sea levels, coral bleaching and ocean acidification) • Weak government capacity for monitoring, control and surveillance (MCS) • Poor agricultural practices within river catchment areas • Fast development of the coastal tourism sector	• Improve management of solid and liquid wastes and other pollution controls in urban centers and other populated centers • Improve processing and marketing of fish and fish products • Establish monitoring and evaluation system for critical habitats • Support development of protected areas (i.e., co-managed areas, MPAs and transboundary conservation area) • Strengthen monitoring, control, and surveillance • Strengthen KWS, Kenya Fisheries Service, and other actor capacity to enforce wildlife regulations and other controls • Support ecosystem rehabilitation projects such as coral transplantation • Enforce and strengthen regulations on beachside constructions and other coastal developments • Secure land tenure for local communities • Develop climate change mitigation and adaptation measures (e.g., alternative energy sources, climate smart agriculture) • Support the development of environmental safeguards to guide coastal developments (i.e., ports, mining, oil, and gas exploration) • Enforce regulations on protected species and species of special concern • Develop community marine protected areas, analogous to community conservancies model • Conduct public awareness and sensitization campaigns

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Overexploitation of resources from: • Overharvesting of mangrove and other forest resources for timber, charcoal production and firewood • Illegal cutting and clearing of mangrove forests • Overfishing of fisheries resources within the buffer area one to five nautical miles from the shore • Use of destructive and illegal fishing gear (i.e., beach seines, monofilament nets, poison, and spear guns) • Potential over exploitation of fish resources within the EEZ especially for some tuna species such as Yellowfin tuna • Illegal, unreported, and unregulated fishing within the EEZ	• Limited monitoring and enforcement capacity within the KFS to ensure people issued with harvesting licenses adhere to the quotas provided • Limited availability of alternative livelihoods • High poverty among fishing communities and fishers • Unregulated introduction of more efficient fishing gears or technologies (i.e., small-scale purse seine) • Limited capacity (personnel, training and equipment) within state agencies responsible for the enforcement of fisheries regulations • Inadequate implementation of fisheries co-management • Lack of a coordinated regional approach in the management of the fisheries within the South Western Indian Ocean region	• Support implementation of the National Mangrove Management Plan • Strengthen participatory forest management between KFS and CFAs • Support ecosystem restoration projects including mangrove replantation project • Support development of alternative income generating projects (e.g., eco-tourism, apiculture and aquaculture) • Support development and implementation of Transition Implementation Plans at the county level • Strengthen KFS capacity to enforce forest harvesting controls and other regulations • Conduct public awareness and education campaigns on sustainable fisheries management • Support development of alternative income generating projects (e.g., mariculture of seaweed, shellfish, milkfish, and cage culture) • Strengthen national and county government capacity in monitoring, control, and surveillance • Improve infrastructure (access roads and jetties) and services (water and electricity) at fish landing sites • Support establishment of fisheries co-management areas including locally managed marine areas, or sustainable fishing areas etc. • Strengthen fisheries co-management • Promote investment to sustainably manage and exploit offshore fisheries resources (e.g., development of a national fleet, sharing of information on fish stocks and location of seamounts, procurement of better fishing equipment for local fishers) • Strengthen national and county government capacity to enforce fisheries regulations and monitoring, control, and surveillance of the resource • Collect and share information on offshore stock status
SAVANNAH AND GRASSLAND		

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Habitat loss from: • Habitat Fragmentation from fencing • Agricultural expansion • Excision and encroachment for settlement and Infrastructure development Uncoordinated and unplanned human settlements	• Poor coordination and collaboration between KWS, county governments, conservancies and other sectors of the economy • An increasing culture of fencing lands • High population in the highlands leading to emigration, needs for food security/diversification of livelihoods, and availability of arable land • Overstocking, overgrazing, land subdivision • Shift from communal land ownership to private ownership	• Remove barriers that lead to fragmentation (i.e., fencing, agricultural encroachment, urban settlements) • Support preparation and implementation of County Spatial Plans as a mechanism for zoning land uses, thus preventing ad hoc developments and affecting critical NRM resources[v] • Increase income from compatible land use practices such as beekeeping, value addition in livestock production, and eco-tourism • Raise awareness about the potential benefits of wildlife conservation • Support the formation of conservancies and strengthen management of existing ones as an alternative land use for the realization of social economic and conservation benefits[vi] • Reduce livestock numbers through improved breeds • Promote holistic management of rangeland • Improve water and soil retention
Loss of biodiversity from: • Human/wildlife conflict • Loss of migratory corridors • Game hunting/ wildlife trafficking • Bushmeat hunting • Poaching • Use of fencing which can kill animals and fragment habitat	• Increasing numbers of people in wildlife areas • Encroachment of agriculture into wildlife areas • Lack of compensation for losses incurred from wildlife leads to substantial loses of the major conflict species (elephants, lions, hyenas, and other cats) • Lack of an alternative means of livelihoods • Shift from communal land ownership to private ownership	• Increase law enforcement and awareness creation • Strengthen the capacity of KWS and county government to mitigate poaching and bush meat trade • Implement/scale up strategies that minimize conflict such as predator proof fencing • Encourage farmers to remove fences especially in the Mara ecosystem where wildebeests are vulnerable • Government should pay compensation for loss of human life/livestock/crops or devise innovate strategies of fund raising for compensation

[v] Government of Kenya, *The County Government Bill, 2012,* 18 January 2012, <http://www.fao.org/fileadmin/user_upload/drought/docs/The%20County%20Governments%20Bill%202012.pdf>.

[vi] An inability to realize social and economic benefits will ultimately lead to disaffection among the land owners who will then be encouraged to seek alternative means to livelihoods. Realization of benefits be a win-win situation for all.

DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS		
DIRECT THREATS	DIRECT DRIVERS	NEEDS
Rangeland degradation from: • Fencing to keep livestock and wildlife out of their land • Increases in numbers of livestock • Range constriction by land conversion to other land uses such as agriculture • Desertification • Water depletion • Erosion	• Increasing number of animals, including camels and goats • Shift from communal land ownership to private ownership • Diminishing grazing land due to multiple reasons such as habitat conversion • Increased competition for grazing between wildlife and livestock which outcompete wildlife	• Reduce livestock numbers, improve herd quality and markets for livestock products • Improve law enforcement • Promote holistic management of the rangelands • Soil and water retention activities • Practice sustainable grazing management
Water resources degradation (quality and quantity) from: • Water pollution from camps developed on riverbanks within the Mara and human settlements • Degradation of forests in the upper catchment areas which reduces water availability at the lower levels • Soil erosion • Opening of land in the catchment	• Conflicting policies with agriculture being promoted in wetlands that serve as the dry season grazing refuge for wildlife and livestock • Privatization of some springs increases livestock numbers/people at the public springs • Agencies responsible (WRMA/county governments) lack of initiative protect them • Land subdivision and/or allocation • Overgrazing • Weak institutions (i.e., county governments, WRMA, NEMA) that fail to enforce national laws and regulations as pertains to siting of developments on riparian areas, water quality regulations • Fragmented approach to managing conservancies	• Soil and water conservation activities • Reduce livestock numbers and improve herd quality • Enforcement of water quality regulations that provides limits for quality of effluent discharge • NEMA also to ensure that camps and lodges are not constructed on riparian land • All privatized springs to be degazetted and restored to public domain • Control agricultural expansion into wetland ecosystems important for both wildlife and livestock such as in the Kimana wetlands in the Amboseli • Protect the springs and provide separate points for livestock and people • Impress on the institutions to carry out their mandate

NECESSARY ACTIONS TO SUPPORT BIODIVERSITY AND TROPICAL FORESTRY CONSERVATION IN KENYA	
Necessary Action 1 *Improved Integration of Natural Resource Management and Spatial Planning into National, Regional, and County-level Development Planning*	**Necessary Action 1.1** – Improve data collection, management and knowledge sharing both within and across key stakeholders
	Necessary Action 1.2 – Development of integrated natural resource management plans at all levels of government, using data-driven approaches as applicable, to actively reduce destruction of key habitats, ecosystems, and biodiversity resources
	Necessary Action 1.3 – Effective valuation of tropical forestry and/or biodiversity resources
Necessary Action 2 *Technical Assistance and Capacity Building to Promote Increased Adoption of Best Management Practices for Sustainable Land-and Water-Use*	**Necessary Action 2.1** – Improve effectiveness and efficiency of land and water management practices at county and community levels in vulnerable and marginalized areas
	Necessary Action 2.2 – Enhance capacity for responsible authorities to effectively enforce existing policies and laws governing management of biodiversity and tropical forest resources
Necessary Action 3 *Focused Integration of Economic Growth Priorities and Biodiversity Conservation and Management Needs*	**Necessary Action 3.1** – Target community-based conservation groups operating in buffer zones for PAs and key natural resources for ecosystem strengthening economic growth initiatives
	Necessary Action 3.2 – Improve benefit sharing schemes in protected area and biodiversity management
	Necessary Action 3.3 – Support sustainable alternative livelihood opportunities
	Necessary Action 3.4 – Support low-emission energy development and increased dissemination and use of more fuel-efficient technologies

EXTENT TO WHICH NECESSARY ACTIONS ARE SUPPORTED BY USAID/KENYA PROGRAMS

EXTENT TO WHICH NECESSARY ACTIONS ARE SUPPORTED BY USAID/KENYA PROGRAMS

+ = EXISTING PROGRAMS MEET THE NECESSARY ACTION **AND** INTEGRATE DIRECT CONSERVATION ACTIONS FOR TROPICAL FORESTS AND BIODIVERSITY

Δ = EXISTING PROGRAMS MEET THE NECESSARY ACTION BUT **DO NOT** SPECIFICALLY INTEGRATE BIODIVERSITY AND FOREST ISSUES INTO THEIR GOVERNANCE ACTIVITY

O = OPPORTUNITY FOR USAID, ACTIVITIES ARE NOT CURRENTLY MEETING THE NECESSARY ACTION, BUT COULD IN FUTURE PROGRAMS

NECESSARY ACTIONS	DO1: Devolution Effectively implemented			D02: Health and human capacity strengthened			DO3: Inclusive, market-driven, environmentally sustainable economic growth				
	IR 1.1: Accountable county governments effectively functioning in targeted counties	**IR 1.2:** Enabling Environment for devolution strengthened	**IR 1.3:** Informed and Empowered citizens participate in county affairs	**IR 2.1:** Increased Kenyan ownership of health, education and social systems	**IR 2.2:** Increased use of quality health and education services	**IR 2.3:** Youth empowered to promote their own social and economic development	**IR 3.1:** Increased Household food security and resilience primarily for the rural poor	**IR 3.2:** More resilient people and ecosystems to climate change in a green growth economy	**IR 3.3:** Increased public and private capital flows	**IR 3.4:** Improved Enabling environment for private sector investment	**IR 3.5:** Private sector engagement in infrastructure development facilitated
1. Improved Integration of Natural Resource Management and Spatial Planning into National, Regional, and County-level Development Planning											
1.1 Improve data collection, management and knowledge sharing both within and across key stakeholders	Δ	Δ	Δ	Δ	Δ			O		Δ	Δ
1.2 Development of integrated natural resource management plans at all levels of government, using data-driven approaches as applicable, to actively reduce destruction of key habitats, ecosystems, and biodiversity resources	Δ	Δ						Δ			
1.3 Effective valuation of tropical forestry and/or biodiversity resources	O	O	O					O			

2. Technical Assistance and Capacity Building to Promote Increased Adoption of Best Management Practices for Sustainable Land-and Water-Use											
2.1 Improve effectiveness and efficiency of land and water management practices at county and community levels in vulnerable and marginalized areas	Δ	Δ	Δ	+	+	O	Δ	+/Δ	Δ		
2.2 Enhance capacity for responsible authorities to effectively enforce existing policies and laws governing management of biodiversity and tropical forest resources	+/Δ	+/Δ	+/Δ					+		O	
3. Focused Integration of Economic Growth Priorities and Biodiversity Conservation and Management Needs											
3.1 Target community-based conservation groups operating in buffer zones for PAs and key natural resources for ecosystem strengthening economic growth initiatives	+/O	+/O	+/O	O	O	O	Δ/O	+	O	O	O
3.2 Improve benefit sharing schemes in protected area and biodiversity management	+/O	+/O	+/O			O			Δ	O	O
3.3 Support sustainable alternative livelihood opportunities	+/Δ	+/Δ	+/Δ			Δ	Δ	+/Δ	Δ	Δ	
3.4 Support low-emission energy development and increased dissemination and use of more fuel-efficient technologies	O	O	O				O	Δ	Δ	+/Δ	+/Δ

KEY RECOMMENDATIONS FOR USAID/KENYA

USAID's CDCS and underlying Development Objective (DO) and Intermediary Results (IR) framework are well positioned to provide support the GoK in carrying out its stated commitment to conservation and sustainable management of tropical forests and biodiversity. The CDCS routinely, explicitly emphasizes and incorporates considerations with sustainable environmental and natural resource management in mind, seeking pathways to compatibly integrate such considerations with broader development priorities. Notwithstanding, the Assessment Team developed identified opportunities where USAID to further refine and strengthen their already commendable programming, and in turn established corresponding recommendations.

The Assessment Team's recommendations fell into two categories. The first set are *specific opportunities* that USAID/Kenya can apply to its existing programs to strengthen the extent to which those programs are supporting broader biodiversity and tropical forestry conservation objectives. These are elaborated in Section 8.1 of the full Assessment. The second set are *strategic recommendations* that the Mission can apply to future programming under both its current and subsequent Country Development Cooperation Strategy (CDCS). These are elaborated in Section 9.

This Executive Summary provides a high-level listing of these recommendations.

SPECIFIC OPPORTUNITIES FOR USAID/KENYA	
SO #1	Integrated natural resource planning as core component of devolution support.
SO #2	Ensuring that county-level data management systems and portals integrate biodiversity and conservation within directly managed USAID programming and advocating for such integration in USAID-supported programing
SO #3	Strengthening of data management systems to link to centralized databases and data-sharing platforms
SO #4	Increasing engagement with Community Forest Associations and Beach Management Units in areas of current implementation
SO #5	Explicit integration of agroforestry, sustainable forestry initiatives, and sustainable wetland management within current FTF programming
SO #6	Integration of dedicated financial services for, and technical assistance to, "green" businesses across all sectors
SO #7	Development of an innovation engine for "green" entrepreneurs
SO #8	Integration of environmental education to youth empowerment programming.

STRATEGIC RECOMMENDATIONS FOR USAID

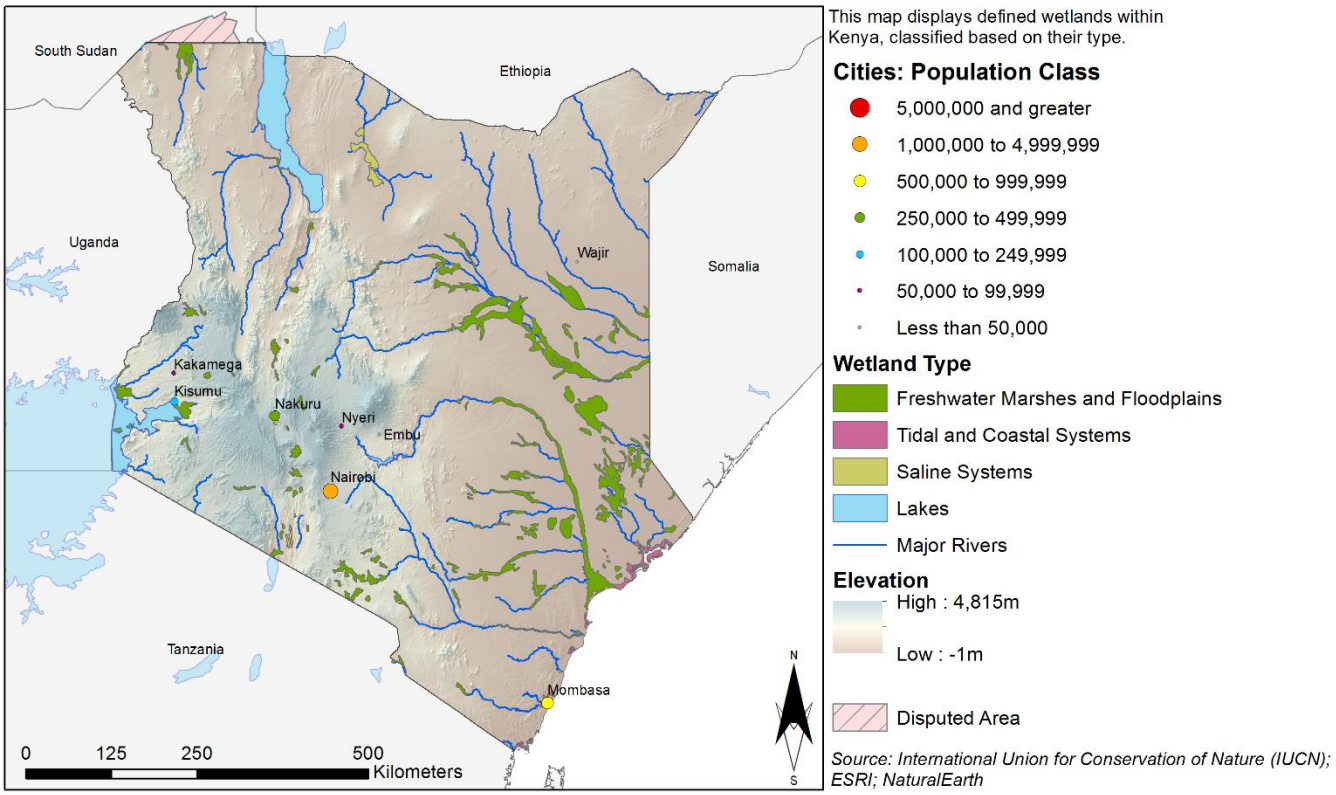
Modifications to, or within, existing CDCS	DO 1 – Addition on an IR under DO1 that explicitly focuses on supporting successful devolution of the governance structures responsible tropical forestry, biodiversity, and related conservation and natural resource management considerations to align and integrate with broader devolution support provided by the Mission. DO 2 – Modification of IRs 2.1 (Increased Kenyan ownership of health, education and social systems) and 2.3 (Youth empowered to promote their own social and economic development) to more explicitly incorporate ecosystem maintenance within broader youth empowerment and health/education/social system ownership objectives DO 3 – Adjust IR 3.2, or develop new complementary IR that emphasizes broader (e.g., catchment-level) ecosystem functioning in line with the green growth agenda; the climate change considerations captured by IR 3.2 would necessarily be captured by such a shift, but this would alter the prioritization. Targeted strategic recommendations for DO3 interventions also include: expanding the nature and type of Payment for Ecosystem Services interventions, aligning with ongoing efforts to establish REDD+ programming in Kenya, and emphasizing the US Government's new 5-year Global Feed-the-Future (FTF) Strategy's Cross-Cutting IR #2, *Improved Climate Risk, Land, Marine, and Other Natural Resource Management*, explicitly into the next USAID/Kenya 5-year FTF Strategy, which is currently under development.
Expansion of geographic areas of focus	The Assessment recognizes the excellent work USAID is undertaking in the Mara, northern rangelands, and northeastern pastoral and dryland forest areas. USAID Kenya should continue these essential support functions in key ecosystems of biodiversity and economic importance. Additioanlly, the Assessment identified the following four geographic areas as areas to which USAID should expand its focus in provision of dedicated biodiversity and forest management and conservation support: • Coastal dryland forests • The Tsavo/Mkomazi Ecosystem • Marine and coastal areas (south of Malindi) • Kenya's major and minor water towers[1]

[1] The assessment notes that WTP's current programming is laying essential groundwork to improve sustainability and resilience of the ecological resources in Mt. Elgon, Cherengani Hills, and Mau Forest Complex. As such, the discussion on Kenya's water towers focuses more on refining current programming priorities into specific forms of technical assistance and engagement, to increase the potential for long-term sustainable management of these critical ecosystems.

1. INTRODUCTION

This assessment supports the USAID/Kenya Mission in its ongoing implementation of its 2014-2018 Country Development Cooperation Strategy (CDCS), as well as strategic planning and prioritization for the next CDCS (anticipated to begin in/around 2020). The assessment includes an evaluation of biodiversity and tropical forest management within Kenya (see Figure 1, below) and proposed programmatic scope of responsibility; a review of strategic plan components within the context of environmental threats; and identification of potential negative impacts of proposed activities to biodiversity and tropical forests. This assessment also identifies issues and opportunities for adding value to those plan components through environmental considerations; and in doing so, complies with Sections118 and 119 of the Foreign Assistance Act (FAA) of 1961, as amended, and Agency guidance on country strategy development under ADS 201 and ADS 204.

Figure 1 Map of Kenya – Including Wetlands



This assessment replaces the FAA 118/119 assessment for USAID/Kenya developed in 2011. This priority-setting process, herein the Assessment, evaluates the current status and threats to the conservation of tropical forestry and biodiversity throughout Kenya. The Assessment includes an overview of environmental conditions and trends and identifies opportunities to promote conservation and enhance environmentally sound development practices as they pertain to tropical forestry and biodiversity within the country.

In so doing, the Assessment achieves the following, as required by FAA Sections 118 and 119:

A) Identifies actions necessary to conserve tropical forests and biodiversity and the extent to which the Mission meets the "actions necessary," and
B) Develops recommendations that will guide the Mission in updating the "extent to which" section in the new regional strategy.

1.1 SCOPE

The purpose of this Assessment is to conduct a country-wide assessment of biodiversity and tropical forestry conservation needs for the purposes of complying with Sections 118 and 119 of the FAA of 1961, as amended, and Agency guidance on country strategy development, under ADS 201.3.9.1, ADS 201.3.9.2, and ADS 204.

Specifically, the assessment analyzes **direct environmental** threats and their direct and indirect **drivers** (i.e., root causes) to identify **actions necessary** for biodiversity and tropical forestry conservation. These necessary actions are discussed in terms of both **specific opportunities** and **strategic recommendations** for USAID/Kenya programming both in consideration of its current CDCS, which runs through 2018, and looking ahead to development of its next CDCS.

The assessment team (see Annex F for a description of the team) considered climate one attribute of the biophysical environment, and therefore the assessment considered climate change primarily as an underlying driver of existing threats to biodiversity and tropical forest conservation and management.

DIRECT THREATS

A direct threat to biodiversity is a human action or unsustainable use that immediately degrades biodiversity (e.g., unsustainable logging, overfishing or mineral extraction).

DRIVERS

A driver is a constraint, opportunity or other important variable that positively or negatively influences direct threats. A constraint is a factor that contributes to direct threats and is often an entry point for conservation actions (e.g., logging policies or demand for fish or illegal wildlife products). An opportunity is a factor that potentially has a positive effect on biodiversity interests, directly or indirectly, and can often serve as an entry point for conservation (e.g., demand for sustainably harvested timber or market requirements for legally caught fish). Drivers are commonly referred to as indirect threats, factors or forces that influence the direct threats.

Source: Best Practice Guide for Foreign Assistance Act Section 118/119 Tropical Forest and Biodiversity Analysis (2017)

This assessment supersedes the 118/119 Biodiversity and Tropical Forests Assessment completed for Kenya in 2011.

1.2 USAID PROGRAMMING

USAID/Kenya's 2014-2018 CDCS was designed with a goal of both leveraging and launching Kenya's newly devolved governance structure, knowing that a success transition to a more decentralized government holds great potential for Kenya with regards to the rights, health, peace and security, and economic opportunities for Kenyans. The CDCS ultimately aims for sustainably transforming Kenya's governance and economy through the following development objectives (DOs):

DO1: DEVOLUTION EFFECTIVELY IMPLEMENTED

DO1 in USAID/Kenya's CDCS focuses on positively impacting the process of devolution by improving democracy and governance systems with the aim of increasing competency, transparency, accountability, and inclusivity. The DO broadly supports capacity building of county governments to provide quality services, respond to people's needs and cooperate effectively with national government. Another import element to the DO is its emphasis on building capacity of civil society organizations to be more effective at representing citizen interests and aspirations. Underpinning the DO are the following three Intermediary Result (IRs) which outline its strategic priorities:

- IR 1.1: Accountable county governments effectively functioning in targeted counties
- IR 1.2: Enabling environment for devolution strengthened
- IR 1.3: Informed and empowered citizens participate in county affairs

While the focus is on effectively implementing devolution, DO1 directly supports and contributes to the achievement of the other two DOs.

DO2: HEALTH AND HUMAN CAPACITY STRENGTHENED

The DO2 development hypothesis suggests that Kenyans will be able to more effectively participate in and contribute to the transformation of their governance and economy if health and human capacity are sustainably strengthened. Therefore, the focus of DO2 is on supporting Kenyan leadership in social services delivery through joint planning, implementation, and resource leveraging to achieve sustainable health and education results. In this case, USAID's notable experience supporting national health and education programs in Kenya has been brought to bear in support of the DO. The mission plans to support DO2 with the following IRs:

- IR 2.1: Increased Kenyan ownership of health, education and social systems
- IR 2.2: Increased use of quality health and education services
- IR 2.3: Youth empowered to promote their own social and economic development

DO2 is primarily linked to health and educations outcomes, but it also supports activities in close collaboration with the other DOs to address the needs of Kenyan's most vulnerable and marginalized people.

DO3: INCLUSIVE, MARKET-DRIVEN, ENVIRONMENTALLY SUSTAINABLE ECONOMIC GROWTH.

DO3 seeks to increase opportunities for Kenyans to participate in an inclusive, market-driven, and environmentally sustainable economy through promotion of initiatives that create the institutional platform needed to accelerate grown while expanding access to marginalized populations. Importantly for conservation efforts, the DO has aligned strategies for economic growth with ecosystem resilience, sustainable energy, protection of water towers and biological diversity, and climate change mitigation and adaptation. The DO specifically relies on the following five fundamental areas to create widespread environmentally sound economic growth opportunities:

- IR 3.1: Increased household food security and resilience – primarily for the rural poor
- IR 3.2: More resilient people and ecosystems to climate change in a green growth economy
- IR 3.3: Increased public and private capital flows
- IR 3.4: Improved enabling environment for private sector investment
- IR 3.5: Private sector engagement in infrastructure development facilitated

Like the other CDCS DOs, DO3 mutually is designed to

1.3 METHODOLOGY

The Assessment team conducted the assessment in three partially overlapping phases: desk review of available information on socioeconomic issues, ecology and conservation, environmental management, and USAID programming in Kenya; stakeholder consultations with Washington, D.C., and Kenya-based stakeholders; and geographic information system (GIS) mapping and analysis of Kenya data pertaining to biodiversity and tropical forestry. This information was used to refine a pre-trip outline for the report and questions to be asked during field based-consultations, identify key resources, and clarify gaps in knowledge. This desk review was completed concurrent with preparations for the three-week field missions.

Figure 2 A Maasai women's beading group, engaged during stakeholder consultations in the Mara region

Field-based consultations and site visits were undertaken from 20 February to 03 March, 2017. Consultations began in Nairobi, from 20-22 February, and included a combination of Government of Kenya (GoK) entities, non-governmental organizations (NGOs) active in biodiversity conservation and management, and research institutions, as well as an in-brief with USAID/Kenya staff.[1] Field visits, held from 22 February to 01 March, focused on interviews, stakeholder consultations, and brief visits to selected areas of biodiversity importance. The objective of the field visits was to more clearly understand the broader set of threats and underlying direct and indirect drivers affecting biodiversity and tropical forests in Kenya, as well as opportunities consulted stakeholders saw to most affectively address those threats; insights that ultimately informed the Necessary Actions, Specific Opportunities, and Strategic Recommendations provided by this assessment.

To conduct field visits and most efficiently maximize geographic coverage, the assessment team divided into two three-person groups: Group 1 travelled from Mt. Elgon, to Kisumu and the Lake Victoria Basin, before proceeding to Narok and the greater Mara region. Group 2 travelled to Mombasa and the southern coastal drylands, including Watamu and Arabuko-Sokoke, Tsavo West National Reserve, and Shimoni, before proceeding to Isiolo and Marsabit. The majority of meetings were conducted with GoK

[1] The in-brief was held on 21 February, 2017, as 20 February was a US Federal holiday, and the Mission was closed.

representatives, NGOs or civil society organizations (CSOs), or community-based conservation entities, based on guidance provided by USAID/Kenya as well as the subject matter expertise and familiarity with key stakeholders provided by the Kenyan consultants on the Assessment Team. A complete list of meetings held is provided as Annex A. Fieldwork concluded with an out-brief with USAID/Kenya and East Africa Mission Staff on 03 March, 2017, in which a preliminary read out of key findings and recommendations was delivered.

Following completion of fieldwork, Washington, DC and additional Kenya-based consultations were conducted, stemming from discussion during the out-brief. This Review Draft of the assessment was then finalized based on updated literature, GIS analysis, and the stakeholder consultations (Annex A).

CONSISTENCY WITH USAID'S BIODIVERSITY POLICY

For additional resources, see the USAID Biodiversity and Development Handbook (USAID 2015a). This Handbook is a fundamental tool for implementation of USAID's Biodiversity Policy, which was approved and launched in 2014. The USAID Biodiversity Policy outlines how the agency will achieve sustainable, resilient development by conserving biodiversity. The Handbook provides guidance for integrating biodiversity into agency programming (including agency programming in other development sectors, drawing on a wide range of USAID programming experiences in forestry, marine and coastal programming, community-based natural resource management, conservation enterprises, and multi-sectoral approaches).

In 2016, USAID also developed and circulated **draft** guidelines for the development of FAA 118/119 Biodiversity and Tropical Forestry assessment. These guidelines were then finalized in February, 2017. This assessment referenced the September 2016 draft guidelines during preparations and fieldwork, and the finalized guidelines during preparation of this review draft.

2. BACKGROUND AND DEVELOPMENT CONTEXT

2.1 SOCIETY

Kenya is in East Africa, bordered by Ethiopia, Somalia, South Sudan, Uganda, and Tanzania. It has a total area of approximately 580,000 kilometer (km^2), and has 600 km of Indian Ocean coastline. There are more than 70 distinct ethnic groups in Kenya, which can be categorized into three overarching linguistic and cultural groups; Bantu, Nilotic, and Cushite. Most often, Kenyans strongly identify with the ethnic group to which they belong, which significantly influences people's political leanings. The lack of diversity reflected in Kenya's national-level leadership is a source of tension, since ethnic affiliations typically supersede national identity resulting in the marginalization of certain groups. With adoption of a new constitution in 2010 and passage of the Transition to Devolved Governance Act in 2012, however, a more representative and inclusive system in which county governments are at the center of dispersing political power and economic resources is anticipated to contribute to greater representation and increased equity overall.

However, successful devolution is dependent on a robust civil society, and Kenya still faces numerous complex social challenges. For example, more than half of the population still lives in poverty with little access to public services, an estimated 1.5 million Kenyans are chronically food insecure, and gender inequities limit progress.[9] The GoK is acutely aware of the need for increased national cohesion, equitable access to opportunities, lower cost of living, and strengthened social protection to achieve development goals, which is highlighted within the Second Medium Term Plan (2013-2017) of Kenya's Vision 2030.

Kenya's Vision 2030 critically strives to guarantee security for all Kenyans. In recent years, social inequity has both impacted development and contributed to broader susceptibility to violent extremism. Despite being the largest economy in the region and attracting increasing numbers of workers to urban areas, income levels for most remain low and unemployment rates high. This, combined with the influence of armed groups in the region—including those close to the border with Somalia—has led to a rise in radicalization and violence in Kenya. By providing a framework for inter-ethnic peace building founded on mutual respect and resolution of preexisting conflicts, the GoK continues to pursue solutions to address these concerns.

2.2 POPULATION TRENDS

Kenya's population is 46 million people, and is growing at an annual rate of 2.6 percent.[10] Over the past 25 years, Kenya's population has doubled, and rapid population growth is expected to continue. Within the next 40 years, projections suggest that the population will increase by one million each year—or roughly 3,000 people per day.[11] Table 1 below shows the increase in population from 2005 to 2015,

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[9]USAID, *Country Development Cooperation Strategy 2014-2018*, May 2014, <https://www.usaid.gov/sites/default/files/documents/1860/USAID%20Kenya%20CDCS%20Public%20Full%20Color%20May%202014.pdf>

[10]The World Bank, *World Development Indicators,* 2012, <https://www.urbanschool.org/uploaded/Herbst_Library/citations.pdf>

[11] Wolfgang Fengler, "Demographic Transition and Growth in Kenya," *The World Bank,* 28 April 2010, <http://www.worldbank.org/en/news/opinion/2010/04/28/demographic-transition-growth-kenya>

both by count and percent increase. The values for 2015 to 2020 are based on population projections. While the overall percent of population growth does decline from 2015 to 2020, the projected 13.35 percent growth suggests continued high growth.

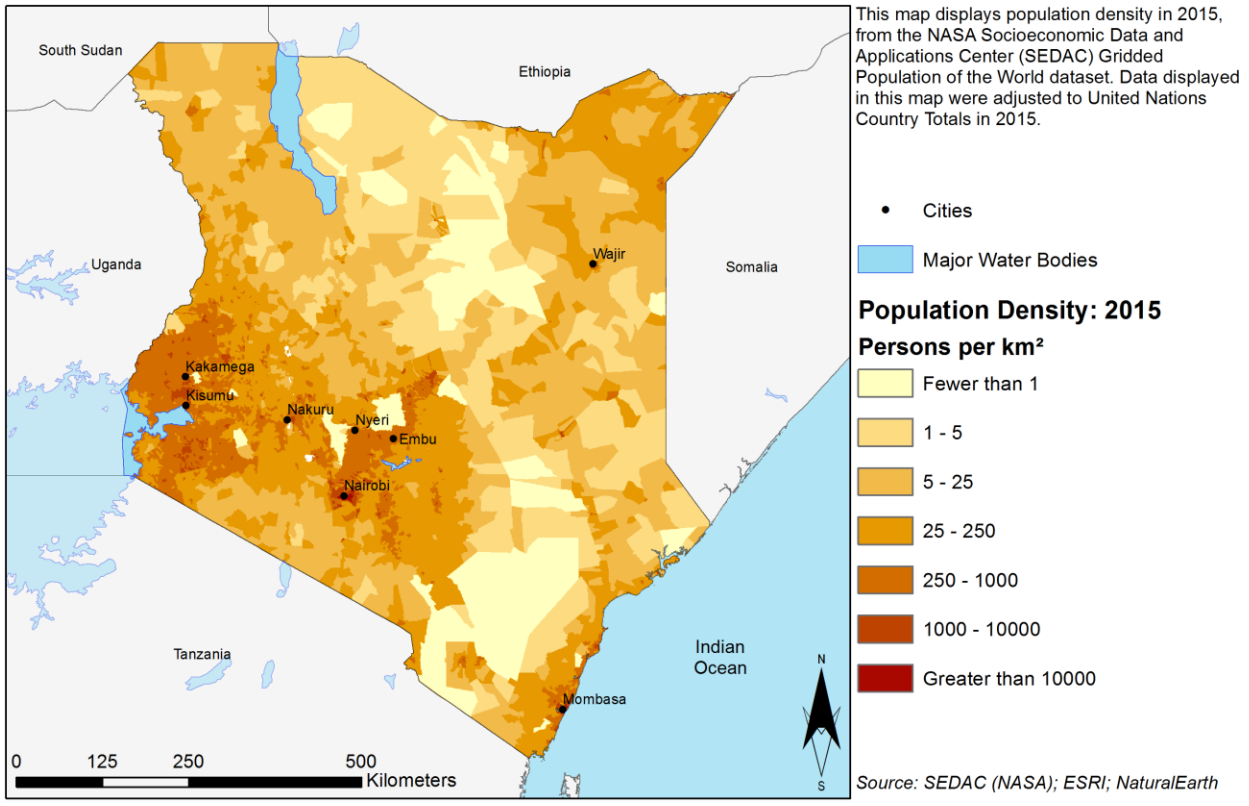
TABLE 1 POPULATION CHANGE IN KENYA

	2005 to 2015		2015 to 2020	
	Count	Percent	Count	Percent
Kenya	10,639,974	30.29	6,107,446	13.35

**Population increase from 2015 to 2020 in count and percent form is based off population projections.*

Error! Reference source not found. below illustrates that Kenya's population density, revealing the p rimary population centers to be in western Kenya in the Lake Victoria Basin, Nairobi and surrounding areas, and along the southern Indian Ocean coastline, in and around Mombasa.

Figure 3 Kenya Population Density in 2015



Kenya's population growth continues to stress the country's labor market, social services, arable land, and natural resources. The recent, rapid increase in population confronts Kenya with a significant youth bulge. The large youth population increases the importance of a strong social system to capture the economic potential of a large and relatively well-educated and capable workforce. If properly realized, the youth bulge coupled with increased rates of rural-urban migration could lead to meaningful economic growth for Kenya.

Kenya's population also includes hundreds of thousands of refugees fleeing violence in neighboring South Sudan, Somalia, and Ethiopia.[12] In early 2016, the Kenyan government announced that they would close refugee camps, including Dadaab, which was the world's largest refugee camp at the time. However, international advocacy organizations successfully pushed the government to reconsider this decision, and the camp remains open.

2.3 ECONOMY

In the East African region, Kenya is the largest and most diversified economy. However, economic growth rates in recent years have not matched national or global expectations, and high rates of poverty persist. In 2014, economic growth slowed to 5.3 percent, though increased modestly to 5.6 percent in 2015.[13] Despite the slight uptick in economic growth, in 2016 Kenya ranked 96 out of 144 countries in the World Economic Forum's Global Competitiveness Report, which assesses the landscape of national economies by examining the structural dimensions affecting their performance.[14]

A major challenge for the Kenyan economy is that the push towards becoming a middle-income country does not align with its current economic composition. Roughly 42 percent of the national GDP is derived from natural resource sectors, with agriculture accounting for approximately six percent of GDP, and more than 75 percent of Kenyans deriving some part of their livelihood from the agricultural sector. [15,16] Even though agriculture still serves as a prominent source of employment, rural-urban migration may contribute to a decline in overall agricultural productivity. However, this may be a positive trend for Kenya's economy, given the strong correlation between population density and economic development.[17] Table 2 below notes the changes in growth for specific sectors throughout 2014 and 2015.

TABLE 2 SECTORAL SOURCES OF GROWTH[18] (PERCENT GROWTH)

	2014				2015			
SECTOR	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Agriculture and forestry	2.2	2.1	6.8	3.8	4.4	5.6	5.5	11.8
Mining and quarrying	10.5	26.9	1.5	22	4.6	7.5	13.7	16.3
Manufacturing	6.4	8.3	1.5	-2.3	3.5	4.6	3.3	1.2
Electricity and water	3.9	4.6	7.2	7.3	8.4	10.2	10	1.8

[12] International Rescue Committee, *Kenya: Strategy Action Plan,* June 2016, <https://www.rescue.org/sites/default/files/document/748/kenyaexternalsap-final.pdf>

[13] Kenya Institute for Public Policy Research and Analysis (KIPPRA). *Kenya Economic Report 2016,* 2016, <*http://kippra.or.ke/images/downloads/Kenya_Economic_Report_2016.pdf*>

[14] Klaus Schwab and Xavier Sala-i-Martín, "The Global Competitiveness Report 2016-2017," *World Economic Forum*, September 2016, <http://www3.weforum.org/docs/GCR2016-2017/05FullReport/TheGlobalCompetitivenessReport2016-2017_FINAL.pdf>

[15] UNEP, *Green Economy Assessment Report – Kenya*, 2014, <https://www.cbd.int/financial/values/kenya-geassessment2014.pdf>

[16] Feed the Future. *Kenya.* 2015. <https://www.feedthefuture.gov/country/kenya>

[17] Fengler, Wolfgang. *Demographic Transition and Growth in Kenya.*

[18] Kenya Institute for Public Policy Research and Analysis (KIPPRA). *Kenya Economic Report 2016.*

TABLE 2 SECTORAL SOURCES OF GROWTH[18] (PERCENT GROWTH)								
	2014				2015			
SECTOR	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Construction	7.6	16.6	8.8	19.4	11.3	9.7	15.6	14.9
Wholesale and retail trade, and repairs	9.7	5.2	5.3	7.9	6.7	5.5	6.2	6
Accommodation and restaurants	-14.1	-19.3	-20.5	-16	7.5	-0.8	-6.5	21.2
Transport	3.8	5.7	7.8	2.8	6	6.1	9.4	5.5
Communication	12.7	8.1	16.1	15.8	9.4	7.7	8.2	5.9
Financial services	8.3	7.9	7.1	10	9.1	7.6	10.3	6.5
Professional services	3	2.5	1.9	3.3	4.4	5.8	1.9	-0.1
Real estate, renting and business services	6.3	6.7	6.2	3.2	2	4.2	11.4	-4.9
Public administration	-4.2	16.2	0.4	10.9	8.4	5.9	3.7	3.7
Education	6.6	8.2	7.5	7.2	3.3	3.5	5.7	4.2
Health	5.1	7.5	7.8	8.3	7.4	8.1	3.2	10.6
Other services	5.5	4.4	4.1	3	3	1.7	3.8	4.1

3. STATUS OF KENYA'S BIODIVERSITY AND TROPICAL FORESTS

3.1 OVERVIEW

Low plains form Kenya's north and extend southeast to the coast. In the center, south and southwest of the country the plains rise into fertile highlands. The Great Rift Valley, running north to south, bisects the western half of the country. The major ecosystem of the highlands is montane forest, while the arid and semi-arid lowlands are comprised primarily of woodland, brushlands, savannah and grassland. Closer to the coast, there are discontinuous but significant patches of dryland forests. The coast is divided between sandy areas and mangrove forests, while offshore Kenya has abundant seagrass beds and a coral reef system. Kenya's freshwater resources are divided between lakes, notably Lake Victoria and Lake Turkana, and several rivers.

Kenya has seasonal rainfall; long rains occur from March to June and short rains from October to November, with dry periods between. Rainfall received varies considerably based on topography. While the coast and highlands can receive up to 1,800 millimeters (mm) of precipitation (Mt. Kenya), the arid north can receive less than 200 mm. Kenya suffers frequent droughts and floods.[19] Additionally, occurrence and intensity vary yearly, with climate change expected to increase variability and overall annual rainfall.[20]

NATIONAL BIOLOGICAL DIVERSITY

Kenya is endowed with tremendous biodiversity. The country has approximately 25,000 species of animals, including 1,133 birds, 315 mammals, 191 reptiles, 180 freshwater fish, 692 marine and brackish fish, and 88 amphibians, as well as 7,000 species of vascular plants and more than 2,000 fungi and bacteria. 1,100 species of vascular plants, 14 mammalian species, and eight bird species are endemic to the country.[21] One-hundred and three species of bird, 51 mammals, eight amphibians and reptiles, and 26 fish species are endangered or threatened (see Annexes C and D).

Unfortunately, there has been a precipitous decline in Kenya's wildlife populations. These declines have been driven by numerous factors, elaborated in Section 6, and include agricultural expansion, habitat fragmentation and degradation, settlement encroachment, and poaching for both meat and trophies. Extensive surveys covering 88 percent of the country found wildlife populations declining by an average of 68 percent between 1977 and 2016. Several once-common species such as warthog, lesser kudu (*Tragelaphus imberbis*), Thomson's gazelle (*Eudorcas thomsonii*), eland, oryx, topi (*Damaliscus korrigum*),

[19] The World Bank Group. Climate Change Knowledge Portal for Development Practitioners and Policy Makers. Kenya Dashboard: Natural Hazards. http://sdwebx.worldbank.org/climateportal/countryprofile/home.cfm?page=country_profile&CCode=KEN&ThisTab=NaturalHazards

[20] The World Bank Group. Climate Change Knowledge Portal for Development Practitioners and Policy Makers. Kenya Dashboard: Climate Future. http://sdwebx.worldbank.org/climateportal/countryprofile/home.cfm?page=country_profile&CCode=KEN&ThisTab=ClimateFuture

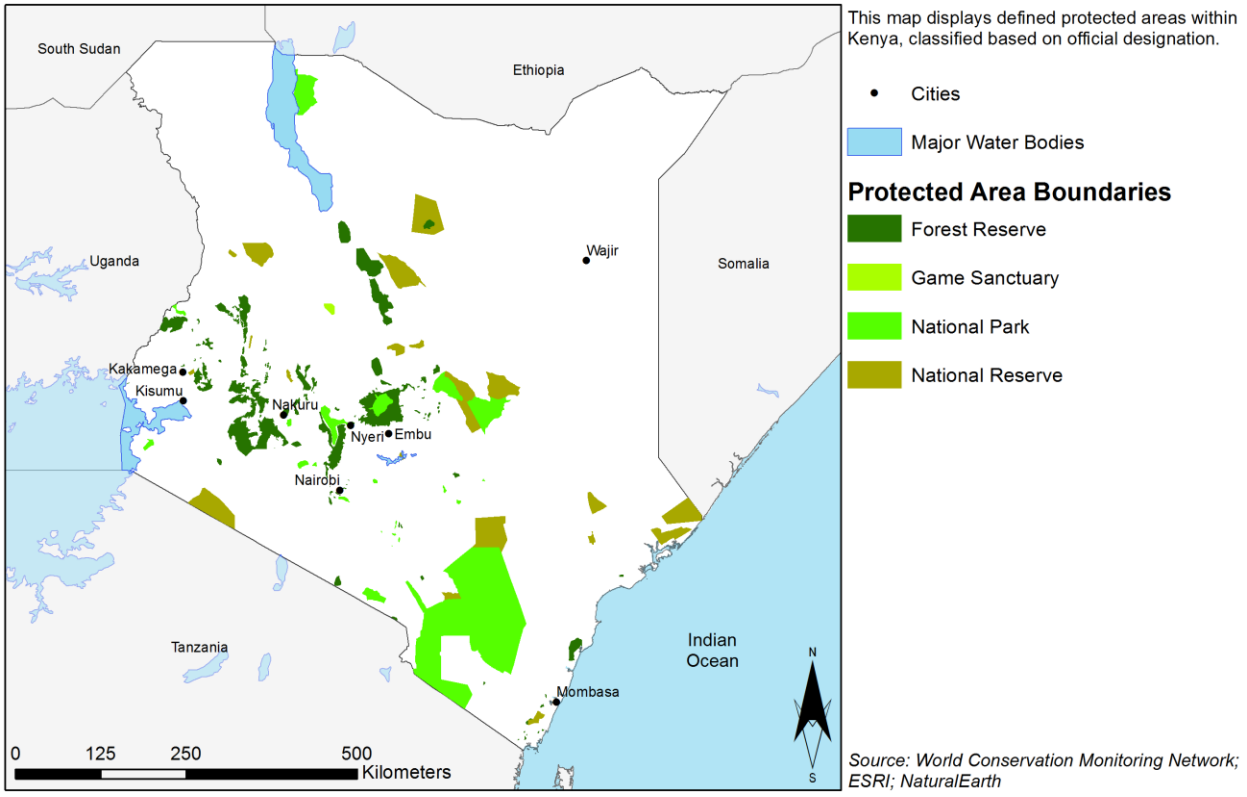
[21] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*, 2015, <https://www.cbd.int/doc/world/ke/ke-nr-05-en.pdf>.

hartebeest (*Alcelaphus buselaphus*), impala (*Aepyceros melampus*), Grevy's zebra (*Equus grevyi*) have declined 72–88 percent threatening their population viability.[22]

NATIONAL PROTECTED AREAS

Kenya has an extensive National Protected Area system, composed of National Parks, Reserves, and Sanctuaries, administered by the Kenya Wildlife Service (KWS), as well as gazetted Forest Reserves, which are managed by the Kenya Forest Service (KFS). The KWS-administered areas are protected for wildlife conservation and comprise eight percent of the country. Gazetted Forest Reserves comprise another two percent of the country. Eighty-eight percent of these forests are natural, while the remainder are plantations. Despite this allotment of protected land, about 70 percent of the nation's biodiversity resources are found outside protected areas and remain vulnerable to exploitation and degradation[23]. Figure 4, below, displays protected areas in Kenya, and Annex D lists out these areas.

Figure 4 National Protected Areas in Kenya



Source: World Conservation Monitoring Network; ESRI; NaturalEarth

CONSERVANCIES

In addition to National Protected Areas, Kenya offers more than 140 conservancies, which cover more than 6 million hectares of land (approximately 11percent of Kenya's land area). Kenya's conservancies

[22] Ogutu et al 2016 Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes? https://doi.org/10.1371/journal.pone.0163249

[23] ibid.

have been established on both private and community lands. In some cases, small parcels of congruent, privately-owned land were amalgamated to create conservancies.

Conservancies play a critical role of securing the migratory routes and dispersal areas for many of Kenya's fauna—particularly its large mammals such as the elephants, wildebeests, and zebras, among others—by protecting connectivity between protected areas and/or critical habitats. This is an essential function, as Kenya's National Parks and Forest Reserves cover a very small portion of the elephant range, meaning they rely on conservancies and community lands.

Further, in areas such as Laikipia and northern Kenya, conservancies on both private and community lands serve as refuge for the endangered and critically endangered species such as the Grevy Zebra {about 90 percent (2546) of the global population is found in Kenya, and 60 percent on community lands}; and the Hirola (over 70 percent of the global population), in addition to harboring a significant proportion of the national populations of endangered species such as the lions, cheetahs, and wild dogs.

Recent legislation, such as the Wildlife Management and Conservation Act (WMCA) of 2012, formally empowered community-level wildlife conservation and management, by treating it as an eligible form of land use, from which the land user can reap the benefits.

IMPORTANT BIRD AREAS

Important Bird Areas (IBAs) are sites designated based on their value as habitat (permanent or temporary) for threatened or important migratory species. Birdlife International classifies sites as IBAs if they serve host to one or more of the following categories of bird species: (i) globally threatened species; (ii) birds with highly restricted distributions; (iii) bird species characteristic of only a particular biome; or (iv) exceptionally large numbers of flocking birds.[24]

There are 66 IBAs in Kenya, 30 of which are formally protected within gazetted forests and national parks. The other 36 IBAs do not have formal protection. Efforts are ongoing to identify additional IBAs, promote increased protection for IBAs that do not currently have protected status, and monitor the status of existing IBAs. Annex E lists the current IBAs in Kenya and their basis for classification.

3.2 MONTANE FORESTS

Montane forests occupy 1.14 million hectares, approximately two percent of Kenya's total land area, in the highlands between 1,500m and 3,000m in altitude.[25] The highlands are the country's densest forests, its most productive agricultural land, and the areas of highest population density.

[24] BirdLife International (2017) Country profile: Kenya. Available from http://www.birdlife.org/datazone/countrykenya.

[25] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*,

BIOLOGICAL DIVERSITY

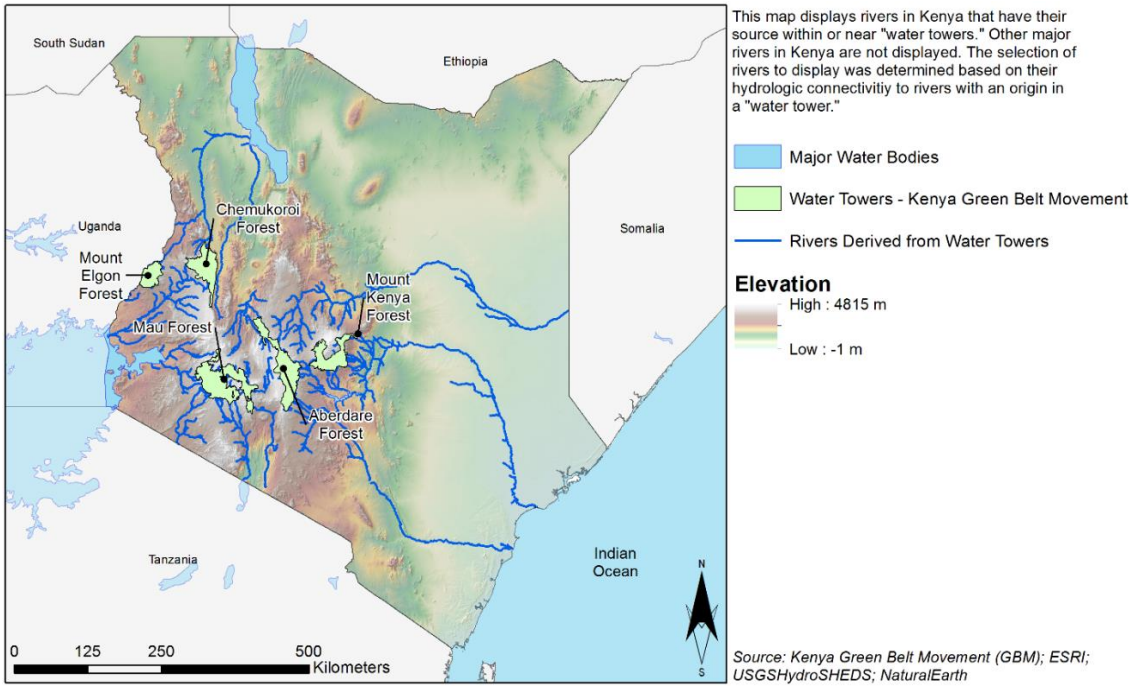
Kenya's montane forests are a key habitat for a wide range of wildlife. Levels of endemism are generally very high, and the region is recognized as a globally important "hotspot" for species conservation.[26] The mountaintops of the Aberdare Mountains and Mt. Kenya include the distinct Moreland and Afroalpine communities, each with unique plant communities.

Typical tree genera in the montane forests are Podocarpus, Olea, Juniperus and Newtonia. Notable fauna includes the elephants of the Aberdares and Mt. Kenya, and forest dwellers such as the Giant Forest Hog (*Hylochoerus meinertzhageni*), Bongo (*Tragelaphus eurycerus*), and Blue Duiker (*Philantomba monticola*). Bird life is abundant; Aberdare National Park alone hosts 250 species of birds, including European migrants. Notable endemic animals include the Aberdare mole shrew (*Surdisorex norae)* and the Aberdare mole rat (*Tachyoryctes audax*), and the endemic plants *Lobelia deckenii sattimae* and *Helichrysum gloria-dei.*

WATER CATCHMENTS

In addition to serving as critical habitat, the montane forests serve as the major source of Kenya's surface water. Five primary catchments, the Mau Forest Complex, Mount Kenya, the Aberdares, Mount Elgon, and Cherangani, collectively known as the country's water towers, supply Kenya's five major river systems. These are presented in Figure 5, below.

Figure 5 Kenya's Water Towers



[26] Russel Mittermeier, Patricio Robles-Gil, Michael Hoffmann, John Pilgrim, Thomas Brooks, Cristina G. Mittermeier, John Lamoreux, and Gustavo A.B. Da Fonseca, "Hotspots Revisited: Earth's Biologically Richest and Most Endangered Ecoregions," *CEMEX*, 2004, <https://www.researchgate.net/publication/275651117_Hotspots_Revisited_Earth's_Biologically_Richest_and_Most_Endangered_Terrestrial_Ecoregions>

The water towers are critical to Kenya's water supply, impacting agriculture, public health, and the energy sector. They are estimated to provide as much as 75 percent of the predominantly arid country's renewable water resources.[27] Downstream users, flora, fauna, and humans alike, depend on water originating in the montane forests.

TRENDS

Demand for wood, land conversion to farms, and population growth have led to tremendous pressure on the montane forests. Given the projected increase in both rural and urban populations, the pressure on montane forests is expected to continue, despite government efforts.

3.3 COASTAL DRYLAND FORESTS

Kenya's coastal forests are relics of an ancient forest mass stretching across Central Africa from the Atlantic to the Indian.[28] Today, only 10 percent of the original forest remains, and it is distributed in fragmented patches.[29] The largest of these forests are the Arabuko-Sokoke Forest Reserve (420 km^2) and the Shimba Hills National Reserve (195 km^2). In addition to these forest and wildlife protected areas, there are a series of Mijikenda *Kayas,* which are forests of spiritual and cultural value. Recognized as United Nations Educational, Scientific and Cultural Organization world heritage sites in 2008, the 10 separate forests, which stretch 200 km along the coast, range from 30 to 200 hectare (ha) in size.

BIOLOGICAL DIVERSITY

The coastal dryland forests represent one of Kenya's biological diversity hotspots, with more than 550 endemic plants (40 percent of total ecosystem flora) and 53 endemic animals. Characteristic trees include the *Cynometra*, *Afzelia*, *Brachylaena,* and *Brachystegia,* and the understory includes a mix of shrubs, grasses, and forbs. The tens of thousands of varieties of African violet existing today originated from a few species endemic to this area.[30]

Arabuko-Sokoke contains 20 percent of Kenya's bird species, 30 percent of butterfly species and at least 24 rare and endemic bird, mammal, and butterfly species. Rare species include the Lesser Galago (or bushbaby) (*Galago moholi*), the golden-rumped elephant-shrew (*Rhynchocyon chrysopygus*), the Sokoke bushy-tailed mongoose (*Bdeogale omnivore*), and the Ader's duiker *(Cephalophus adersi)*. The Clarke's weaver's (*Ploceus golandi*) worldwide range is restricted to Arabuko-Sokoke and another smaller area 30 km further north.

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[27] Republic of Kenya, "National Forest Programme 2016–2030," *MENR*, August 2016, < http://www.environment.go.ke/wp-content/uploads/2016/07/Kenya-NFP-draft-doc-2016-07-12-small-v2-1.pdf>.

[28] Piritta Peltorinne, *The forest types of Kenya*, 2004, <http://www.helsinki.fi/science/taita/reports/Peltorinne_Forest_types.pdf>

[29] Republic of Kenya, "National Forest Programme 2016–2030," *MENR*, August 2016, < http://www.environment.go.ke/wp-content/uploads/2016/07/Kenya-NFP-draft-doc-2016-07-12-small-v2-1.pdf>.

[30] Critical Ecosystem Partnership Fund, "Coastal Forests of East Africa, Conservation International," *Conservation International*, 2016 <http://www.cepf.net/resources/hotspots/africa/Pages/Coastal-Forests-of-Eastern-Africa.aspx>

Shimba Hills Reserve supports the only remaining herd of Sable Antelope (*Hippotragus niger*) in Kenya. Linking with Tsavo West National Park, it also supports a high concentration of elephants as well as a variety of other wildlife species.

TRENDS

The coastal dryland forests an extremely endangered ecosystem in Kenya. Given the restricted range of its endemic plants and animals, their extinction can occur with only minor changes in land use practices and/or habitat loss. The serious population decline in the Sable Antelope may be due to loss of genetic diversity through isolation and in-breeding.[31]

3.4 WOODLAND-BRUSHLAND

The woodland-brushland ecosystem covers approximately 36 percent of Kenya's land area.[32] Though found throughout the country, this ecosystem is pre-dominant in Kenya's southeast. The woodland-brushland ecosystem is important to pastoralists, including the Maasai, Samburu, Rendili, Somali, Borana, and Turkana.

The woodland-brushland ecosystem is both biologically and geographically varied. It can be transitional or occur interspersed with other vegetation types, depending on local topography and rainfall. Species composition and percentage of tree canopy closure vary significantly, though typically the tree and shrub overstory ranges from 10 to 40 percent with varying amounts of grass and forbs understory. The Tsavo East and West National Parks are a typical example, with an Acacia-Commiphora deciduous wooded grassland dominating the landscape intermixed with grasslands and riverine forests.[33,34]

Woodland-brushland areas include several national parks and reserves. This includes Tsavo East and West (which together form one of the largest contiguous blocks of protected area in East Africa), Samburu National Reserve, South Turkana Reserve and the Meru, Kora, Longonot, Ol Donyo Sabuk, Nairobi, Amboseli, Chyulu, and Maralai National Parks.

BIOLOGICAL DIVERSITY

The woodland-brushland ecosystem supports a wide variety of wildlife populations. Plant and animal communities found here are adapted to semi-arid conditions, including periods of severe drought. Endemism is rare.

TRENDS

Woodlands and brushlands in Kenya have been under prolonged stress in recent years, and wildlife has been in decline. The prolonged drought of 2009 and current drought of 2017, have caused a general

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[31] Stakeholder consultation with KWS in Shimoni.

[32] Norbert Henninger and Florence Landsberg, "Nature's Benefits in Kenya, An Atlas of Ecosystems and Human Well-Being," *WRI*, May 2007, <http://www.wri.org/publication/natures-benefits-kenya>

[33] Kindt, R., et al. *Potential natural vegetation of eastern Africa, Volume 3: Description and tree species composition for woodland and wooded grassland types.* Forest & Landscape Working Paper 63-2011. 2011.

[34] FAO. *Country Report Kenya*, Global Forest Resources Assessment, 2015.

degradation and loss of resiliency in the ecosystem[35]. A consequent breakdown in traditional grazing patterns, overgrazing, and illegal charcoal production (induced by individuals seeking alternative livelihoods due to crop failure), has compounded the problem, as has land privatization, bushmeat poaching, and trophy and ivory poaching.

The endangered Grevy's zebra (*Equus grevyi*) has declined from 15,000 in the late 1970s to the present-day estimate of 2,800 animals, with 80 percent of the remaining population confined to the Laikipia-Samburu area[36]. Similarly, elephant populations in Tsavo National Parks declined from 35,000 in the 1970s to 11,000 in 2014. Most dramatically, black rhinoceros (*Diceros bicornis*) populations have plummeted from 20,000 in the 1970s to 440 today[37].

3.5 SAVANNAH AND GRASSLANDS

The grasslands and savannahs of Kenya are home to many large herbivores such as elephants, zebras, buffaloes, elands, and gazelles among others. Some parks and reserves such as the Amboseli National Park and Maasai Mara National Reserve have the dominant vegetation type as open grasslands with scattered Acacia trees. The community lands adjacent to these protected area form part of the wildlife dispersal areas and/or migratory routes and corridors

Savannah and grassland ecosystems comprise approximately 39 percent of Kenya, and are the iconic image of wild Kenya.[38] They are characterized as an open landscape dominated by a grass/forb/brush understory with scattered tree crown cover not exceeding 15 percent.[39] Elephants, along with naturally occurring fire, create and maintain the ecosystem's open character. Widely distributed, the composition and productivity of grasslands vary greatly, from the more productive rangelands of Narok, Kajiado, and Trans-Mara in the south, to the semi-desert conditions of Northern Kenya.[40]

BIOLOGICAL DIVERSITY

The ecosystem is world famous for its wildlife diversity and abundance. Macrofauna abound, including elephants, lions, buffalo, rhinoceros, zebra, and antelope. Common trees include the whistling thorn (*Acaia drepanolobium*), toothbrush tree (*Salvadora persica*), and umbrella tree (*Acacia tortillis*). The savannah and grasslands generally have a low level of endemism due to interspersion with other

[35] Stakeholder consultations with NRT (Isiolo) and KFS (Marsabit)

[36] KWS (2012) Conservation and Management Strategy for Grevy's Zebra (Equus grevyi) in Kenya, (2012-2016), 2nd edition. pp.40, Kenya Wildlife Service, Nairobi, Kenya

[37] In February, 2017, KWS, supported by The David Sheldrick Wildlife Trust (DSWT), African Wildlife Foundation (AWF), World Wildlife Fund Kenya (WWF –K), Save the Elephants, and The International Fund for Animal Welfare (IFAW) completed an intensive aerial survey of wildlife, focused on elephants. The results of this USAID/East Africa-funded survey have not been released at time of writing.

[38] Norbert Henninger and Florence Landsberg, *Nature's Benefits in Kenya, An Atlas of Ecosystems and Human Well-Being*.

[39] FAO, *Global Forest Resources Assessment-Country Report Kenya*, 2014, <http://www.fao.org/3/a-az251e.pdf>

[40] WRI, *Nature's Benefits in Kenya, An Atlas of Ecosystems and Human Well-Being*, 2007, < http://pdf.wri.org/kenya_atlas_fulltext_150.pdf>.

ecosystems (e.g., woodland-brushland).[41] Two endemic, and endangered, birds are the Sharpe's longclaw (*Macronyx sharpie*) and the Aberdare cisticola (*Cisticola aberdare*).[42]

The many protected areas overlap substantially with those in the woodlands and brushland, and include the Maasi Mara National Reserve, Tsavo East and West National Parks, Meru National Park, Amboseli National Park, and Nairobi National Park.[43]

TRENDS

Trends are similar to those found in the woodland-brushlands. Wildlife populations are drastically reduced from 1970s numbers due to a combination of factors including loss of habitat and migration corridors, bushmeat poaching, and illegal hunting of elephants and rhinos. Elephant poaching has had an ecosystem-wide impact, as reductions in elephant populations have resulted in substantial loss of grassland habitat, negatively impacting both wildlife and livestock grazing.

The prolonged drought of 2009 and current drought of 2017 have caused general degradation of the ecosystem, loss in resiliency, and reduction in water availability, and they have exacerbated longer-term problems. The more productive rangelands such as in Narok, Kajiado and Trans-Mara have seen increased human settlement and consequent habitat fragmentation, a trend compounded by overgrazing.

3.6 FRESHWATER RESOURCES

Surface water bodies, including lakes, rivers and swamps represent 1.9 percent of Kenya's area.[44]

RIVERS

Kenya has a complex network of intermittent, annual and perennial streams and rivers. There are 29 rivers and six major drainage basins in Kenya: Lake Victoria, the Tana, Athi, Ewaso Ng'iro north, Ewaso Ng'iro south, and Northern Rift Valley.[45] The five montane water towers are the primary catchment areas supplying Kenya's five major river systems, the Tana, Athi, Sabaki, Ewasso Nyiro, Nzoia, and Turkwel.

Two major rivers influence habitats on the Kenyan coastline. These are Tana and Sabaki, which at 950 km and 650 km long, are the largest and the second largest rivers in the country respectively. There are

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[41] R.S. Reid, S. Serneels, M. Nyabenge and J. Hanson, "The Changing Face of Pastoral Systems in Grass Dominated Ecosystems of Eastern Africa," *FAO*, 2005, <http://www.fao.org/docrep/008/y8344e/y8344e06.htm>.

[42] Donald A. Turner, *East Africa's diminishing bird habitats and bird species*, June 2013, < https://www.ajol.info/index.php/scopus/article/download/108324/98142>.

[43] Robert J. Smith & Samuel M. Kasiki, "A spatial analysis of human-elephant conflict in the Tsavo ecosystem, Kenya," *Durrell Institute of Conservation & Ecology,* January 2000, <https://anotherbobsmith.files.wordpress.com/2013/02/smith_kasiki_00_hec.pdf>

[44] NEMA, *Kenya State of the Environment and Outlook 2010- Supporting the Delivery of Vision 2030*, 2011, <https://na.unep.net/siouxfalls/publications/Kenya_SDM.pdf>

[45] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*,

also a number of other small rivers along the coast, such as Mwena, Mwache, Mwachema, and Umba, which also discharge freshwater and sediments into the ocean.

The rivers provide high nutrient loads that flow into the ocean, contributing to high productivity which support rich fisheries such as in Ungwana Bay.

These five areas are estimated to provide as much as 75 percent of the renewable water resources of Kenya, as well as hydropower to meet the country's increasing energy needs. The Lake Victoria basin has the highest density of perennial rivers and 65 percent of Kenya's surface water supply.[46] Other important rivers are the Mara River, shared by Kenya and Tanzania, and the Tsavo River which joins the Athi River in southeastern Kenya to form the Galana River. The Galana and the Tana River flow into the Indian Ocean.

LAKES

Kenya's largest water body is Lake Victoria, which it shares with Tanzania and Uganda. It covers 68,635 km^2, an area larger Switzerland, and is Africa's largest lake and the second largest lake in the world. Lake Victoria has more than 200 endemic fish species, hosts fisheries worth US$600 million per year[47] and provides livelihoods to more than three million people.

Other lakes include Lake Turkana, the second largest lake in Kenya, and a host of smaller lakes, including Baringo, Nakuru, Naivasha, and Magadi. There are also several lakes at the coast, especially in the Tana Delta. Most are oxbow lakes that are recharged either through ground water seepage or by periodic flooding of the Tana River. Examples are Lakes Shakabobo and Bilisa. Apart from providing water for humans and livestock, the lakes are also important for freshwater fisheries.

WETLANDS

Wetlands occupy three to four percent of Kenya's land area, including six RAMSAR wetlands of international importance: Lake Baringo, Lake Elmenteita, Lake Bogoria, Lake Nakuru, Lake Naivasha, and the Tana River Delta. [48, 49] The ecosystem services provided by wetlands are critical to wet area-dependent species and traditional agricultural and pastoral systems. Wetlands are among the most productive ecosystems in the world. Kenya's wetlands provide important dry season grazing areas for cattle and wildlife, serve as vital fish spawning grounds, and habitat for migratory birds.

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[46] WRI, *Nature's Benefits in Kenya, An Atlas of Ecosystems and Human Well-Being*.

[47] NEMA, *Kenya State of the Environment and Outlook 2010- Supporting the Delivery of Vision 2030*, 2011, <https://na.unep.net/siouxfalls/publications/Kenya_SDM.pdf>

[48] MEMR, *Kenya Wetlands Atlas*, 2012, <https://na.unep.net/siouxfalls/publications/Kenya_Wetlands.pdf>

[49] Ramsar Sites Information Service, *Region/Country-Kenya*, 2017, <https://rsis.ramsar.org/ris-search/?f[0]=regionCountry_en_ss%3AKenya>

BIOLOGICAL DIVERSITY

Rivers are vital to the survival of humans, wildlife, and livestock in the arid and semi-arid areas of Kenya, which comprise 80 percent of its land surface**.** The rivers serve as arteries that connect the water towers to the lakes and ocean**,** sustaining Kenya's wetlands, river deltas, and mangroves. Riverine forests and floodplains, such as the Tana Delta and Forests Complex (proposed World Heritage Site),[50] provide unique flora and fauna communities.

Figure 6 Paradise Lake, Marsabit National Park

Lake Victoria and the Tana River systems are considered important centers for freshwater biodiversity and fish species endemism.[51] Other lakes and rivers, including Lake Turkana and the Kombeni, Manjema, and Ewaso Nyiro Rivers, also contain endemic fish.

TRENDS

Population growth and development are putting increasing pressure on the freshwater resources of Kenya. A combination of overfishing, introduction of exotic species, urbanization, and pollution have caused a deterioration of the productivity of Lake Victoria and Lake Nakuru, famed for its flamingos. Upstream dams, such as the recently constructed Gibe III in Ethiopia, threaten the survival of Lake Turkana due to reduced water flow and availability. Prolonged droughts and overgrazing by wildlife and livestock threaten smaller water bodies such as Paradise Lake in Marsabit National Park.

Deforestation, dams, irrigation, urbanization and land use practices have had negative impacts on the quantity, quality, and flow regimes of river systems. The Tana River, the longest river in Kenya, is a prime example of the cumulative impacts of these factors. [52]

Though of major ecological importance, wetlands continue to be under threat particularly from draining and agricultural conversion.

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[50] Kenya Wildlife Service, *The Tana Delta and Forests Complex*, 2010, <http://whc.unesco.org/en/tentativelists>

[51] The IUCN Red List of Threatened Species. *Version 2016-3*. <www.iucnredlist.org>

[52] Knoop L., Sambalino F., and F. Van Steenbergen. *Securing Water and Land in the Tana Basin: a resource book for water managers and practitioners.* 3R Water Secretariat. 2012.

3.7 COASTAL AND MARINE ECOSYSTEMS

Kenya's coastline is a mix of sand dunes and beaches, mangroves, coral reefs, and seagrass beds. Coastal ecosystems are characterized by interdependencies. Intertidal areas, particularly mudflats, are important habitat for a number of migrating and local birds, alongside creeks, narrow coastline reassesses, estuaries, and salt pans. The mangroves, coral reefs, and seagrass beds function as interconnected systems. Fish, crabs, prawns, and other organisms depend on all three for parts of their life cycle.[53]

Figure 7 Restored Mangroves, Kilifi, Kenya

COASTAL MANGROVES

The Kenyan coast has between 53,000 and 61,000 ha of mangrove forests. Sixty-seven percent of reefs are located in Lamu county (33,500 ha), while 10 percent each are found in Kwale (8,800 ha) and Kilifi (6,600 ha) districts.[54]

These are rich ecosystems that provide an energy source for corals and nurseries for crabs, prawns, and marine fish species. They are important as sediment filters, sources of wood, and shoreline protection. Nine mangrove species are found in the country, though the loop-root (*Rhizophora mucronata*) and tengar (*Ceriops tagal*) dominate. Other rarer species include the looking-glass (*Heritiera littoralis*) and cedar mangroves (*Xylocarpus moluccensis*).[55]

Figure 8 Turtle Bay, Watamu, Kenya

SEAGRASS

Seagrass beds cover extensive areas of coral reefs in sheltered areas. Seagrasses are highly productive and form an important habitat for many marine species and adjacent ecosystems. They stabilize bottom sediments with their dense roots and rhizomes especially during storms and

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[53] Ismael Kimirei, "Importance of mangroves and seagrass beds as nurseries for coral reef fishes in Tanzania. PhD Thesis," *Radboud University*, 2012. <http://www.academia.edu/1475492/Kimirei_IA_2012_Importance_of_mangroves_and_seagrass_beds_as_nurseries_for_coral_reef_fishes_in_Tanzania._PhD_Thesis_Radboud_Universiteit_Nijmegen_204_p>

[54] NEMA, *State of the Coast Report-Towards Integrated Management of Coastal and Marine Resources in Kenya*, 2009, <http://www.oceandocs.org/bitstream/handle/1834/7215/ktf0378.pdf?sequence=2&isAllowed=y>

[55] NEMA, *Kenya State of the Environment and Outlook 2010- Supporting the Delivery of Vision 2030.*

cyclones. Seagrass ecosystems are also vital to the fishing industries as they serve as an important habitat to approximately 70 percent of fish species, for at least a part of their life cycle. Seagrass beds are also important foraging grounds for endangered species such as dugongs and marine turtles.

Twelve types of seagrass beds are found in Kenya with each having its own assemblages of species. *Thalassia*, *Thalassodendron*, and broadblade seagrass (*Enhalus acoroides*) are dominant in mature communities. Although seagrass species composition and structure are known, the amount and distribution has not been mapped.[56]

CORAL REEFS

The coral reefs of East Africa, in general, are considered moderate in fish and coral diversity relative to other Indo-Pacific reef systems. They are still extremely productive, supporting an estimated 297 species of coral in 55 genera, 11,300 species of macrofloral and macrofauna, 403 species of seaweed, and 662 species of fish. [57,58] Coral reef communities extend from shallow inshore waters to approximately 20 – 25 m depths, limited by water clarity and nature of the substrate.

Kenya has a generally continuous reef system, though its characteristics change from north to south. Moving north, the reef system becomes narrower and less diverse as oceanic waters become cooler. The freshwater outflow of the Galana and Tana Rivers, as well as smaller rivers and creeks, suppress coral growth, causing localized reef fragmentation.[59]

Figure 9 Turtle Bay, Watamu, Kenya

BEACH AND SAND DUNES

Sandy beaches are found throughout the Kenyan coastline, particularly near the Tana and Sabaki rivers and Lamu. Sandy beaches, often viewed as barren, support a wide variety of mollusks, crustaceans, and insects, and provide critical nesting habitat for sea turtles and shorebirds.

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[56] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*,

[57] Benjamin Cowburn, Robert D Sluka and Joy Smith, "Coral Reef Ecology and Biodiversity in Watamu Marine National Park" *Arocha Kenya*, 2013, <http://www.arocha.or.ke/wp-content/uploads/sites/16/2015/04/Coral-Reef-Ecology-and-Biodiversity-in-Watamu-Marine-National-Park-Kenya.pdf>

[58] Charles Griffiths, "Coastal marine biodiversity in East Africa," *Indian Journal of Marine Sciences*, 2004, <http://nopr.niscair.res.in/bitstream/123456789/1541/1/IJMS%2034(1)%2035-41.pdf>

[59]NEMA, *State of the Coast Report-Towards Integrated Management of Coastal and Marine Resources in Kenya*, 2009, <http://www.oceandocs.org/bitstream/handle/1834/7215/ktf0378.pdf?sequence=2&isAllowed=y>

Sand dunes are created by beach-blown sand and colonized by vegetation whose interconnected roots stabilize the sand. Sand dunes support a diverse plant community and are important bird habitat.[60] They also are critical in the retention of freshwater tables protecting against saltwater intrusion.[61]

MARINE FISHERIES RESOURCES

The inshore marine waters support a vibrant fishing industry comprising of an artisanal fishery with a variety of gears and methods. Reported inshore commercial catches have fluctuated between 5,000 – 10,000 metric tons (MT) with higher catches during the North-East Monsoon. Catches are dominated by demersal reef and reef associated species. More than 13,000 fishers are directly engaged in the fishery and despite catches remaining constant over the years, there has been an increasing number of new entrants into the fishery, and development of new fishing gears and methods.

Recent comprehensive assessments of the EEZ fisheries potential in Kenya is lacking. However, estimates by the Food and Agricultural Organization in the 1980's indicated a potential yield of 150,000 MT from offshore waters.

BIODIVERSITY

Coastal Kenya provides habitat for numerous endangered species. Five species of marine turtles are found in Kenya's waters. They are the green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), olive ridley (*Ledpidochelys olivacea*), and leatherback (*Dermochelys coriacea*). Its beaches are critical nesting sites for the endangered green, loggerhead, and olive ridley turtles.[62]

The dugong, which relies on seagrass for food, is listed as vulnerable on the International Union for the Conservation of Nature (IUCN) Red List, though is possibly extinct in Kenya. KWS is currently conducting an aerial census to locate and count any remaining populations.

TRENDS

Approximately 10 percent of Kenya's population lives in coastal communities, and the coast is a major tourist destination. Coastal development has been rapid, and essentially without integrated resource management planning or regard to the environmental consequences. Large areas have been replaced by port facilities, salt production, and irrigation projects. The port of Mombasa continues to see growth in tonnage handled and is soon to be joined by an additional deep-water port at Lamu in anticipation of oil imports from South Sudan and Ethiopia.

The result has been overexploitation of the biological resources, coastal habitat destruction, and industrial pollution. A stark example is offered in Mombasa, where only 30 percent of Mombasa Island's population and 15 percent Mombasa Mainland West's population is connected to sewerage services; the rest is either served by septic tanks or cesspits, including pit latrines. Sedimentation of mangrove swamps and coral reefs have become major problems. Coastal mangroves are essentially unmanaged and

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[60] Jan Hoorweg, "Dunes, Groundwater and Birdlife in Coastal Kenya Editor," *African Centre for Technology Studies Press*,1998,

<http://www.ascleiden.nl/publications/dunes-groundwater-mangroves-and-birdlife-coastal-kenya>

[61] CORDIO Status Report 2011. Obura DO & Samoilys MA (Eds). CORDIO East Africa. <www.cordioea.net>

[62] NEMA, *State of the Coast Report-Towards Integrated Management of Coastal and Marine Resources in Kenya.*

often overharvested for wood. Shoreline erosion is increasing, having both environmental and economic consequences. The marine system is also at risk, primarily from overfishing in near-shore fisheries.

4 LEGAL FRAMEWORK AND INSTITUTIONAL STRUCTURE AFFECTING TROPICAL FORESTS AND BIOLOGICAL DIVERSITY

4.1 NATIONAL LAWS, POLICIES, AND STRATEGIES

KENYA'S CONSTITUTION

The new Kenyan Constitution, promulgated in 2010, emphasizes the significance of the environment and the necessity of managing, protecting, and conserving it for the benefit of future generations, and establishes guiding principles of participation, consultation, and transparency for doing so. Chapter 4, Part 2, Article 42 of the Constitution specifically states that all Kenyan's have the right to a "clean and healthy environment." Article 70 of the constitution further empowers individuals covered under Article 42 to bring to court any violation of that right.

Kenya's 2010 constitution also established a new institutional and legal framework for the management of public land and protected areas. Under Article 67, the Constitution established the National Land Commission of Kenya, which is charged with management of public lands on behalf of national and county governments, research into land use of natural resources, investigations into historical land injustices, monitoring and oversight over land use planning, and holding land title on behalf of the national government.

More broadly, the Constitution provides for the vertical integration of the functions of the national and county governments, allocating some natural resource management functions and powers to the national government and devolving others to county governments. The national government has a primary role in the use of international waters and water resources, land planning, and environmental protection and natural resource management, including fishing and wildlife. County governments have jurisdiction in agriculture and the implementation of specific national government policies on natural resources and environmental conservation. This two-tier approach, as fostered by Kenya's devolution, creates opportunities to improve coordination between national actors such as the Ministry of Environment and Natural Resources (MENR), Kenya Wildlife Service (KWS), and Kenya Forest Service (KFS), and county level governments.

FRAMEWORK ENVIRONMENTAL LEGISLATION

ENVIRONMENT MANAGEMENT AND COORDINATION ACT NO. 8 OF 1999, AMENDED 2015

The Environment Management and Coordination Act (EMCA) established a legal and institutional framework for the management and utilization of environmental resources, regulatory and management structures, and requirements for reporting, mitigation, and restoration. EMCA is the primary reference legislation on all matters that relate to environmental management.

THE NATIONAL LAND COMMISSION ACTS 5 & 6 OF 2012

National Land Commission (NLC) Act 5 established the NLC, which oversees land use planning country-wide, manages public land for the national and county governments, and regulates land use.[63]

[63] Government of Kenya, *National Land Commission Act, No. 5 of 2012, Section 5,* 2016, <https://www.ecolex.org/details/legislation/national-land-commission-act-2012-no-5-of-2012-lex-faoc112132/>

NLC Act 6 revised, consolidated, and rationalized land laws. It assigned NLC responsibility for identifying ecologically sensitive areas within public lands and to prevent environmental degradation and the effects of climate change on public land that includes endangered or endemic species, critical habitats, or protected areas.

FOREST SECTOR LEGISLATIVE FRAMEWORK AND STRATEGY

FORESTS ACT 2005

The Forests Act (2005) provided for the establishment, development, and sustainable management of forest resources for the socio-economic development of the country, under the aegis of KFS. The act mandated integrated management plans for all state, community, and private forests. It also recognized customary land rights and institutionalized Forest Conservation Committees and Community Forest Associations to promote participatory control and management of forests.

The Forest Act 2005 was repealed and superseded by the Forest Conservation and Management Act No. 34 of 2016.

FOREST CONSERVATION AND MANAGEMENT ACT NO. 34 OF 2016

The Forest Conservation and Management Act of 2016 (FCMA) further provides for the establishment development, and sustainable management of forest resources, clarifying the relative conservation and management requirements for public, community, and private forests. The act additionally defines user's rights and establishes rules governing use of forest land. Importantly, the FCMA makes provision for community management and participation in forest lands via community forest associations (CFAs), trade in forest products, and protection of water towers and indigenous resources[64].

NATIONAL FOREST PROGRAMME 2016-2030

The National Forest Programme (NFP) 2016-2030, establishes Kenya's 15-year strategic vision for improved and sustainable management of Kenya's forests. Specifically, the NFP seeks to: "increase tree cover and reverse forest degradation through sustainable forest management, enhance forest-based economic, social, and environmental benefits including by improving the livelihoods of forest-dependent people, enhance capacity development, research, and adoption of technologies to increase value adding to forest products, create an enabling environment for mobilizing resources and investment to spur forest development, and inculcate good forest governance through integrating national values and principles of governance in forest development."

The NFP was developed to align with both the Constitutionally protected rights of Kenyan's to a clean and healthy environment while still allowing Kenya to pursue the strategic vision articulated in Vision 2030. To achieve the above referenced objectives, the NFP defines eight thematic clusters for programming: Forest Productivity; Forest Governance; Natural Forest Management and Conservation; Forest for Water; Forest for Energy; Forestry Education, Training, and Research; Forest and Climate Change; and Forest Financing. The NFP goes on to elaborate each of these clusters, identifying strengths, weaknesses, opportunities, and threats, establishing core objectives, and developing a roadmap to achieve those objectives.

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[64] Forest Conservation and Management Act, 2016 (No. 34 of 2016). < https://www.ecolex.org/details/legislation/forest-conservation-and-management-act-2016-no-34-of-2016-lex-faoc160882/>

MARITIME FRAMEWORK LEGISLATION

KENYA MARITIME AUTHORITY ACT CAP 370, 2007

This act established the Kenya Maritime Authority (KMA) to monitor, regulate, and coordinate the maritime industry, collaborate with other public agencies to prevent marine pollution, protect the marine environment, and respond to marine environmental incidents.

NATIONAL FISHERIES AND OCEANS POLICY, 2008

The policy established a partnership-based framework to tackle fishery sector challenges by promoting good governance and transparency, co-management, conservation, and utilization of management plans for fisheries, with the aim of increasing fisheries' contribution to income, employment, and food security.

THE FISHERIES MANAGEMENT AND DEVELOPMENT ACT NO. 35 OF 2016

This act provided for the protection, management, use, and development of aquatic resources consistent with ecologically sustainable development to raise living standards in fishing communities, introduce fishing to non-fishing communities, and enhance food security. It also established the Kenya Fisheries Service.

WILDLIFE FRAMEWORK LEGISLATION

WILDLIFE CONSERVATION AND MANAGEMENT ACT NO. 47 OF 2013

The Wildlife Conservation and Management Act (WCMA) provided for the protection, conservation, sustainable use and management of wildlife in Kenya. It promotes environmentally sound conservation and development practices, including devolution, public participation, sustainable utilization, and benefit sharing.

4.2 INTERNATIONAL AGREEMENTS

Kenya is a signatory to the following major international agreements, treaties, and conventions:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (joined 1979, KWN is the enforcement authority)
- Convention on Biological Diversity (1994)
- Convention of the Conservation of Migratory Species of Wild Animals (1999)
- Ramsar Convention on Wetlands of International Importance (1990)

Kenya is also a signatory to a broad range of other international environmental agreements and many continental and regional agreements.

4.3 GOVERNMENT AGENCIES

TABLE 3 GOVERNMENT AGENCIES WITH ENVIRONMENTALLY FOCUSED MANDATES

INSTITUTION	MANDATE
MINISTRY OF ENVIRONMENT AND NATURAL RESOURCES	• To protect, conserve, and manage the environment and natural resources for socio-economic development • Semi-autonomous agencies under the Ministry include: National Environment Management Authority (NEMA), Kenya Water Towers Agency (KWTA), KWS, KFS, and Kenya Forest Research Institution (KEFRI)
NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY	• Principal government authority supervising and coordinating environment-related matters • Coordinates environmental management activities of all lead agencies within the coastal zone • Integrates environmental considerations into the works of other agencies
KENYA WILDLIFE SERVICE	• Conserves and manages wildlife • Sole jurisdiction over national parks and some national reserves, including marine parks and reserves • Supervisory responsibility over most of the other national reserves, community and private conservancies, and sanctuaries • National authority on several environmental conventions and protocols • Licenses, controls, and regulates all wildlife conservation and management outside of protected areas
KENYA FOREST SERVICE	• Formulates policies and guidelines for the management, conservation, and utilization of forests • Develops forest management plans in collaboration with relevant owners • Manages forests in concert with communities and other organizations
KENYA WATER TOWERS AGENCY	• Co-ordinates and oversees the protection, rehabilitation, conservation, and sustainable management of the water towers • Co-ordinates and oversees recovery and restoration of forests, wetlands, and biodiversity hotspots • Promotes implementation of livelihood programs in the water towers
KENYA MARITIME AUTHORITY	• Has regulatory oversight over the Kenyan maritime industry • Enforces legislation relating to the maritime sector • Protects the marine environment from pollution
COAST DEVELOPMENT AUTHORITY	• Plans and coordinates implementation of integrated development projects in the coastal region and Garissa county along the Tana River • Developed Integrated Coast Region Master Plan 2010-2030
KENYA MARINE FISHERIES RESEARCH INSTITUTE	• Researches marine and freshwater fisheries to inform sustainable exploitation, management, and conservation of fisheries and other aquatic resources
TANA RIVER DEVELOPMENT AUTHORITY	• Undertakes integrated development, coordination and management of the resources within the Tana and Athi River basins to ensure the proper utilization and protection of water and soil in the area
KENYA FISHERIES SERVICE	• Successor to the State Department of Fisheries as of 2016 • Government statutory body with the responsibility for the conservation, management, and development of Kenya's fisheries resources

4.4 THE LEGISLATIVE ENVIRONMENT, FORESTS, AND BIODIVERSITY: PROGRESS AND CHALLENGES

KENYA'S MONTANE FORESTS

The water towers' value for both forest products and watershed regulation has led to significant regulatory oversight, and overlap, in the montane forests. KFS, KWS, Water Resources Management Authority (WRMA), and the Kenya water towers Agency (KWTA) all have authority over various elements of the area, and inconsistencies between the Forests Act (2005) and other laws, especially the WCMA, have led to the dual gazettement of several montane forest areas, including Mt. Marsabit, Mt. Kenya, and the Shimba hills, as both Forest Reserves under the Forests Act and National Reserves under the WCMA. Competing and uncomplimentary roles among these organizations have undermined their respective mandates and capabilities rather than strengthening them.[65] It remains to be seen whether these issues will be resolved in part or in whole by the FCMA.

Disjointed administration joins two entrenched legal problems in the water towers. First, many forest borders are still poorly defined, which reduces the practical enforceability of the various agencies' mandates.[66] Second, and most critically, corruption and patronage politics have badly undermined various agencies' conservation efforts. Illegal logging, farming, and charcoal production in the water towers have been sponsored by political elites from Nairobi for decades. In recent years, this has improved due to a national drive against corruption and a change in local conservation management. Forest control is being devolved to local CFAs, which are empowered to enforce conservation mandates at the ground level. This process began with the Forests Act (2005)—a process the FCMA seeks to strengthen—and results are encouraging thus far. Although corruption-sanctioned deforestation is still an issue, the devolution of power to CFAs and an increased emphasis on conservation from the KFA have the potential to stem the tide.[67] While the FCMA has too recently been enacted to conclusively determine the efficacy of the new regulatory regime for forest management, reports following Kenya's devolution suggest a clear reduction in illegal excisions of forests,[68] despite early mixed results regarding broader institutional change[69].

BIOLOGICAL DIVERSITY

WILDLIFE TRAFFICKING

Like many African nations with abundant macrofauna, Kenya has severe wildlife poaching and trafficking problems. Kenya banned game and trophy hunting in 1977, but poaching and trafficking have remained embedded in Kenya due to a thick web of law enforcement loopholes, corruption, and weak capacity. Persistently high demand in Asia has led to increasingly sophisticated illicit supply chains. Within Kenya,

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[65] Tapani Oksanen, Michael Gachanja, and Anni Blåsten, "Strategy Note for Forest Governance Reform in Kenya," *Indufor,* 2011, <http://formin.finland.fi/public/download.aspx?ID=107024&GUID=%7BFC61ED21-F7A4-4682-9BF2-C69C3361A1DB%7D>

[66] Evelyne Macharia, "Kenya Water Towers Status Report," *Kenya Forest Service,* <http://www.kenyaforestservice.org/index.php?option=com_content&view=article&id=501:kenya-water-towers-status-report&catid=81&Itemid=538>

[67] Fred Pearce, "In Kenya's Mountain Forests, A New Path to Conservation," *Yale Environment 360*, 26 Feb 2015, <http://e360.yale.edu/features/in_kenyas_mountain_forests_a_new_path_to_conservation>

[68] Ministry of Environment, Water and Natural Resources & UN-REDD Programme. "A Corruption Risk Assessment for REDD+ in Kenya". 2013.

[69] Coleman, E, et. al. "Comparing Forest Decentralization and Local Institutional Change in Bolivia, Kenya, Mexico, and Uganda." World Development 2012 http://www.sciencedirect.com/science/article/pii/S0305750X11002300.

incentives are high for rural people to poach, port, and airport workers to abet trafficking, and for government officials to profit from, rather than combat, criminal enterprises. This situation requires substantial resources and high capacity nationwide to combat effectively. While important progress has been made, many policy and enforcement hurdles remain nationwide. Chief among these are:

- The WMCA mandates very high minimum penalties (KSh 250 million and/or life imprisonment), which encourages 'not guilty' pleas. This has reduced the incentive for defendants to plead guilty in exchange for cooperation, thereby bottlenecking investigations at low levels of criminal organizations. It also contributes many trials to an already overburdened judicial system;
- DNA and forensic evidence are underutilized, and forensic experts are in short supply;
- Corruption extends to the court system, where important evidence and files "go missing;"
- Ambiguous legislation has led to inter-agency "turf wars," rather than collaboration; and
- Insufficient numbers of scene-of-crime officers, whose evidence is required at trial.[70]

With greater legal clarity, incentives for defendants to cooperate with investigations, more human resources, and improved collaboration, Kenya can continue to improve its defense of its biodiversity and natural heritage.

LAND-USE PLANNING

Beyond wildlife trafficking, land-use planning in the face of increasing population growth, urbanization, industrialization, agricultural expansion, and pastoralism is a central challenge in wildlife management in Kenya. Recent analyses have concluded that, without 1) careful land use planning, zoning, and demarcation that accounts for compatible land use practices, 2) harmonization of those plans and zones with existing pastoral, water, and forest use practices, and 3) actual enforcement of the governing laws and regulations, Kenya's wildlife will remain under significant threat[71]. The WCMA establishes a framework through which sufficient ownership rights can be claimed by communities, but capacity building support is needed for community-based groups to effectively achieve the above-described needs.[72]

[70] Sam Weru, "Wildlife Protection and Trafficking Assessment in Kenya," *Traffic Report*, May 2016, <http://www.trafficj.org/publication/16_Wildlife_Protection_and_Trafficking_Assessment_Kenya.pdf>

[71] Ogutu et al 2016 Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes? https://doi.org/10.1371/journal.pone.0163249

[72] ibid.

5 ECOSYSTEM SERVICES VALUATION

5.1 BACKGROUND

The Kenyan government recognizes ecosystems and biodiversity as critical foundations of the national economy as well as individual livelihoods and well-being throughout Kenya. Kenya Vision 2030 establishes strategies to conserve environmental resources to facilitate sustained economic and social development nationwide.[73] These environmental resources are ecosystem services and include the provisioning of directly utilized resources; non-material cultural services; regulating services, which provide critical benefits through reliable ecosystem processes; and supporting services, which underlie the others through extremely long-term and broad scale processes, such as soil creation and nutrient cycling (see Figure 10).

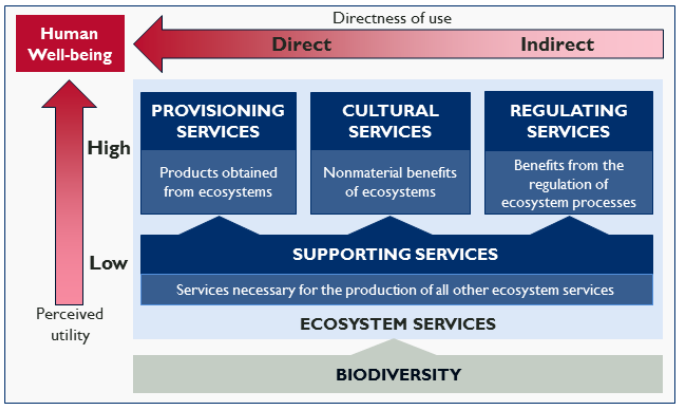

Figure 10 Overview of Ecosystem Services

5.2 ECOSYSTEM SERVICE VALUATIONS IN KENYA

Despite the acknowledged importance of ecosystem services to the Kenyan economy and society, Kenya lacks accurate and complete valuations of its ecosystem services on a national scale. The most complete valuations have been performed by the government as parts of nationwide statistical analyses and natural-resource surveys, notably in the forestry and agriculture sectors. These have focused on directly utilized provisioning services, using economic metrics like gross value added (GVA) and contribution to gross domestic product (GDP). This approach poses significant challenges. By not evaluating the contributions of non-provisioning ecosystem resources, these surveys systematically and significantly underestimate the total economic value of ecosystem services nationwide.

NGOs and academics have undertaken valuations that have produced more complete estimates of ecosystem service contributions by utilizing a variety of methodologies. However, differing methodological choices can result in widely varied results, and the contextual specificity of regional studies can prevent accurate extrapolation to national scope. The value of ecosystem services in Kenya is thus currently viewed through a fractured lens.

5.3 ECOSYSTEM SERVICE VALUES

Ecosystem services are a function of multiple complexly intersecting variables, including geography, hydrology, economy, community livelihoods, and the energy sector. The most valuable ecosystem services that emerge from this combination of variables in Kenya are the provisioning of wood and fodder, wild game tourism, and water regulation. These are complimented by other regionally and nationally important ecosystem services.

[73] Republic of Kenya. *Kenya Vision 2030,* August 2007, <http://theredddesk.org/sites/default/files/vision_2030_brochure__july_2007.pdf>.

PROVISIONING SERVICES

FOREST PRODUCTS

The most economically important ecosystem provisions in Kenya are forest products, primarily as timber and fuelwood. For individual households, fuelwood for cooking, in the forms of both wood and charcoal, is an essential ecosystem service. This is especially true in rural dryland areas, where grid-supplied electricity is most often unavailable, and fuelwood is the primary household energy source for up to 99 percent of households.[74]

The contribution of forestry to the GVA of the national economy makes timber provisioning the most valuable ecosystem service measured by the government, consistently valued at approximately one percent of national GVA annually, and assessed by the Kenya National Bureau of Statistics at KSh 80,633,000 GVA in 2015.[75] An assessment of value added from the forestry industry to other industries has revealed considerable induced value additions unrecorded in the national GVA analysis. Chief among these downstream beneficiaries are the chemical industry (30.7 percent of total value induced by forest products in 2010), agriculture (15.5 percent), wood and paper (13.3 percent), and construction (12.3 percent). Incorporating these linkages into a national analysis would undoubtedly raise the value of wood provisioning.[76]

Monetized values of wood provisioning per unit area vary widely. In the highly productive montane forests, the cash value of timber and fuelwood has been valued at 408,500 ha/year in 2015 KSh.[77] This figure is heavily influenced by the value of commercial timber, and is orders of magnitude higher than the rest of the country, where local demand, lower value trees, and lower tree density predominate. In dryland forests, assessed values range from 5,170 ha/year in 2015 KSh for riparian and dry forests to 1,830 ha/year in 2015 KSh for still drier lands.[78] Mangrove forest wood provisioning in one location has been valued at 3,230 ha/year in 2015 KSh.[79]

FODDER

In dryland areas, pastoralism is the dominant livelihood and a cultural cornerstone, making fodder provision a critical and non-substitutable ecosystem service for 34 percent of the country's population. National-level valuations of fodder have not yet been conducted, but a detailed study in Turkana district

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[74] Barrow, Edmund and Morgaka, Hezron. "Kenya's Drylands – Wastelends or an Undervalued Economic Resource?" *IUCN*, 2007 <https://www.researchgate.net/publication/268013045_Kenya%27s_Drylands_-_Wastelands_or_an_Undervalued_National_Economic_Resource>.

[75] Kenya National Bureau of Statistics, *Economic Survey 2016*, 2016, <http://www.knbs.or.ke/index.php?option=com_phocadownload&view=category&download=862:economic-survey-2016&id=107:economic-survey-publications&Itemid=1181>.

[76] UNEP, *The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy*, 5 November 2012, <http://reliefweb.int/report/kenya/role-and-contribution-montane-forests-and-related-ecosystem-services-kenyan-economy>.

[77] UNEP, *The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy*

[78] Barrow, Edmund and Morgaka, Hezron. *Kenya's Drylands – Wastelends or an Undervalued Economic Resource?*

[79] UNEP. Economic Analysis of Mangrove Forests: A case study in Gazi Bay, Kenya. 2011.

(where 80 percent of the population depend on livestock) valued fodder provisioning at 23,680/ha/year in 2015 KSh.[80]

FISH[81]

Fish provisioning is among the major services of aquatic ecosystems. Fishing and fish marketing are economically dynamic and diverse sectors, making valuations very unstable over time and geography. Kenya has a diverse fishing sector that includes commercial and artisanal fishing, household consumption, and domestic and export markets. Ninety-five percent of the sector is based on inland fisheries. Lake Victoria produces a significant share of inland fish, at 150,125 MTs (2013). All other inland sources total 4,075 MTs, with Lake Turkana dominating these regions (2013).[82]

Using recent market prices of KSh 150 for local tilapia and perch, the provisioning value of Lake Victoria can be valued at 62,870 ha/year for Kenyan fisheries in 2015 KSh.[83] Lake Turkana and other inland fisheries are far less productive, at 900 ha/year in 2015 KSh. This may represent significant underutilization, especially of Lake Turkana, and studies have proposed potential values as high as 75,150 ha/year in 2015 KSh if commercial fishing is maximally exploited. However, increasing siltation and a proposed dam in Ethiopia may leave this theoretical maximum unrealized.[84]

Kenya's marine catch in 2013 was 8,980 MT, or KSh 1,347,000,000 at market prices. The provisioning value of this catch is distributed among all three productive marine ecosystems - mangroves, seagrasses, and coral reefs – as many fish species spend different parts of their lifecycle in each one of these. Using a conservative estimate of mangrove extent, and the assumption that 32 percent of fishery productivity is attributed to mangroves, the fish provisioning value of mangroves can be conservatively valued at KSh 491 million 2015 KSh.[85] The dimensions of Kenya's coral reefs and seagrass beds are very poorly understood, thus preventing even broad estimates of fish productivity per hectare.

WATERSHED SERVICES

Watershed services are arguably Kenya's most important ecosystem service, with substantial value derived from the energy sector (with nearly half of the national supply provided via hydropower derived from the water towers' catchments), freshwater fishing, municipal water, and agriculture.

The direct loss of watershed services (which also includes regulating services, descried below) due to deforestation has been estimated at 2.7 times greater than the cash benefits of the forest products obtained (1,096,385 2015 KSh/ha vs. 408,500 2015 KSh/ha). A more inclusive estimation, incorporating

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[80] Barrow, Edmund and Morgaka, Hezron. *Kenya's Drylands – Wastelends or an Undervalued Economic Resource?*

[81] Refer to Annex G for additional information about how figures for this sub-section were derived.

[82] FAO Fisheries and Agriculture Department. Fishery and Aquaculture Country Profiles: The Republic of Kenya. 2015. http://www.fao.org/fishery/facp/KEN/en

[83] Ogutu, Kevin. "Chinese fish floods Kisumu markets," *Standard Digital,* 4 July 2016, <https://www.standardmedia.co.ke/article/2000207446/chinese-fish-floods-kisumu-markets>

[84] Stephen Mwikya, "Lake Turkana Fishery: Options for Development of a Sustainable Trade," *SNV*, September 2005, <http://www.oceandocs.org/bitstream/handle/1834/6925/ktf0040.pdf?sequence=1&isAllowed=y>

[85] Aburto-Oropeza O, 2008. Mangroves in the Gulf of California increase fishery yields, PNSA Vol. 150 no. 30

both direct and indirect effects of a decline in these services on the national economy indicate that the water towers' regulating services exceed the value of forest products by a factor of 4.2 to 5 (1,715,770 to 2,042,600 2105 KSh ha/year).[86]

5.3.2 CULTURAL SERVICES

Kenya's tourism industry is its second largest earner of foreign exchange, and Kenya's natural heritage, in the form of the big game of the brushlands and savannah, is its prime driver.[87] In 2015, the tourism industry earned 84.6 billion KSh, the country hosted 1,180,500 tourists, and national parks and game reserves hosted 1,953,800 visitors.[88] At the present, Kenya lacks an ecosystem services-based analysis of its tourism industry. However, given the well-known centrality of these cultural resources to the Kenyan economy, and the threats posed to big game by habitat encroachment and poaching, undertaking such a survey may prove to be quite useful.

5.3.3 REGULATING SERVICES

WATERSHED SERVICES

The regulating services provided by Kenya's water towers are critical in a country dominated by drylands. As Kenya's most upstream catchments, the water towers are the main drivers in the generation of watershed services: local climate regulation, flow regulation, erosion regulation, water purification and waste treatment, and disease regulation. See discussion of provisioning watershed services, above, for collective valuation of Kenya's regulating and provisioning watershed services.

COASTAL PROTECTION

The most well studied regulating service of coastal ecosystems in Kenya is shoreline protection from tsunamis. Mangroves are understood to provide effective protection against tsunamis, which are a risk for Kenya, notably from the Karthala volcano on the Cormoros. The United Nations Environment Programme estimated the shoreline protection value of Kenya's mangroves at 14,185 ha/year in 2015 KSh.[89]

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[86] UNEP. *The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy.*

[87] Peter Martell, "Counting the Cost of East Africa's Poaching Economy," *Phys.org.,* 23 March 2014, <https://phys.org/news/2014-03-east-africa-poaching-economy.html>

[88] Kenya National Bureau of Statistics, *Economic Survey 2016*

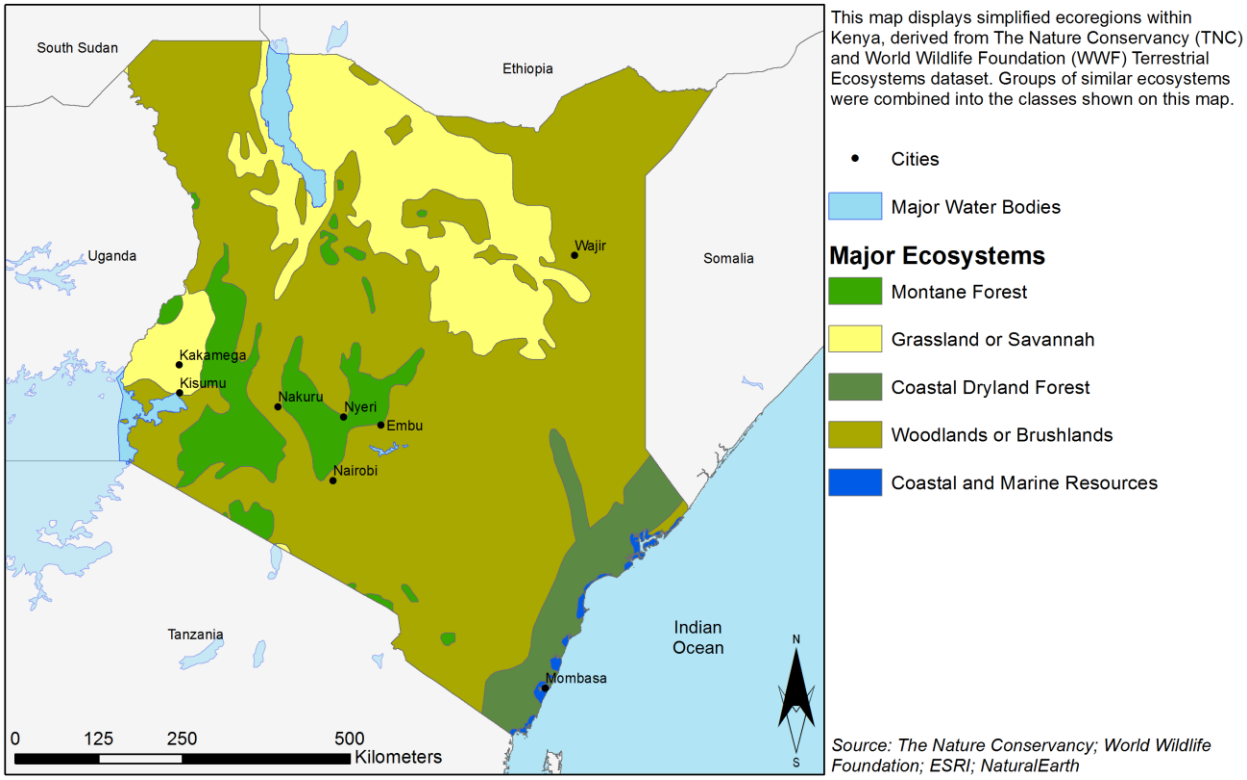
[89] UNEP. *Economic Analysis of Mangrove Forests: A case study in Gazi Bay, Kenya.*

6 KEY DRIVERS AND THREATS TO BIODIVERSITY AND TROPICAL FORESTS IN KENYA

6.1 OVERVIEW

Building from the status of biodiversity and tropical forests (Section 3), the legislative and institutional setting (Section 4), and examination of ecosystem services (Section 5), this section establishes the core threats to tropical forest conservation and maintenance of biological diversity in Kenya. Threats are considered for the following simplified ecosystems, used for analytical purposes in this analysis: (1) the Montane Forests, (2) Woodland-Brushland areas, (3) Coastal Dryland Forests, (4) Freshwater, Rivers, and Wetlands, (5) Coastal and Marine Resources, and (6) Grasslands and Savannah. Underlying direct and indirect drivers are defined for threats identified.

Figure 11 Simplified Ecosystems in Kenya



6.2 MONTANE FORESTS ENVIRONMENTAL THREATS AND DRIVERS

Montane forests occupy 1.14 million hectares, about two percent of Kenya's total land area and approximately 10 percent of their original land area. Kenya loses 54,000 ha of forest annually with the montane forests having the highest rate of loss.[90] Given that they provide as much as 75 percent of the predominantly arid country's renewable water resources, their continued destruction has far-ranging impacts that extend beyond the forest boundaries.[91]

[90] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*,

[91] UNEP, *The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy*

The main threats to the montane forests, their biological diversity, and watershed value include;

- Legal and illegal conversion of forest to agricultural lands for crop and livestock production;
- Illegal Logging and overharvesting of forest products for lumber, furniture production, targeted tree species (e.g., sandalwood), fuelwood, and charcoal production;
- Poaching for bushmeat and trophy hunting;
- Illegal grazing/overgrazing; and
- Invasive plant species.

As an example, the forests in the Mau Forest Complex and Cherengani Hills, which provide critical ecological services to the country, have been impacted by extensive irregular and ill-planned settlements, as well as illegal forest resources extraction. Conservations efforts have been impeded by a lack of coordination and resource planning effort between KFS and indigenous communities, including the development of forest management plans (Figure 17). In addition, the inadequate law enforcement and poor management of the KFS's Plantation Establishment and Livelihood Improvement Scheme (PELIS) Forestry Programme has failed to increase forest cover, improve community livelihoods, and reduced degradation of water towers in Western Kenya (e.g., Mt. Elgon and Cherengani Hills) as planned.

TABLE 4 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN MONTANE FORESTS

lists the primary threats facing the montane forests in Kenya's major and minor water towers. The type of threat and its magnitude of impact vary by forest. The same is true for the degree of deterioration. For example, Mount Kenya is showing a possible net increase in forest cover while the Mau Forest Complex continues to show a significant downward trend.[92]

DEFORESTATION

Land encroachment is a major driver of deforestation. With both very limited land area suitable for agriculture, and rapid population growth, agricultural expansion into areas offering even marginal potential for agriculture threatens Kenya's montane forests. In recent past, this occurred with governmental approval and subsequent attempts to remove farmers and reforest these areas remain extremely difficult.

Economic incentives drive the illegal harvest of high value commercial species, such as sandalwood (*Oscillis lanceolate*). Increased settlements require building materials, including wood products. Given that 80 percent of Kenya's population depends on firewood and charcoal cooking, heat, and light, it is unlikely that pressure on forests will ease.[93] It is possible that more efficient charcoal kilns and cook stoves might help reduce the rate of increase.

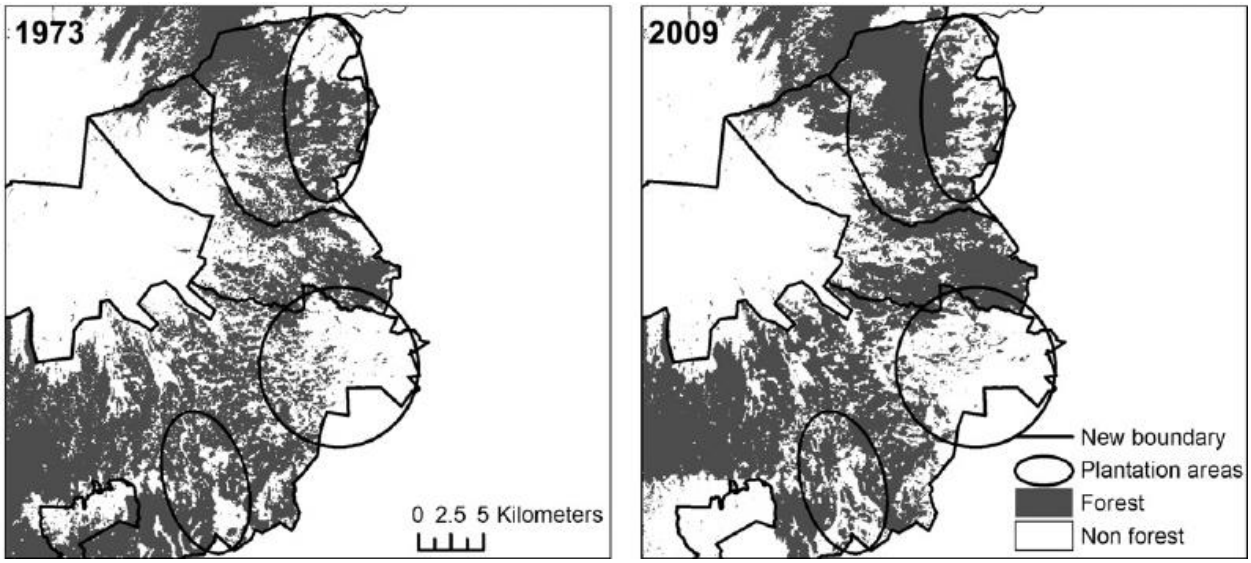
One prominent example of this comes in Mt. Elgon, where deforestation—especially in non-protected areas—is substantial. Historically, forest management practices in Mt. Elgon included the Shamba

[92] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*,

[93] Ministry of Environment, Water and Natural Resources, *Analysis of The Charcoal Value Chain In Kenya*, August 2013, http://www.kenyaforestservice.org/documents/redd/Charcoal%20Value%20Chain%20Analysis.pdf.

system[94] or soft-wood plantations, which were overseen by the Kenyan Forest Department (predecessor to KFS). However, as illustrated in Figure 12, below, forest cover in these plantation or Shamba areas eroded significantly from over the past 40 years, in large part due to the mismanagement or corruption of officials within the Kenyan Forest Department. The Shamba system, which relied on rent-payment to Forest Department officials, ultimately incentivized these officials to exploit the dependency created by this arrangement, and in turn discouraged effective, sustainable management of the forest plots.[95]

FIGURE 12 FOREST COVER IN AND AROUND PLANTATIONS AND SHAMBA SYSTEM[96]



Factors outside of Kenya's borders also have the potential to indirectly contribute to deforestation. Illegal intra-regional trade of timber and other forest products in East Africa is growing, including significant flows into Kenya from Tanzania. The types of forest products include exotic species such as *Cupressus lusitanica*, *Pinus patula*, and *Tectona grandis*, as well as timber used for furniture production, walking sticks, gum, roots, seeds and seedlings, wooden crates, and sandalwood[97]. In turn, the expansion of this illicit trade is spurring increasing concern about the potential for unsustainable forest practices, negative impacts on local economies and forest dependent communities, increasing costs of forest management, and accentuated market distortions[98].

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[94] The Shamba system promoted local communities with historical land rights to cultivate areas within the montane forests until the canopy cover closed.

[95] Petursson J G, et., al. Forest Policy and Economics, 26: 2013. "An institutional analysis of deforestation processes in protected areas: The case of the transboundary Mt. Elgon, Uganda and Kenya."

[96] ibid.

[97] East African Wild Life Society (EAWLS). (2012). The Trade in Forest Products Between Kenya and Tanzania. Arusha: FAO Forest Law Enforcement, Governance and Trade Support Programme for African, Caribbean and Pacific Countries.

[98] Advisory Group on Finance Collaborative Partnership on Forests. (2012). 2012 Study on Forest Financing. New York: UN Forum on Forests (UNFF).

LOSS OF BIODIVERSITY

Poaching is pervasive and driven by economics. There is a readily available market for cheap animal protein as well as the highly lucrative market for illegal animal products such as skins, ivory, and tusks are economic incentives for individuals having limited livelihood alternatives. Because of KWS's focus on illegal trafficking in wildlife, bushmeat poaching is largely ignored.

Plant biodiversity has suffered from both intentional and unintended introduced of non-native species into forest habitat. This includes increased incidences of invasive species, such as *Psygium quajava* and *Ocotea usambarensis* in Mt. Kenya forest, or the introduction of Eucalyptus, which was widespread during the colonial period. Poorly considered reforestation efforts, establishment of woodlots, and agroforestry initiatives have the potential to further the introduction of exotic trees out-competing native species.

Stakeholders interviewed repeatedly cited poor governance, the lack of forest management plans, inadequate law enforcement, insufficient KWS and KFS funding, lack of private land incentives including government financial support as contributing to the loss of montane forests. Illegal grazing of forest lands is a good example of the inability of local officials to effectively enforce regulations and control use.

Other institutional challenges include conflicting management objectives in forests jointly managed by the KFS and KWS (e.g., Mt. Kenya), the process of re-defining of roles and responsibilities resulting from Kenya's devolution of responsibilities to county governments, the lack of integrated natural resource planning, and public involvement in the planning process including the management of forests and other conservation lands.

As an example, the forests in the Mau Forest Complex and Cherengani Hills, which provide critical ecological services to the country, have been impacted by extensive irregular and ill-planned settlements, as well as illegal forest resources extraction. Conservations efforts have been impeded by a lack of coordination and resource planning effort between KFS and indigenous communities, including the development of forest management plans (Figure 17). In addition, the inadequate law enforcement and poor management of the KFS'S Plantation Establishment and Livelihood Improvement Scheme (PELIS) Forestry Programme has failed to increase forest cover, improve community livelihoods, and reduced degradation of water towers in Western Kenya (e.g., Mt. Elgon and Cherengani Hills) as planned.

TABLE 4 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN MONTANE FORESTS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Deforestation from: • Legal and illegal forest excisions • Illegal charcoal production • Forest clearing/land conversion for agricultural production • Unsustainable utilization (e.g., pastoral encroachment)	• Urban and peri-urban expansion • Increased small-holder and commercial agriculture • Increased industrialism and related activities • Tourism (e.g., construction, mask production) • Furniture production • Infrastructure development (e.g., transportation corridors) • Increasing fuelwood demand for energy	• Population growth • Lack of integration and/or implementation of natural resource management and related integrated land use management plans (e.g., in the Aberdares and Mt. Elgon) • Insufficient financial resources to carry out legal mandates (at national, county, and community levels) for forest management • Poor management of financial resources • Dual gazettement of some forests (e.g., Mt Kenya) coupled with political turf battles between various agencies (e.g., KFS and KWS)

TABLE 4 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN MONTANE FORESTS		
DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
• Increased prevalence of extractive industry (mining, quarrying, logging) •	• Weak enforcement of legal mandates for both protected and non-protected areas • Lack of an effective benefit sharing framework (e.g., for CFAs) • Lack of alternative livelihoods that promote or rely-upon sustainable forest management • Lack of alternative energy/electricity/fuel sources	• Lack of nationally recognized/maintained valuation system for forest-based ecosystem services • Lack of county-level forest policy and laws • Lack of clear conflict management framework between different users of forest resources (e.g., communities and private sector) • Weak co-management practices of the forestry estate due to inadequate capacity of CFAs • Weak governance systems
Loss of biodiversity and habitat degradation from: • Invasive species, new pests, and diseases (e.g., *Psygium Quajava* and *Ocotea* in Mt Kenya) • Harvesting of sandalwood *(Oscillis lanceolate)* • Overgrazing • Expansion of human settlements • Illegal hunting/poaching • Fires (for land clearing, hunting)	• Weak enforcement of legal mandates for both protected and non-protected areas • Weak implementation framework for County Wildlife Compensation Committees • Collapse of grazing plans (e.g., Baringo, Laikipia) • Human/wildlife conflict • Increased water scarcity leading to increased food scarcity • Increased migration to urban and peri-urban areas • Infrastructure development	• Lack of an effective benefit sharing framework • Climate change • Population growth • Limited alternative livelihoods • Political insecurity • Uncertainty and ambiguity related to devolution of government roles/responsibilities (e.g., ambiguous legal frameworks) • Regional economic integration and national economic development objectives • High levels of corruption • Inadequate regulatory framework for rangeland and crop management • Weakening of protected area systems • Lack of synergy of protected area institution systems • Dual Gazettement of some forests (e.g., Mt Kenya) coupled with political turf battles between various agencies (e.g., KFS and KWS)

6.3 THREATS TO WOODLAND-BRUSHLAND

The woodland-brushland ecosystem covers approximately 36 percent of Kenya's land area[99]. Given the increasing human pressures throughout Kenya's more productive lands, the ecosystem is increasing in importance for biodiversity conservation, particularly wildlife's long-term survival. The main threat areas are: 1) landscape-scale habitat degradation; 2) decline and loss of wildlife populations; and 3) deforestation; loss of forest biological diversity.

LANDSCAPE-SCALE ECOSYSTEM DEGRADATION

The degradation of woodland-brushland ecosystems in Kenya is driven by both climate and anthropogenic factors. Climate-related drivers include more frequent, intense, and widespread droughts

99 Norbert Henninger and Florence Landsberg, *Nature's Benefits in Kenya, An Atlas of Ecosystems and Human Well-Being*.

during the last 50 years,[100] with what was previously a five-year drought cycle now a two- to three-year cycle.[101] More frequent and intense droughts further exacerbate challenges connected to water scarcity. Increasingly, communities are responding by fencing off more productive grazing areas, restricting both wildlife and traditional pastoral dry and wet season land use patterns.

At the same time, human populations and livestock numbers have increased, while land use change and habitat loss means that pastoralists are increasingly confined to more limited habitat/grazing areas, often shared by wildlife. The increase in livestock is driven by combination of factors. More traditional pastoralists, such as the Samburu, still consider herd size to be a sign of wealth. For more market-oriented pastoralists, the problem is a lack of a dependable livestock market. Herds are built up, overgrazing occurs, droughts occur, and the lands suffer increasingly severe pressures. Additionally, in response to increasingly harsh conditions, herders have shifted from cattle and sheep to camels and goats. Both have much more damaging impacts on the plant communities, leading to further deterioration.

Landscape-scale ecosystem degradation if further exacerbated by privatization of lands and competing GoK priorities for both economic development and natural resource management. Taken together, these prevent direct wildlife use of essential land resources and disrupts traditional corridors for wildlife migration and movement.

PRIVATIZATION

Tsavo East and West National Parks serve as a prime example; offering the largest (22,000 km^2) intact protected woodland-brush habitat in Kenya they likewise serve as one of the largest such protected systems in the world. Figure 13 below illustrates the role the Tsavo system plays in supporting elephant migration corridors, which require extensive, contiguous land. Despite its size, still only a fraction of these corridors fall within Tsavo's protected areas.

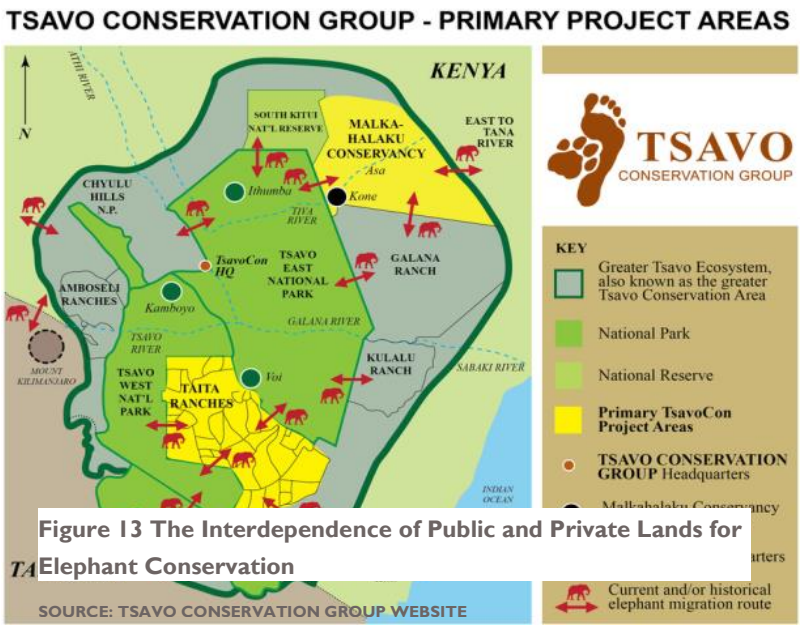

Figure 13 The Interdependence of Public and Private Lands for Elephant Conservation

Without private landowner support, the future of the elephant population is in jeopardy. While increasing privatization of land ownership, driven in part by

100 1. Masih, S. Maskey, F. E. F. Mussá, P. Trambauer, "A review of droughts on the African continent: a geospatial and long-term perspective," *Hydrology and Earth System Sciences*, 17 September 2014, http://www.hydrol-earth-syst-sci.net/18/3635/2014/hess-18-3635-2014.pdf.

101 Damaris E. Mateche, "The Cycle of Drought in Kenya a Looming Humanitarian Crisis," *Institute for Security Studies*, 18 January 2011, <https://issafrica.org/iss-today/the-cycle-of-drought-in-kenya-a-looming-humanitarian-crisis.>

Kenya's ongoing devolution, creates greater opportunity for economic reward for land owners, there remain limited economic incentives for land owners to conserve biological diversity. Instead, land conversion for agricultural production or sale for industrial use, offer greater economic benefit.

Additionally, the conservation of wildlife on private lands often comes at an economic cost to land owners, such as crop loss, reduced livestock carrying capacity, predation, disease, staffing, and infrastructure. Ultimately, only a small percentage of landowners are positioned to benefit directly from wildlife, without both strengthening and expanding the pool of economic incentives for conservation and its consequences; a sentiment frequently expressed by landowners, NGO groups, KWS/KFS staff, and at the ministerial level during consultations for this assessment.

Similarly, the Kimana-Amboseli ecosystem may be irreversibly damaged due to land use changes, farming, and fragmentation. Nairobi National Park, once the pride of Kenya, has lost lands to Nairobi expansion, and is now effectively walled by surrounding development, which prevents wildlife migration.

COMPETING GOK PRIORITIES

The GoK's large-scale objectives for development sit at cross purpose with its stated commitment to the conservation of its natural resources. This is evident in four large-scale developments impacting the woodland-brushland ecosystem.

The elevated railroad to upgrade the Nairobi-Mombasa rail line is effectively creating a continuous barrier to movement between Tsavo East and West National Parks. It also will transect the already threatened Nairobi National Park. This is compounded by the concurrent re-construction of the Nairobi-Mombasa road into a high-speed, multilane highway, which is expected to significantly increase the likelihood of human/wildlife conflict[102].

A third example of development at the expense of biological resources is the proposed Lamu Port-South Sudan-Ethiopia-Transport (LAPSSET) Corridor Development project. This project spans 2000 km from Lamu to Isiolo, as well as linking to South Sudan and Ethiopia. It will include oil pipelines, a railroad, high speed highway, and a five km wide economic development corridor, which will include a tourist destination city at Isiolo that will require development of dams to support anticipated growth.[103] The potential large-scale negative impacts on the land, wildlife, pastoralists, and downstream aquatic ecosystems are well-documented in the strategic environmental assessment conducted for the proposed work.

A final example of developments threatening wildlife is the Konza Techno City, with an expected population of 250,000. The site is located on a former cooperative ranch that had been subdivided into seven acre parcels subsequently bought by the government. More than 600 animals, including zebra, hartebeest, wildebeest, and Thomson's (*Eudorcas thomsonii*) and Grant's gazelles (*Nanger granti*) were removed from the 5,000 acre fenced enclosure, which simultaneously damaged and fragmented the remaining habitat. As there are no bans on surrounding development, the city and infrastructure will

[102] Based on site visit to Tsavo East National Park and consultation with Donald Mombo, Taita Teveta County coordinator, Tsavo Conservation Group, February 2017.

[103] LAPSSET Corridor Development Authority, *Strategic Environmental Assessment for the LAPSSET Infrastructure Corridor*, January 2017, http://www.laikipia.org/wp-content/uploads/2017/02/SEA_LAPSSET.pdf.

create a much wider zone of development, potentially leading to uncontrolled growth similar to what occurred around in Nairobi.

DECLINE AND LOSS OF WILDLIFE POPULATIONS

Decline and loss of wildlife populations is driven by the landscape-scale ecosystem degradation discussed above, as well as illegal hunting and commercial poaching for 1) bushmeat and 2) trophies, including trafficking.

Bushmeat consumption is increasingly more prevalent in sedentary communities, even among non-pastoral Maasai, a traditional non-consumer. Although long a traditional source of protein among certain groups, such as the Kamba, the trade in illegal bushmeat is rapidly escalating.[104] The demand for bushmeat has become more driven by economics rather than culture.[105] Poaching for bushmeat is a nationwide issue, with the woodland-brushland ecosystem particularly hard hit. In Tsavo, organized gangs stay in the park for weeks at a time either drying the meat or moving it out via motorized transport[106]. It is estimated that some 3,000 animals are poached in Tsavo a year, yielding approximately 643,950 kilogram (kg) of wet meat.[107]

As with bushmeat, poaching for, and illegal trafficking in, trophies exists throughout Kenya. The main targets are rhinos for their horns and elephants for their tusks. In the 1970s the Tsavo ecosystem had 6,000 to 8,000 rhinos. By 1989, only 20 remained. Today, the Ngulia Rhino Sanctuary has more than 70.[108] In January, two rhinos were killed in the sanctuary. Field staff blamed the loss on lack of centralized KWS support for vehicle and helicopter maintenance.

Having the biggest population of elephants in Kenya and Tsavo East and West are centers of illegal ivory poaching by well-armed gangs. In March 2017, one of the last remaining "Big Tuskers," Satao II, was killed. His death came two days after the killing of a park ranger, the second anti-poaching ranger killed in one month[109].

While Kenya continues efforts to address and reduce poaching occurring within its borders, internal challenges persist (as discussed in Section 4). Additionally, the country remains vulnerable to illegal trafficking from surrounding countries, particularly the South Sudan, DRC, and Uganda. There are several reasons cited, including; Kenya's efficient communication and transport system, porous borders,

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[104] Ministry of Environment, Water and Natural Resources, *Lifting the Siege: Securing Kenya's Wildlife*, June 2014, <https://www.eawildlife.org/resources/reports/Report_of_the_task_force_on_WildLife_Security.pdf>

[105] Christian Kiffner, Leah Peters, Ahren Stroming, John Kioko, "Bushmeat Consumption in the Tarangire-Manyara Ecosystem, Tanzania," *Tropical Conservation Science,* 1 June 2015, http://journals.sagepub.com/doi/abs/10.1177/194008291500800204.

[106] Based on site visit to Tsavo East National Park and consultation with Donald Mombo, Taita Teveta County coordinator, Tsavo Conservation Group, February 2017.

[107] Ministry of Environment, Water and Natural Resources, *Lifting the Siege: Securing Kenya's Wildlife*, June 2014, <https://www.eawildlife.org/resources/reports/Report_of_the_task_force_on_WildLife_Security.pdf>

[108] Africal Wildlife Fund. *Nigulia Rhino Sanctuary*. <www.awf.org/projects/ngulia-rhino-sanctuary>

[109] Based on site visit to Tsavo East National Park and consultation with Donald Mombo, Taita Teveta County coordinator, Tsavo Conservation Group, February 2017.

lack of effective regulations, poorly staffed and/or equipped agencies, and corruption among enforcement officials.[110]

DEFORESTATION AND LOSS OF FOREST BIOLOGICAL DIVERSITY

The major reason for deforestation of the woodland-brushland ecosystem is charcoal production. More than 80 percent of Kenya's urban population, and over 30 percent of its rural population use charcoal as their primary source of domestic energy. It is the single largest end-use of wood in Kenya today.[111] Both its production and use are highly inefficient. Based on Stockholm Environment Institute-United Nations Development Programme estimates for fuel wood (18.7 million m^3) and charcoal (16.3 million m^3), demand (35 million m^3 in total), Kenya exceeds the estimated sustainable level of 31.4 million m^3. Every year, Kenya is losing 10.3 million m^3 of wood from its forests, nearly half likely originating in woodland-brushland communities Kajiado, Makueni, Kitui, Kwale, Baringo, Elgeyo. Marakwet and Tana River are the major county sources of charcoal. Other counties of significance are Kilifi, Garissa, Laikipia, Machakos, Marsabit, Meru, Narok, Tharaka, and Turkana.[112] Urban areas are the major market for charcoal. An illegal market also exists including exports to Somalia with links to El Shabaab[113].

[110] Sam Weru, "Wildlife Protection and Trafficking Assessment in Kenya," *Traffic Report*, May 2016, <http://www.trafficj.org/publication/16_Wildlife_Protection_and_Trafficking_Assessment_Kenya.pdf>

[111] SEI-UNDP, *How Kenya can transform the charcoal sector and create new opportunities for low-carbon rural development*, n.d., <https://www.sei-international.org/mediamanager/documents/Publications/SEI-UNDP-DB-2016-Kenya-sustainable-charcoal.pdf.>

[112] Ministry of Environment, Water and Natural Resources, *Analysis of The Charcoal Value Chain In Kenya*

[113] Stakeholder consultation with Abdullahi Abdi Ibrahim, Chairman of National Muslim Leaders Forum (NAMLEF), CEO of Northern Aid

TABLE 5 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN WOODLANDS AND BRUSHLANDS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Landscape-scale Ecosystem Degradation from: • Large-scale Development (e.g., LAPSSET, Nairobi-Mombasa Rail/Road Corridor, Dams, etc.) • Increase in rearing of camels and goats • Overgrazing, soil compaction, erosion • Fencing off high-productivity grazing areas by landowners • Poorly regulated/illegal charcoal making •	• Lack of integrated land/resource Planning • Conflicting or overlapping roles and responsibilities for governmental entities • Insufficient long-term funding and staffing for national and community conservation • Human population growth • Limited community/county conservation education, extension, and training programs • Increased water scarcity • Poor land and water use and management	• Gap between national policy and on-the-ground commitment to environmental protection Weak application or enforcement of regulatory and legal mandates • Continued top-down decision making • Still nascent devolution of governmental responsibilities, lack of integrated planning framework • Prioritization of development over conservation • Limited involvement of ministry of natural resources agencies in ecosystem-level development planning • Lack of national/county re-investment in natural resources • Lack of a standardized national-level ecosystems data and database systems • Increased intensity and frequency of droughts • Limited awareness of land- and water-management best practices
Decline and loss of wildlife populations (distribution, abundance) from: • Fencing and other movement control measures • Human/wildlife conflicts • Agricultural expansion into key wildlife habitat areas • Reduced land availability and carrying capacity • Hunting for bushmeat • Illegal wildlife hunting/trafficking	• Disproportionate responsibility placed on local communities for wildlife conservation • Often limited tangible, direct benefits to communities for conservation • Decline in tourism and revenue discouraging upkeep of community-based tourism initiatives • Demand for bush meat • Lack of alternative livelihoods • Drought • Lack of wildlife restocking programs on private lands • Loss of dry season water access • Lack of economic incentives for conservation (revenue sharing, controlled hunting, taxes) • Economic value of illegal hunting/trafficking • Lack of national/county/private enforcement staff	• Limited national commitment/national resources to sustaining wildlife populations and their habitats • Overconfidence in Kenya's ability to attract wildlife-related tourism • Focus on "money making" parks, reserves and forests at the expense of the entire system • Prioritization of development over conservation • Over-reliance external (donor, non-government organization (NGO)/private voluntary organization (PVO)) funding. • Increasing security risks • Anthropocentric focus of land use/development

TABLE 5 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN WOODLANDS AND BRUSHLANDS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
	• Over-reliance on tourism stunting generation and promulgation of alternative forms of incentivizing landowners to support conservation	
Deforestation and Loss of Forest Biological Diversity from: • Conversion of woodlands to other uses on private lands (e.g. kasigau corridor, LAPSSET proposals) • Agricultural encroachment (legal and illegal) • Invasive species (e.g., Psygium Quajava, Ocotea) • Forest fires	• Increased populations and settlements in woodland areas • Local demand for woodland products (lumber, furniture, poles, tree/plant species) • International demand for high-valued tree species (sandalwood, acacia gum-Arabic) • Lack of KFS forest and CFA management plans • De facto abandonment of unprofitable forests and forest reserves • Understaffed KFS and CFA areas • Strong/increasing market for charcoal production • Lack of alternative energy sources • Lack of alternative forest-related revenue sources in times of crop failure or jobs (e.g. downturn in tourism)	• National focus on major water towers reduces attention on micro catchment areas • Lack of true national commitment to sustainable forest resource management • Poor integration of natural forest management into land/resource planning • Focus on "money making" parks, reserves and forests at the expense of the entire system • Woodlands and brushlands often not prioritized ecosystems of conservation efforts • Prioritization of development over conservation • Over-reliance on short-term, unsustainable external (donor, NGO/PVO) funding

6.4 COASTAL DRYLAND FORESTS

While Kenya's coastal dryland forests are relatively small and somewhat fragmented, they contain remarkable levels of biodiversity, and are particularly important habitats for endemic birds, mammals and, to a lesser degree, reptiles. These biodiversity rich forests, including the Arabuko-Sokoke, Shimba, Tana, Boni, and Kayas, among others, are significant contributors to local livelihoods, and serve as the source of significant tourism and products that are traded both domestically and internationally. While this increases the value of the coastal dryland forests, it also drives the critical threats to their survival. The most serious threats to Kenya's coastal forests include the following:

DEFORESTATION

There is broad agreement that the expansion of agricultural activities into forest land is among the most critical threats facing Kenya's coastal dryland forests. Many of the surrounding soils are of relatively low quality, being largely suitable for tree crops and livestock, and are quickly depleted by agricultural

production.[114] Farmers of crops such as cassava and maize, which follow shifting cultivation patterns, often deplete soils and move into unprotected or free forest areas. This involves clearing the coastal forest for farm land, and the farming practices utilized are not typically sustainable or appropriate for the soil and land conditions (e.g., slash and burn clearing and shifting cultivation with short fallow periods).[115] This has been exacerbated by a lack of policy coherence and conflicts observed between the various legislations that fail to account for the value of these forest ecosystems and their interconnection with other coastal ecosystems. This is exemplified by the action of the Jubilee government beginning in 2013 which embarked on a massive issuance of title deeds of forested lands across the coastal region of Kenya[116]. Expanding populations combined with these unsustainable practices and weak forest protection (e.g., poor enforcement of the conservation requirements in the Agricultural Act) leave many forests acutely vulnerable to destruction. While subsistence agriculture is the primary driver of the deforestation, commercial agriculture, also contributes significantly to forest clearance and conversion[117].

In addition to agricultural expansion, large swaths of coastal forest lands are excised and cleared for settlement and infrastructure. For example, development along the Tana River has contributed to significant declines in the population of endemic primates and other species, including the Red Colobus and Crested Mangabey.[118] The Arabuko-Sokoke forest and others have also felt extensive pressure from urbanization, settlement, and nearby infrastructure development. The push to develop coastal "resort cities" in Diani, Kilifi, and Lamu, along with expanded infrastructure to support international market access (e.g., road, port, and power infrastructure) is increasingly clearing the coastal dryland forests. Other major infrastructure development initiatives being promoted by Kenya, including the refurbishment and/or expansion of large ports both via LAPSETT as well as Port of Mombasa, represent significant threats to the rich biodiversity of these fragile ecosystems.

Additionally, as with other ecosystems in Kenya, one of the most critical causes of deforestation, particularly in areas close to coastal cities and alongside main roads, is the production of charcoal.[119] Much of the charcoal comes from the woodland and brushland areas of unprotected or privately owned coastal forests. For areas farther away from large towns and roads, the more significant concern is the collection of firewood.

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[114] Anthony Githitho, "The Coastal Terrestrial Forests of Kenya," *WWF Eastern African Coastal Forest Programme*, March 2004, <http://cf.tfcg.org/pubs/CFResource-Ken.pdf>

[115] Critical Ecosystem Partnership Fund, *Synopsis of Current Threats*, n.d., <http://www.cepf.net/where_we_work/regions/africa/eastern_arc_coastal_forests/ecosystem_profile/Pages/synopsis_of_current_threats.aspx>

[116] Government of Kenya. <http://www.president.go.ke/2016/09/03/president-faults-leaders-criticizing-issuance-of-title-deeds-to-coast-residents/>

[117] Critical Ecosystem Partnership Fund, *Synopsis of Current Threats*, n.d., <http://www.cepf.net/where_we_work/regions/africa/eastern_arc_coastal_forests/ecosystem_profile/Pages/synopsis_of_current_threats.aspx>

[118] Paul Matiku, "The Coastal Forests of Kenya," *Nature Kenya*, n.d., <http://coastalforests.tfcg.org/pubs/National-Synthesis-Ken.pdf>

[119] WWF Eastern Africa Regional Programme Office, *The Eastern Africa Coastal Forests Ecoregion: Strategic Framework for Conservation 2005–2025*, August 2016, <http://awsassets.panda.org/downloads/eacfe_strategic_framework.pdf>

Other threats exist that are unique the northern end of Kenya's coastal dryland forest ecosystem including Alshabab's influence and presence in the Boni Forest. The evolving security situation in that area has made natural resource and forest management a significant challenge. From discussions the Assessment Team has had with stakeholders inside and outside the GoK, Kenya's multi-stakeholder task force involving KFS, KWS, Kenya Defense Forces, Lamu County Government and other security agents has made progress in addressing Alshabab threats in the short and medium term. The proposed infrastructure programs planned for the GoK, while a threat to biodiversity and natural habitat, would conversely result in a sustained security presence and thus greatly undermine the threats posed by Alshabab.

LAND DEGRADATION

Beyond complete clearance and destruction, Kenya's coastal dryland forests are threatened by a wide range of drivers leading to land degradation. Larger-scale unsustainable logging of timber trees, whether legal or, as in most cases illegal, also threaten the coastal dryland forests. Large areas of Kenya's coastal closed forests have already been extensively logged, particularly for large logs using pit-sawing techniques. Remaining efforts often focus on wood carving species (e.g., *Brachylaena huillensis*) and are driven by tourist demand for products and accommodations.[120]

Intentional burning of forests can be used for cultivation, honey harvesting, defense against wildlife, and game hunting. These fires can grow out of control and burn very large areas. Additionally, they can lead to significant loss of ground cover and increase soil erosion.[121] Over time, with more frequent fires, thicket vegetation can be converted to more fire-adapted vegetation, leading to the loss of more specialized endemic coastal forest species.[122] Destructive mining practices are also contributing to degraded and cleared coastal dryland forests. Kenya's coasts are endowed with titanium, high grade silica sands, lead, limestone, marble, and iron ore. Numerous large-scale mining activities along the coasts have resulted in significant forest encroachment and natural vegetation destruction, including in the Kayas Mrima, Kambe, and Kauma, as well as Arabuko-Sokoke.[123] Such activities are affecting crucial habitats for endemic, data deficient, threatened, and rare species.[124]

LOSS OF BIODIVERSITY AND KEYSTONE SPECIES

The threats noted above all contribute to overall loss of biodiversity in coastal dryland forests. These are compounded by hunting, both for local bushmeat trade and consumption, which contributes to losses of smaller mammals, as well as for consumption of game meat and trophy hunting, which can threaten rare wildlife. As an example, local hunters in the Arabuko-Sokoke forest have contributed to

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[120] Critical Ecosystem Partnership Fund, "Coastal Forests of East Africa," *Conservation International*, 2016, <http://www.cepf.net/resources/hotspots/africa/Pages/Coastal-Forests-of-Eastern-Africa.aspx>

[121] National Environment Management Authority, *Kenya: State of the Environment and Outlook 2010*, 2011, <https://na.unep.net/siouxfalls/publications/kenya_sdm.pdf>

[122] WWF Eastern Africa Regional Programme Office, *The Eastern Africa Coastal Forests Ecoregion: Strategic Framework for Conservation 2005–2025*

[123] Anthony Githitho, *The Coastal Terrestrial Forests of Kenya.*

[124] Republic of Kenya, *Fifth National Report to The Conference of Parties to The Convention on Biological Diversity*.

significantly reducing the population of the endangered Aders' duiker (*Cephalophus adersi*).[125] The impact on biodiversity of often unregulated hunting for consumption, trade, and illegal trafficking is compounded by the loss of migratory corridors. Such corridors and wildlife dispersal areas are frequently encroached upon by poor and landless residents who lack secure land tenure. This can constrict and degrade feeding and breeding grounds and threaten species.[126] Also, such restriction on the corridors can reduce the ability of keystone species (e.g., elephants) to perform essential ecological functions such as forest clearing (to increase access to grass for other grazers) and dispersal of seeds via excreta (to improve genetic diversity of plant types).

TABLE 6 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN COASTAL DRYLAND FORESTS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Deforestation from: • Agricultural expansion • Excision and encroachment for settlement and infrastructure development • Charcoal production and fuel wood collection • Unsustainable logging and commercial timber expansion • Forest clearance for cultivation	• Poverty/livelihood seeking • Decreased productivity of agricultural land • Land degradation • Water scarcity • Increase access to international markets (e.g., via ports) – includes road development, port development, power infrastructure • Demand for tourism facilities in coastal "resort cities" (like those in Diani, Kilifi, and Lamu) • Inadequate and poorly enforced land use planning • Insufficient uptake of new technologies like high efficiency cook stoves and solar panels • Increased demand for energy • Increasing prices of energy alternatives • Increase in local construction demand	• Loss of livelihoods • Limited knowledge of or willingness to apply less destructive land management practices • Loss of traditional knowledge • Extreme or variable weather events (e.g., droughts and sporadic rainfall) • Limited awareness about, or technical capacity to maintain, alternative livelihoods (e.g., beekeeping or butterfly gardens) • Limited economic benefit to communities in conservation of non-protected forest areas • Kenya 2030's "Blue Economy" priorities focusing on development over conservation • Population growth, particularly in urban and peri-urban areas • Presence of large-scale commercial enterprises (sugar factories, titanium mining) • Potential for on- and off-shore oil and gas exploration and development (e.g., oil and gas exploration in Arabuko-Sokoke) • Security concerns impacting tourism

[125] Critical Ecosystem Partnership Fund, *Synopsis of Current Threats*, n.d., <http://www.cepf.net/where_we_work/regions/africa/eastern_arc_coastal_forests/ecosystem_profile/Pages/synopsis_of_current_threats.aspx>

[126] National Environment Management Authority, *Kenya: State of the Environment and Outlook 2010*

TABLE 6 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN COASTAL DRYLAND FORESTS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Land Degradation from: • Uncontrolled fires / burning • Destructive mining practices • Overgrazing • Increased livestock raising • Altered hydrology (e.g., sedimentation of existing surface waterbodies, deforestation, mangrove reduction)	• Poverty and livelihood seeking • Increased access for fuelwood and charcoal merchants • Increased urbanization and industrialization • Commercial value of products in international markets • Tourism (e.g., mask production, hotels, and attractions) • Natural or accidental wildfires • Increased demand for mineral deposits • Government-approved access to international mining companies • Weak or non-existent integrated resource management planning • Increases in ground water salinity • Over-abstraction • Road and infrastructure development, increasing access	• Weak governance/regulation of protected and non-protected areas • Weak enforcement of existing laws regulating controlled burning • Insufficient enforcement of moratoria on commercial logging • Increases in international energy market prices • Loss of traditional knowledge • Climate change and extreme or variable weather events (e.g., droughts; sporadic rainfall) • Limited economic benefit to communities in conservation of non-protected forest areas • Increased domestic and international trade • Urbanization and population pressures • Poor livestock husbandry and management practices • Coastal erosion and mangrove destruction leading to • Ambiguously defined governance roles/responsibilities for land use/management (particularly at county levels) • Insufficient capacity to implement integrated resource management plans • Encroachment by elephants/oversaturation on available grazing areas
Loss of biodiversity and keystone species from: • Deforestation • Loss of migratory corridors • Game hunting / wildlife trafficking • Bush meat hunting • Poaching	• Expansion of agricultural activity • Increased development of transportation and industrial infrastructure • Human/wildlife conflict • Increased local demand for game meat and products • Increase in demand for bush meat products • Low agricultural productivity • Lack of viable alternative livelihoods	• Loss of alternative livelihoods • Limitations in funding for existing governance systems • Water scarcity/over-abstraction of water resources • Lack of payment for ecosystem services/unrealized benefits at community level for participatory forest management (e.g., Malunganje elephant sanctuary, loss of tourism revenue) • Rapid population growth (particularly in urban/peri-urban areas) • Weak governance and enforcement of anti-poaching and anti-trafficking laws • Poverty/livelihood seeking • Climate change

6.5 FRESHWATER LAKES, RIVERS, AND WETLANDS

FRESHWATER LAKES AND RIVERS

Healthy and sustainable freshwater and terrestrial ecosystems are mutually dependent through complex networks of various types of ecological interaction. When these ecosystems are unbalanced or under threat, the effects of that pressure can directly and indirectly contribute to the deterioration of ecosystem structures, services, and biological production processes.

However, both anthropogenic and natural threats target the biodiversity associated Kenya's inland waters, rivers, and wetlands. These systems are vital for plant genetic diversity and support large numbers of bird, mammal, reptile, amphibian, fish, and invertebrate species. The loss of freshwater habitat and biodiversity affects major components of the food webs, energy flows, and chemical cycling that shape the physical structure of the freshwater ecosystem. The most serious underlying threats to Kenya's freshwater ecosystems include the following:

HABITAT MODIFICATION, FRAGMENTATION, AND DESTRUCTION

In Kenya, habitat modification, fragmentation and destruction, particularly in the upper catchment, has reduced natural flood controls and destroyed the habitats used by fish, water birds, and many other species for breeding, feeding, and migrating. For example, the deforestation taking place in the water towers surrounding Lake Victoria, including Mt. Elgon, Cherangani Hills, and the Mau Forest Complex, have resulted in flash flooding events in downstream sections of the catchments.

Poor land use planning practices deplete vegetation cover and topsoil, increase erosion and sedimentation, alter surface runoff and infiltration rates, reduce or halt flows, drain wetlands, and inundate riparian habitats. The resulting impacts lead to the destruction of biodiversity habitat and the intensification of floods, and they negatively affect overall water resource availability and quality. The clarity and quality of waters in Lake Victoria have significantly deteriorated, which has affected fish breeding and forced the Nile perch (*Lates niloticus*), which hunt by sight, to move to areas of the lake with greater water depth and visibility.

The degradation of riparian areas, catchments, and wetlands is primarily the result of the destruction of natural vegetation from poor farming practices and deforestation. As discussed above (particularly in Sections 6.2, 6.3, and 6.4), the causes of deforestation and forest degradation include increased land conversion for agriculture, charcoal, brick production, illegal logging, forest fires and livestock encroachment. Physical developments including the construction of dams, hydro power stations, settlements, and commercial buildings along the main rivers and within converted wetlands and water towers also threaten freshwater biodiversity and habitats.

WATER POLLUTION AND SEDIMENTATION

Water pollution remains a serious threat impacting Kenya's limited freshwater resources. Declining water quality resulting from both point and non-point sources are altering ecosystem productivity and resulting in biodiversity loss. The primary pollutants include organic residues from discharges of raw untreated sewage, leachate from mining and garbage dumps, toxic wastes from heavy metal and pesticide discharges, and uncontrolled domestic and industrial wastes. In the Mara Reserve for example, some of

the private hotel and lodge constructions along the Mara River have been identified for their poor wastewater management practices.[127]

The exposure to point source pollution is especially pronounced in population centers where industrial and domestic pollution and inadequate waste treatment capacity has increased with urbanization. Examples of such industrial wastes, which are a critical environmental issue in Kenya, include effluents, sludge, and solid waste from sugar, coffee pulping and textile factories, breweries, leather tanneries, paper and pulp mills, and slaughter houses. The negative effect of industrial land use activities on water resources is well illustrated by the significant degradation of water quality in the Ngong, Nairobi, and Mathare rivers from pollution caused in Nairobi County.[128]

Declining water quality due to increased pollution and siltation from poorly managed upper catchment and agricultural zones is also a key threat to biodiversity and habitats. Poor land use, including clearcutting forests for agriculture, overstocking and overgrazing, and cultivation on steep slopes, river banks, and lake shores, has significantly increased the sedimentation of the waterways. The agrochemicals and fertilizers leaching into waterways has caused increased nutrient loads, resulting in eutrophication of water bodies and facilitating the spread of invasive weeds like water hyacinth (*Eicchornia crassipes*) and red water fern (*Azolla filiculoides*) in Lake Naivasha and Lake Victoria[129].

OVERFISHING

Kenya's aquatic ecosystems and species suffer significantly from chronic overharvesting and the use of destructive fishing practices. Species diversity, distribution, and abundance, especially of fish, has declined from the previous 400-500 species to just under 10, with only three species holding commercial value.[130] Banned fishing technologies like monofilament nylon gill nets with undersized mesh, plant-based poisons, and hooks (especially small ones) have put additional pressure on fish stocks, particularly in Lake Victoria and Lake Naivasha. The threat of increasing deterioration to freshwater species is driven primarily by poverty, population growth, youth unemployment, and increased market pressures.

INVASIVE SPECIES

Management of introduced species has been a major threat in Kenya. Over the last six decades, at least 34 alien species, 15 of which target wetland species, have been introduced.[131] The proliferation of invasive species in the country is creating serious ecological imbalances and threatening indigenous species. Notable examples include introduction of the common carp (*Cyprinus carpio*) in Lake Naivasha and the Nile perch in Lake Victoria, which have virtually eliminated Kenya's indigenous fish species. Also,

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[127] From interviews with Maasai Mara National Reserve (MMNR) Head of Rhino Monitoring Program/Deputy to the Senior Warden, MMNR Community Liaison Officer, and women beading groups living downstream.

[128] Shadrack Mulei Kithiia, "Water Quality Degradation Trends in Kenya over the Last Decade, Water Quality Monitoring and Assessment," *InTech*, 2012, <http://cdn.intechopen.com/pdfs/35067/InTech-Water_quality_degradation_trends_in_kenya_over_the_last_decade.pdf>.

[129] Based on consultation with Dr. Christopher Aura and Dr. Cyprian Adoli at KMFRI on February 24, 2017.

[130] Research efforts were discussed during consultation with Dr. Christopher Aura and Dr. Cyprian Adoli at KMFRI on February 24, 2017. The Kenya Marine and Fisheries Institute, 2010/2011 Scientific Annual Report, provides additional information on KMFRI programming and priorities (from 2010-2016). The report can be accessed at: http://kmfri.co.ke/images/pdf/AnnualReport2010to2011.pdf -- Kenya Marine and Fisheries Research Institute, *2010/2011 Scientific Annual Report*, 2011, http://kmfri.co.ke/images/pdf/AnnualReport2010to2011.pdf.

[131] Government of Kenya, *Fourth National Report to the Conference of Parties of the Convention on Biological Diversity*, July 2009, <http://www.cbd.int/doc/world/ke/ke-nr-04-en.pdf>.

wetland areas, and particularly in Lake Victoria, suffer greatly from the relatively recent invasion of water hyacinth beginning in the 1990s. The invasive weed's growth creates dense mats of vegetation that chokes off all competing plant life and deoxygenates the water, killing aquatic species requiring specialized habitats and driving others like Nile perch to deeper waters.

TABLE 7 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN INLAND WATERS, RIVERS, AND WETLANDS

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Habitat modification, fragmentation and destruction from: • Eutrophication of the lake waters • Water pollution • Presence of the water hyacinth • Loss of habitat connectivity and refugia • Altered hydrology	• Expanding agricultural activities and livestock grazing • Unplanned expansion of towns and cities • Power generation and upstream water abstraction • Decreased productivity of agricultural land • Land degradation • Lack of integrated land/resource planning • Upper watershed deforestation • Water scarcity • Reduced river flows and lake volumes from increased incidences of drought • Over-abstraction • Soil erosion and sedimentation	• Poverty • Climate change • Increase in population leading to land scarcity • Weak governance/regulation of protected and non-protected areas • Weak enforcement of existing laws regulating controlled burning • Lack of viable alternative livelihoods
Water pollution from: • Effluent discharge • Poor solid waste management • Biomagnification of heavy metals in the water	• Inadequate infrastructure for solid and liquid waste management • Weak enforcement of existing laws regulating industrial water waste treatment (e.g., from breweries, tanning factories, paper mills, fish processers, sugar refineries, coffee washing stations, abattoirs, and mining operations) • Urban runoff, soil erosion, fertilizer, and other agrochemicals, and atmospheric deposition • Nutrient and residue inflows from poor agriculture practices • Increased small-holder and commercial agriculture • Pesticide and fertilizer residue from farmlands, car washing, sedimentation	• Poor planning • Poverty • Weak regulation & policy framework • Rapid population growth (particularly in urban/peri-urban areas) • Increased industrialism and related activities
Overfishing from: • Increased domestic demand for fish • Use of illegal fishing gear and introduction of more harmful and efficient technologies (Mono filament)	• Limited opportunities for livelihoods • Youth unemployment • Inadequate policing/patrols • Unregulated cage fishing culture • Traditional practice	• Weak regulation and policy framework • Poverty • Conflicting/competing/overlapping roles and responsibilities (Beach Management Units (BMUs), county government, and Kenya Fisheries Service)
Loss of biodiversity from invasive Species from: • Sedimentation from	• Nutrient and residue inflows from poor agriculture practices • Soil erosion • Upper watershed deforestation • Lack of coordinated control measures	• Weak regulation • Population pressure • Poverty • Poor surveillance and monitoring • Deficiency in predictive and

TABLE 7 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN INLAND WATERS, RIVERS, AND WETLANDS		
DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
upstream agricultural activities (water hyacinth) • Introduction of exotic species (e.g., Nile perch and non-native tilapia)	• Poor preparation in government departments	monitoring capacity

6.6 COASTAL AND MARINE RESOURCES

The reasons for environmental decline in Kenya's coastal and marine areas are complex, but the primary threats to biodiversity and forests come from habitat degradation, overexploitation of resources, and conflicting development and conservation interests. Anthropogenic pressures include overfishing, urbanization, tourism development, agricultural expansion and waste, and industrialization. Simultaneously, impacts from climate change, including temperature increases, irregular precipitation, sea level rise, and ocean acidification pose significant challenges to the health, structure, and function of these ecosystems.[132]

HABITAT DESTRUCTION AND DEGRADATION

Land use changes from agriculture and development activities in adjacent watersheds and along the coast contribute to habitat degradation. Poor agriculture practices and associated deforestation result in sediment loads, in turn altering nutrient balances in shallow coastal water ecosystems and suffocating mangroves, coral reefs and seagrass beds.[133] Such land use changes contribute to sedimentation in coral reefs, which shifts nutrient balances in the shallow waters where reefs are found, directly killing the coral formations.

These threats are further exacerbated by human development; Kenya's southern coastal areas is a rich depository of numerous mineral resources, attracting large-scale extractives. The Northern coast, meanwhile, has offshore oil and gas exploration and exploitation potential, likewise instigating significant development (e.g., the proposed LAPSETT corridor). Dams, coastal infrastructure (e.g., ports, hotels for tourism), industrial waste from extractives and commercial agriculture, and sediment runoff all add to habitat degradation if not outright destruction. Ships, in turn, contribute through discharge of ballast or sewage, or oil spills. Finally, climate change further compounds the threats, such as widespread coral bleaching in 1998, resulting in mass coral kills and harming broader ecosystem functioning.[134] Human development (through introduction of sea walls), in combination with reduction of mangrove cover (see below), likewise leads to coastal erosion damaging or eliminating nesting areas for sea turtles.

[132] Tuda, Arthur, and Mohamed Omar. 2012. "Protection of Marine Areas in Kenya." The George Wright Forum (The George Wright Society) 29 (1): 43–50.

[133] McClanahan, T.R., and D. Obura. 1997. Sedimentation effects on shallow coral communities in Kenya. Journal of Experimental marine Biology and Ecology 209(1–2): 103–122.

[134] Tuda, Arthur, and Mohamed Omar. 2012. "Protection of Marine Areas in Kenya." The George Wright Forum (The George Wright Society) 29 (1): 43–50.

OVEREXPLOITATION OF RESOURCES

In additional to habitat degradation, as described above, marine and coastal resources suffer substantially from overexploitation, which broadly comprises of over harvesting mangroves and other forest resources, and overfishing.

Overharvesting of mangroves and forest resources is heavily driven by charcoal production, particularly to feed urban centers such as Mombasa. Given the essential ecosystem functions mangroves play, including habitat for fish, crab, shrimp, and mollusks, and coastal erosion and flood control, the ongoing overharvesting of Kenya's mangrove forests can and will have adverse ripple effects, some of which are already being observed. These include diminishing fish stocks and declines in catches among fisherfolk, in line with the destruction of mangrove breeding habitats.[135]

Beyond overexploitation of these resources overfishing poses a significant threat. Driven by both declining fish yields, increasing populations, and limited alternative livelihoods, overfishing is a significant threat to Kenya's inshore (within five km) fisheries. The proliferation of harmful fishing technologies, which include illegal and destructive fine-mesh nets, spearfishing, and use of weighted nets, exacerbates the harm of overfishing. Further, beyond depleting fish, shrimp, and crab stock, overfishing harms reef ecology, through reduction predators for sea urchins, which then overpopulate and scratch or damage corals reducing system diversity and robustness. Additionally, overfishing impacts coral and reef recovery[136], both weakening the system and making it more vulnerable to shocks. Kenya's offshore fisheries are likewise heavily exploited, often by trawlers from East Asia. Kenya Vision 2030's Blue Economy initiative likewise incorporates a goal of building a Kenyan fleet to better exploit the country's offshore fishery resources[137].

TABLE 8 DIRECT AND INDIRECT DRIVERS OF DEGRADATION AND DEFORESTATION IN COASTAL AND MARINE RESOURCES

DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Habitat destruction and degradation from: • Sedimentation • Pollution • Degradation of benthic habitats (i.e., coral reefs and seagrass beds) • Coastal tourism and Industrial development • Unsustainable fishing practices	• Poor agricultural practices within river catchment areas and areas surrounding mangrove forests • Diversion/reduced flow of freshwater supplies to mangrove forests • Improper disposal of both solid and liquid waste particularly within mangrove forests close to populated centers such as Kibarani in Mombasa • Negative impacts of climate change (rising sea levels, coral bleaching and ocean acidification)	• Urbanization • Development of mega-projects such as expansion of the Mombasa port • Sea-level rise and other effects of climate change • Negative impacts of climate change such as coral bleaching because of increase in sea surface temperatures

[135] ibid.

[136] ibid.

[137] At present, there is limited quantification of the sustainable extraction rates these fisheries can endure. A consultation with KMFRI in February 2017 indicated that, through support from Belgium, the institution received a research vessel with capacity to evaluate Kenya's offshore fishery stocks. Until such information is collected, the full extent of the current threat to Kenya's offshore fisheries is uncertain.

TABLE 8 DIRECT AND INDIRECT DRIVERS OF DEGRADATION AND DEFORESTATION IN COASTAL AND MARINE RESOURCES		
DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
• Sedimentation of shallow coastal waters • Conversion of mangrove forest areas to other uses such as aquaculture, salt ponds and infrastructure development such as ports and roads	• Weak government capacity for monitoring, control and surveillance (MCS) • Poor agricultural practices within river catchment areas • Fast development of the coastal tourism sector	• Limited knowledge on the impacts of emerging issues such as oil and gas exploration, climate change, and ocean acidification on tuna resources
Overexploitation of resources from: • Overharvesting of mangrove and other forest resources for timber, charcoal production and firewood • Illegal cutting and clearing of mangrove forests • Overfishing of fisheries resources within the buffer area one to five nautical miles from the shore • Use of destructive and illegal fishing gear (i.e., beach seines, monofilament nets, poison, and spear guns) • Potential over exploitation of fish resources within the EEZ especially for some tuna species such as Yellowfin tuna • Illegal, unreported, and unregulated fishing within the EEZ	• Limited monitoring and enforcement capacity within the KFS to ensure people issued with harvesting licenses adhere to the quotas provided • Limited availability of alternative livelihoods • High poverty among fishing communities and fishers • Unregulated introduction of more efficient fishing gears or technologies (i.e., small-scale purse seine) • Limited capacity (personnel, training and equipment) within state agencies responsible for the enforcement of fisheries regulations • Inadequate implementation of fisheries co-management • Lack of a coordinated regional approach in the management of the fisheries within the South Western Indian Ocean region	• Lack of an inter-sectoral coordination mechanism for mangrove forest management • Lack of focused and effective governance specifically for mangrove management (i.e., management of mangroves falls under the broader regulatory framework governing terrestrial forests) • Gender inequalities in mangrove management (i.e. women and youth rarely engaged in decision-making in mangrove management) • Lack of a coordinated approach in management of the resources within the EEZ • Increased demand and competition for limited government resources • Lack of a marine spatial plan • Lack of safety and increased threats of piracy and terrorism acts • Limited information on fish stock levels

6.7 GRASSLANDS AND SAVANNAH

Wildlife populations in Kenya have declined by on average of 68 percent between 1977 and 2016.[138] This substantial decline in wildlife is driven by numerous threats, including land use changes, habitat loss and fragmentation, human settlements, illegal killing of wildlife (especially elephants, rhinos, and pangolins for trophies), the bush meat trade, poverty, and proliferation of small arms. Poor governance of the wildlife sector, weaknesses in law enforcement, and—especially—significant population growth (as discussed in Section), drive many of these threats.

[138] Joseph O. Ogutu, et al., "Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes?," *PLoS ONE*, 2016, http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0163249#abstract0.

RANGELAND DEGRADATION AND LOSS OF BIODIVERSITY

Kenya's rangelands support 50 percent of the country's livestock production, with pastoralism being a major livelihood activity for many ethnic communities. Livestock numbers in the rangelands have increased beyond the carrying capacity, resulting in overgrazing and land degradation. During the same period when declines in wildlife were reported, the overall livestock biomass grew from 3.5 times wildlife biomass in 1977 -1980 to 8.1 times more than wildlife in 2011 – 2013.[139] Continuous and heavy livestock grazing reduces the productivity of the range. Overgrazing also reduces vegetation cover and plant biomass accumulation and causes a shift in plant species composition by replacing highly palatable grass species with unpalatable ones. In addition, wildlife is facing stiff competition from the increasing livestock numbers; many species such as Grevy's zebra (*Equus grevyi*), wildebeests, roan antelope (*Hippotragus equinus*), topi (*Damaliscus korrigum*), and the Hirola (*Beatragus hunter*) are consequently decreasing in number. Herd mobility continues to be the main strategy used to manage risk and use the range resources communally and efficiently. However, this strategy is untenable under the individual land tenure arrangement, which has also constricted due to land use changes and fencing. The rangelands are also increasingly becoming vulnerable to climate change.

Additionally, the vegetative composition of the Kenyan savanna is influenced by a range of factors, particularly the effects of fire, wildlife, and domestic livestock. The grasslands so often associated with the savanna are the result of periodic fires and impacts of browsing animals, particularly elephants, whose uprooting of trees makes room for the grass species. Without fire and browsers, trees and shrubs, rather than grass, would dominate much of Kenya's savanna. The continued reduction in elephant populations is already having an adverse impact on ranchlands, according to Dr. Donald Mombo of the Tsavo Conservation Trust. This has caused some ranchers to re-think the policy of elephant exclusion.

WATER RESOURCES DEGRADATION (QUALITY AND QUANTITY)

Water resources in the rangelands are normally scarce, and wildlife and livestock have always relied on migrating toward permanent water sources during the dry season and dispersing during the rains when availability of pastures and water is widespread. The situation is expected to get worse as the population increases and as demand by the different sectors out-matches the existing supply. Increased water pollution due to unregulated wastewater discharges, especially from lodges which have been developed along river banks and on springs reduces availability of water of adequate quality. In addition, agricultural practices in the upper catchments increases silt loads and the potential for pollution from agrochemicals.

INCREASING LAND UNDER CONSERVANCIES

Land leasing for the establishment of conservancies can have the adverse impact of reducing livestock range if proper measures are not undertaken to effectively manage the overall number of animals. In some cases, landowners will lease all their land, yet still want to keep livestock. These can lead to overgrazing and land degradation in these areas, as discussed above, particularly as there are many instances in which conservancies lack a coordinated and integrated framework for broader ecosystem management.

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[139] Joseph O. Ogutu, et al., *Extreme Wildlife Declines and Concurrent Increase in Livestock Numbers in Kenya: What Are the Causes?*

TABLE 9 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN GRASSLAND AND SAVANNAH		
DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Habitat loss from: • Habitat Fragmentation from fencing • Agricultural expansion • Excision and encroachment for settlement and Infrastructure development • Uncoordinated and unplanned human settlements	• Poor coordination and collaboration between KWS, county governments, conservancies and other sectors of the economy • An increasing culture of fencing lands • High population in the highlands leading to emigration, needs for food security/diversification of livelihoods, and availability of arable land • Overstocking, overgrazing, land subdivision • Shift from communal land ownership to private ownership	• Institutional silos; lack of an integrated approach and framework for the management of the ecosystems such as the Mara and Amboseli ecosystems • Lack of a national spatial plan and local level land use plans to guide urban settlements • Lack of coordinated framework for managing the conservancies • Population growth
Loss of biodiversity from: • Human/wildlife conflict • Loss of migratory corridors • Game hunting/ wildlife trafficking • Bushmeat hunting • Poaching • Use of fencing which can kill animals and fragment habitat	• Increasing numbers of people in wildlife areas • Encroachment of agriculture into wildlife areas • Lack of compensation for losses incurred from wildlife leads to substantial losses of the major conflict species (elephants, lions, hyenas, and other cats) • Lack of an alternative means of livelihoods • Shift from communal land ownership to private ownership	• Availability of small arms and volatility in neighboring Somali • Population increase • Dependence on land and land based resources for livelihoods • High ivory/rhino horn prices in the international market • Disgruntled communities who feel they are not benefiting from wildlife
Rangeland degradation from: • Fencing to keep livestock and wildlife out of their land • Increases in numbers of livestock • Range constriction by land conversion to other land uses such as agriculture • Desertification • Water depletion • Erosion	• Increasing number of animals, including camels and goats • Shift from communal land ownership to private ownership • Diminishing grazing land due to multiple reasons such as habitat conversion • Increased competition for grazing between wildlife and livestock which outcompete wildlife	• More frequent and prolonged drought periods • A Lack of focused and effective governance specifically for range management practices • Lack of coordinated framework for managing the conservancies • Lack of viable alternative livelihoods

TABLE 9 DIRECT AND INDIRECT DRIVERS OF DEGRADATION, DEFORESTATION, AND BIODIVERSITY LOSS IN GRASSLAND AND SAVANNAH		
DIRECT THREATS	DIRECT DRIVERS	INDIRECT DRIVERS
Water resources degradation (quality and quantity) from: • Water pollution from camps developed on riverbanks within the Mara and human settlements • Degradation of forests in the upper catchment areas which reduces water availability at the lower levels • Soil erosion • Opening of land in the catchment	• Conflicting policies with agriculture being promoted in wetlands that serve as the dry season grazing refuge for wildlife and livestock • Privatization of some springs increases livestock numbers/people at the public springs • Agencies responsible (WRMA/county governments) lack of initiative protect them • Land subdivision and/or allocation • Overgrazing • Weak institutions (i.e., county governments, WRMA, NEMA) that fail to enforce national laws and regulations as pertains to siting of developments on riparian areas, water quality regulations • Fragmented approach to managing conservancies	• Unsustainable farming practices • Weak capacity • Unprotected springs (both communal and private) • Weak law enforcement

7 NECESSARY ACTIONS TO CONSERVE BIODIVERSITY AND TROPICAL FORESTS IN KENYA

This section establishes the set of Necessary Actions required to conserve biodiversity and tropical forests in Kenya. The assessment proposes that these Necessary Actions fall under three interrelated themes: 1) improved integration of natural resource management considerations into spatial and development planning at the national, regional, and county-levels; 2) technical assistance and capacity building to promote increased adoption of best management practices for sustainable land- and water-use; and 3) focused integration of economic growth priorities with biodiversity conservation and management needs.

Elaboration and explanation for why each of these themes, and the underlying components, was selected is provided below:

7.1 NECESSARY ACTION 1: IMPROVED INTEGRATION OF NATURAL RESOURCE MANAGEMENT CONSIDERATIONS INTO SPATIAL AND DEVELOPMENT PLANNING AT THE NATIONAL, REGIONAL, AND COUNTY-LEVEL

For USAID to effectively support the DOs outlined in Kenya's Vision 2030, while fulfilling broader conservation goals, an integrated natural resource management approach must be pursued, developed, and employed. This is critical for conservation efforts in Kenya as effective resource management includes consideration of the complex interrelationships between the natural world along with DOs to identify conflicting and complimentary management scenarios. The process of developing integrated resource management and spatial plans is also important, since the necessary stakeholder engagement and collaboration at different levels of government increases awareness and promotes valuation of conservation efforts and natural resource assets.

NECESSARY ACTION 1.1 – IMPROVE DATA COLLECTION, MANAGEMENT, AND KNOWLEDGE SHARING ACROSS KEY STAKEHOLDERS.

During stakeholder consultations held in Kenya with various institutions including WRMA, KFS, KWS, Kenya Marine and Fisheries Research Institute (KMFRI), Kenya Fisheries Service, and the KWTA, the Assessment Team consistently heard the need for improved information and knowledge management systems. It was reported that in most instances current data is not systematically collected, organized, and shared across institutions. Improving access to harmonized data will support retention of institutional knowledge and improved collaboration and integration of information. This, in turn can foster improved conservation planning efforts at the national, catchment, county, and community levels.

NECESSARY ACTION 1.2 – DEVELOPMENT OF INTEGRATED NATURAL RESOURCE MANAGEMENT PLANS AT ALL LEVELS OF GOVERNMENT USING DATA DRIVEN APPROACHES AS APPLICABLE TO ACTIVELY REDUCE DESTRUCTION OF KEY HABITATS/ECOSYSTEMS/BIODIVERSITY

Planning efforts need to reflect strategies and approaches that support resource management practices and thus seek to protect and preserve areas of critical importance in terms of biodiversity, forests, and in turn broader ecosystem functioning. Because of devolution and the advent of new laws and regulations, which have decentralized planning processes, the need exists to support better and more informed incorporation of available data and resources to shape effective conservation efforts. Review of

available County Integrated Development Plans (CIDPs), for instance, indicates that county development priorities, programs, and plans often do not adequately incorporate environmental and conservation considerations. Without better integration of conservation issues into planning processes, the potential exists for county level development to use and manage natural resources in a manner that ultimately leads to negative effects on ecological and human health and safety.

NECESSARY ACTION 1.3 – EFFECTIVE VALUATION OF TROPICAL FORESTS AND/OR BIODIVERSITY

Successful integration of overarching development priorities with sustainable resource management needs often requires availability of information on the environmental, social, and economic value provided by conservation of biodiversity and forest resources relative to other management practices, policies, and land uses. Frequently, traditional project evaluation procedures do not incorporate the full range of environmental and social costs associated with different land use and management policies and practices. To this end, there is need for robust, standardized, national valuation of ecosystem services in Kenya, to support a sustainable balance of use or exploitation and conservation of the country's many natural resources. This sentiment was relayed repeatedly to the Assessment Team during stakeholder interviews. Further, these consultations revealed a strong need for—and interest in—developing the capacity and associated methodologies to demonstrate to decision makers the economic value of conservation and sustainable land use management.

7.2 TECHNICAL ASSISTANCE AND CAPACITY BUILDING TO PROMOTE INCREASED ADOPTION OF BEST MANAGEMENT PRACTICES FOR SUSTAINABLE LAND- AND WATER-USE, INCLUDING WILDLIFE AND FOREST CONSERVATION

Component parts of Necessary Action 1 are insufficient on their own. To ensure that integrated natural resource management plans are ultimately implemented as designed, technical assistance and capacity building must be provided to key stakeholders and actors in community-, county-, and national land use and management. Furthermore, best management practices must be disseminated to ensure implementation of natural resource management plans is effective and promotes sustainable land- and water-use. Stakeholder consultation revealed numerous instances where resource management, wildlife management, and/or forest conservation plans existed on the books, but the stakeholders in charge of their implementation lacked the financial or technical resources to execute them.

NECESSARY ACTION 2.1 – IMPROVE EFFECTIVENESS AND EFFICIENCY OF LAND AND WATER MANAGEMENT PRACTICES AT COUNTY AND COMMUNITY LEVELS IN VULNERABLE AND MARGINALIZED AREAS

As described in detail in the above sections, large expanses of Kenya's land and water resources are being degraded because of poor management practices, which include over-extraction of trees for timber and charcoal, poor crop- and livestock management practices, overfishing, and pollution. There is a need for supporting sustainable land and water management practices aimed at simultaneously reducing land degradation, enhancing food security, and increasing resiliency of marginalized communities to climatic variability and enhancing maintenance of biodiversity and forests.

Simultaneously, to preserve free-flowing river systems, intact wetlands, and groundwater recharge areas essential for maintaining ecosystem resilience, there is a need for further investment in rural and urban water supply and sanitation infrastructure that reduces the impact of pollution on the watershed and the ecosystem goods and services that it provides. This is the case in the Lake Victoria basin where point-source pollution from rapid population growth and urbanization around the Lake, coupled with insufficient wastewater and solid waste management infrastructure, has contributed to deterioration of water quality and supported the growth of water hyacinth.[140]

NECESSARY ACTION 2.2 – ENHANCE CAPACITY OF RESPONSIBLE AUTHORITIES TO EFFECTIVELY ENFORCE EXISTING POLICIES AND LAWS GOVERNING MANAGEMENT OF BIODIVERSITY AND TROPICAL FOREST RESOURCES

There is widespread recognition of the importance of biodiversity and forestry conservation to a comprehensive strategy for sustainable development, as evidenced by the policies, laws and mandates (e.g., WCMA, FCMA, Land Tenure Act) developed in recent years in Kenya. There is a need, however, to translate these policies and intentions in to action on the ground in a meaningful and committed manner. It was frequently expressed to the Assessment Team during consultations that a lack of political will, stakeholder support, conflicting or overlapping mandates, and insufficient resources and capacity served as barriers to better sustainable land and water management practices.

7.3 FOCUSED INTEGRATION OF ECONOMIC GROWTH PRIORITIES AND BIODIVERSITY CONSERVATION AND MANAGEMENT NEEDS

The fates of Kenya's natural resources, including biodiversity and tropical forests, are entwined with socioeconomic development. Therefore, it is vitally important to advance participatory modes of management where stakeholders share in the costs and benefits of resource management while enhancing their quality of life. Based on research and stakeholder consultation, the Assessment Team identified the need for development of economic policies and strategies that eliminate perverse incentives while creating positive ones to influence the types, areas, and rates of biodiversity and forest loss.

NECESSARY ACTION 3.1 – TARGET COMMUNITY CONSERVANCY GROUPS OPERATING IN BUFFER ZONES OF PROTECTED AREAS AND/OR KEY ECOSYSTEM RESOURCES FOR AGROFORESTRY, CLIMATE SMART AGRICULTURE, AND SUSTAINABLE PASTORALISM/RANGELAND MANAGEMENT

Sustainable natural resource management and biodiversity conservation of protected areas and key ecosystems depends on the level and type of engagement with surrounding communities. To reduce pressure on important ecological areas, communities, and community conservation groups in buffer areas need to be targeted with interventions that support adoption of better agriculture and land management practices. By dedicating efforts to support agroforestry, climate smart agriculture, and sustainable pastoralism/rangeland management, key ecosystems, and the services they provide can be preserved and enhanced. On Mt. Elgon for example, the Assessment Team heard from KFS about the challenges of deforestation they faced from surrounding agricultural communities encroaching on the national park. It was revealed later in consultation with the regional manager for WRMA's Lake Victoria South office that the effects of erosion, caused in part from unsustainable farming practices in the Mt.

[140] This was supported by discussion with Dr. Christopher Aura and Dr. Cyprian Adoli at KMFRI and Mr. David Mutai from WRMA's Lake Victoria South regional office.

Elgon water tower, could be linked to high amounts of sedimentation in Lake Victoria and increased risks from flooding for communities near Kisumu.

NECESSARY ACTION 3.2 – IMPROVE BENEFIT SHARING SCHEMES IN PROTECTED AREAS

Sustainable conservation efforts are dependent on engaged and committed communities that value and benefit from the economic, social, and environmental returns that conserving biodiversity and forests can provide. It is necessary to ensure that there is systematic inclusion and explicit benefit sharing for communities to make them champions of conservation efforts. Stakeholders frequently expressed that many communities simply do not feel they are benefiting from conservation efforts. A prominent example was a Maasai women's beading group (see Figure 2) who despite being community members from around the Maasai Mara National Reserve, are not permitted to sell their wares within the park where shops offer non-local products. Another example came from field visits to the Mau Forest reserve, where the Assessment Team arrived while KWS was in the process of negotiating with community members about resolving an incident in which an elephant killed a woman the night prior. The decision in this case was made to put down the elephant so as not to prompt reprisal killings of a far greater number of elephants in the region.[141]

In consideration of the above examples, efforts need to be made to provide additional avenues for benefit-sharing while increasing transparency on how communities are profiting and developing education programs to change perceptions and increase awareness. Meanwhile, conservancy-based models that have demonstrated to be an effective tool for protecting wildlife and habitat while driving tangible benefits to landowners need to be further exploited. The need to develop and/or explore such models is particularly acute for communities with less obvious and immediate tourism potential.

NECESSARY ACTION 3.3 – SUPPORT SUSTAINABLE ALTERNATIVE LIVELIHOOD OPPORTUNITIES

Effective and sustainable livelihood alternatives need to be promoted to reduce local threats to biodiversity and forests while improving or maintaining the conservation status of those elements. While donor interventions are supporting economic development through livelihood diversification, there is a need to more strongly link economic objectives with sustainable conservation objectives. This requires performing systematic targeting of communities for support to determine livelihood strategies that are in line with conservation needs. For example, around Lake Victoria, the Assessment Team heard from Beach Management Unit (BMU), KMFRI, Kenya Fisheries Service, and Lake Victoria Basin Commission (LVBC) stakeholders that targeted alternative livelihoods initiatives need to be more focused on strategies to pull unemployed youth from the fisheries industry to reduce pressures of overfishing on the Lake.

NECESSARY ACTION 3.4 – SUPPORT LOW-EMISSION ENERGY DEVELOPMENT AND INCREASED DISSEMINATION AND USE OF MORE FUEL-EFFICIENT TECHNOLOGIES TO ADDRESS DRIVERS OF CHARCOAL PRODUCTION FOR FUEL

As discussed in Section 6, forest exploitation for charcoal production and other energy needs remains a serious threat to Kenya's tropical forests and biodiversity. Wood fuels will continue to play a key role in the economic development and social welfare for poor communities. Finding sustainable energy solutions requires a holistic and tailored approach that copes with the specific needs of a region, county,

[141] This episode of human/wildlife conflict was revealed to the team during consultation with Francis Muchiri, KWS Warden for Narok County.

or community. While there has been significant investment from donor organizations for adoption of low emission and fuel-efficient technologies, more support is needed that prioritizes market-based approaches and designs interventions to be linked to other development objectives and opportunities. The remainder of this section maps the specific sets of needs to address the underlying drivers of the primary direct threats within each ecosystem to the thematic Necessary Actions outlined above.

7.4 UNDERLYING NEEDS MAPPED TO THE ASSESSMENT'S NECESSARY ACTION FRAMEWORK

TABLE **10** NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN MONTANE FORESTS

THREAT AREA	NEEDS	NECESSARY ACTION
Deforestation	• Realign existing and new plans to the climate change adaptation and mitigation plans • Enhance of carbon stocks through reforestation, afforestation, and minimization of fire risks • Strengthen forest monitoring, reporting, and verification (MRV) capability to assess effect of REDD+ strategy on GHG emissions, livelihoods, and other benefits • Promote sustainable utilization of forests by developing alternative energy sources to charcoal and fuel wood • Align development to the National Forest Programme and the FCMA of 2016 • Strengthen forest law enforcement and governance • Review participatory forest management rules and strengthen CFAs • Promote multiagency ecosystem planning approach • Promote fire risk and control • Support mapping and rehabilitation of degraded areas and hotspots • Promote alternative livelihoods • Develop and implement grazing plans	1.1, 1.2, 1.3 2,1, 2.3 3.1, 3.2, 3.3, 3.4
Loss of biodiversity and habitat degradation	• Develop a benefits-sharing framework • Promote ethical use of forests as part community participation and environmental education • Support valuation of ecosystems, especially water towers • Coordinate and harmonize various planning models (i.e., forest management plans, sub-catchment management plans etc.) • Harmonize gazettement of protected area (i.e., nature and forest reserves) • Harmonize CFA's and WRUA'S • Strengthen governance structure (i.e., forest conservation committees, environmental committees, sub-catchment committees)	1.1, 1.2, 1.3 2.2 3.1, 3.2, 3.3

TABLE 11 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS WOODLANDS AND BRUSHLANDS		
THREAT AREA	NEEDS	NECESSARY ACTION
Landscape-scale Ecosystem Degradation	• Restoration of ecosystems and ecosystem productivity • Discourage shift from cattle/sheep to reliance on camel/goat herds that is causing accelerated ecosystem deterioration • Support and/or provide extension services to improve livestock production, herd reduction, and marketing (central and county government, Northern Rangelands Trust (NRT), Kenya Wildlife Conservancies Association (KWCA), CFAs, etc.) • Provide alternative agricultural strategies, products, and revenue sources in times of drought • Integrated water systems development and management, including sub-catchment management, rainwater harvesting • Landscape-scale data collection and management, standardized throughout the country • Dissuade population increases and settlements in arid/semiarid lands	1.1 1.2, 1.3 2.1, 2.2, 2.3 3.3, 3.4
Decline and loss of wildlife populations (distribution, abundance)	• Improve field level funding/staffing of KWS and KFS management of parks, forests protected areas, etc. • Re-establish presence and management of "paper" protected areas. • Support KWS, KFS and conservation NGO/PVO • Technical and law enforcement support for private and community held lands.	1.3 2.1, 2.2, 2.3 3.1
Deforestation and Loss of Forest Biological Diversity	• Secure tenure for all ranches • Build capacity of land owners on leadership and governance • Strengthen security engaging rangers • Conduct resources surveys and develop management plans • Develop a profile of investment opportunities and convene investors forum • Determine the economic cost of wildlife to communities and private land owners • Provide economic incentives for forest and wildlife management (revenue sharing, tax incentives, etc.) on private and community lands • Identify critical geographic areas for conservation association and CFA support (wildlife corridors, water towers, etc.) • Develop clean, sustainable alternative energy sources to reduce demands on charcoal	1.1, 1.2 2.1, 2.3 3.2, 3.3, 3.4

TABLE 12 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN COASTAL DRYLAND FORESTS

THREAT AREA	NEEDS	NECESSARY ACTION
Deforestation	• Develop agroforestry initiatives (e.g., intercropping native forest products with drought resistant maize) in the buffer zone of reserve areas—particularly around Arabuko-Sokoke and Shimba Hills • Introduce interventions to promote family planning to try to decelerate rate of population growth in increasingly resource scarce areas • Re-invigorate, with improved approaches, alternative livelihoods activities that have had some past success (e.g., beekeeping, butterfly gardens) • Promote tree nurseries in support of afforestation efforts, commercial sale, and household use. (E.g., non-invasive fruit trees, native tree forest products, etc.)	2.1, 2.3 3.1, 3.3
Land Degradation	• Develop hydrologically appropriate water supply systems • Build capacity and provide technical assistance for county-level, community-level governance systems/structures/individuals • Build capacity and provide technical assistance to water resource management associations/governance systems • Conduct additional studies/analyses on catchment and county-level ecosystems to inform catchment and county-level decision-making • Introduce climate-smart agriculture initiatives, including improved/drought tolerant seed/crop varieties and associated behavior/culture change programming (e.g., to consume millet instead of the more common maize) • Support agricultural value chain development activities in coastal areas (e.g., Kwale, Kalifi, Malindi) for both current agricultural value chains (e.g., maize) and alternative (e.g., millet and other dryland crops)	1.2 2.1, 2.3 3.3, 3.4
Loss of biodiversity and keystone species	• Introduce/boost eco-tourism initiatives (e.g., Dabaso Creek Conservation Group crab farming initiative under the Kenya Coastal Development Project, Malunganje Elephant Sanctuary) through supporting business/management capacity; improving marketing capacity, and support development/creation of linkages with potential public and private partners (e.g., creation of Community-Public-Private Partnerships) • Provide technical assistance and capacity building for proven alternative livelihoods in the coastal region (e.g., coral reef restoration/planting via KCDP, seaweed gardening) • Increased economic benefit realized for community conservancies to continue to incentivize community-led conservation efforts • Availability of alternative livelihoods and increased food security to reduce need for/dependence on local fauna as food source or source of income	1.2, 1.3 2.1 3.1, 3.2, 3.3

TABLE 13 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN FRESHWATER, RIVERS, AND WETLANDS		
THREAT AREA	Needs	NECESSARY ACTION
Habitat modification, fragmentation and destruction	• Planting of fast growing trees as a source of fuel and timber • Promote affordable energy (e.g., efficient cook stoves, solar energy) • Provide incentives for local communities to protect wetlands • Explore opportunities that sustainably utilize wetland resources and implement poverty alleviation activities (e.g., ecotourism, basket weaving, beekeeping) • Lobby county governments to protect wetlands • Promote sustainable agriculture practices and rehabilitate catchment areas • Strengthen water resource users' associations (WRUAs) and CFAs • Reforest gazetted and non-gazetted areas • Construct fire bricks and fire surveillance/monitoring capabilities • Support implementation of the Tana Delta Master Plan • Secure land tenure and demarcation of wetlands	1.2, 1.3 2.1 3.1, 3.2, 3.3, 3.4
Water pollution	• Investment in sewerage infrastructure • Improved solid waste management • Strengthen capacity of local authorities to manage solid and liquid waste • Invest in soil and water conservation practices in the catchment • Rehabilitate the hills around Lake Victoria • Support efforts to manage water hyacinth • Improve infrastructure for management of effluents and solid waste management from urban centers within the catchment areas of Lake Victoria • Strengthen water quality and quantity monitoring capabilities • Improve water supply systems • Ensure industries and factories have and operate wastewater treatment plants	1.1, 1.2 2.1, 2.2, 2.3
Overfishing	• Promote alternative livelihoods with special focus on youth (e.g., tree nursey establishment, beekeeping) • Investment in additional vocational training opportunities (e.g., boat building) • Promote fish farming and cage culture • Develop guidelines and regulations for cage fishing culture.	1.1, 1.2 2.1, 2.3 3.2, 3.3
Invasive Species	• Develop a national inventory of invasive alien species that currently or potentially impact the ecological character of wetlands, especially Ramsar sites • Promote actions to prevent, control or eradicate such species in wetland systems through targeted harvesting.	1.1, 1.2 2.1, 2.3 3.1

TABLE 14 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN COASTAL AND MARINE RESOURCES		
THREAT AREA	NEEDS	NECESSARY ACTION
Habitat Destruction and Degradation	• Improve management of solid and liquid wastes and other pollution controls in urban centers and other populated centers • Improve processing and marketing of fish and fish products • Establish monitoring and evaluation system for critical habitats • Support development of protected areas (i.e., co-managed areas, MPAs and transboundary conservation area) • Strengthen monitoring, control, and surveillance • Strengthen KWS, Kenya Fisheries Service, and other actor capacity to enforce wildlife regulations and other controls • Support ecosystem rehabilitation projects such as coral transplantation • Enforce and strengthen regulations on beachside constructions and other coastal developments • Secure land tenure for local communities • Develop climate change mitigation and adaptation measures (e.g., alternative energy sources, climate smart agriculture) • Support the development of environmental safeguards to guide coastal developments (i.e., ports, mining, oil, and gas exploration) • Enforce regulations on protected species and species of special concern • Develop community marine protected areas, analogous to community conservancies model • Conduct public awareness and sensitization campaigns	1.1, 1.2, 1.3 2.1, 2.2 3.2, 3.3, 3.4
Overexploitation of Resources	• Support implementation of the National Mangrove Management Plan • Strengthen participatory forest management between KFS and CFAs • Support ecosystem restoration projects including mangrove replantation project • Support development of alternative income generating projects (e.g., eco-tourism, apiculture and aquaculture) • Support development and implementation of Transition Implementation Plans at the county level • Strengthen KFS capacity to enforce forest harvesting controls and other regulations • Conduct public awareness and education campaigns on sustainable fisheries management • Support development of alternative income generating projects (e.g., mariculture of seaweed, shellfish, milkfish, and cage culture) • Strengthen national and county government capacity in monitoring, control, and surveillance • Improve infrastructure (access roads and jetties) and services (water and electricity) at fish landing sites • Support establishment of fisheries co-management areas including locally managed marine areas, or sustainable fishing areas etc. • Strengthen fisheries co-management • Promote investment to sustainably manage and exploit offshore fisheries resources (e.g., development of a national fleet, sharing of information on fish stocks and location of seamounts, procurement of better fishing equipment for local fishers) • Strengthen national and county government capacity to enforce fisheries regulations and monitoring, control, and surveillance of the resource • Collect and share information on offshore stock status	1.1 1.2, 1.3 2.1, 2.2, 2.3 3.2, 3.3

TABLE 15 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN GRASSLANDS AND SAVANNAH		
THREAT AREA	NEEDS	NECESSARY ACTION
Habitat Loss	• Remove barriers that lead to fragmentation (i.e., fencing, agricultural encroachment, urban settlements) • Support preparation and implementation of County Spatial Plans as a mechanism for zoning land uses, thus preventing ad hoc developments and affecting critical NRM resources[142] • Increase income from compatible land use practices such as beekeeping, value addition in livestock production, and eco-tourism • Raise awareness about the potential benefits of wildlife conservation • Support the formation of conservancies and strengthen management of existing ones as an alternative land use for the realization of social economic and conservation benefits[143] • Reduce livestock numbers through improved breeds • Promote holistic management of rangeland • Improve water and soil retention	1.1, 1.2, 1.3 2.1, 2.3 3.1, 3.2, 3.3
Loss of Biodiversity	• Increase law enforcement and awareness creation • Strengthen the capacity of KWS and county government to mitigate poaching and bush meat trade • Implement/scale up strategies that minimize conflict such as predator proof fencing • Encourage farmers to remove fences especially in the Mara ecosystem where wildebeests are vulnerable • Government should pay compensation for loss of human life/livestock/crops or devise innovate strategies of fund raising for compensation	2.1, 2.3 3.1, 3.2, 3.3
Rangeland degradation	• Reduce livestock numbers, improve herd quality and markets for livestock products • Improve law enforcement • Promote holistic management of the rangelands • Soil and water retention activities • Practice sustainable grazing management	1.2, 1.3 2.1, 2.2 3.3

[142] Government of Kenya, *The County Government Bill, 2012,* 18 January 2012, <http://www.fao.org/fileadmin/user_upload/drought/docs/The%20County%20Governments%20Bill%202012.pdf>.

[143] An inability to realize social and economic benefits will ultimately lead to disaffection among the land owners who will then be encouraged to seek alternative means to livelihoods. Realization of benefits be a win-win situation for all.

TABLE 15 NECESSARY ACTIONS TO ADDRESS THREATS AND DRIVERS IN GRASSLANDS AND SAVANNAH		
THREAT AREA	NEEDS	NECESSARY ACTION
Water resources degradation (quality and quantity)	• Soil and water conservation activities • Reduce livestock numbers and improve herd quality • Enforcement of water quality regulations that provides limits for quality of effluent discharge • NEMA also to ensure that camps and lodges are not constructed on riparian land • All privatized springs to be degazetted and restored to public domain • Control agricultural expansion into wetland ecosystems important for both wildlife and livestock such as in the Kimana wetlands in the Amboseli • Protect the springs and provide separate points for livestock and people • Impress on the institutions to carry out their mandate	1.1, 1.2 2.1, 2.2, 2.3 3.2, 3.3

8 LINKAGES TO USAID STRATEGY AND PROGRAMS

8.1 DISCUSSION OF NECESSARY ACTIONS AND LINKS TO USAID FRAMEWORK

This section discusses the extent to which USAID/Kenya's strategic framework, as articulated by the 2014-2018 CDCS, as well as recent and current programming, collaborating activities (e.g., efforts by non-USAID U.S. Government agencies, or other USAID missions/operating units), and planned programs are addressing the Necessary Actions to conserve biodiversity and tropical forests in Kenya. This section also links USAID's contributions to forestry and biodiversity conservation with a taxonomy designed by the IUCN and the Conservation Measures Partnership (CMP) to define and classify response strategies.

For each of the three thematic Necessary Actions introduced in Section 7.1, this section discusses:

1. Where USAID/Kenya's (or related) ongoing and proposed programs align with the Necessary Actions;
2. Where current or planned programming can better align with the Necessary Actions to successfully support biodiversity and tropical forestry management and conservation while still achieving the mission's broader set of development objectives; and
3. Specific actions that the mission could take within their current programming to strengthen biodiversity and tropical forest management.

A summarizing table, linking the specific actions with the applicable Necessary Actions, USAID/Kenya CDCS DOs and IRs, and IUCN/CMP classification is provided at the close of each discussion.

NECESSARY ACTION 1: IMPROVED INTEGRATION OF NATURAL RESOURCE MANAGEMENT AND SPATIAL PLANNING INTO NATIONAL, REGIONAL, AND COUNTY-LEVEL DEVELOPMENT PLANNING

OVERLAP BETWEEN USAID PROGRAMMING AND NECESSARY ACTION 1

USAID/Kenya is undertaking or planning a broad range of programs that directly address the needs underpinning Necessary Action 1. The Mission's dedicated conservation programming employed via the Community Conservancy Policy Support and Implementation Program (CCPSIP), and plans for related programming through the Effective Biodiversity Conservation and Livelihood Improvement by Community Conservancies (EBC-LICC) in the Mara Region, with The Nature Conservancy (TNC), demonstrate both a keen understanding of and deep commitment to address the key threats to, and relevant underlying drivers of, ongoing loss of biodiversity in key ecosystems in Kenya—the Mara region and the northern rangelands.

These dedicated biodiversity activities are particularly effective because they cross-cut all three of the thematic Necessary Actions identified in this assessment. While their alignment with Necessary Actions 2 and 3 will be elaborated in those respective sections, the fact that these activities simultaneously address the gaps in county- and community-level integrated resource management ***planning***, ***implementation*** of those plans, and ***buy-in*** to those plans (through linkages with alternative livelihoods, peace and security, and resilience programming) hits upon three fundamental pillars of effective programming; and importantly, recent studies support the notion that interventions focused around

strengthening community conservancies in this manner have discernable positive impacts on wildlife populations.[144]

USAID/Kenya is also supporting, in collaboration with the United States Forest Service (USFS), the Kenya Water Towers Climate Change Resilience Project (WTP). WTP aims "to support informed implementation of climate adaptation and resilience programming in Mau Forest Complex, Cherengani Hills, and Mt. Elgon Water Tower Ecosystems," and consists of five core components: Climate Change Vulnerability Impact Assessments, Valuation of Ecosystem Services, Socio-economic and Ecological Monitoring of Water Tower Landscapes, Capacity Building and Training, and Strategy to Enhance Resilience and Adaptive Capacity of the Water Towers. [145] These components largely align with Necessary Action 1—elaborated below—and set the foundation for future programming and opportunities in line with Necessary Actions 2 and 3.

Necessary Action 1.2

Within the umbrella of Necessary Action 1, USAID/Kenya's dedicated biodiversity programs particularly map to Necessary Action 1.2 (NA 1.2), as they explicitly emphasize more effective community- and county level resource management by leveraging institutional relationships with the still relatively new Kenya Wildlife Conservancies Association (KWCA, formed with USAID/Kenya support in 2014), and the regional member branches operating in these key geographies: the Maasai Mara Wildlife Conservancy Association (MMWCA, formed in 2014 with USAID/Kenya support) and the Northern Rangelands Trust (NRT, established with USAID support in 2004). The work with Northern Rangelands Trust (NRT) and MMWCA emphasizes support to county- and community-level governance structures, private landowners and private sector entities, and KWS, in development of effective integrated resource and land use management plans, with rangeland management and livestock grazing particularly important in both Mara and the Northern drylands.

Under WTP, USAID likewise seeks to pursue programming that will address the need for improved, integrated natural resource management planning. Specifically, WTP will support development of a 20-year strategy for the three target water tower ecosystems, aiming to strengthen their adaptive capacity and resilience in the face of a changing climate.[146] Further, the strategy will explicitly incorporate action and implementation planning designed to leverage and maximize ecosystem services from the water towers, to support Vision 2030 and NFP strategic objectives.

Beyond USAID's dedicated biodiversity and conservation programming, numerous ongoing projects—some USAID/Kenya managed and others supported by USAID funding (e.g., World Bank or United Nations managed)—target DO1 priorities. These projects specifically seek to enhance management collaboration and communication flows between national and county governments, and in turn, counties and communities. Examples include: 1) the Integrated United Nations Development Programme (UNDP) Support Programme to Devolution Process in Kenya, to which USAID/Kenya provides funding,

[144] Joseph O. Ogutu, et al., "Wildlife Population Dynamics in Human-Dominated Landscapes under Community-Based Conservation: The Example of Nakuru Wildlife Conservancy, Kenya," *PLoS ONE*, 2016, <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0169730>.

[145] USAID, *Kenya Water Towers Climate Change Resilience Project Factsheet,* June 2016

[146] ibid.

offers a range of technical assistance, including the development of County Integrated Development Plans (CIDPs) and establishment of County Integrated Monitoring and Evaluation Systems (CIMES) that allow for county-level evidence-based policymaking and development planning;[147] 2) the World Bank led Kenya Accountable Devolution Program (KADP) Multi-Trust Fund, to which USAID is again a funding contributor;[148] 3) Resilience and Economic Growth in Arid Lands – Improving Resilience IN KENYA (REGAL-IR), which supports development and implementation of Community Development Action Plans (CDAPs) and Community Development Committees (CDCs); and 4) Resilient Arid Lands Partnership for Integrated Development (RAPID), through which USAID targets improved county- and community-level WASH and rangeland management governance as core strategic programming objectives.[149] However, while these programs intersect with key intervention points for supporting Kenya's devolution in consideration of biodiversity and tropical forest conservation, those are not adequately addressed in these programs. This is elaborated in the discussion of NA 1 gaps, below.

Necessary Action 1.1

Much of the work being done by USAID with regards to NA 1.1 (data collection and management) is through either the USFS-led WTP, or programming managed by the mission's East Africa Operating Unit, via the Planning for Resilience in East Africa through Policy, Adaptation, Research and Economic Development (PREPARED) project.

As mentioned above, one of WTP's core components entails conduct of climate change vulnerability impact assessments; these are expressly intended to provide participating stakeholders within GoK (e.g., MENR, KFS, KEFRI) with clear, readily accessible data to better understand both the potential magnitude of change in climate in the Mau Forest Complex, Cherengani Hills, and Mt. Elgon Water Tower ecosystems, as well as the extent these ecosystems may be affected by climate change. Such support directly aligns with NA 1.1, seeking to address data gaps pertaining to climate resilience, which will have both direct and indirect implications for biodiversity, given the ecological importance of these water towers. Additionally, as the support under WTP seeks to improve collaboration across key GoK stakeholders, efforts under the program may help address some of the challenges in data management and sharing; at least for climate change and related data for the three ecosystems of focus.

The PREPARED program, operating at a regional scale, identified data management as one of the four primary gaps serving as obstacle to integrated development in East Africa, specifically pointing to lack of institutional coordination, harmonization of data quality, and utilization of data in decision-making. To address these, PREPARED has supported numerous interventions directly and indirectly linked to broader conservation objectives. Examples of direct linkages include PREPARED's support to the development of the Spatial Monitoring and Reporting Tool (SMART) and the Wildlife Information Landscape Database (WILD); these mobile-based applications allow for more effective community-level

[147] UNDP, *Integrated UNDP Support Programme to Devolution Process in Kenya, 2014-2018,* October 2016, http://www.ke.undp.org/content/kenya/en/home/library/democratic_governance/USAID-Support-to-UNDP-Devolution-process-in-Kenya.html.

[148] KADP's Component 3 assists counties with development and/or strengthening of monitoring and evaluation systems; outcomes of this support include development of Open County Portals, which serve as county-level web-based information repositories intended increase community access to county-level data. KADP's Component 5, meanwhile, provides devolved sector-specific support across a range of sectors, including climate change, resilience, and environmental health (as informs water and sanitation).

[149] USAID, *Kenya Resilient Arid Lands Partnership for Integrated Development,* February 2016,

<https://www.usaid.gov/sites/default/files/documents/1860/Kenya%20RAPID_2pager%20Feb%202016.pdf>.

monitoring and reporting on land use and wildlife conservation related activities, part of USAID/Kenya and East Africa's broader alignment with USAID's global strategy to combat wildlife trafficking. Indirectly, PREPARED has also worked closely with the Regional Centre for Mapping of Resources for Development (RCMRD) and the USAID SERVIR project to substantially strengthen the quality and availability of climate change data for the East Africa region, including Kenya, to inform decision-making and broader policy considerations regarding land use and resilience planning. While RCMRD's portal is not explicitly designed for biodiversity and tropical forest management, the information it provides certainly is valuable in considering broader implications and risks introduced in the face of the changing global climate.

USAID's substantial support to adoption of improved technologies utilized by customs and trade officials likewise falls into NA 1.1. Through the Wildlife Trafficking Response Assessment and Priority Setting Initiative, jointly run with the IUCN and TRAFFIC (an IUCN and World Wildlife Fund (WWF) partnership) and which concluded in 2016, USAID interjected enhanced capabilities to monitor and track illicit trade of wildlife trophies by enhanced collection and analysis of forensic and intelligence data. In line with such efforts, the National Academy of Sciences and USAID Global Development Lab's Partnership for Enhanced Engagement in Research (PEER) initiative, currently funds research on more effective ways to code and identify wildlife trophies in an effort to better identify illicit goods during police, customs, and related inspections and to ultimately lead to better enforcement of existing laws and regulations on wildlife conservation (in line with NA 2.2, a broader discussion of which is provided under NA 2).

Necessary Action 1.3

One of the core components of the USFS led WTP entails conducting a valuation of ecosystem services for the Mau Forest Complex, Cherangani Hills, and Mt. Elgon ecosystems. These evaluations will seek to provide a clear and sound assessment of the economic and non-economic value of these ecosystems, as well as establish a scalable methodology that can be applied to other ecosystems in the future. This component of WTP maps directly to NA 1.3[150].

Beyond WTP's ecosystem valuation activities, USAID's programming linkages to NA 1.3 are largely limited or indirect. Most prominently, through its support to KWCA, MMWCA, and NRT, and the associated work establishing community-based conservancies, ongoing biodiversity and conservation programming necessarily establishes valuation of ecosystem services. In the Mara, this valuation is typically linked to tourism potential for conservancies, or related industry (e.g., bead-making), though markets continue to be strengthened in livestock. In the northern rangelands, particularly with USAID's complementary programming (discussed at greater length under NA 2 and NA 3), valuation is linked to an increasingly diversified marketplace, that includes among other options, more robust livestock, meat, and dairy markets.

Taken together, USAID is making substantial inroads in strengthening the quality, availability, utilization, and dissemination of information on valuation of ecosystems within Kenya.

CURRENT GAPS BETWEEN NECESSARY ACTION 1 AND USAID PROGRAMMING

[150] USAID, *Kenya Water Towers Climate Change Resilience Project Factsheet,* June 2016.

Necessary Action 1.2

Outside of USAID's dedicated biodiversity and conservation programming, many of the Mission's activities intersecting with NA 1.2 offer insufficient incorporation of integrated resource management planning into county- and community-level action plans. Whether looking at USAID's direct or indirect support to development of CIDPs, CIMES, CDAPs, or CDCs, unless the county or community also received dedicated support for biodiversity and conservation planning, program documents suggest such considerations were not a point of emphasis.

A related observation by the Assessment Team, fueled by insights provided via stakeholder consultations, was the fact that KFS and KWS, which do not have devolved mandates, were occasionally, if not frequently, omitted from county-level planning discussions. This omission menat that the subject-matter expertise that these institutions could offer with regards to effective integrated resource management planning, was often absent from key decision-making processes.

As such, the necessary approach to address this gap vis-à-vis ongoing USAID programming was clear, per Specific Opportunity #1 (SO1).

Specific Opportunity #1 – Integrated natural resource planning as core component of devolution support.

Incorporate dedicated focus on meaningful and effective integrated natural resource management planning into devolution support programming interfacing with development of CIDPs, CIMES, CDAPs, CDCs and similar county- and community-level planning, strategy, or governance documents. USAID can likewise seek to facilitate improved and transparent coordination between KFS, KWS, WRUAs, BMUs, and county-level governments to ensure KFS and KWS technical expertise supports county- and community-level decision-making.

Necessary Action 1.1

Effective planning and decision-making is incumbent on availability of, and access to, high quality information. Increasingly, as described above, whether via USAID, other donors such as World Bank, the United Nations, or NGOs and CSOs including TNC, Conservation International, and WWF, such high quality information is increasingly available. However, consultations with stakeholders in KWS, KFS, KMFRI, KEFRI, KWTA, African Wildlife Foundation, WWF, and KWCA, consistently indicated that the sharing of, and ready access to, this data—both within their own institutions and with other organizations—faced challenges ranging from incompatibilities across data management platforms, inconsistencies in data quality, and political turf battles over data ownership or management. These same consultations, in turn, routinely led to calls for a central repository for the hard data pertaining to conservation and effective biodiversity and tropical forestry management in Kenya.

USAID's excellent work under PREPARED, with both RCMRD and the Intergovernmental Agency for Development's Climate Prediction and Applications Centre (ICPAC), has yielded impressive returns regarding both the collection and management of climate change and related land use data for the East Africa region. USAID/Kenya, however, currently does not conduct any programming that directly addresses this call for improved and more centralized data management. The Integrated UNDP Support Programme to Devolution Process in Kenya includes development of CIMES for the counties in which it

operates. Similarly, the WB led KADP supports development and deployment of Open County Portals. Meanwhile, USAID's AHADI program relies on an information hub "to disseminate practical tools, policy research, and lessons learned"[151] in support of county-level collaboration and implementation of best practices with regards to devolution. Currently none of these address management of data related to biodiversity or tropical forestry, directly or indirectly, though they all provide pathways for both conservation-related data management and sharing at the county levels. All the same, the need for more centralized management of this information exists, a need that currently sits outside of USAID's programming priorities. Likewise, there is need to support collaboration among and across key GoK institutions such as KFS, KWS, and KWTA, as well as the NGOs and CSOs with which they commonly work, to enhance information-sharing and harmonize data quality.

Specific Opportunity #2 – Ensuring that county-level data management systems and portals integrate biodiversity and conservation within directly managed USAID programming and advocating for such integration in USAID-supported programing.

USAID should ensure that the capacity for capturing and sharing relevant county-level data that pertains to biodiversity and tropical forest conservation and management are embedded in systems such as AHADI's information hubs. With systems such as the information hubs implemented such as the Open County Portals, CIMES, which are led by other donors on programs for which USAID is a funding contributor, USAID should use its seat at the table to advocate for inclusion of such capabilities in the respective county-level data management systems.

***Specific Opportunity #3 – Strengthening of data management systems* to link to centralized databases and data-sharing platforms**

Beyond building in the capabilities to capture and share county- and community-level data in their respective platforms, county- and community-level data collection and management systems should be harmonized and connected to centralized databases, managed and maintained with GoK entities determined through consultative engagement with key stakeholders (e.g., MENR, KWS, KFS, KEFRI, KMFRI, KWTA, among others)

Necessary Action 1.3

As discussed in Section 5, one of the key data gaps in Kenya is the availability of consistent, country-wide valuation of the country's myriad ecosystem services. Section 7 goes on to highlight valuation of ecosystem services as an underlying need feeding into this thematic necessary action. As such, valuation will be keystone in enabling meaningful prioritization of programming and planning inclusive of ecosystem conservation requirements; a reality readily acknowledged given the WTP's inclusion of a valuation of ecosystem services component. Decision-makers generally default to prioritizing economic

[151] Agile and Harmonized Assistance for Devolved Institutions (AHADI) Project http://www.cid.suny.edu/our_work/current_projects/our_work_projects_ahadi.shtml

growth and/or social cohesion.[152] As such, without providing cost-competitive and data-driven justification for the maintenance of areas of biodiversity and/or forest importance, such conservation priorities are often overlooked or relegated to secondary considerations. USAID's current programming, however, does not currently address this gap, nor does it provide ready vehicles to country-wide valuation. This is elaborated as a strategic recommendation in Section 9.

TABLE 16 NECESSARY ACTION #1 – SPECIFIC OPPORTUNITIES

SPECIFIC OPPORTUNITY	LINK TO NECESSARY ACTION (NA)	LINK TO USAID/KENYA CDCS	LINK TO IUCN/CMP TAXONOMY
1. Integrated resource planning as core component of devolution support.	**#1:** 1.1, 1.2 **#2:** 2.2 **#3**: 3.1, 3.2	**DO1:** IR 1.1, IR 1.2, IR 1.3 **DO3:** IR3.2	**#4:** 4.2., 4.3 **#5:** 5.1, 5.2 **#7:** 7.1, 7.2
2. Ensuring that county-level data management systems and portals integrate biodiversity and conservation within directly managed USAID programming and advocating for such integration in USAID-supported programing.	**#1:** 1.1, 1.3 **#2:** 2.1, 2.2 **#3:** 3.1	**DO1:** IR 1.1, IR 1.2, IR 1.3 **DO2:** IR 2.3 **DO3:** IR 3.2	**#1**: 1.1, 1.2 **#2:** 2.1, 2.2, 2.3 **#3:** 3.1, 3.2 **#4:** 4.3 **#7:** 7.1, 7.2
3. Strengthening of data management systems to link to centralized databases and data-sharing platforms	**#1:** 1.1, 1.2 **#2:** 2.2 **#3:** 3.1, 3.2	**DO1:** IR 1.1, IR 1.2, IR 1.3	**#4:** 4.2., 4.3 **#5:** 5.1, 5.2 **#7:** 7.1, 7.2

NECESSARY ACTION 2: TECHNICAL ASSISTANCE AND CAPACITY BUILDING TO PROMOTE INCREASED ADOPTION OF BEST MANAGEMENT PRACTICES FOR SUSTAINABLE LAND- AND WATER-USE

OVERLAP BETWEEN USAID PROGRAMMING AND NECESSARY ACTION 2

Necessary Actions 2.1

USAID/Kenya is actively supporting numerous programs providing technical assistance and capacity building leading to increased adoption of sustainable land- and water-use best management practices (BMPs). Ongoing activities in which this type of technical assistance include: dedicated biodiversity and conservation programming, such as CCPSIP, EBC-LICC, and WTP; Feed-the-Future (FTF) programming such as REGAL-IR, Kenya Agricultural Value Chain Enterprises (KAVES), and Accelerated Value Chain Development (AVCD); and Afya Uzazi, one of the mission's central health programs, as well as the Mission's core Water, Sanitation, and Health (WASH) programs, Kenya Integrated WASH (KiWASH) and RAPID.

Under numerous current and planned initiatives, USAID/Kenya, USAID/East Africa, and collaborating USG agencies are supporting community-based wildlife conservancies, particularly in the Mara region and the Northern Rangelands. Work in these areas has been impressive both in breadth and depth; interventions do an excellent job of interspersing technical assistance focused on a mix of climate resilience, alternative livelihoods, improved land use practices (e.g., grazing management), and dedicated

[152] Consultations, including with Honorable Amina Abdallah, chair of the Parliamentary Committee, consistently confirmed the need for systematic evaluation of the cost and benefits of wildlife and biodiversity conservation to the national economy and private landowners.

conservation considerations (e.g., counter wildlife trafficking technologies, training of community scouts, etc.)

For good reason and to great benefit, past and ongoing dedicated biodiversity programming from the Mission has predominantly emphasized systemic, community-driven wildlife conservation in the Northern Rangelands and Mara region. Interventions supported by CCPSIP and EBC-LICC include delivery of technical assistance by, among others, NRT, MMWCA, and KWS, spanning interrelated issues; wildlife conservation practices, rangeland management and grazing techniques, human/wildlife conflict resolution, and peace and security chief among them. Under PREPARED, efforts to improve the collection and availability of key biodiversity, climate change, and ecological data for the broader Lake Victoria Basin are excellent, as are efforts to strengthen the capacity of EAC and LVBC partner states (including Kenya) to monitor for water quality and quantity.

REGAL-IR's focus on resilience in Kenya's ASAL areas incorporates rain-water harvesting and water storage tank technologies to reduce over-abstraction of—and potential for conflict over—scarce water resources while simultaneously increasing access to higher quality water supply for household and agricultural use. The project also works with community-based natural resource management (CBNRM) institutions to support improved grazing land management practices through adoption of participatory land use planning and supports communities in more effective implementation of any existing land use management plans. Likewise, KAVES includes numerous components targeting improved sustainable land- and water-use practices. Agricultural support elements include adoption of agricultural BMPs for FTF focus crops, which include maize, sorghum, gram greens, cowpea, numerous horticultural products, and dairy production. KAVES has, to at least some degree, incorporated technological approaches and capacity building to encourage improved water efficiency and land-use, such as cultivation of water efficient maize varieties, promoting minimum tillage agriculture, on-farm water harvesting, use of super-absorbent polymer fertilizers, and fruit tree planting.

Afya Uzazi, in aligning with broader East Africa regional efforts to support integrated population, health, and environment programs in the Lake Victoria Basin, has specifically incorporated workplan components designed to message and promote family planning interventions aligned with strengthened environmental management; a direct acknowledgement of the link between conservation, ecosystem health, and human health.

Necessary Action 2.2

USAID's work with KWCA, MMWCA, and NRT to 1) support communities in achieving formal registration status for community wildlife conservancies, and 2) empower communities to understand and realize the potential benefits from that legal status, is a great success of the Mission's programming and aligns well with NA 2.2. Further, these successes in turn allow for the community-based conservancies to follow through and implement the policies and plans developed (in line with NA 1.2). The RAPID project, meanwhile, explicitly emphasizes the empowerment of communities to understand and exercise their rights with regards to water and rangeland management. Additionally, WTP includes capacity building and technical assistance as one of its core components, and has the potential to directly support officials at KFS, KEFRI, and within CFAs to uphold and enforce laws, policies, and management plans governing natural resource management in its areas of implementation.

Additionally, as a Tier One country under USAID's Biodiversity strategy, and a central player in the US government's broader efforts to reduce and counter wildlife trafficking, Kenya has attracted and coordinated support from numerous USG actors outside of the mission. In particularly, the US Department of State's Bureau of International Narcotics and Law Enforcement Affairs (INL), the US Department of the Interior's International Technical Assistance Program (ITAP), and USAID's Global Development Lab (GDL) have actively contributed to the broader counter wildlife trafficking efforts ongoing in Kenya and throughout the East Africa region. INL efforts focus on reducing corruption and strengthening the capacity of police officers, park rangers, customs officials, investigators, judges, and prosecutors to more effectively address and reduce wildlife trafficking in Kenya.[153] Meanwhile, beginning in March, 2016, USAID/Kenya's collaboration with ITAP has included funding both GoK agencies (e.g., KWS), as well as CSOs and NGOs working to improve community-level effectiveness in countering wildlife poaching and related crimes (e.g., as conducted by IUCN). Meanwhile, a necessary extension of the GDL-funded PEER research discussed under would be positioning those same customs official, police officers, and park rangers receiving INL support to have more effective tools and technologies to conduct their work and uphold the governing policies and laws countering wildlife crime; a clear and beneficial overlap with NA 1.1 and 1.2 discussed previously.

CURRENT GAPS BETWEEN NECESSARY ACTION 2 AND USAID PROGRAMMING

Necessary Action 2.1

While USAID has done well to reach community-based conservation entities where providing dedicated biodiversity programming, the Mission has largely prioritized groups oriented towards wildlife conservation, versus CFAs and BMUs. CFAs and BMUs throughout the country struggle with fulfilling their mandates and implementing their resource management plans due to limited technical and financial resources.[154] In numerous cases, the Assessment Team received copies of plans that we were informed had never been implemented. In most cases, the plans had been developed via donor assistance.[155] Absent donor support, (such as the Mission's work to-date with community-based conservancies in the Mara and Northern Rangelands, or the World Bank's work with BMUs via the Kenya Coastal Development Project), these community based conservation groups struggle to serve their intended purposes.

[153] U.S. Department of State, "INL Work by Country: Kenya," *Bureau of International Narcotics and Law Enforcement Affairs*, n.d., <https://www.state.gov/j/inl/regions/africamiddleeast/218989.htm>.

[154]Conversations with KFS, State Department of Fisheries representatives, CFAs, and BMUs were conducted in Nairobi, Shimoni, Mombasa, Arabuko Sokoke/Watamu, Marsabit, Kisumu, Mara, Mt. Elgon. BMUs and State Department of Fisheries representatives were visited in Shimoni, Mombasa, and Kisumu/surrounding areas.

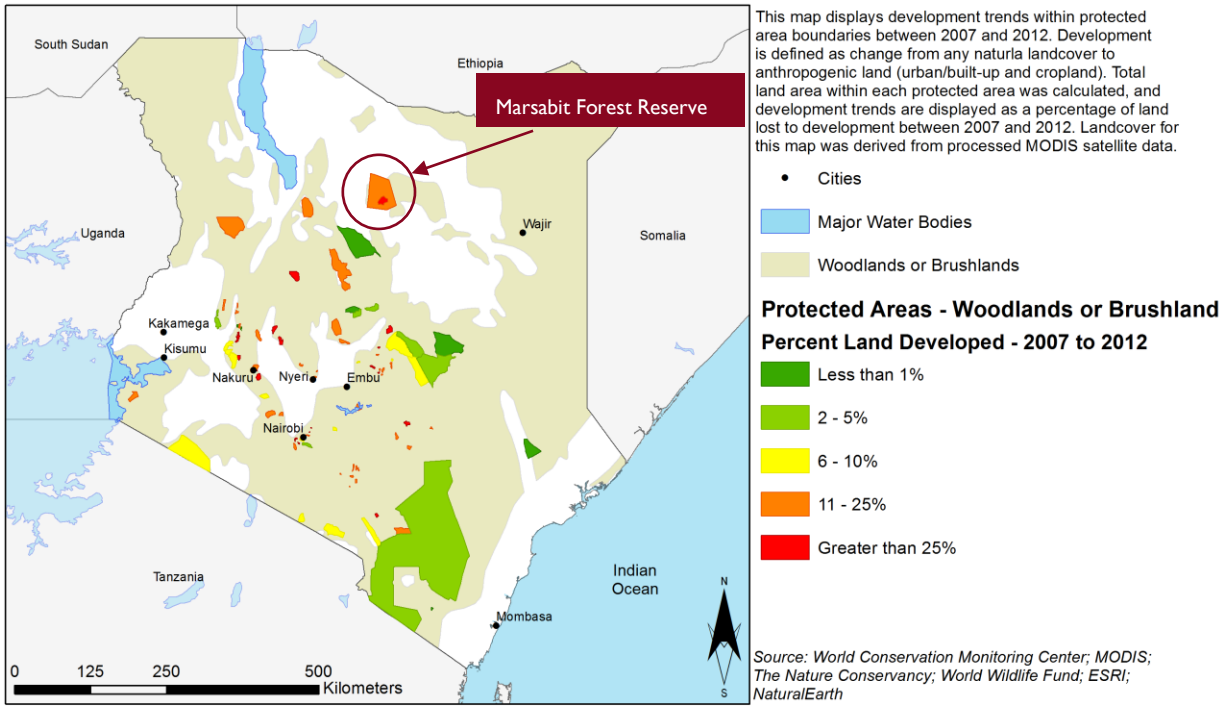
[155] One prominent example was consultation with KFS in Shimoni where they described how almost none of the conservation plan developed to support the Sable Antelope in Shimba Hills—the last ecosystem in Kenya where the species is found—had been implemented. The reason provided was insufficient staff and financial resources to effectively implement the plan.

Figure 14 Development Trends in Woodland and Brushland Protected Areas

Specific Opportunity #4 – Increase engagement with CFAs and BMUs in areas of current implementation.

CFAs and BMUs do not appear as core participants in USAID's ongoing programming. However, there are numerous instances where their involvement could enhance incorporation, adoption, and efficacy of best management practices for sustainable land- and water-use. WTP programming can seek to engage and empower CFAs within the Mau Forest Complex, Cherengani Hills, and Mt. Elgon water towers in development and/or implementation of natural resource management plans or action plans. KAVES programming could interface with Kisumu BMUs to align fishery and/or water quality monitoring and management with deployment of upstream agricultural practices; similarly KAVES programming adjacent to the Mau Forest Complex or REGAL-AG and -IR programming near Marsabit reserves, could integrate CFAs into broader deployment of resilience and economic growth programming to increase buy-in and seek to strengthen forest conservation around threatened resources (See Figure 14 below).

A related gap can be observed in REGAL-IR programming priorities. The initiative does extremely well to provide essential technical assistance and capacity buildings to counties and underlying communities the areas it is operating. However, the types of technical assistance it provides, while clearly promoting economic and environmental resilience, as well as conflict resolution and management, the support seems to be driven principally by economic and conflict considerations in a manner that improves localized environmental conditions, rather than broader ecosystem functioning. In the ASAL, the preservation and maintenance of sensitive buffer areas, such as the agricultural production zones immediately surrounding the Marsabit Forest Reserve, are vital to the health of the broader Marsabit ecosystem (See Figure 14, below). The agricultural development, settlement expansion and encroachment of pastoral grazing threatening the forest reserve—which serves as the region's water tower—are, in fact, threatening the broader ecosystem.



Similarly, in western Kenya, encroachment of agricultural production and increasing deforestation—especially near the Mt. Elgon and Mau Forest Complex water towers, as well as adjacent to Lake Victoria—threatens the quality and quantity of water in Lake Victoria and available to surrounding communities. As such, much as environmental health considerations were embedded in Afya Uzazi's family planning programming, so too should they be considered in agricultural productivity efforts. This expands beyond promoting water-minimizing crops to programming that explicitly incorporates and supports broader ecosystem functioning. Specific examples include integrating dedicated agroforestry initiatives to simultaneously reduce pressures on diminishing forest resources while strengthening soil retention and improving both soil and water quality and environmental awareness raising and capacity building to reduce and dissuade conversion of the valuable wetland areas adjacent to Lake Victoria for agricultural purposes.

This concern pertains to a few of USAID's core FTF programs, such as KAVES, AVCD, REGAL-AG, and the (now closed) Financial Inclusion for Rural Markets. As suggested above, KAVES and AVCD programming encourages horticultural activities in the Lake Victoria Basin. While these it is unclear whether these activities will directly place additional land- and water-use pressures on an already strained area, such impacts are certainly possible.[156] Even if there are no such direct impacts, successful agricultural interventions often have spillover effects, with individuals not recipient to technical assistance seeking to replicate observed successes of their neighbors. While the projects make efforts to promote improved land- and water-use management through adoption of agricultural BMPs and water efficient crops (relative to common practice among farmers not benefitting from USAID support), the omission of any discussion[157] of ecosystem strengthening initiatives such as agroforestry, intercropping, sustainable forestry, or wetland management suggest, at minimum, these are not prioritized components of current programming. While there may be elements (e.g., the planting of fruit trees such as passion fruit, and mango trees—a fast growing tree with great potential to ease deforestation—creates opportunities for agroforestry type initiatives) information available does not make clear whether such best practices are being prioritized, encouraged, or employed to both improve broader ecosystem function and reduce pressures on key natural resources.

Specific Opportunity #5 – Explicit integration of agroforestry, sustainable forestry initiatives, and sustainable wetland management within current FTF programming

Agroforestry initiatives, particularly in areas adjacent to major water towers, have potential to support broader ecosystem functioning. At the same time, with selection of appropriate, non-invasive trees crops, these initiatives help mitigate against the underlying drivers to deforestation, particularly charcoal production in and around urban centers where demand is high and population growth continues to lead to encroachment on essential forest resources.

Similarly, integrating FTF initiatives with technical assistance to promote sustainable wetland management can help maintain the quality and value of the rich natural resource base in turn sustaining higher productivity agricultural yields

The absence of technical assistance programming for sustainable fisheries management extends beyond the southern coastal areas. Despite increasingly dwindling fisheries in the Lake Victoria Basin, USAID/Kenya is providing no direct interventions to support fisherfolk in uptake of improved fishing practices. PREPARED's efforts to improve the collection and availability of key biodiversity, climate change, and ecological data for the broader Lake Victoria Basin is excellent. Further, PREPARED's efforts to strengthen the capacity of EAC and LVBC partner states (including Kenya) to monitor for water quality and quantity is essential. All the same, the efforts on PREPARED do not hit all necessary actions to support biodiversity conservation in that area, with direct technical assistance in fisheries management BMPs chief among them. Even for those aspects that PREPARED does hit the mark, such

[156] The best practices promoted under KAVES and AVCD are likely to improve intensification of land use, which could very likely result in more efficient land- and water-use practices. That said, KAVES 2016 3rd Quarter report suggested that productivity for a number of crops was below target, suggesting that anticipated land use efficiencies may not have been realized.

[157] Based upon review of the USAID/Kenya 5-year FTF strategy quarterly and annual reports provided from 2015 and 2016 for KAVES, FIRM, REGAL-AG, review of project websites for AVCD (https://avcdkenya.net/), and REGAL-AG, and publicly available USAID factsheets

as the aforementioned capacity building support to LVBC Partner Sates in monitoring water quality and quantity, PREPARED programming is potentially at odds with USAID/Kenya's own FTF programming; the high focus on horticultural production in the Lake Victoria Basin area encourages the agricultural development practices that currently drive—at least in part—the downstream challenges that PREPARED is seeking to reverse, a reality acknowledge in PREPARED's own Activity Approval Document prior to the beginning of PREPARED programming[158]. The strategic implications for this potential incompatibility are discussed in Section 9.1.

TABLE 17 NECESSARY ACTION #2 – SPECIFIC OPPORTUNITIES			
SPECIFIC OPPORTUNITY	LINK TO NECESSARY ACTION (NA)	LINK TO USAID/KENYA CDCS	LINK TO IUCN/CMP TAXONOMY
4. Increase engagement with CFAs and BMUs in areas of current implementation.	**#2**: 2.1, 2.2 **#3**: 3.1, 3.2, 3.3, 3.4	**DO1:** IR 1.2, IR 1.3 **DO2:** IR 2.3 **DO3:** IR 3.1, IR 3.2, IR 3.3, IR 3.4	**#1:** 1.1, 1.2 **#2:** 2.1, 2.2, 2.3 **#3:** 3.1, 3.2 **#4:** 4.2., 4.3 **#5:** 5.4 **#6:** 6.1, 6.2, 6.3 **#7:** 7.1, 7.2
5. Explicit integration of agroforestry and sustainable forestry initiatives within current FTF programming	**#2:** 2.1 **#3:** 3.1, 3.3, 3.4	**DO3:** IR, 3.1, IR 3.2, IR 3.3, IR 3.4	**#1:** 1.1, 1.2 **#2:** 2.1, 2.2, 2.3 **#3:** 3.1, 3.2 **#4:** 4.2 **#6:** 6.1, 6.2

NECESSARY ACTION 3: FOCUSED INTEGRATION OF ECONOMIC GROWTH PRIORITIES AND BIODIVERSITY CONSERVATION AND MANAGEMENT NEEDS

OVERLAP BETWEEN USAID PROGRAMMING AND NECESSARY ACTION 2

Necessary Action 3.1, 3.2, 3.3

NAs 3.1, 3.2, and 3.3 are interrelated, and connect to the broader need for greater economic opportunities and outcomes for communities, and designated groups such as CFAs and community-based conservancies. USAID/Kenya's dedicated biodiversity and conservation programs are already supporting such efforts. The mission's support to, and work with, conservancies in the Mara region via the MMWCA, for example creates linkages to and supports viability of (predominantly) eco-tourism enterprises with the community conservancies., extremely viable approaches within the right context and broader setting.

Importantly, beyond just its dedicated biodiversity programming, some of the Mission's resilient economic growth programming addresses these NAs through their support to communities in the ASAL. Both REGAL-IR and REGAL-AG, for example, strengthen livestock oriented markets, such as dairy farming and meat production, helping to mitigate some of the underlying systemic vulnerabilities that both directly threaten communities (such as food security, poverty, and limited economic alternatives) and indirectly drive some of the direct threats to biodiversity. In tandem with USAID's work with NRT to supports improved rangeland management, establishment of grazing plans, and

158 Specifically, the AAD noted that "the geographic overlap of FtF focal areas with areas of significant biodiversity and forest conservation in Kenya (USAID 2010) is disquieting and may put biodiversity and agricultural development goals at odds, not to mention potential negative impacts to drinking water supply from more intensive agricultural production." – Richard Bawden, Patricia Aust Sterns, Steven Harris, and Julio Berdegue, "Activity Approval Document," *USAID Kenya*, 2002, http://pdf.usaid.gov/pdf_docs/Pdabw321.pdf

conflict resolution, the resilience of these markets is substantially strengthened. Taken together, communities are encouraged to buy in to improved natural resource management practices, as they benefit directly from the effort required to support broader conservation and ecosystem management due to the parallel benefits to their livestock, and in turn economic opportunities realized through the strengthened markets.

Broadly, the Mission supports numerous economic growth activities, predominantly focusing on agriculture through its FTF programming, as discussed under NA 2, above. As raised in that discussion, the agricultural best management practices under KAVES and AVCD (as examples) incorporate improved resource management, but don't embed discrete biodiversity and conservation management objectives (as suggested by Specific Opportunities #4 and 5). Some of the other Mission's programs likewise touch on elements of NA 3.2 and NA 3.3, such as the Kenya Innovation Engine (KIE) and FIRM. The two initiatives support entrepreneurship, including initiatives that promote improved agricultural practices which *can* lead to improved natural resource management and support broader ecosystem functioning. This is not, however, a guaranteed outcome of these programs.

Additionally, the Young African Leaders Initiative (YALI) supports promising young Africans across a wide range of technical and professional fields and supports their professional advancement. While YALI does not prioritize professionals with backgrounds or professional aspirations that align with broader biodiversity and tropical forest conservation needs or objectives, such individuals are—or can be—among those supported through YALI programming.

Necessary Action 3.4

Under USAID's DO3 programming there are numerous channels through which projects promoting alternative energy and/or more efficient use of energy are—or could be—supported. USAID's Power Africa programming in Kenya, for instance, is targeting solely renewable energy generation options with wind (Lake Turkana Wind Farm) projects under way or completed, and geothermal and solar anticipated to be developed in the future. Additionally, FIRM has supported a handful of small-scale renewable energy projects—largely run-of-river micro-hydro—aligned with one of the core program objectives (the other four more heavily oriented toward increasing financing options and opportunities for agricultural development).

CURRENT GAPS BETWEEN NECESSARY ACTION 3 AND USAID PROGRAMMING

Necessary Action 3.1, 3.2, and 3.2

There are a few ways in which current USAID programming could be refined to more directly support biodiversity and tropical conservation in line with broader programming objectives. As discussed under NA 2, current FTF programs such as KAVES and AVCD could benefit from integration of sustainable agroforestry, forestry, or wetland management components to supplement—and likely strengthen—current programming priorities and objectives while bolstering the sensitive ecosystems adjacent to its target areas (especially in western Kenya).

While FIRM just closed, the model employed could be recreated, with slight adjustment. FIRM indicated its criteria for lending/financial services support looked at 1) agriculture, particularly in line with FTF commodities, 2) clean/renewable energy, and 3) water services. A similar mechanism could likewise provide financial support services, though more explicitly oriented towards sustainable land use and

management. A financial service provider or support vehicle (such as DCA) could simply incorporate increased targeting of—and, ideally, technical assistance to—entrepreneurial schemes designed to maximize land user benefits while promoting broader ecosystem functioning.

Similarly, the KIE model could be expanded or adjusted to target "green growth" entrepreneurs, rather than the current programming focus on agricultural and nutritional innovations. USAID already supports a form of this via the NRT Trading program, the NRT's branch devoted to supporting and fostering sustainable enterprises. However, additional forms and vehicles for the incubation and promulgation of such green businesses could support the Mission's pursuit of a green growth economy. Ultimately, this would represent a strong complement to the dedicate capacity building support to financial services that Specific Opportunity #6 would entail.

Specific Opportunity #6 – Integration of dedicated financial services for, and technical assistance to, "green" businesses across all sectors.

The CDCS specifically targets promotion of a "green growth" economy under IR 3.2. To increase the potential such green growth, USAID should employ financial services programming, either through direct provision of loans or grants, or through a risk-reduction approach such as DCA, that specifically targets green businesses. These can overlap with agricultural services that interact with FTF programming, water services

Specific Opportunity #7 – Development of an innovation engine for "green" entrepreneurs.

Similar both to Specific Opportunity #6, and the Mission's KIE, and the NRT Trading program, which already functions as a sustainable business incubation entity, this would serve to instigate the green growth economy by giving "green" entrepreneurs a platform through which they could prove their ideas and, in turn, intensify the growth and potential for Kenya's green growth.

Additionally, ongoing youth empowerment initiatives such as YALI and the Kenya Youth Employment and Skills Program (K-YES) provide essential functions both in enhancing the opportunities of promising youth, and providing meaningful livelihoods and alternatives to individuals that may otherwise be vulnerability to extremist groups or other at-risk activities. However, neither YALI nor K-YES incorporate an explicit focus on natural resource management as part of their youth empowerment programming. While YALI doesn't provide a natural vehicle, other than ensuring to include biodiversity conservation oriented professionals among its rosters, a program such as K-YES could, at minimum, ensure that if youth are being supported in certain sectors that have potential to exacerbate existing

threats to biodiversity conservation, they receive at least basic training and aware raising regarding how and why to avoid poor practices that won't adversely impact their employment potential.

Specific Opportunity #8 – Integration of environmental education to youth empowerment programming.

The Mission's ongoing support to empower youth vis-à-vis improving business, technical, and vocational skills, as done under K-YES, is essential to Kenya's security and prosperity. At the same time, such engagement with Kenya's youth provides an opportunity to embed environmental education components, likely largely in alignment with the vocation they will be pursuing, while having the potential to create an ally on broader conservation priorities.

Necessary Action 3.4

Relatively recent USAID programming, such as the Developing a Sustainable Cookstove Sector project, supported the dissemination and use of more efficient cookstoves through the development of financial products to ease household or distributor purchase of cookstoves as well as support to manufacturers to increase scale and production and distribution. Such promotion and/or dissemination of clean cookstove technologies should resume.

USAID also needs to continue to promote and prioritize renewable energy generation, particularly small-scale off-grid renewable energy options for communities most likely to serve as sources of the high energy demand driving rampant deforestation and forest degradation for charcoal production. Current or recent initiatives calling for and/or supporting clean energy and off-grid energy development, as Power Africa is doing and FIRM had done, are excellent initiatives. While energy development will necessarily have to navigate a large and diverse network of considerations before moving forward, attempting to align power development locations to ***support*** rather than (potentially) ***exacerbate*** ongoing degradation to key ecosystem resources will be important. Furthermore, appropriately targeted and designed energy generation can help reduce incentive and need among communities living proximate to protected and other areas of ecosystem importance—such as Kenya's major and minor water towers and the coastal dryland forests—to continue illegal charcoal production to meeting ever-growing energy demand.

TABLE 18 NECESSARY ACTION #3 – SPECIFIC OPPORTUNITIES			
SPECIFIC OPPORTUNITY	LINK TO NECESSARY ACTION (NA)	LINK TO USAID/KENYA CDCS	LINK TO IUCN/CMP TAXONOMY
6. Integration of dedicated financial services for, and technical assistance to, "green" businesses across all sectors.	**#2:** 2.1 **#3:** 3.3	**DO3:** IR 3.1, IR 3.2, IR 3.3, IR 3.4	**#4:** 4.2., 4.3 **#6:** 6.2 **#7:** 7.2, 7.3
7. Development of an innovation engine for "green" entrepreneurs.	**#3:** 3.3	**DO3:** IR 3.2, IR 3.3, IR 3.4	**#4:** 4.3 **#6:** 6.2 **#7:** 7.2, 7.3
8. Integration of environmental education to youth empowerment programming.	**#1:** 1.1, 1.3 **#3:** 3.3	**DO2:** IR 2.2, IR 2.3 **DO3:** IR 3.2	**#4:** 4.1, 4.2., 4.3 **#7:** 7.1

8.2 EXTENT TO WHICH ACTIONS PROPOSED BY USAID MEET THE NEEDS

Table 19 below summarizes the discussion from Section 8.1, illustrating which components of USAID/Kenya's strategy are effectively incorporating the thematic necessary actions, as well as those areas where opportunities for increased integration present.

TABLE 19. EXTENT TO WHICH NECESSARY ACTIONS ARE SUPPORTED BY USAID/KENYA PROGRAMS

+ = EXISTING PROGRAMS MEET THE NECESSARY ACTION **AND** INTEGRATE DIRECT CONSERVATION ACTIONS FOR TROPICAL FORESTS AND BIODIVERSITY

Δ = EXISTING PROGRAMS MEET THE NECESSARY ACTION BUT **DO NOT** SPECIFICALLY INTEGRATE BIODIVERSITY AND FOREST ISSUES INTO THEIR GOVERNANCE ACTIVITY

O = OPPORTUNITY FOR USAID, ACTIVITIES ARE NOT CURRENTLY MEETING THE NECESSARY ACTION, BUT COULD IN FUTURE PROGRAMS

NECESSARY ACTIONS	DO1: Devolution Effectively implemented			D02: Health and human capacity strengthened			DO3: Inclusive, market-driven, environmentally sustainable economic growth				
	IR 1.1: Accountable county governments effectively functioning in targeted counties	**IR 1.2:** Enabling Environment for devolution strengthened	**IR 1.3:** Informed and Empowered citizens participate in county affairs	**IR 2.1:** Increased Kenyan ownership of health, education and social systems	**IR 2.2:** Increased use of quality health and education services	**IR 2.3:** Youth empowered to promote their own social and economic development	**IR 3.1:** Increased Household food security and resilience primarily for the rural poor	**IR 3.2:** More resilient people and ecosystems to climate change in a green growth economy	**IR 3.3:** Increased public and private capital flows	**IR 3.4:** Improved Enabling environment for private sector investment	**IR 3.5:** Private sector engagement in infrastructure development facilitated
1. Improved Integration of Natural Resource Management and Spatial Planning into National, Regional, and County-level Development Planning											
1.1 Improve data collection, management and knowledge sharing both within and across key stakeholders	Δ	Δ	Δ	Δ	Δ			O		Δ	Δ
1.2 Development of integrated natural resource management plans at all levels of government, using data-driven approaches as applicable, to actively reduce destruction of key habitats, ecosystems, and biodiversity resources	Δ	Δ						Δ			

1.3 Effective valuation of tropical forestry and/or biodiversity resources	O	O	O					O			
2. Technical Assistance and Capacity Building to Promote Increased Adoption of Best Management Practices for Sustainable Land-and Water-Use											
2.1 Improve effectiveness and efficiency of land and water management practices at county and community levels in vulnerable and marginalized areas	Δ	Δ	Δ	+	+	O	Δ	+/Δ	Δ		
2.2 Enhance capacity for responsible authorities to effectively enforce existing policies and laws governing management of biodiversity and tropical forest resources	+/Δ	+/Δ	+/Δ					+		O	
3. Focused Integration of Economic Growth Priorities and Biodiversity Conservation and Management Needs											
3.1 Target community-based conservation groups operating in buffer zones for PAs and key natural resources for ecosystem strengthening economic growth initiatives	+/O	+/O	+/O	O	O	O	Δ/O	+	O	O	O
3.2 Improve benefit sharing schemes in protected area and biodiversity management	+/O	+/O	+/O			O			Δ	O	O
3.3 Support sustainable alternative livelihood opportunities	+/Δ	+/Δ	+/Δ			Δ	Δ	+/Δ	Δ	Δ	
3.4 Support low-emission energy development and increased dissemination and use of more fuel-efficient technologies	O	O	O				O	Δ	Δ	+/Δ	+/Δ

TABLE 20. IUCN-CMP TAXONOMY OF CONSERVATION ACTIONS	
CONSERVATION ACTION TYPE	IUCN-CMP TAXONOMY OF CONSERVATION ACTIONS
Direct "On-the-Ground" Conservation Actions	**1. Land/Water Protection: actions to identify, establish or expand parks and other legally protected area** *1.1 Site/area protection* *1.2 Resource & habitat protection*
	2. Land/Water Management: actions directed at conserving or restoring sites, habitats, and the wider environment *2.1 Site/area management* *2.2 Invasive/problematic species control* *2.3 Habitat and natural process restoration*
	3. Species Management: actions directed at managing or restoring species, focused on the species of concern itself *3.1 Species management* *3.2 Species recovery* *3.3 Species reintroduction* 3.4 *Ex-situ conservation*
Actions to Improve the Enabling Environment	**4. Education and Awareness: actions directed at people to improve understanding and skills, and to influence behavior** *4.1 Formal education* *4.2 Training* *4.3 Awareness and communications*
	5. Law and Policy: actions to develop, change, influence, and help implement formal legislation, regulations, and voluntary standards *5.1 Legislation* *5.2 Policies and regulations* *5.3 Private-sector standards and codes* 5.4 *Compliance and enforcement*
	6. Livelihood, Economic, and Other Incentives: actions to use economic and other incentives to influence behavior *6.1 Linked enterprises and livelihood alternatives* *6.2 Substitution* *6.3 Market forces* *6.4 Conservation payments* 6.5 *Non-monetary values*
	7. External Capacity Building: actions to build the infrastructure to do better conservation *7.1 Institutional and civil society development* *7.2 Alliance and partnership development* 7.3 *Conservation finance*

9 DISCUSSION OF RECOMMENDATIONS TO STRENGTHEN USAID/KENYA STRATEGY AND PROGRAMS FOR BIODIVERSITY AND TROPICAL FOREST MANAGEMENT

USAID's CDCDs strategy and Intermediary Results framework are well positioned to provide support the GoK in carrying out its stated commitment to conservation and sustainable management of tropical forests and biodiversity. Whereas the previous section discussed the extent to which USAID/Kenya's strategic framework and programing are addressing the Necessary Actions in addition to specific related opportunities, this section identifies and describes the following: 1) Recommended modifications to the existing CDCS to reinforce and emphasize conservation strategies within its development objectives; and 2) New priority considerations to guide future strategic planning on mission programing.

9.1 RECOMMENDED MODIFICATIONS TO THE EXISTING CDCS TO REINFORCE AND EMPHASIZE CONSERVATION STRATEGIES WITHIN ITS DEVELOPMENT OBJECTIVES

DO1 DEVOLUTION EFFECTIVELY IMPLEMENTED

Recognizing that the success of devolution is inherently linked to furthering reforms that address important economic, social, and governance issues, USAID has dedicated its first DO to Kenya's transition under its new constitution and strengthening linkages between citizens and government. Devolution also provides Kenya a positive path forward for managing natural resources and biodiversity conservation by bringing resources more directly under management of communities and providing avenues for county governments to embrace public participation in planning processes and policy formulation.

While the CDCS has been successful in guiding development of USAID programs to strengthen governance systems, enable counties to cooperate and advance their interests, and build CSOs, as discussed in Section 8.1, conservation of biodiversity and forests has not been an explicit management objective. There is notable opportunity to solidify the roles of government and society as relate to conservation through the strengthening systems during the process of Devolution. This was made apparent, and emphasized strongly during consultation with stakeholders in Kenya, when issues around conflicting mandates and poor capacity to take on new devolved responsibilities were identified as a major barrier to conservation and natural resource management. Therefore, *the Assessment Team recommends that an IR be added to DO1 that focuses on supporting successful devolution of tropical forestry, biodiversity, and related conservation systems*. Doing so will improve coordination of conservation actions, compliment other IRs and result in a more holistic application of development efforts under DO1.

In line with the addition of this IR, opportunities to more directly emphasize community-based conservation entities such as CFAs and BMUs could be pursued. That would also signal a valuable strategic expansion of conservation priorities beyond interventions typically oriented around wildlife (be it anti-trafficking or tourism promotion) or peace and security (one of the primary drivers for interventions through the ASAL). This would, instead, align with broader need for conservation of severely threated forest, freshwater, and marine resources.

DO2 HEALTH AND HUMAN CAPACITY STRENGTHENED

The strategic vision provided by the CDCS for DO2 has focused on improving health and human capacity through support to national health and education programs across all of Kenya's counties. As

outlined in Section 7, programs that are being implemented and planned under DO2 have been successful in strengthening relationships with national and local government, private sector, and civil society to achieve the sustainable development impacts envisioned under the IRs and sub-IRs.

For conservation purposes, this DO's focus on education and health provides interesting opportunities to bridge gaps that separate the fields of conservation, health, population, and development by promoting integrated approaches that recognize conservation as a social issue. There have been examples of programs taking this approach in Kenya and the region including the East Africa operating unit, which recently supported the East Africa Community in developing a Population, Health and Education (PHE) strategy for 2016-2021. Acknowledging the strong and important work already done in this area to develop a broader regional strategy, the Assessment Team recommends that the USAID/Kenya and East Africa mission collaborate further to align and target future programing at the national level with meaningful adoption of that strategy.

There are also opportunities to embed environmental education and natural resource management livelihoods into youth empowerment interventions that form an important focus area of DO2, as discussed in Section 8.1. This can be accomplished through a combination of incorporating additional IR or sub-IR under the DO, or modifying IRs 2.1 (Increased Kenyan ownership of health, education and social systems) and 2.3 (Youth empowered to promote their own social and economic development) to more explicitly incorporate ecosystem maintenance within broader youth empowerment, and health/education/social system ownership objectives.

A recent example of a USAID/Kenya program that established conservation priorities and capacity building in an education program was the U.S. Higher Education Initiative – Partnership between University of Nairobi and Colorado State University that concluded in 2014. The project was established to address challenges of development, marginalization, and sustainability of dryland regions including Narok, Makueni, Isiolo, Marsabit, Kaijado, Turkana, Yatta Machakos, Lolita, Samburu, Taita-Taveta, and Laikipia. By engaging various stakeholders on natural resource management, sustainability of ecosystems, food security, pastoral livestock production systems, climate resiliency, and wildlife conservation, the program strengthened capacity for establishing and sustaining dryland ecosystems and human livelihoods through higher education transformation.[159] It is recommended that new education programs and or activities within existing programs similarly align conservation and land management with interdisciplinary education, research and community outreach.

DO3 INCLUSIVE, MARKET-DRIVEN ENVIRONMENTALLY SUSTAINABLE ECONOMIC GROWTH

The existing strategy embodied by DO 3, which is "inclusive, market-driven, environmentally sustainable economic growth," is fully compatible with biodiversity and tropical forestry conservation priorities. Notwithstanding, USAID's current programming as discussed in Section 8, suggests opportunities to shift priorities within the DO, pulling levers that may lead more directly to the desired environmentally sustainable economic growth, without losing the important complementary need for inclusive, market-driven interventions.

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[159] USAID Kenya, *Africa-U.S. U.S. Higher Education Initiative – Partnership Between University of Nairobi and Colorado State University, Final Report,* March 2015, <http://pdf.usaid.gov/pdf_docs/PA00KBBC.pdf>

COMPLEMENTING IR 3.2: MORE RESILIENT PEOPLE AND ECOSYSTEMS TO CLIMATE CHANGE IN A GREEN GROWTH ECONOMY

IR 3.2 prioritizes climate change adaptation to promote both more resilient community-level ecosystems and a broader green growth agenda. A slight, but important, adjustment to this IR could be to reverse the prioritization, emphasizing broader (e.g., catchment-level) ecosystem functioning in line with the green growth agenda that still ultimately targets community-level market-driven interventions. This shift could lead to a greater prioritization and targeting of buffer areas of ecosystem resources of high importance, such as Kenya's major and minor water towers as discussed in Section 8.1. This would not change the nature of the core programming already being implemented; for example, REGAL-IR's interventions throughout the ASAL clearly hit many of the NAs defined by this Assessment. Instead, it would require more explicit targeting of successful interventions, such as those deployed by REGAL-IR, toward the preservation and strengthening of the essential resources on which broader ecosystems rely.

PAYMENT FOR ECOSYSTEM SERVICES

This relates directly to the potential for more targeted pursuit and deployment of PES mechanisms. While, as discussed in Section 8.1, numerous USAID's interventions directly or indirectly incorporate elements of PES, additional opportunities exist, in two general categories. One, in line with the preceding discussion, is the potential to explore viable PES schemes in areas of ecosystem importance, such as Kenya's major and minor water towers, the Tsavo Park Complex, coastal dryland forests, or with communities interfacing with Kenya's coastal mangroves, reefs, beaches, and marine fisheries. The second category would address the need for standardization across the existing valuations of ecosystem services that have been conducted.

While, as elaborated in Section 5, piecemeal valuation has been done for selected geographies, commodities, and (typically provisioning) services, need remains for more consistent and nationally relevant valuation. Beyond that, having quality data on valuation of ecosystem services is one part of a broader need to explore and operationalize effective PES schemes. Kenya's 2016 NFP, the 2015 Fifth National Report to the Convention on Biodiversity, and the 2016-2020 KWTA Strategic Plan all list PES among the opportunities available for improved natural resource management. Without strong valuation of ecosystem services, fulfillment of these strategic priorities will be unlikely.

SUPPORTING DEVELOPMENT OF REDD+ OPTIONS

In the same spirit as PES, opportunities exist for USAID to strategically align with ongoing efforts to establish REDD+ programming in Kenya aimed at reducing emissions and enhancing carbon sink capacities of forest ecosystems. This would expand beyond the excellent work undertaken by RCMRD and ICPAC, which have substantially the quality and availability of climate change data for the East Africa region, USAID can focus support to Kenya on the development of its National REDD+ Strategy in line with the recently released UN-REDD Programme report focusing on mapping of land use in Kenya to support deployment of REDD+ interventions. The report identifies the following next steps for the GoK: i) Understanding the various functions of forests and the potential benefits of REDD+ activities in relation to these functions; ii) prioritize strategy options and identifying zones where action is most needed, especially in combination with the distribution data on drivers/barriers; iii) estimate which options offer greatest potential, and pursue further information gathering as needed for those options[160].

[160] Maukonen, P., Runsten, L., Thorley, J., Gichu, A., Akombo, R. and Miles, L. (2016). Mapping to support land-use planning for REDD+ in Kenya: securing additional benefits. Prepared on behalf of the UN-REDD Programme, Cambridge, UK: UNEP-WCMC.

USAID/KENYA'S NEW 5-YEAR FTF STRATEGY

USAID's Global FTF strategy for 2017-2021 defines numerous pathways through which the Mission can directly embed ecosystem and catchment level support through the targeting and focus of its food security and agricultural programming. Most explicitly, the strategy's Cross-Cutting IR #2—*Improved Climate Risk, Land, Marine, and Other Natural Resource Management*—explicitly notes that "while the largest numbers of food insecure people do not live in protected areas, (protected areas) are still particularly important for biodiversity and preserving vital ecosystems, which in turn enhance human welfare."[161] Beyond the rationale underpinning Specific Opportunity #4 and Specific Opportunity #5, Kenya's future FTF strategy must seriously consider the Global strategy's allowance for ecosystem and catchment level planning. As discussed in section 8.1 and elaborated in Strategic Recommendation 2 (in Section 9.2 below), there are key ecosystem resources under severe threat, in no small part due to encroaching agricultural production and the related land use change. Kenya's next 5-year strategy can actively target those areas, *even if they are not the most heavily populated regions in the country*, to reverse severely damaging ecosystem destruction that threatens both short- and long-term resilience for immediately proximate and down-system communities.

9.2 STRATEGIC RECOMMENDATION 2: EXPANDING GEOGRAPHIC AREAS OF FOCUS

USAID's current programming in the Mara region, the northern drylands, and the northeastern pastoral and forest areas, and USFS-led WTP efforts in Mt. Elgon, Cherengani Hills, and Mau Forest Complex water towers, all support integrated resource management for these key ecosystems. At the same time, the conservation of many of Kenya's key ecosystem resources remains outside of USAID's current strategic focus.

USAID/Kenya must continue its excellent work in the Mara region, throughout the northern rangelands, and the northeastern pastoralist and dryland forest areas. These simultaneously represent areas of significance from the perspective of biodiversity and forest management and conservation in Kenya, as well strategic areas of intervention for effective promotion of peaceful and sustainable economic growth and increased resilience to climate change. The work being done with MMWCA and NRT is establishes systems designed to foster positive outcomes for vulnerable populations in ways that are compatible with the high value biodiversity found in Kenya. However, as these systems begin (or continue to) flourish, there are additional areas that require assistance.

Specifically, USAID should look to expand its conservation efforts to include or more fully incorporate the following areas which, as discussed throughout sections 6 and 7, and elaborated further here, are significantly threatened and not currently as central a part of USAID/Kenya's programming: a) Kenya's major and minor water towers, b) the Coastal Dryland forests, c) Tsavo/Mkomazi ecosystem, and d) Kenya's marine and coastal resources, including mangroves, coral reefs, and near- and offshore fisheries. These locations areasare highlighted because of their importance for broader ecological functioning, the role more effective management or conservation of biodiversity resources in these areas could play in addressing underlying drivers of primary threats, and the fact that USAID's presence in these areas is currently limited. The assessment notes that WTP's current programming is laying essential groundwork to improve sustainability and resilience of the ecological resources in Mt. Elgon, Cherengani Hills, and Mau Forest Complex. As such, the discussion on Kenya's water towers focuses more on

[161] U.S. Government. (2016) "Global Food Security Strategy FY 2017-2021."

refining current programming priorities into specific forms of technical assistance and engagement, to increase the potential for long-term sustainable management of these critical ecosystems.

KENYA'S WATER TOWERS

While Section 8.1 pointed to some specific opportunities for USAID's programming, there is extensive opportunity for a strategic shift to strengthen Kenya's water towers. Beyond serving as essential resources for ecosystem functioning within Kenya (as detailed in Section 3.2), maintenance of the major water towers also carries regional implications (e.g., Mt. Elgon feeds transboundary lakes Victoria and Turkana). At the same time, dryland water towers such as Kirisia Forest and Marsabit Forest Reserve offer fundamental ecosystem services for the northern dryland areas but are under significant threat; between 1973 and 2005, Marsabit experienced 32 percent forest cover loss; Kirisia's lost a bit more than 21 percent from 1973 through 2015.[162]

Opportunities in the major water towers can borrow from recent programs, such as the work done via ProMara and the Securing Rights to Land and Natural Resources for Biodiversity and Livelihoods project, both of which ended in 2012. Additionally, USAID should continue to build upon the strong foundation being established via WTP. As the ecosystems valuation, climate vulnerability impact assessment, and ecological monitoring yield results that allow for the development of informed action and implementation plans, USAID/Kenya will be primed to provide technical assistance to KFS, KEFRI, and local communities. This technical assistance and capacity should range from execution of those plans, enhanced coordination and collaboration across stakeholder groups, and implementation of income-generating activities that leverage the economic benefits determined available and accessible. USAID/Kenya should also look to intertwine these support activities with

The Mission should also sharpen the focus of its expansion in the ASAL, aligning ongoing alternative livelihoods and community-based empowerment efforts to strengthen the resilience and management of the minor dryland water towers. Figure 14, in Section 8.1, and Figure 17, below, provide visualizations and mapping of potential target areas that suggest intervention opportunities. Figure 17 highlights the absence of a management plan for Marsabit Forest Reserve, and the visualization in Figure 14 demonstrates the extent of deforestation for development purpose within that Reserve, USAID should thus emphasize technical assistance to facilitate development and strong implementation of a forest management plan for the Marsabit Reserve.

Figure 17 further illustrates that USAID's current targeting of the Mau Forest Complex, Cherangani Hills, and Mt. Elgon, via WTP, aligns with those major water towers requiring substantial additional development of forest management plans. USAID should ensure WTP extends—or follow-up programming is provided—to ensure that management or action plans developed under WTP are effectively implemented and relevant stakeholders have sufficient capacity to oversee that implementation. USAID should also look for opportunities to expand its programming to support effective implementation of existing plans in Mt. Kenya and the Aberdares, potentially leveraging learnings from WTP and like programs.

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[162] Warinwa, F., Mwaura, F., Kiringe, J.W. and Ndubi, A.O., "Land Cover Dynamics in the Kirisia Forest Ecosystem, Samburu County, Kenya," *Advances in Remote Sensing,* 5 August 2016, <http://dx.doi.org/10.4236/ars.2016.53014>

COASTAL DRYALND FORESTS

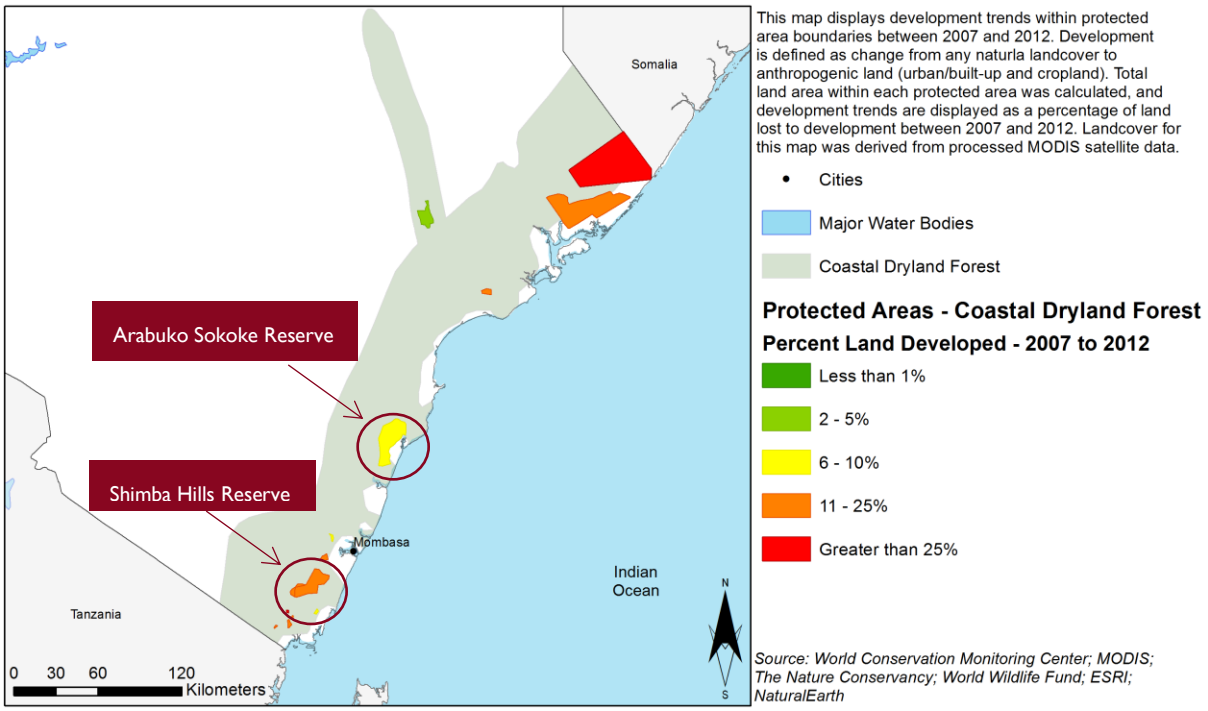
In Kenya's southern coastal dryland forest and marine areas, USAID is notably absent; conversation with USAID/Kenya indicated that past experiences with selected GoK actors operating in the southern coastal areas may have influenced programming decisions and discouraged return to programming in/around Mombasa. All the same, there is significant need—whether for CFAs, BMUs, counties, or regarding national priorities—to address the weak integration of natural resource management into broader spatial and development planning. Many of the highest risks to the coastal dryland forests can be linked directly or indirectly to the Blue Economy initiative that Kenya is pursuing under its Vision 2030 National Strategy.

As highlighted in Figure 15, below, Arabuko-Sokoke Reserve shows that between six and 10 percent of its land area was developed from 2007 to 2012. Meanwhile, 11 to 25 percent of the Shimba Hills reserve[163] was developed over the same period.[164] These connect to the broader trends in the southern coastal areas of deforestation, urban and peri-urban expansion, and increasing industrial development. Broadly, these factors and trends combine to further threaten the (often unsustainable) livelihoods of the most vulnerable populations, which increasingly depend upon these ever-depleting forest and/or biodiversity resources (e.g., charcoal production/timber extraction from dryland forests and mangroves, or near-shore marine fishing). Technical assistance to support sustainable land and water-use practices in this region are desperately needed—in addition to improved national (e.g., Marine Spatial Plan) and county- and community-level integrated resource management planning as discussed in Section 8.1—to increase resilience of the biodiversity resources in this area.

[163] The Shimba Hills is a national reserve, not a park and, as such, is managed jointly by the KFS and KWS, and under the jurisdiction of the county government. The elephant corridor between Shimba Hills and Mwaluganje is private land. Owners have received compensation for the corridor from the David Sheldrick Wildlife Trust, but without continued funding it would likely be converted for agricultural production.

[164] Importantly, Figure 18 also shows that more than 25 percent of the Boni National Reserve and 11 to 25 percent of the Dodori National Reserve along Kenya's northeastern cost were developed between 2007 and 2012. This highlights both the importance of USAID work with NRT in that region, as well as the strain on USAID to address the full range of threats facing biodiversity and tropical forests in Kenya.

Figure 15 Protected Areas – Coastal Dryland Forest: Percent Land Developed



TSAVO/MKOMAZI ECOSYSTEM

The integrated management of the Tsavo/Mkomazi ecosystem should be a major focus of international, national and county efforts, as it—along with Kenya's broader array of woodland-brushland areas—key to the long-term survival of wildlife, particularly the larger species such as elephant, rhino, giraffe, buffalo, lions, hyenas, and leopards.[165] The Tsavo/Mkomazi ecosystem includes the Taita-Taveta District, and Tsavo East and West National Parks, the Taita Hills, and *Mkomazi* National Park in Northeastern Tanzania. Given the continuity size of this area, its potential for wildlife conservation is apparent. However, discussions with various stakeholders indicate *the* Tsavo/Mkomazi ecosystem is not receiving the attention and funding required to insure its long-term viability.

As discussed in Section 6.3, the survival of wildlife, particularly elephants, in the Tsavo/Mkomazi complex and the Shimba Hills-Mwaluganje Elephant Sanctuary depends on the continued cooperation of local county government and private landowners. USAID (under the Conservation of Resources through Enterprise project), WYSS Foundation, Tsavo Trust, Save The Elephants and others have funded the Tsavo Conservation Group to work with county government, private companies, ranches and conservancies to support wildlife conservation on private lands, whose goal is to create a homogeneous landscape with an integrated land use plan.[166] Providing dedicated support, particularly to strengthen

[165] IFAW. 2005. "*Tsavo Challenges, Solutions, Hopes July 2005 - June 2011*" <http://www.ifaw.org/united-states/node/6304>

[166] Donald Mombo, Coordinator, Taita Taveta County, Per stakeholder consultation and subsequent communication in February and March, 2017

communities in understanding, realizing, and partaking in the value of this ecosystem (via direct tangible benefits that may or may not be tied to tourism) will be an essential component to ensure long-term prioritization of this area by GoK. As shown in Figure 16, below, there are opportunities to strengthen the community conservancy network in and around Taita hills, as well as in the area linking the Tsavo/Mkomazi ecosystem to the Shimba Hills reserve.

MARINE AND COASTAL RESOURCES

Despite the lack of a comprehensive Marine Spatial Plan, under Kenya Vision 2030's Blue Economy initiative, Kenya is actively promoting the refurbishment and/or expansion of large ports (both via LAPSETT in the northern coastal area, as well as Port of Mombasa), development of smaller ports throughout the coast (e.g., in Kilifi, Watamu, Shimoni), increased offshore oil and gas exploration, increased development of a national maritime fleet to more effectively exploit offshore fishery resources, continued support to and expansion of large-scale industry (e.g., sugar plantations and titanium mining), and strengthening and promotion of coastal tourism operations. Whether looking at terrestrial risks—via continued deforestation of dryland forest areas—or risks to Kenya's coral reefs, mangroves, and near- and off-shore fisheries, the lack of national spatial planning to guide the broader Blue Economy objectives is a significant concern. At the same time, entities tasked to support conservation at the county or community level, whether KFS, KWS, Kenya Fisheries, KMFRI, CFAs, or BMUs, have limited resources and/or technical capacity to develop and implement effective county- or community-level plans or strategies to better protect these valuable biodiversity and tropical forest resources. Perhaps as importantly, other donors that have had successful recent interventions in the southern coastal areas, such as the World Bank's KCDP, are ending their projects without new coastal development initiatives in the immediate pipeline. This further exacerbates the vulnerability of the coastal and marine biodiversity and communities that depend on those natural resources for their survival.

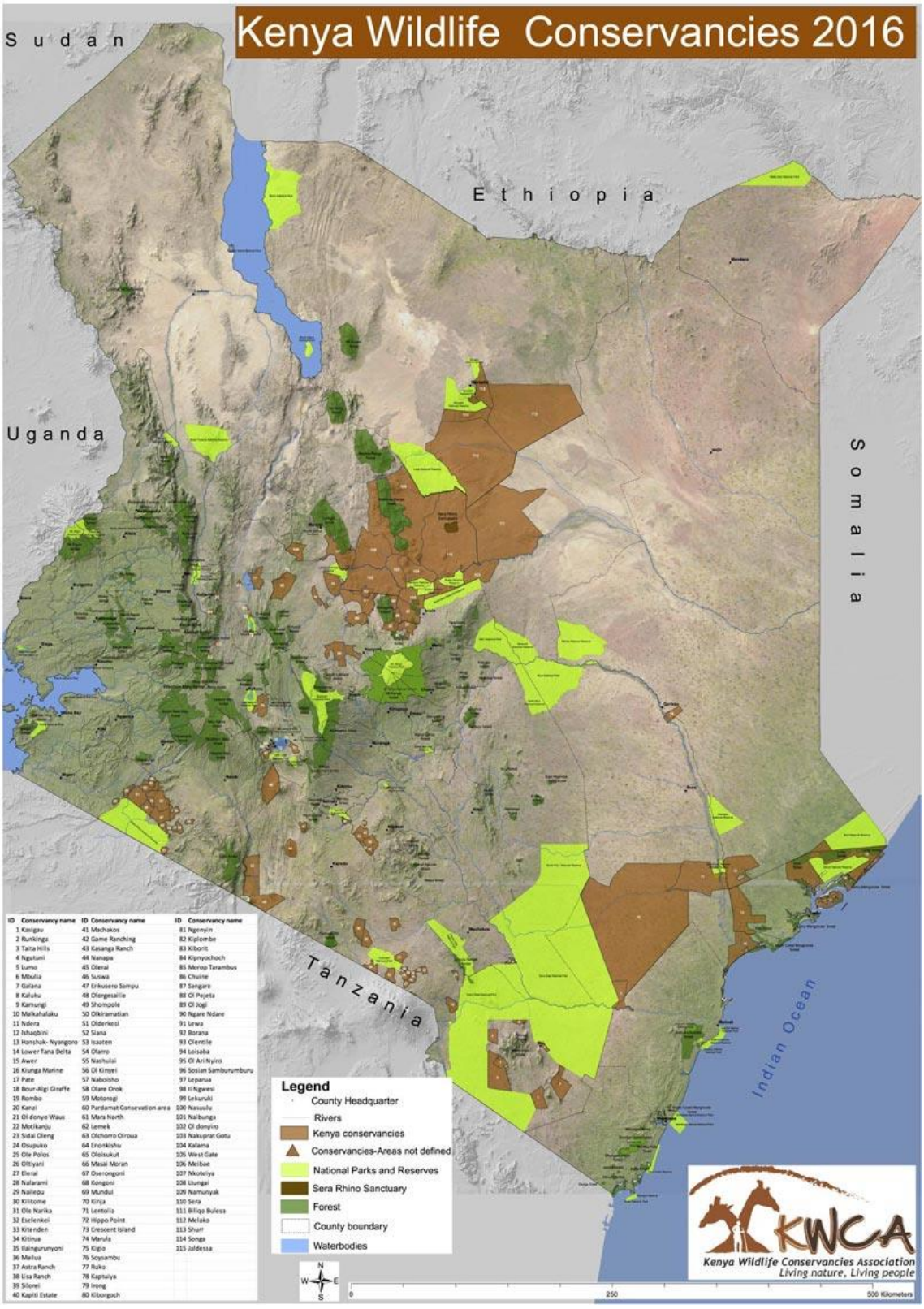
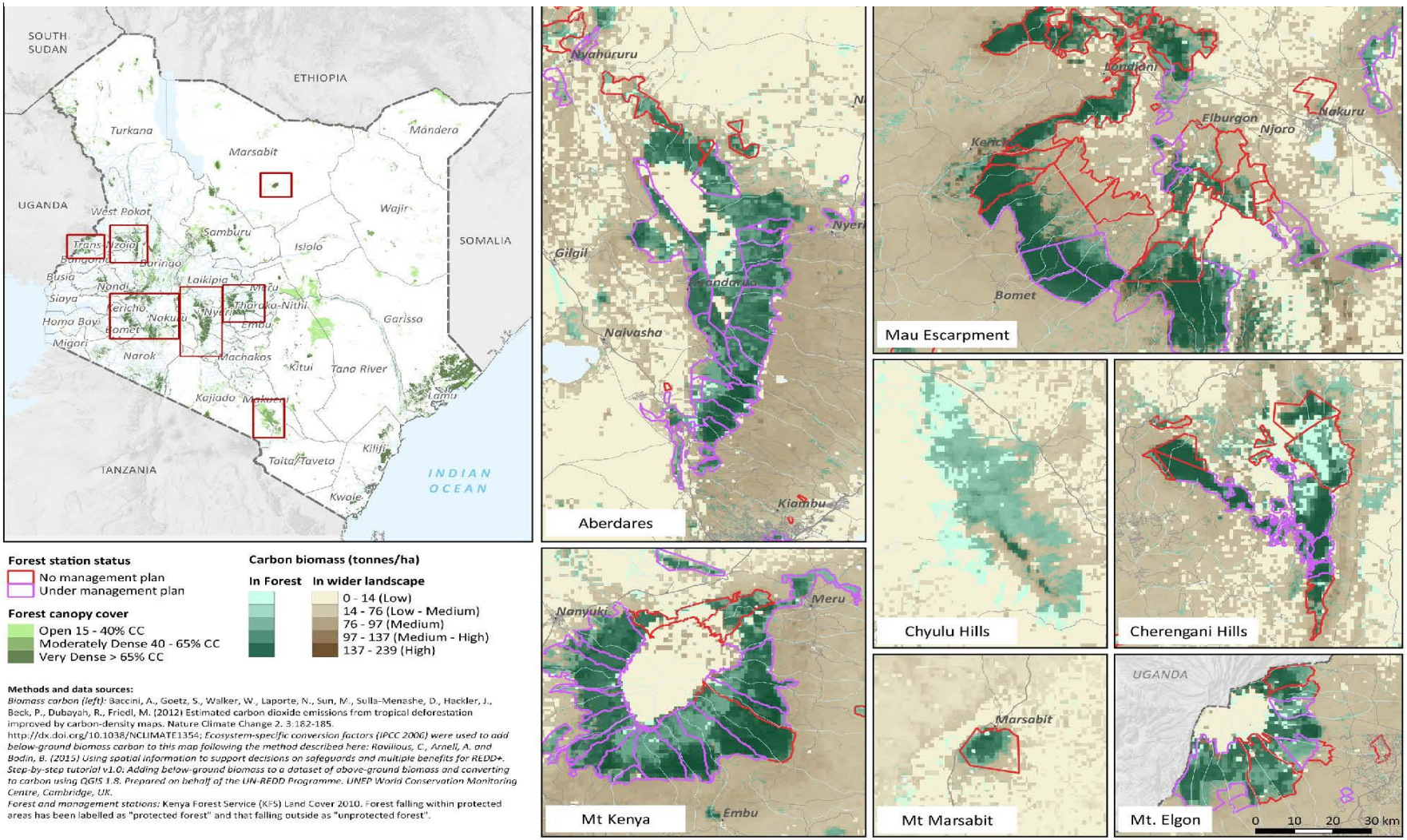


Figure 16 Kenya Wildlife Conservancies 2016

Figure 17 Forest Station Status in Kenya's Water Towers



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ANNEXES

Annex A: Stakeholders Consulted

Annex B: Institution Descriptions

Annex C: Threatened and Endangered Species

Annex D: Protected Areas information

Annex E: Biographical Sketches of Team Members

Annex F: Calculations and Sources for Valuation of Ecosystem Services

ANNEX A: STAKEHOLDERS CONSULTED

TABLE 21 TEAM A – STAKEHOLDER CONSULTATIONS			
TEAM MEMBER NAME	POSITION	INSTITUTION	CONTACT INFORMATION
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Mr. Lucas Fondo	Chairman	Mombasa Kilidini Community Forest Association(MOKICFA)	+254721327144
Mr. Dickson Juma & Mr. Katana Ngala Hinzano	Project Manager	Kuruwitu Conservation and Welfare Association	+254723163512
Mr. Geoffrey Wakaba	Warden	Kenya Wildlife Service-Shimba	+254727104764
Mr. Kafaa Rimo	Chairman	Mwaluganje	+254721765476
Mr. Mtengo Omari	Chairman	Kwale County BMU Network	+254704743007
Mr. Omar Abdallah	Secretary	Wasini Beach Management Unit Network	+254729870309
Mr. Christopher Maina	Ecosystem Conservator	Kenya Forest Service Kilifi County	+254721412255
Mr Charo Ngumbao	Vice-Chairman	Gede Community Forest Association	----
Mr. Peter Mwangi	Forester	Kenya Forest Service - Sokoke Forest Station	----
Mr. Blessington Maganga	Forester	Kenya Forest Service - Gede Forest Station	+254775518710
Mr. Nicholas Baya	Assistant Project Manager	Dabaso Community Conservation Group	+254715602048

TABLE 22 TEAM B – STAKEHOLDER CONSULTATION			
TEAM MEMBER NAME	POSITION	INSTITUTION	CONTACT INFORMATION
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Dr. Julius Tanui Dr. Winnie Musila	Director – Partnerships Ecosystems	Kenya Water Towers Agency	----
Mr. Mumo	Director, Governance	Kenya Water Towers Agency	----
Ms. Susan Boit	Deputy Director	Kenya Water Towers Agency	----
Dr. Lange	Deputy Director, Research and Planning	NEMA	CLange@nema.go.ke
Ms. Jane Nyadika	Principal Compliance Officer	NEMA	----
Mr. Wilson Busienei	Research Officer	NEMA	-----

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Ms. Gladys Warigia	Legal Officer	Kenya Wildlife Conservancies Association (KWCA)	gwarigia@kwca.com
Dr. Noah Sitati	CEO	Maasai Mara Wildlife Conservancies Association (MMWCA)	----
Ms. Fiesta Warinwa	Director, Philanthropy Africa	African Wildlife Foundation (AWF)	fwarinwa@awfke.com
Mr. Daudi Sumba	Vice President for Program Design and Government Relations	African Wildlife Foundation (AWF)	----
Mr. Dennis Kirengo	Forest Conservator	Kenya Forest Service	Denniskirengo@gmail.com, dkirengo@kenyaforestservice.or
Mr. Adan Alio	Assistant Director - Western Area Regional Office	Kenya Wildlife Service,	amalio@kws.go.ke
Mr. Bernard Kuloba	Research Officer	Kenya Wildlife Service,	----
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Mr. Maurice Munyina	Environmental Safeguards Forester	LVEMP II	lvemp2@gmail.com 0572020563
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Mr. Tom Guda	Head of BMU Network	BMU Networks	tomguda2011@yahoo.com 0727371074
Mr. Samson Lenjit	Senior Warden	Maasai Mara National Reserve	----
Mr. Dennis Rotiken	Head of Rhino Monitoring Program/Deputy to the Senior Warden	Maasai Mara National Reserve (MMNR)	----
Mr. Dickson Keiwa	Community Liaison Officer	Maasai Mara National Reserve (MMNR)	----
Mr. Stephen Manegene	Director	Wildlife Conservation, State Department of Natural Resources, Ministry of Environment and Natural Resources	smmanegene@gmail.com
Mr. Dominic Koya	Community Liaison Manager	Naboisho Conservancy	Benson@seiyaltd.com
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ANNEX B: INSTITUTION DESCRIPTIONS

TABLE 23 NON-GOVERNMENTAL ORGANIZATIONS AND COMMUNITY BASED ORGANIZATIONS	
ORGANIZATION	SUPPORT PROVIDED
ACT Kenya	Advocacy, capacity building and training, Organizational development and management of grants in the following sectors (Environment NRM, Democracy and Governance and Peace Building & conflict transformation).
African Conservation Centre (ACC)	Facilitation, technical and resource mobilization for purposes of protecting biodiversity, improving livelihoods and promoting learning exchanges.
African Wildlife Foundation	Facilitation, technical and resource mobilization towards wildlife conservation, land and habitat protection, community empowerment and economic development
Arocha Kenya	Facilitation, technical and financial support towards conservation of marine and coastal resources
Coastal and Marine Resources Development (COMRED-Africa)	Coastal and Marine Research and development
CORDIO East Africa	Coastal oceans Research and development along the Kenyan coast
East Africa Wildlife Society (EAWLS)	Policy and advocacy, information sharing & dissemination, conservation programs (forests, wildlife conservation, wetlands and marine).
Eco-ethics International Kenya Chapter	Advocacy, social development, environment education and awareness
International Fund for Animal Welfare (IFAW)	Facilitation, technical and financial towards wildlife and habitat conservation, strengthening law enforcement in KWS to combat wildlife crime, securing linkages between conservation areas, wildlife monitoring/tracking and community development
Kenya Forest Working Group	Policy and advocacy on forest management issues, forest conservation and management, capacity building and training, especially for CFAs, information sharing & dissemination and monitoring of water towers.
Kenya Wildlife Conservancies Association (KWCA)	Seeks to create an enabling environment for non-state actors' participation in wildlife conservation as well as provide a platform for them have a unified voice; and lobbies for enhanced economic incentives for land owners having wildlife conservation as a land use.
Nature Kenya	Facilitation, technical, capacity building, awareness creation, IGAs, addressing threats to biodiversity and financial support to site support Groups. They also do advocacy and monitoring of species.
Northern Rangelands Trust (NRT)	Facilitation, technical, capacity building and resource mobilization for wildlife management outside of the parks and reserves, especially conservancies in northern Kenya. Critical role played by NRT is in the mobilization of communities to establish conservancies; their formation, security, wildlife monitoring.

Osienala (Friends of Lake Victoria)	Research, capacity building, community development, catchment conservation/restoration, promotion of solar energy, participation in regional forums on the conservation of Lake Victoria
Seacology Foundation	Financial support of local community initiatives for the conservation and protection of habitats and species
The Nature Conservancy (TNC)	Facilitation, technical and financial support towards conservation of marine and coastal resources, fresh water management in Upper Tana, wildlife & habitat conservation in northern Kenya, and Lamu
Watamu Marine Association	Facilitation, technical and financial support towards conservation of marine and coastal resources
Wildlife Conservation Society (WCS)	Research and monitoring of habitats & wildlife including coral reef ecosystems and climate change
World Wide Fund for Nature	Facilitation, technical and financial support towards conservation of marine and coastal resources; governance & partnerships in NRM; Forest resource management; renewable energy, ESD, Wildlife conservation (rhino & elephants) and fresh water management.

TABLE 24 DONORS WORKING TO SUPPORT ENVIRONMENT AND NRM ACTIVITIES IN KENYA

Donor	Key Intervention Areas	Implementing Partners
Danida	• Green Growth and Employment Program focusing on 2 thematic areas: • Sustainable growth and jobs from investment and trade; • Sustainable use of resources and community resilience	Micro-enterprise Support Program Trust (MESPT), NEMA, Kenya Association of Manufacturers (KAM), Kenya Climate Innovation Centre (KCIC), Water Services Trust Fund (WSTF), MENR, NRT and Trade Mark East Africa
World Bank	• Kenya Climate Smart Agricultural Project (recently approved) - targets smallholder farming and pastoral communities in Kenya; • Kenya Water Security and Climate Resilience Project; • Promoting Biogas as a sustainable Clean Cooking Fuel for Rural Households; • Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL); • Kenya Coastal Development Project (KCDP) about to close out. • Lake Victoria Environmental Management Program (LVEMP 2) about to close.	Through KMFRI, KWS, FD, KEFRI, Coast Development Authority (CDA), Implemented Under the Lake Victoria Basin Commission (LVBC)
European Union	• Water Towers Protection and Climate Change Mitigation and Adaptation (WaTER) Programme: The Objective is to restore the	Funded through the MENR and implemented by KFS in collaboration with the KWTA,

	Cherangani and Mt. Elgon water Towers ecosystems and ecosystem services as well as the livelihoods of the people living around them.	KWS, National Climate Change Secretariat and the respective County governments where these forests are found.
Finland	• National Forestry Programme (NFP) • Water and Sanitation	Support to the implementation of the NFP. Previously funded the recently closed out program called Miti Mingi Maisha Bora (MMMB). Through Water Services Trust Fund (WSTF)
JICA	• Capacity Development Project for Sustainable Forest Management in Kenya	State Department of NR, KFS and KEFRI.
SIDA	• Water and Sanitation projects	Through WSTF
UNEP	• Finalization of the Wildlife Policy	Through the State Department of Natural Resources

ANNEX C: THREATENED AND ENDANGERED SPECIES

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Acacia condyloclada		LR/nt	1998	
ANIMALIA	Acanthastrea hemprichii		VU	2008	U
ANIMALIA	Acanthastrea ishigakiensis		VU	2014	U
ANIMALIA	Acanthastrea lordhowensis		NT	2008	U
PLANTAE	Acanthus kulalensis		VU	2015	D
ANIMALIA	Acinonyx jubatus	Cheetah, Hunting Leopard	VU	2015	D
ANIMALIA	Acrocephalus griseldis	Basra Reed-warbler, Basra Reed-Warbler, Basra Reed Warbler	EN	2016	S
ANIMALIA	Acropora aculeus		VU	2014	D
ANIMALIA	Acropora appressa		NT	2008	D
ANIMALIA	Acropora digitifera		NT	2014	D
ANIMALIA	Acropora divaricata		NT	2008	D
ANIMALIA	Acropora florida	Branch Coral	NT	2014	D
ANIMALIA	Acropora formosa	Staghorn Coral	NT	2014	D
ANIMALIA	Acropora granulosa		NT	2014	D
ANIMALIA	Acropora hemprichii		VU	2008	D
ANIMALIA	Acropora horrida		VU	2008	D
ANIMALIA	Acropora humilis	Finger Coral	NT	2014	D
ANIMALIA	Acropora hyacinthus	Brush Coral	NT	2008	D
ANIMALIA	Acropora loripes		NT	2014	D
ANIMALIA	Acropora monticulosa		NT	2014	D
ANIMALIA	Acropora nasuta		NT	2014	D
ANIMALIA	Acropora pharaonis		VU	2008	D
ANIMALIA	Acropora secale		NT	2014	D
ANIMALIA	Acropora solitaryensis		VU	2008	D
ANIMALIA	Acropora tenuis		NT	2014	D
ANIMALIA	Acropora verweyi		VU	2014	D
ANIMALIA	Acropora willisae		VU	2008	D
ANIMALIA	Actinopyga echinites	Brownfish, Deep Water Redfish	VU	2013	D
ANIMALIA	Actinopyga mauritiana	Surf Redfish	VU	2013	D
ANIMALIA	Actinopyga miliaris	Blackfish, Harry Blackfish	VU	2013	D
ANIMALIA	Adolfus alleni	Alpine Meadow Lizard	NT	2014	S
ANIMALIA	Adolfus masavaensis		NT	2014	S
ANIMALIA	Aetobatus narinari	Spotted Eagle Ray, Maylan, Bonnetray	NT	2006	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Aetobatus ocellatus	Ocellated Eagle Ray	VU	2016	D
ANIMALIA	Afrixalus sylvaticus		VU	2016	D
PLANTAE	Afrocanthium keniense		VU	1998	
PLANTAE	Afrocanthium kilifiense		VU	1998	
PLANTAE	Afrocarpus usambarensis		EN	2013	D
PLANTAE	Afrothismia baerae		CR	2009	U
PLANTAE	Agelanthus longipes		VU	2013	D
PLANTAE	Agelanthus microphyllus		EN	2013	D
PLANTAE	Agelanthus pennatulus		VU	2013	D
ANIMALIA	Alcolapia alcalicus		EN	2006	U
ANIMALIA	Alcolapia grahami		VU	2006	U
ANIMALIA	Allocnemis abbotti		NT	2010	U
PLANTAE	Allophylus zimmermannianus		VU	1998	
PLANTAE	Aloe ballyi	Rat Aloe	EN	2009	D
PLANTAE	Aloe classenii		CR	2009	D
PLANTAE	Aloe deserti		NT	2009	U
PLANTAE	Aloe erensii		EN	2013	U
PLANTAE	Aloe ketabrowniorum		EN	2013	D
PLANTAE	Aloe kilifiensis		EN	2009	D
PLANTAE	Aloe massawana		VU	2009	D
PLANTAE	Aloe penduliflora		EN	2009	U
PLANTAE	Aloe rugosifolia		VU	2013	D
PLANTAE	Aloe ukambensis		VU	2009	U
ANIMALIA	Alopias pelagicus	Pelagic Thresher, Thresher Shark, Whiptail Shark	VU	2009	D
ANIMALIA	Alopias vulpinus	Common Thresher Shark	VU	2009	D
ANIMALIA	Alveopora allingi		VU	2014	U
ANIMALIA	Alveopora daedalea		VU	2008	U
ANIMALIA	Alveopora fenestrata		VU	2014	U
ANIMALIA	Alveopora spongiosa		NT	2014	U
PLANTAE	Amorphophallus stuhlmannii		EN	2009	U
ANIMALIA	Anguilla bengalensis	Indian Mottled Eel, African Mottled Eel, Mottled Eel	NT	2014	U
ANIMALIA	Anguilla bicolor	Shortfin Eel	NT	2014	U
PLANTAE	Angylocalyx braunii		VU	1998	

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Anisocycla blepharosepala		NT	2013	D
PLANTAE	Anisotes galanae		VU	2015	D
PLANTAE	Anisotes ukambensis		EN	2015	D
ANIMALIA	Anomastraea irregularis		VU	2008	D
PLANTAE	Ansellia africana	Leopard Orchid, Monkey Sugarcane, African Ansellia, Mopane Orchid, Tree Orchid	VU	2013	D
ANIMALIA	Anthreptes reichenowi	Plain-backed Sunbird	NT	2016	D
ANIMALIA	Anthus sokokensis	Sokoke Pipit	EN	2016	D
ANIMALIA	Aonyx capensis	African Clawless Otter, Cape Clawless Otter	NT	2015	D
ANIMALIA	Apalis chariessa	White-winged Apalis	VU	2016	D
ANIMALIA	Apalis fuscigularis	Taita Apalis	CR	2016	D
ANIMALIA	Apalis kaboboensis	Kabobo Apalis	NT	2016	S
ANIMALIA	Apalis karamojae	Karamoja Apalis	VU	2016	D
ANIMALIA	Aplocheilichthys sp. nov. 'Baringo'		CR	2006	D
ANIMALIA	Aquila heliaca	Eastern Imperial Eagle, Imperial Eagle, Asian Imperial Eagle	VU	2016	D
ANIMALIA	Aquila nipalensis	Steppe Eagle	EN	2016	D
ANIMALIA	Ardeola idae	Madagascar Pond-heron, Madagascar Squacco Heron, Madagascar Pond-Heron, Malagasy Pond Heron	EN	2016	D
ANIMALIA	Ardeotis kori	Kori Bustard	NT	2016	D
ANIMALIA	Aresceutica subnuda	Usambara Dusky Grasshopper	EN	2013	U
PLANTAE	Aristogeitonia monophylla		VU	1998	
ANIMALIA	Arthroleptides dutoiti	Du Toit's Torrent Frog	CR	2016	D
PLANTAE	Aspilia macrorrhiza		EN	2016	D
PLANTAE	Asteranthe asterias		NT	2009	D
ANIMALIA	Astreopora expansa		NT	2008	D
PLANTAE	Asystasia linearis		EN	2015	D
PLANTAE	Asystasia lorata		EN	2015	D
PLANTAE	Asystasia minutiflora		VU	2015	D
ANIMALIA	Balaenoptera borealis	Sei Whale	EN	2008	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Balaenoptera musculus	Blue Whale	EN	2008	I
ANIMALIA	Balearica pavonina	Black Crowned-crane, Black Crowned-Crane, Black Crowned Crane, Northern Crowned Crane	VU	2016	D
ANIMALIA	Balearica regulorum	Grey Crowned-crane, Grey Crowned-Crane, Grey Crowned Crane, Southern Crowned Crane	EN	2016	D
PLANTAE	Baphia keniensis		VU	1998	
ANIMALIA	Barbus sp. nov. 'Pangani'		VU	2006	U
PLANTAE	Barleria athiensis		VU	2015	U
PLANTAE	Barleria lukei		EN	2015	D
PLANTAE	Barleria maculata		EN	2015	U
PLANTAE	Barleria maritima		VU	2015	D
PLANTAE	Barleria usambarica		NT	2015	D
PLANTAE	Barleria whytei		EN	2015	D
PLANTAE	Basananthe zanzibarica		VU	2013	U
PLANTAE	Bauhinia mombassae		EN	1998	
ANIMALIA	Bdeogale jacksoni	Jackson's Mongoose	NT	2015	D
ANIMALIA	Bdeogale omnivora	Sokoke Dog Mongoose, Sokoke Bushy-tailed Mongoose	VU	2016	D
ANIMALIA	Beatragus hunteri	Hirola, Hunter's Antelope, Herola, Hunter's Hartebeest	CR	2008	D
PLANTAE	Bivinia jalbertii		LR/nt	1998	
PLANTAE	Blepharis kenyensis		EN	2015	D
PLANTAE	Blepharis pratensis		VU	2015	D
PLANTAE	Blepharis turkanae		VU	2015	U
PLANTAE	Blotiella hieronymi		EN	2013	U
ANIMALIA	Bolbometopon muricatum	Green Humphead Parrotfish, Bumphead Parrotfish, Humphead Parrotfish, Double-headed Parrotfish	VU	2012	D
PLANTAE	Bothriocline nyiruensis		EN	2016	U
PLANTAE	Bottegoa insignis		LR/nt	1998	
ANIMALIA	Boulengerula changamwensis	Changamwensis African Caecilian, Changamwe Lowland Caecilian, Changamwe Caecilian	EN	2013	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Boulengerula niedeni	Sagalla Caecilian	EN	2013	U
ANIMALIA	Boulengerula taitana	Taita African Caecilian, Taita Hills Caecilian, Taita Mountains Caecilia	EN	2013	D
PLANTAE	Brachylaena huillensis		LR/nt	1998	
PLANTAE	Brachystephanus coeruleus		NT	2015	U
PLANTAE	Brucea macrocarpa		EN	1998	
ANIMALIA	Bucorvus leadbeateri	Southern Ground-hornbill, Southern Ground-Hornbill, Southern Ground Hornbill	VU	2016	D
PLANTAE	Bulbostylis clarkeana		NT	2010	U
ANIMALIA	Bulinus browni		NT	2016	D
ANIMALIA	Bulinus hightoni		NT	2010	U
ANIMALIA	Bulinus permembranaceus		VU	2016	D
ANIMALIA	Burnupia crassistriata		NT	2010	U
ANIMALIA	Burnupia stuhlmanni		NT	2016	S
ANIMALIA	Buteo oreophilus	Mountain Buzzard	NT	2016	D
PLANTAE	Buxus obtusifolia		VU	1998	
ANIMALIA	Calamonastides bensoni	Zambian Yellow Warbler	VU	2016	D
ANIMALIA	Calamonastides gracilirostris	Papyrus Yellow Warbler	VU	2016	D
ANIMALIA	Calidris ferruginea	Curlew Sandpiper	NT	2016	D
PLANTAE	Callopsis volkensii		NT	2009	D
ANIMALIA	Callulina dawida	Taita Hills Warty Frog	CR	2014	D
PLANTAE	Camptolepis ramiflora		VU	1998	
ANIMALIA	Carcharhinus albimarginatus	Silvertip Shark	VU	2016	D
ANIMALIA	Carcharhinus falciformis	Silky Shark	NT	2016	D
ANIMALIA	Carcharhinus longimanus	Oceanic Whitetip Shark, Whitetip Shark, White-tipped Shark, Whitetip Oceanic Shark	VU	2015	D
ANIMALIA	Carcharhinus macloti	Hardnose Shark	NT	2003	U
ANIMALIA	Carcharhinus melanopterus	Blacktip Reef Shark	NT	2009	D
ANIMALIA	Carcharhinus sealei	Blackspot Shark	NT	2003	U
ANIMALIA	Carcharodon carcharias	Great White Shark	VU	2009	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Caretta caretta	Loggerhead Turtle	VU	2015	D
PLANTAE	Carex monostachya		VU	2010	U
PLANTAE	Carex phragmitoides		VU	2010	U
PLANTAE	Carex runssoroensis		VU	2010	U
ANIMALIA	Catalaphyllia jardinei		VU	2008	U
ANIMALIA	Caulastrea connata		VU	2008	D
ANIMALIA	Caulastrea tumida		NT	2008	D
PLANTAE	Cephalophis lukei		EN	2015	U
ANIMALIA	Cephalophus adersi	Aders' Duiker	CR	2008	D
ANIMALIA	Cephalophus silvicultor	Yellow-backed Duiker	NT	2016	D
PLANTAE	Cephalosphaera usambarensis		VU	1998	
ANIMALIA	Ceratophallus kisumiensis		NT	2016	S
ANIMALIA	Ceratophallus subtilis		CR	2016	D
ANIMALIA	Ceratotherium simum	White Rhinoceros, Square-lipped Rhinoceros, White Rhino	NT	2012	I
ANIMALIA	Cercocebus galeritus	Tana River Mangabey, Tana River Crested Mangabey	EN	2008	D
ANIMALIA	Chaetodon trifascialis	Acropora Butterfly, Chevron Butterflyfish, Chevron Butterflyfish, Chevroned Butterflyfish, Rightangle Butterflyfish, Triangulate Butterflyfish, V-lined Butterflyfish	NT	2010	D
ANIMALIA	Charadrius pallidus	Chestnut-banded Plover	NT	2016	S
ANIMALIA	Cheilinus undulatus	Giant Wrasse, Humphead, Humphead Wrasse, Maori Wrasse, Napoleon Wrasse, Truck Wrasse, Undulate Wrasse	EN	2004	D
ANIMALIA	Chelonia mydas	Green Turtle	EN	2004	D
PLANTAE	Chlamydacanthus lindavianus		NT	2015	D
PLANTAE	Chytranthus obliquinervis		VU	1998	
ANIMALIA	Cinnyris usambaricus	Usambara Double-collared Sunbird	NT	2016	S

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Circaetus fasciolatus	Southern Banded Snake-eagle, Southern Banded Snake Eagle, Fasciated Snake-Eagle	NT	2016	D
ANIMALIA	Circus macrourus	Pallid Harrier, Pale Harrier	NT	2016	D
PLANTAE	Cissampelos nigrescens		VU	2013	D
ANIMALIA	Cisticola aberdare	Aberdare Cisticola	EN	2016	D
ANIMALIA	Clanga clanga	Greater Spotted Eagle, Spotted Eagle	VU	2016	D
ANIMALIA	Cleopatra athiensis		EN	2010	U
ANIMALIA	Cleopatra cridlandi		CR	2016	D
ANIMALIA	Cleopatra exarata		VU	2010	U
ANIMALIA	Cnemaspis elgonensis	Mt Elgon Forest Gecko	VU	2014	U
ANIMALIA	Coelatura alluaudi		VU	2016	U
ANIMALIA	Coelatura rothschildi		CR	2016	D
PLANTAE	Coffea fadenii		VU	1998	
PLANTAE	Coffea pseudozanguebariae		VU	1998	
PLANTAE	Cola octoloboides		EN	1998	
PLANTAE	Cola porphyrantha		EN	1998	
PLANTAE	Colpodium chionogeiton		VU	2004	U
PLANTAE	Colpodium hedbergii		VU	2004	U
PLANTAE	Combretum tenuipetiolatum		CR	1998	
PLANTAE	Commiphora chaetocarpa		VU	1998	
PLANTAE	Commiphora ciliata		LR/nt	1998	
PLANTAE	Commiphora corrugata		LR/nt	1998	
PLANTAE	Commiphora obovata		LR/nt	1998	
PLANTAE	Commiphora pseudopaolii		LR/nt	1998	
PLANTAE	Commiphora unilobata		LR/nt	1998	
ANIMALIA	Coryphagrion grandis	East Coast Giant	VU	2010	U
ANIMALIA	Coscinaraea crassa		NT	2008	U
ANIMALIA	Crocidura allex	East African Highland Shrew, Highlands Shrew	VU	2008	D
PLANTAE	Crossandra friesiorum		VU	2015	D
PLANTAE	Crotalaria jacksonii		VU	2012	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Croton alienus		EN	1998	
PLANTAE	Croton megalocarpoides		LR/nt	1998	
PLANTAE	Croton talaeporos		LR/nt	1998	
ANIMALIA	Ctenochromis aff. pectoralis		VU	2004	U
ANIMALIA	Cynarina lacrymalis		NT	2008	U
PLANTAE	Cynometra lukei		EN	1998	
PLANTAE	Cynometra suaheliensis		VU	1998	
PLANTAE	Cynometra webberi		VU	1998	
PLANTAE	Cynorkis uncata		VU	2013	U
PLANTAE	Cyperus afroalpinus		NT	2010	U
PLANTAE	Cyperus afrodunensis		EN	2013	U
PLANTAE	Cyperus flavoculmis		CR	2010	U
PLANTAE	Cyperus microumbellatus		CR	2010	U
PLANTAE	Dalbergia bracteolata		LR/nt	1998	
PLANTAE	Dalbergia eremicola		NT	2012	U
PLANTAE	Dalbergia gloveri		EN	2013	D
PLANTAE	Dalbergia melanoxylon	African Blackwood, Mozambique Ebony	LR/nt	1998	
PLANTAE	Dalbergia vacciniifolia		VU	1998	
PLANTAE	Dasylepis integra		VU	1998	
ANIMALIA	Deckenia imitatrix		NT	2008	D
ANIMALIA	Deckenia mitis		NT	2008	D
PLANTAE	Delonix baccal	Poinciana	NT	2014	D
ANIMALIA	Dendrohyrax validus	Eastern Tree Hyrax	NT	2015	D
PLANTAE	Dendrosenecio cheranganiensis		EN	2016	U
ANIMALIA	Dermochelys coriacea	Leatherback, Leatherback Sea Turtle, Leathery Turtle, Luth, Trunkback Turtle, Trunk Turtle, Coffin-back	VU	2013	D
PLANTAE	Deschampsia angusta		VU	2004	U
PLANTAE	Dialium holtzii		VU	1998	
PLANTAE	Dialium orientale		LR/nt	1998	
ANIMALIA	Diceros bicornis	Black Rhinoceros, Hook-lipped Rhinoceros	CR	2012	I
PLANTAE	Dicliptera cicatricosa		EN	2015	U
PLANTAE	Dicliptera cordibracteata		EN	2015	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Dicliptera inconspicua		VU	2015	D
PLANTAE	Dicliptera latibracteata		VU	2015	D
PLANTAE	Dicliptera napierae		EN	2015	D
PLANTAE	Dicliptera nilotica		VU	2015	D
PLANTAE	Dicraeopetalum stipulare		VU	1998	
PLANTAE	Diospyros amaniensis		VU	1998	
PLANTAE	Diospyros greenwayi		VU	1998	
PLANTAE	Diospyros shimbaensis		EN	1998	
PLANTAE	Diospyros wajirensis		LR/nt	1998	
PLANTAE	Diphasiopsis fadenii		VU	1998	
ANIMALIA	Diploastrea heliopora		NT	2014	D
PLANTAE	Disperis aphylla		VU	2013	U
PLANTAE	Dorstenia goetzei		NT	2013	D
PLANTAE	Dorstenia tenuiradiata		VU	2013	D
PLANTAE	Dorstenia warneckei		NT	2013	D
ANIMALIA	Dugong dugon	Dugong, Sea Cow	VU	2015	D
PLANTAE	Duosperma subquadrangulare		VU	2015	D
ANIMALIA	Echinopora forskaliana		NT	2008	D
ANIMALIA	Echinopora mammiformis		NT	2008	D
ANIMALIA	Echinopora robusta		VU	2008	D
ANIMALIA	Eidolon helvum	African Straw-coloured Fruit-bat, Staw-coloured Flying Fox, Pale Xantharpy, Straw-coloured Fruit Bat	NT	2008	D
PLANTAE	Ellipanthus hemandradenioides		LR/nt	1998	
PLANTAE	Emilia bellioides		VU	2016	U
PLANTAE	Encephalartos hildebrandtii	Mombasa Cycad	NT	2010	D
PLANTAE	Encephalartos kisambo	Voi Cycad	EN	2010	D
PLANTAE	Englerina drummondii		VU	2013	D
PLANTAE	Englerina ramulosa		EN	2013	U
PLANTAE	Entandrophragma angolense		VU	1998	
ANIMALIA	Epinephelus coioides	Orange-spotted Grouper, Estuary Cod	NT	2004	D
ANIMALIA	Epinephelus fuscoguttatus	Brown-marbled Grouper, Tiger grouper	NT	2004	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Epinephelus lanceolatus	Giant Grouper, Queensland Groper, Brindle Bass, Brindled Grouper	VU	2006	D
ANIMALIA	Epinephelus malabaricus	Malabar Grouper	NT	2006	D
ANIMALIA	Epinephelus polyphekadion	Camouflage Grouper	NT	2006	D
ANIMALIA	Equus grevyi	Grevy's Zebra	EN	2016	S
ANIMALIA	Equus quagga	Plains Zebra, Painted Zebra, Common Zebra, Burchell's Zebra	NT	2016	D
PLANTAE	Eragrostis ambleia		VU	2013	U
PLANTAE	Eragrostis perbella		VU	2013	U
ANIMALIA	Eremomela turneri	Turner's Eremomela	EN	2016	D
ANIMALIA	Eretmochelys imbricata	Hawksbill Turtle	CR	2008	D
PLANTAE	Erianthemum alveatum		VU	2013	D
PLANTAE	Erianthemum occultum		VU	2013	D
PLANTAE	Erythrina sacleuxii		NT	2012	S
PLANTAE	Ethulia scheffleri		EN	2010	U
ANIMALIA	Eudorcas thomsonii	Thomson's Gazelle	NT	2008	D
PLANTAE	Eugenia tanaensis		EN	2013	D
ANIMALIA	Euonyma curtissima		EN	1996	
PLANTAE	Euphorbia cussonioides		VU	1998	
PLANTAE	Euphorbia pervittata		VU	2013	D
PLANTAE	Euphorbia tanaensis		CR	1998	
PLANTAE	Euphorbia wakefieldii		EN	1998	
ANIMALIA	Euphyllia cristata		VU	2014	S
ANIMALIA	Euphyllia glabrescens		NT	2014	U
ANIMALIA	Euplectes jacksoni	Jackson's Widowbird, Jackson's Whydah	NT	2016	S
ANIMALIA	Eussoia inopina		EN	2010	U
ANIMALIA	Falco cherrug	Saker Falcon, Saker	EN	2016	D
ANIMALIA	Falco concolor	Sooty Falcon	NT	2016	D
ANIMALIA	Falco fasciinucha	Taita Falcon, Teita Falcon	VU	2016	D
ANIMALIA	Falco vespertinus	Red-footed Falcon, Western Red-footed Falcon	NT	2016	D
ANIMALIA	Favia helianthoides		NT	2014	D
ANIMALIA	Favia lacuna		NT	2008	D
ANIMALIA	Favia laxa		NT	2008	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Favia lizardensis		NT	2008	D
ANIMALIA	Favia maritima		NT	2014	D
ANIMALIA	Favia matthaii		NT	2014	D
ANIMALIA	Favia maxima		NT	2014	D
ANIMALIA	Favia stelligera		NT	2014	D
ANIMALIA	Favia vietnamensis		NT	2008	D
ANIMALIA	Favites abdita		NT	2014	D
ANIMALIA	Favites acuticollis		NT	2008	D
ANIMALIA	Favites chinensis		NT	2008	D
ANIMALIA	Favites complanata		NT	2008	D
ANIMALIA	Favites flexuosa		NT	2014	D
ANIMALIA	Favites halicora		NT	2014	D
ANIMALIA	Favites micropentagona		NT	2008	D
ANIMALIA	Favites russelli		NT	2014	D
ANIMALIA	Favites spinosa		VU	2008	D
ANIMALIA	Favites stylifera		NT	2008	D
ANIMALIA	Favites vasta		NT	2008	D
ANIMALIA	Ferrissia kavirondica		EN	2016	U
PLANTAE	Ficus faulkneriana		VU	2013	D
ANIMALIA	Fraseria lendu	Chapin's Flycatcher	VU	2016	D
ANIMALIA	Fungia curvata		VU	2008	U
ANIMALIA	Fungia fungites	Common Mushroom Coral	NT	2014	U
ANIMALIA	Gabbiella barthi		CR	2016	U
ANIMALIA	Gabbiella rosea		NT	2010	U
ANIMALIA	Gabbiella verdcourti		EN	2010	U
ANIMALIA	Galagoides orinus	Mountain Dwarf Galago, Amani Dwarf Galago, Uluguru Bushbaby	NT	2008	D
ANIMALIA	Galaxea astreata		VU	2008	U
ANIMALIA	Galaxea fascicularis		NT	2014	U
ANIMALIA	Galeocerdo cuvier	Tiger Shark	NT	2009	U
ANIMALIA	Gallinago media	Great Snipe	NT	2016	D
PLANTAE	Gardenia transvenulosa		VU	1998	
ANIMALIA	Gastropholis prasina	Green Keel-bellied Lizard	NT	2015	U
ANIMALIA	Geokichla guttata	Spotted Ground-thrush, Spotted Ground Thrush, Natal Thrush, Spotted Forest Thrush, Spotted Ground-Thrush	EN	2016	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Gigasiphon macrosiphon		EN	1998	
ANIMALIA	Giraffa camelopardalis	Giraffe	VU	2016	D
PLANTAE	Gladiolus usambarensis		NT	2009	U
ANIMALIA	Glareola ocularis	Madagascar Pratincole	VU	2016	D
PLANTAE	Gonatopus marattioides		EN	2009	D
PLANTAE	Gonatopus petiolulatus		VU	2009	D
ANIMALIA	Goniastrea columella		NT	2008	D
ANIMALIA	Goniastrea deformis		VU	2008	D
ANIMALIA	Goniastrea favulus		NT	2008	D
ANIMALIA	Goniastrea minuta		NT	2008	D
ANIMALIA	Goniastrea palauensis		NT	2014	D
ANIMALIA	Goniastrea peresi		NT	2008	D
ANIMALIA	Goniopora lobata		NT	2014	U
ANIMALIA	Goniopora minor		NT	2014	U
ANIMALIA	Goniopora stokesi		NT	2008	U
ANIMALIA	Grammomys gigas	Giant Thicket Rat	EN	2016	U
PLANTAE	Guibourtia schliebenii		VU	2013	D
ANIMALIA	Gulella taitensis		EN	2004	D
PLANTAE	Gymnosiphon usambaricus		EN	2009	U
PLANTAE	Gynura campanulata		CR	2016	U
ANIMALIA	Gypaetus barbatus	Bearded Vulture, Lammergeyer	NT	2016	D
ANIMALIA	Gyps africanus	White-backed Vulture	CR	2016	D
ANIMALIA	Gyps rueppelli	R<fc>ppell's Vulture, Ruppell's Vulture, R<fc>ppell's Griffon Vulture, Rueppell's Griffon	CR	2016	D
PLANTAE	Habenaria plectromaniaca		VU	2013	U
PLANTAE	Habenaria stylites		VU	2013	U
ANIMALIA	Haematopus ostralegus	Eurasian Oystercatcher, Pied Oystercatcher	NT	2016	D
ANIMALIA	Haplochromis bicolor		VU	2016	U
ANIMALIA	Haplochromis chromogynos		VU	2010	I
ANIMALIA	Haplochromis dentex		CR	2010	D
ANIMALIA	Haplochromis fischeri		VU	2010	U

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Haplochromis granti		CR	2010	D
ANIMALIA	Haplochromis guiarti		CR	2010	D
ANIMALIA	Haplochromis ishmaeli		CR	2010	D
ANIMALIA	Haplochromis macrognathus		CR	2010	D
ANIMALIA	Haplochromis martini		CR	2010	D
ANIMALIA	Haplochromis maxillaris		VU	2010	U
ANIMALIA	Haplochromis megalops		VU	2010	I
ANIMALIA	Haplochromis michaeli		CR	2010	D
ANIMALIA	Haplochromis nubilus		VU	2010	U
ANIMALIA	Haplochromis obesus		CR	2010	D
ANIMALIA	Haplochromis obliquidens		VU	2010	U
ANIMALIA	Haplochromis parvidens		CR	2010	D
ANIMALIA	Haplochromis pyrrhopteryx		CR	2010	D
ANIMALIA	Haplochromis retrodens		VU	2016	U
ANIMALIA	Haplochromis sauvagei	Rock Kribensis	VU	2010	U
ANIMALIA	Haplochromis sp. nov. 'Amboseli'		CR	2004	U
ANIMALIA	Haplochromis victorianus		CR	2010	D
ANIMALIA	Harpagochromis sp. nov. 'frogmouth'		VU	1996	
ANIMALIA	Hedydipna pallidigaster	Amani Sunbird	EN	2016	D
ANIMALIA	Heliopora coerulea	Blue Coral	VU	2008	D
PLANTAE	Hibiscus greenwayi		VU	2013	U
PLANTAE	Hibiscus holstii		VU	2013	U
ANIMALIA	Himantura uarnak	Reticulate Whipray, Marbled Stingray, Leopard Stingray, Honeycomb Stingray	VU	2016	D
ANIMALIA	Hippopotamus amphibius	Hippopotamus, Large Hippo, Common Hippopotamus	VU	2008	D
ANIMALIA	Hipposideros vittatus	Commerson's Leafnosed Bat, Commerson's Roundleaf Bat, Commerson's Rhinolph, Giant Leaf-nosed Bat	NT	2008	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Hirundo atrocaerulea	Blue Swallow	VU	2016	D
PLANTAE	Holmskioldia gigas		CR	1998	
ANIMALIA	Holothuria arenacava		VU	2013	U
ANIMALIA	Holothuria fuscogilva		VU	2013	D
ANIMALIA	Holothuria lessoni	Golden Sandfish	EN	2013	D
ANIMALIA	Holothuria nobilis	Black Teatfish	EN	2013	
ANIMALIA	Holothuria scabra	Golden Sandfish, Sandfish	EN	2013	D
ANIMALIA	Horastrea indica		VU	2008	U
PLANTAE	Huperzia holstii		NT	2013	U
ANIMALIA	Hyaena hyaena	Striped Hyaena	NT	2015	D
ANIMALIA	Hydnophora exesa		NT	2014	U
ANIMALIA	Hydnophora microconos		NT	2014	U
ANIMALIA	Hydrictis maculicollis	Spotted-necked Otter, Speckle-throated Otter, Spot-necked Otter	NT	2015	D
ANIMALIA	Hydrobates matsudairae	Matsudaira's Storm-petrel, Matsudaira's Storm-Petrel, Matsudaira's Storm Petrel	VU	2016	U
PLANTAE	Hygrophila asteracanthoides		NT	2010	U
PLANTAE	Hylebates chlorochloe		VU	2013	U
ANIMALIA	Hyperolius cystocandicans	Tigoni Reed Frog, Bladder Reed Frog	NT	2016	D
ANIMALIA	Hyperolius rubrovermiculatus		EN	2016	D
ANIMALIA	Incertihydrobia teesdalei		CR	2010	U
PLANTAE	Ipomoea flavivillosa		EN	2013	U
PLANTAE	Isoetes nigroreticulata		CR	2010	U
PLANTAE	Isoglossa candelabrum		EN	2015	U
PLANTAE	Isolona cauliflora		EN	2009	D
ANIMALIA	Isopora brueggemanni		VU	2008	D
ANIMALIA	Isopora cuneata		VU	2014	D
ANIMALIA	Isopora palifera	Catch Bowl Coral	NT	2014	D
ANIMALIA	Isurus oxyrinchus	Shortfin Mako	VU	2009	D
ANIMALIA	Ixalidium sjostedti	Kilimanjaro Drumming Grasshopper	VU	2014	U
PLANTAE	Jatropha hildebrandtii		VU	2013	D
PLANTAE	Julbernardia magnistipulata		VU	1998	
PLANTAE	Justicia anisophylla		NT	2015	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Justicia brevipila		VU	2015	D
PLANTAE	Justicia breviracemosa		EN	2015	D
PLANTAE	Justicia drummondii		CR	2015	D
PLANTAE	Justicia faulknerae		EN	2015	D
PLANTAE	Justicia galeata		VU	2015	D
PLANTAE	Justicia gilbertii		VU	2015	U
PLANTAE	Justicia heterotricha		VU	2015	D
PLANTAE	Justicia kulalensis		VU	2015	U
PLANTAE	Justicia regis		NT	2015	U
ANIMALIA	Kajikia audax	Striped Marlin	NT	2011	D
ANIMALIA	Kinyongia asheorum	Mount Nyiro Bearded Chameleon	NT	2014	U
ANIMALIA	Kinyongia boehmei	Taita Blade-horned Chameleon, B<f6>hme's Two-horned Chameleon	NT	2014	U
ANIMALIA	Kinyongia excubitor	Mount Kenya Sentinel Chameleon, Mt Kenya Hornless Chameleon	VU	2014	S
ANIMALIA	Kinyongia tavetana	Kilimanjaro Blade-horned Chameleon, Mt. Kilimanjaro Two-Horned Chameleon	NT	2014	D
PLANTAE	Kleinia leptophylla		EN	2016	U
PLANTAE	Kraussia speciosa		VU	1998	
ANIMALIA	Labeo percivali	Ewaso Nyiro Labeo	VU	2006	U
ANIMALIA	Labeo sp. nov. 'Baomo'		VU	2004	U
ANIMALIA	Labeo sp. nov. 'Mzima'		VU	2004	U
ANIMALIA	Labeo trigliceps		VU	2006	U
ANIMALIA	Labeo victorianus	Ningu	CR	2016	D
ANIMALIA	Laniarius mufumbiri	Papyrus Gonolek	NT	2016	D
ANIMALIA	Lanistes ciliatus		VU	2010	U
ANIMALIA	Larus leucophthalmus	White-eyed Gull	NT	2016	S
PLANTAE	Lellingeria strangeana		VU	2013	D
PLANTAE	Lepidagathis pseudoaristata		EN	2015	D
ANIMALIA	Lepidochelys olivacea	Olive Ridley, Pacific Ridley	VU	2008	D
ANIMALIA	Leptastrea bottae		NT	2014	D
ANIMALIA	Leptastrea inaequalis		NT	2008	D
ANIMALIA	Leptoria irregularis		VU	2008	D
ANIMALIA	Leptoria phrygia		NT	2014	D
ANIMALIA	Leptoseris incrustans		VU	2014	U

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PLANTAE	Lettowianthus stellatus		NT	2009	
ANIMALIA	Limosa lapponica	Bar-tailed Godwit	NT	2016	D
ANIMALIA	Limosa limosa	Black-tailed Godwit	NT	2016	D
ANIMALIA	Litocranius walleri	Gerenuk	NT	2016	D
PLANTAE	Lonchocarpus kanurii		LR/nt	1998	
PLANTAE	Lovoa swynnertonii	Brown Mahogany, Kilimanjaro Mahogany	NT	2013	D
ANIMALIA	Loxodonta africana	African Elephant	VU	2008	I
PLANTAE	Luzula mannii		VU	2010	U
ANIMALIA	Lycaon pictus	African Wild Dog, Painted Hunting Dog, Cape Hunting Dog	EN	2012	D
PLANTAE	Macaranga conglomerata		VU	1998	
ANIMALIA	Macronyx sharpei	Sharpe's Longclaw, Sharpe's Pipit	EN	2016	D
ANIMALIA	Makaira nigricans	Blue Marlin	VU	2011	D
ANIMALIA	Malacochersus tornieri	Crevice Tortoise, Pancake Tortoise, Softshell Tortoise, Tornier's Tortoise	VU	1996	
ANIMALIA	Manta birostris	Giant Manta Ray, Oceanic Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Chevron Manta Ray	VU	2011	D
ANIMALIA	Marcusenius sp. nov. 'Malindi'		VU	2004	U
ANIMALIA	Marcusenius sp. nov. 'Turkwell'		VU	2004	U
PLANTAE	Marsilea botryocarpa		EN	2013	U
PLANTAE	Marsilea fadeniana		CR	2013	U
PLANTAE	Megalochlamys tanaensis		CR	2015	D
PLANTAE	Meineckia ovata		VU	1998	
PLANTAE	Memecylon buxoides		CR	2013	D
PLANTAE	Memecylon teitense		VU	2013	U
PLANTAE	Memecylon verruculosum		VU	2013	U
ANIMALIA	Mertensophryne lonnbergi	L<f6>nnbergs Toad, Lonnbergs Toad	VU	2016	D
PLANTAE	Micrococca scariosa		VU	1998	

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PLANTAE	Mildbraedia carpinifolia		VU	1998	
PLANTAE	Milicia excelsa		LR/nt	1998	
PLANTAE	Mimusops riparia		VU	1998	
PLANTAE	Mkilua fragrans		VU	2009	D
ANIMALIA	Mobula eregoodootenkee	Pygmy Devilray	NT	2003	U
ANIMALIA	Mola mola	Ocean Sunfish, Mola Ocean Sunfish, Moonfish, Giant Sunfish, Sunfish, Sun-fish, Headfish	VU	2015	D
PLANTAE	Monanthotaxis faulknerae		EN	2009	D
ANIMALIA	Montastrea annuligera		NT	2008	D
ANIMALIA	Montastrea magnistellata		NT	2014	D
ANIMALIA	Montastrea serageldini		VU	2008	D
ANIMALIA	Montastrea valenciennesi		NT	2014	D
ANIMALIA	Montipora calcarea		VU	2008	D
ANIMALIA	Montipora caliculata		VU	2014	D
ANIMALIA	Montipora cryptus		NT	2008	D
ANIMALIA	Montipora efflorescens		NT	2014	D
ANIMALIA	Montipora effusa		NT	2008	D
ANIMALIA	Montipora foliosa		NT	2014	D
ANIMALIA	Montipora foveolata		NT	2014	D
ANIMALIA	Montipora nodosa		NT	2008	D
ANIMALIA	Montipora peltiformis		NT	2008	D
ANIMALIA	Montipora stilosa		VU	2008	D
ANIMALIA	Montipora undata		NT	2008	D
ANIMALIA	Montipora venosa		NT	2014	D
PLANTAE	Moringa arborea		VU	1998	
PLANTAE	Multidentia sclerocarpa		VU	1998	
ANIMALIA	Mutela bourguignati		NT	2016	U
ANIMALIA	Necrosyrtes monachus	Hooded Vulture	CR	2016	D
ANIMALIA	Neophron percnopterus	Egyptian Vulture, Egyptian Eagle	EN	2016	D
ANIMALIA	Neotis denhami	Denham's Bustard, Stanley Bustard	NT	2016	D

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ANIMALIA	Neritina natalensis		NT	2010	U
PLANTAE	Nesaea parkeri		EN	2013	D
PLANTAE	Nesaea pedicellata		VU	2013	D
PLANTAE	Nesaea stuhlmannii		EN	2013	D
PLANTAE	Nesaea triflora		EN	2013	D
PLANTAE	Neuracanthus ukambensis		VU	2015	D
PLANTAE	Newtonia erlangeri		EN	2012	D
PLANTAE	Newtonia paucijuga		VU	1998	
ANIMALIA	Nothobranchius bojiensis	Boji Plains Nothobranch	VU	2006	U
ANIMALIA	Nothobranchius elongatus	Elongate Nothobranch	VU	2006	U
ANIMALIA	Nothobranchius interruptus	Kikambala Nothobranch	VU	2006	U
ANIMALIA	Nothobranchius willerti	Mnanzini Nothobranch	VU	2006	U
ANIMALIA	Notogomphus maathaiae	Maathai's Longleg	EN	2016	U
ANIMALIA	Numenius arquata	Eurasian Curlew, Curlew	NT	2016	D
PLANTAE	Ocotea argylei		VU	1998	
PLANTAE	Ocotea kenyensis		VU	1998	
PLANTAE	Oncella curviramea		VU	2013	D
PLANTAE	Ophrypetalum odoratum		VU	2009	D
ANIMALIA	Oreochromis esculentus	Singidia Tilapia	CR	2006	D
ANIMALIA	Oreochromis hunteri	Lake Chala Tilapia	CR	2006	D
ANIMALIA	Oreochromis jipe	Jipe Tilapia	CR	2006	D
ANIMALIA	Oreochromis variabilis		CR	2006	D
ANIMALIA	Oryx beisa	Beisa Oryx	NT	2008	D
ANIMALIA	Otomops martiensseni	Large-eared Free-tailed Bat, Martiensen's Free-tailed Bat, Large-eared Giant Mastiff Bat, Giant Mastiff Bat, Martienssen Bat, Martienssen's Big-eared Bulldog Bat	NT	2008	D
ANIMALIA	Otomys barbouri	Barbour's Vlei Rat	EN	2008	D
ANIMALIA	Otomys lacustris	Tanzanian Vlei Rat	VU	2008	D

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ANIMALIA	Otus ireneae	Sokoke Scops-owl, Sokoke Scops-Owl, Sokoke Scops Owl, Morden's Scops-owl	EN	2016	D
ANIMALIA	Oulophyllia crispa		NT	2014	D
PLANTAE	Ouratea schusteri		VU	1998	
ANIMALIA	Oxymonacanthus longirostris	Harlequin Filefish, Longnosed Filefish, Beaked Leatherjacket, Coral Filefish	VU	2016	D
PLANTAE	Oxystigma msoo		VU	1998	
ANIMALIA	Oxyura maccoa	Maccoa Duck	NT	2016	D
ANIMALIA	Pachyseris rugosa		VU	2014	U
PLANTAE	Pandanus kajui		VU	1998	
PLANTAE	Pandanus rabaiensis		NT	2009	D
PLANTAE	Panicum nudiflorum		EN	2013	U
PLANTAE	Panicum pinifolium		VU	2013	U
PLANTAE	Panicum pleianthum		NT	2013	U
ANIMALIA	Panthera leo	Lion, African Lion	VU	2016	D
ANIMALIA	Panthera pardus	Leopard	VU	2016	D
PLANTAE	Pavetta linearifolia		VU	1998	
PLANTAE	Pavetta tarennoides		VU	1998	
ANIMALIA	Pavona cactus		VU	2014	U
ANIMALIA	Pavona decussata	Cactus Coral	VU	2014	U
ANIMALIA	Pavona venosa		VU	2014	U
ANIMALIA	Pectinia africanus		VU	2008	U
ANIMALIA	Pectinia lactuca	Lettuce Coral	VU	2008	U
ANIMALIA	Pelomys isseli	Issel's Groove-toothed Swamp Rat	NT	2016	U
ANIMALIA	Pelusios broadleyi	Turkana Mud Turtle, Lake Turkana Hinged Terrapin	VU	1996	
ANIMALIA	Phataginus tricuspis	White-bellied Pangolin, African White-bellied Pangolin, Tree Pangolin, Three-cusped Pangolin	VU	2014	D
ANIMALIA	Phoeniconaias minor	Lesser Flamingo	NT	2016	D
ANIMALIA	Phrynobatrachus irangi	Irangi Puddle Frog	EN	2016	D
ANIMALIA	Phrynobatrachus kinangopensis	Kinangop River Frog	VU	2016	D
ANIMALIA	Phrynobatrachus ungujae		EN	2016	D
ANIMALIA	Phyllastrephus albigula	Montane Tiny Greenbul	NT	2016	D

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ANIMALIA	Physeter macrocephalus	Sperm Whale, Cachelot, Spermacet Whale, Pot Whale	VU	2008	U
ANIMALIA	Physogyra lichtensteini		VU	2014	U
ANIMALIA	Piliocolobus rufomitratus	Tana River Red Colobus, Eastern Red Colobus	EN	2016	D
ANIMALIA	Pisidium artifex		VU	2010	D
ANIMALIA	Pisidium montigenum		NT	2010	U
PLANTAE	Pistacia aethiopica		LR/nt	1998	
ANIMALIA	Platycypha amboniensis	Kenya Jewel	CR	2010	U
ANIMALIA	Platygyra acuta		NT	2008	D
ANIMALIA	Platygyra carnosus		NT	2008	D
ANIMALIA	Platygyra crosslandi		NT	2008	D
ANIMALIA	Platygyra lamellina		NT	2008	D
PLANTAE	Plectranthus triangularis		NT	2013	D
ANIMALIA	Plectropomus laevis	Blacksaddled Coral Grouper	VU	2008	D
ANIMALIA	Plectropomus pessuliferus	Roving Coralgrouper, Violet Coral Trout, Leopard Grouper	NT	2008	D
ANIMALIA	Plerogyra sinuosa		NT	2014	U
ANIMALIA	Plesiastrea devantieri		NT	2008	D
ANIMALIA	Ploceus golandi	Clarke's Weaver	EN	2016	D
PLANTAE	Pneumatopteris usambarensis		EN	2013	U
ANIMALIA	Pocillopora eydouxi		NT	2014	U
ANIMALIA	Podabacia motuporensis		NT	2008	U
ANIMALIA	Poeoptera femoralis	Abbott's Starling	VU	2016	D
ANIMALIA	Polemaetus bellicosus	Martial Eagle	VU	2016	D
PLANTAE	Polyalthia stuhlmannii		VU	2009	D
PLANTAE	Polyscias kikuyuensis	Parasol Tree	VU	1998	
PLANTAE	Polyscias stuhlmannii		EN	2009	U
PLANTAE	Polystachya disiformis		EN	2013	U
PLANTAE	Polystachya fischeri		EN	2013	U
PLANTAE	Polystachya holstii		EN	2013	U
PLANTAE	Polystachya teitensis		EN	2013	U
PLANTAE	Populus ilicifolia	Tana River Poplar	VU	1998	
ANIMALIA	Porites cylindrica		NT	2014	U
ANIMALIA	Porites echinulata		NT	2008	U
ANIMALIA	Porites lobata		NT	2014	U

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ANIMALIA	Porites murrayensis		NT	2014	U
ANIMALIA	Porites nigrescens		VU	2014	U
ANIMALIA	Porites somaliensis		NT	2008	U
ANIMALIA	Potamonautes pilosus		VU	2008	U
ANIMALIA	Potamonautes platycentron		EN	2008	U
ANIMALIA	Potamonautes raybouldi	East African Tree Hole Crab	VU	2008	U
ANIMALIA	Potamonautes subukia	Subukia Crab	VU	2016	U
PLANTAE	Premna maxima		VU	1998	
ANIMALIA	Prionace glauca	Blue Shark	NT	2009	U
ANIMALIA	Prionops poliolophus	Grey-crested Helmet-shrike, Grey-crested Helmet Shrike, Grey-crested Helmetshrike	NT	2016	D
ANIMALIA	Pristis zijsron	Green Sawfish, Olive Sawfish, Narrowsnout Sawfish, Longcomb Sawfish	CR	2013	D
PLANTAE	Prunus africana	Red Stinkwood, African Cherry, African Almond	VU	1998	
ANIMALIA	Psammocora contigua		NT	2014	U
ANIMALIA	Pseudagrion bicoerulans	Giant Sprite	VU	2016	U
PLANTAE	Pseudobersama mossambicensis		NT	2013	D
ANIMALIA	Pseudoginglymostoma brevicaudatum	Shorttail Nurse Shark	VU	2004	U
ANIMALIA	Psittacus erithacus	Grey Parrot	EN	2016	D
PLANTAE	Psychotria alsophila		VU	1998	
PLANTAE	Psychotria crassipetala		VU	1998	
PLANTAE	Psychotria petitii		VU	1998	
PLANTAE	Psychotria pseudoplatyphylla		VU	1998	
PLANTAE	Psychotria taitensis		VU	1998	
PLANTAE	Psydrax faulknerae		VU	1998	
PLANTAE	Pteleopsis tetraptera		LR/nt	1998	
PLANTAE	Pteris albersii		VU	2013	U
ANIMALIA	Ptyochromis sp. nov. 'rainbow sheller'		CR	1996	
ANIMALIA	Ptyochromis sp. nov. 'Rusinga oral sheller'		CR	1996	
PLANTAE	Pycnocoma littoralis		VU	1998	
ANIMALIA	Rhabdalestes leleupi		CR	2006	D

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ANIMALIA	Rhina ancylostoma	Shark Ray, Mud Skate, Bowmouth Guitarfish	VU	2016	D
ANIMALIA	Rhincodon typus	Whale Shark	EN	2016	D
ANIMALIA	Rhinolophus deckenii	Decken's Horseshoe Bat	NT	2008	D
ANIMALIA	Rhynchobatus djiddensis	Giant Guitarfish, Whitespotted Wedgefish	VU	2006	D
ANIMALIA	Rhynchobatus laevis	Smoothnose Wedgefish	VU	2016	D
ANIMALIA	Rhynchocyon chrysopygus	Golden-rumped Sengi, Golden-rumped Elephant-shrew	EN	2015	D
PLANTAE	Rothmannia macrosiphon		VU	1998	
ANIMALIA	Rynchops flavirostris	African Skimmer	NT	2016	D
PLANTAE	Rytigynia eickii		VU	1998	
ANIMALIA	Sagittarius serpentarius	Secretarybird, Secretary Bird	VU	2016	D
PLANTAE	Saintpaulia ionantha		NT	2014	D
PLANTAE	Saintpaulia teitensis		CR	2014	D
PLANTAE	Sapium triloculare		VU	1998	
PLANTAE	Sclerocarya gillettii		VU	1998	
ANIMALIA	Scleroptila elgonensis	Elgon Francolin	NT	2016	D
ANIMALIA	Scleroptila streptophora	Ring-necked Francolin	NT	2016	D
ANIMALIA	Scomberomorus commerson	Narrow-barred Spanish Mackerel	NT	2011	D
PLANTAE	Senecio amplificatus		VU	2016	U
PLANTAE	Sesbania speciosa		VU	2012	D
ANIMALIA	Sheppardia gunningi	East Coast Akalat, Gunning's Akalat	NT	2016	D
ANIMALIA	Smutsia temminckii	Temminck's Ground Pangolin, Steppe Pangolin, Scaly Anteater, South African Pangolin, Ground Pangolin, Cape Pangolin	VU	2014	D
PLANTAE	Sorindeia calantha		CR	1998	
ANIMALIA	Sousa chinensis	Indo-pacific Hump-backed Dolphin, Indo-Pacific Humpbacked Dolphin, Indo-pacific Humpback Dolphin, Chinese White Dolphin	NT	2008	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Sphyrna mokarran	Great Hammerhead, Squat-headed Hammerhead Shark, Hammerhead Shark	EN	2007	D
ANIMALIA	Stephanoaetus coronatus	Crowned Eagle, Crowned Hawk-Eagle, Crowned Eagle	NT	2016	D
PLANTAE	Sterculia schliebenii		VU	1998	
ANIMALIA	Stichopus herrmanni	Curryfish	VU	2013	D
PLANTAE	Streptocarpus montanus		NT	2014	U
ANIMALIA	Streptopelia reichenowi	White-winged Collared-dove, White-winged Collared-Dove, White-winged Collared Dove, White-winged Dove	NT	2016	S
ANIMALIA	Struthio molybdophanes	Somali Ostrich	VU	2016	D
PLANTAE	Stuhlmannia moavi		VU	1998	
PLANTAE	Stylochaeton bogneri		EN	2009	D
ANIMALIA	Stylophora pistillata	Smooth Cauliflower Coral	NT	2014	U
ANIMALIA	Subuliniscus arambourgi		EN	1996	
ANIMALIA	Suncus aequatorius		EN	2016	U
ANIMALIA	Sylvietta chapini	Lendu Crombec, Chapin's Crombec	CR	2016	D
PLANTAE	Synsepalum kassneri		VU	1998	
PLANTAE	Synsepalum subverticillatum		EN	1998	
PLANTAE	Syzygium micklethwaitii		NT	2013	D
ANIMALIA	Taeniura lymma	Ribbontailed Stingray, Blue-spotted Stingray, Bluespotted Ribbontail Ray, Fantail Ray, Bluespotted Ribbontail	NT	2005	U
ANIMALIA	Taeniurops meyeni	Blotched Fantail Ray, Giant Reef Ray, Black-blotched Stingray, Fantail Stingray, Black-spotted Stingray, Round Ribbontail Ray, Speckled Stingray	VU	2015	D
ANIMALIA	Taphozous hildegardeae	Hildegarde's Tomb Bat	VU	2008	D
PLANTAE	Tarenna drummondii		VU	1998	
ANIMALIA	Tauraco fischeri	Fischer's Turaco	NT	2016	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Taxillus wiensii		CR	2013	D
ANIMALIA	Teinobasis alluaudi	Indian Ocean Fineliner, Seychelles Fineliner	VU	2006	U
ANIMALIA	Terathopius ecaudatus	Bateleur	NT	2016	D
ANIMALIA	Thapsia buraensis		EN	2004	D
ANIMALIA	Thelenota ananas	Prickly Redfish	EN	2013	D
ANIMALIA	Thelotornis usambaricus	Usambara Vine Snake	VU	2015	U
ANIMALIA	Thermodiaptomus galeboides		VU	1996	
ANIMALIA	Thrasops schmidti	Schmidt's Bold-eyed Tree Snake	EN	2014	U
ANIMALIA	Thunnus alalunga	Albacore Tuna, Albacore Fish, A<e1>hi Taria, Bastard Albacore, Bonito, Langvin Tuna, Long-finned Tuna, Longfin Tuna, Long-fin Tunny, Longfin Tunny, Tuna, Albacore	NT	2011	D
ANIMALIA	Thunnus albacares	Yellowfin Tuna, Yellowfinned Albacore, Allison's Tuna, Pacific Long-tailed Tuna	NT	2011	D
ANIMALIA	Thunnus obesus	Bigeye Tuna	VU	2011	D
ANIMALIA	Torgos tracheliotos	Lappet-faced Vulture	EN	2016	D
PLANTAE	Toussaintia orientalis		EN	2009	D
ANIMALIA	Trachylepis irregularis	Alpine Meadow Mabuya	NT	2014	S
ANIMALIA	Trachyphyllia geoffroyi		NT	2008	D
ANIMALIA	Tragelaphus eurycerus	Bongo	NT	2016	D
ANIMALIA	Tragelaphus imberbis	Lesser Kudu	NT	2016	D
ANIMALIA	Triaenodon obesus	Whitetip Reef Shark	NT	2005	U
PLANTAE	Tridactyle cruciformis		EN	2013	U
PLANTAE	Tridactyle tanneri		EN	2013	U
ANIMALIA	Trigonoceps occipitalis	White-headed Vulture	CR	2016	D
ANIMALIA	Trioceros kinangopensis		NT	2014	U
ANIMALIA	Trioceros marsabitensis	Marsabit One-horned Chameleon, Mt Marsabit Chameleon, Tilbury's Chameleon	NT	2014	S

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
ANIMALIA	Trioceros narraioca	Mount Kulal Stump-nosed Chameleo, Mount Kulal Chameleon	NT	2014	U
ANIMALIA	Trioceros schubotzi	Mount Kenya Dwarf Chameleon, Mt Kenya Side-striped Chameleon	NT	2014	S
ANIMALIA	Tropodiaptomus neumanni		VU	1996	
ANIMALIA	Tropodiaptomus stuhlmanni		VU	1996	
ANIMALIA	Tubipora musica	Organ Pipe Coral	NT	2008	U
ANIMALIA	Turbinaria mesenterina		VU	2014	U
ANIMALIA	Turbinaria peltata		VU	2008	U
ANIMALIA	Turbinaria reniformis		VU	2014	U
ANIMALIA	Turbinaria stellulata		VU	2014	U
ANIMALIA	Turdoides hindei	Hinde's Babbler, Hinde's Pied Babbler, Hinde's Pied-babbler, Hinde's Pied-Babbler	VU	2016	D
ANIMALIA	Turdus helleri	Taita Thrush	CR	2016	D
PLANTAE	Turraea barbata		EN	2013	U
PLANTAE	Turraea elephantina		CR	2013	D
ANIMALIA	Urogymnus asperrimus	Porcupine Ray	VU	2016	D
PLANTAE	Uvaria denhardtiana		NT	2009	U
PLANTAE	Uvaria faulknerae		EN	2009	D
PLANTAE	Uvaria kirkii		NT	2009	U
PLANTAE	Uvariodendron anisatum		VU	1998	
PLANTAE	Uvariodendron gorgonis		EN	2009	U
PLANTAE	Uvariodendron kirkii		VU	2009	D
PLANTAE	Vangueria induta		VU	1998	
PLANTAE	Vangueria pallidiflora		VU	1998	
PLANTAE	Vepris glandulosa		EN	1998	
PLANTAE	Vepris samburuensis		VU	1998	
PLANTAE	Vepris sansibarensis		VU	1998	
PLANTAE	Vernonia ballyi		CR	2016	U
PLANTAE	Vitellariopsis kirkii		VU	1998	
PLANTAE	Vitex keniensis	Meru Oak	VU	1998	
PLANTAE	Vitex zanzibarensis		VU	1998	
PLANTAE	Warburgia stuhlmannii		VU	2013	D

KINGDOM	SCIENTIFIC NAME	COMMON NAME(S)	RED LIST STATUS	YEAR ASSESSED	TREND
PLANTAE	Warneckea amaniensis		VU	2013	D
PLANTAE	Warneckea maritima		EN	2013	D
PLANTAE	Warneckea melindensis		EN	2013	U
PLANTAE	Warneckea mouririifolia		VU	2013	D
ANIMALIA	Xenoclarias eupogon	Lake Victoria Deepwater Catfish	CR	2016	U
PLANTAE	Xylopia arenaria		VU	2009	D
ANIMALIA	Zingis radiolata		CR	2004	U
PLANTAE	Ziziphus robertsoniana		EN	1998	
PLANTAE	Zostera capensis	Species code: Zp	VU	2010	D
ANIMALIA	Zosterops kulalensis	Kulal White-eye	NT	2016	U
ANIMALIA	Zosterops silvanus	Taita White-eye	EN	2016	U

Source: IUCN Red List http://www.iucnredlist.org/

[1] EW = extinct in the wild, CR = critically endangered, EN = endangered, VU = vulnerable, NT = near threatened, LR/nt=lower risk/near threatened

[2] I = increasing, D = decreasing, U = unknown, S=stable. Several cells in this column were blank in the IUCN dataset.

ANNEX D: KENYA PROTECTED AREAS

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
COMMUNITY CONSERVANCIES					
Elangata Wuas	1992	595	Designated	National	Local communities
Elerai	2008	20.23	Designated	National	Local communities
Esenlenkei	1983	74.79	Designated	National	Local communities
Imbirikani		4.61382	Designated	National	Local communities
Kimana Wildlife Sanctuary	1999	24.28	Designated	National	Local communities
Lemek	1995	68.6	Designated	National	Local communities
Lewa Wildlife Conservancy	1995	222.6	Designated	National	Non-profit organisations
Mara North	2009	309.55	Designated	National	Local communities
Motikanju	2010	28	Designated	National	Local communities
Motorogi	2006	54.66	Designated	National	Local communities
Mpala	1969	194	Designated	National	Non-profit organisations
Mugie	1970	198	Designated	National	Non-profit organisations
Naboisho	2010	206.28	Designated	National	Non-profit organisations
Nailepu	2010	15.78	Designated	National	Local communities
Ol Chorro Oiroua	2010	68.79	Designated	National	Local communities
Ol Kinyei	2005	34.4	Designated	National	Non-profit organisations
Ol Pejeta	2004	364	Designated	National	Non-profit organisations
Olare Orok	2006	97.2	Designated	National	Non-profit organisations
Osupuko	2009	12.14	Designated	National	Local communities
Shompole	2000	100	Designated	National	Local communities
Tawi	2010	23.47	Designated	National	Local communities
COMMUNITY NATURE RESERVES					

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Awer Community Conservancy	2010	209		National	Indigenous peoples
Biliqo-Bulesa Community Conservancy	2007	3784.823		National	Indigenous peoples
Hanshak-Nyongoro Community Conservancy	2010	792		National	Indigenous peoples
Il Ngwesi Community Trust	1995	94.33323		National	Indigenous peoples
Ishaqbini Hirola Community Conservancy	2007	732		National	Indigenous peoples
Jaldesa Community Conservancy	2013	520.7865		National	Indigenous peoples
Kalama Community Wildlife Conservancy	2002	496.7374		National	Indigenous peoples
Kiunga Marine Conservancy	2010	287		National	Indigenous peoples
Lekurruki Conservancy Trust	1999	87.83601		National	Indigenous peoples
Leparua Community Conservancy	2011	328.352		National	Indigenous peoples
Lower Tana Delta Conservation Trust	2010	512		National	Indigenous peoples
Ltungai Community Conservancy Trust	2002	193.0808		National	Indigenous peoples
Meibae Community Conservancy	2006	1016.485		National	Indigenous peoples
Melako Community Conservancy	2004	5491.247		National	Indigenous peoples
Mpus Kutuk Community Conservancy	2007	544.549		National	Indigenous peoples
Naibunga Conservancy Trust	2001	471.0511		National	Indigenous peoples
Nakuprat-Gotu Community Conservancy	2010	719.9231		National	Indigenous peoples
Namunyak Wildlife Conservation Trust	1995	2868.974		National	Indigenous peoples
Nasuulu Community Wildlife Conservancy	2011	346.0097		National	Indigenous peoples
Ndera Community Conservancy	2010	1155		National	Indigenous peoples
Ngare Ndare Community Conservancy	2000	55.10741		National	Indigenous peoples
Ol Lentille Conservancy	2006	0		National	Non-profit organisations
Pate Marine Community Conservancy	2010	192		National	Indigenous peoples
Ruko Community Widlife Conservancy	2006	178.9687		National	Indigenous peoples

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Sera Community Conservancy	2001	3393.356		National	Indigenous peoples
Shura Community Conservancy	2004	4170.982		National	Indigenous peoples
Songa Community Conservancy	2013	1038.681		National	Indigenous peoples
West Gate Community Conservancy	2004	362.5251		National	Indigenous peoples
FOREST RESERVES					
Aberdare	1943	1033.16	Designated	National	Federal or national ministry or agency
Arabuko Sokoke	1943	416.76	Designated	National	
Bahati	1932	101.01	Designated	National	
Buda	1932	6.7	Designated	National	
Bunyala	1956	8.08	Designated	National	
Buyanga		38.57	Designated	National	
Chebartigon	1949	1.02	Designated	National	
Cheboit		25.27	Proposed	National	
Chemorogok	1949	13.38	Designated	National	
Chemurokoi	1941	39.79	Designated	National	
Chepalungu	1956	49.77	Designated	National	
Chepkuchumo	1962	3.27	Designated	National	
Cherial	1949	0.4	Designated	National	
Dagoretti	1938	7.74	Designated	National	
East Ngamba	1978	12.05	Designated	National	
Eastern Mau	1941	660.67	Designated	National	
Eburu	1932	87.36	Designated	National	
Eldoret I and II	1966	1.52	Designated	National	
Embakasi	1941	5.91	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Embobut	1954	216.89	Designated	National	
Endau (Kenya)		69.15	Proposed	National	
Gaikuyu		32.58	Proposed	National	
Gembe		27.16	Proposed	National	
Gogoni	1932	8.24	Designated	National	
Gonja	1961	8.61	Designated	National	
Gwasi		49.58	Proposed	National	
Ikilisa	1960	0.8	Designated	National	
Imba		7.5	Proposed	National	
Imenti or Upper Imenti	1938	121.99	Designated	National	
Jombo	1941	8.87	Designated	National	
Kabarak	1962	13.95	Designated	National	
Kabiok	1949	0.14	Designated	National	
Kabonge		0.29	Proposed	National	
Kaisungor	1941	10.89	Designated	National	
Kakamega	1933	178.38	Designated	National	
Kalimani	1960	1.92	Designated	National	
Kamatira		19.44	Proposed	National	
Kamiti	1933	1.71	Designated	National	
Kapchemutwa	1941	88.74	Designated	National	
Kapchorua I	1941	1.41	Designated	National	
Kapchorua IV	1941	1.41	Designated	National	
Kapkanyar	1967	57.64	Designated	National	
Kapolet	1941	16.25	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Kapsaret	1932	10.08	Designated	National	
Kaptagat	1941	129.85	Designated	National	
Kaptaroi	1936	3.18	Designated	National	
Kaptimom	1949	0.96	Designated	National	
Karura	1932	10.45	Designated	National	
Kasigau	1941	2.02	Designated	National	
Katende	1960	9.33	Designated	National	
Katimok	1949	20.19	Designated	National	
Kenze	1960	1.89	Designated	National	
Kerrer	1954	22.41	Designated	National	
Kessop	1941	19.71	Designated	National	
Ketnwan	1949	0.44	Designated	National	
Kiagu	1959	13.61	Designated	National	
Kiambere		6.93	Proposed	National	
Kiambu	1932	1.49	Designated	National	
Kiangombe		14.27	Proposed	National	
Kianjiru		10.25	Proposed	National	
Kibithewa	1959	2.39	Designated	National	
Kibwezi	1936	58.5	Designated	National	
Kieiga	1959	5.73	Designated	National	
Kierera	1959	7.77	Designated	National	
Kiganjo	1932	1.72	Designated	National	
Kijabe Hill	1980	7.4	Designated	National	
Kijege	1959	33.03	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Kikingo	1959	12.03	Designated	National	
Kikuyu Escarpment	1943	376.19	Designated	National	
Kilala	1960	1.61	Designated	National	
Kilombe Hill	1936	15.34	Designated	National	
Kilungu	1933	1.45	Designated	National	
Kimojoch	1949	7.62	Designated	National	
Kingatua		0.62	Proposed	National	
Kinyo	1949	3.39	Designated	National	
Kiongwani	1960	0.37	Designated	National	
Kioo	1960	0.44	Designated	National	
Kipipiri	1956	50.77	Designated	National	
Kipkabus (Elg-Marak)	1961	67.6	Designated	National	
Kipkabus (Uasin/Gishu)	1941	58.27	Designated	National	
Kipkunurr	1941	158.92	Designated	National	
Kiptaberr	1967	128.01	Designated	National	
Kirima		5.12	Proposed	National	
Kirimiri		1.74	Proposed	National	
Kisere		4.57	Proposed	National	
Kitalale	1977	20.7	Designated	National	
Kitale Township	1932	3.43	Designated	National	
Kithendu	1960	2.48	Designated	National	
Kitondu	1960	10.93	Designated	National	
Kitoo	1960	0.37	Designated	National	
Kitumbuuni	1960	0.74	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Kiu (Ngungu)	1960	0.83	Designated	National	
Kotim Range		33.32	Proposed	National	
Kyai	1960	1.09	Designated	National	
Kyawea		0.61	Proposed	National	
Kyemundu	1960	1.47	Designated	National	
Lambwe		24.55	Proposed	National	
Lariak	1932	49.88	Designated	National	
Lelan	1958	145.16	Designated	National	
Lembus	1959	169.28	Designated	National	
Leroghi	1936	917.94	Designated	National	
Leshau	1960	1.98	Designated	National	
Loitokitok	1977	7.66	Designated	National	
Londiani	1932	1.06	Designated	National	
Lower Imenti	1938	24.77	Designated	National	
Lugari	1977	21.93	Designated	National	
Lusoi	1984	2.68	Designated	National	
Maasai Mau		463.73	Proposed	National	
Maatha	1959	6.32	Designated	National	
Magumo North	1978	2.4	Designated	National	
Magumo South	1979	3.64	Designated	National	
Mai		4.94	Proposed	National	
Mailuganji	1941	16.85	Designated	National	
Maji Mazuri	1932	78.09	Designated	National	
Makongo-kitui	1961	24.47	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Makongo-machakos	1960	1.69	Designated	National	
Makuli-nguuta	1960	16.76	Designated	National	
Malaba	1933	7.21	Designated	National	
Maragoli	1957	4.7	Designated	National	
Maranga		2.38	Proposed	National	
Marenji	1967	15.19	Designated	National	
Marmanet	1932	226.44	Designated	National	
Marop	1949	2.11	Designated	National	
Marsabit	1932	157.78	Designated	National	
Mataa	1960	0.48	Designated	National	
Mathews Range	1956	973.92	Designated	National	Federal or national ministry or agency
Mau Narok	1967	8.51	Designated	National	
Mbooni North	1933	0.4	Designated	National	
Mbooni South	1933	2.07	Designated	National	
Menengai	1977	57.37	Designated	National	
Metkei	1954	19.58	Designated	National	
Mkongani North	1956	11.65	Designated	National	
Mkongani West	1956	14.08	Designated	National	
Molo	1932	9.15	Designated	National	
Momandu	1955	1.44	Designated	National	
Mosegem	1949	2.05	Designated	National	
Motunyi Hill		19.73	Proposed	National	
Mount Elgon	1932	730.89	Designated	National	
Mount Kenya	1943	2009.74	Designated	National	Federal or national ministry or agency

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Mount Kulal		459.42	Proposed	National	
Mount Londiani	1932	301.52	Designated	National	
Mount Nyiru	1956	454.96	Designated	National	
Mrima	1961	3.9	Designated	National	
Mtarakwa	1949	1.1	Designated	National	
Muguga	1938	2.25	Designated	National	
Mukobe	1962	7.47	Designated	National	
Mukogodo	1937	299.31	Designated	National	Federal or national ministry or agency
Mumbaka	1986	4.44	Designated	National	
Munguni	1959	1.89	Designated	National	
Muringato Nursery	1932	0.24	Designated	National	
Muruai		7.17	Proposed	National	
Museve		0.54	Proposed	National	
Mutejwa	1959	13.18	Designated	National	
Mutharanga	1959	2.93	Designated	National	
Mutiluni		5.67	Proposed	National	
Mutito	1962	19.75	Designated	National	
Mutula	1960	5.78	Designated	National	
Muumoni		110.31	Proposed	National	
Mwachi	1938	3.81	Designated	National	
Nabkoi	1932	30.33	Designated	National	
Nairobi Arboretum	1932	0.3	Designated	National	
Nakuru	1977	6.31	Designated	National	
Namanga Hill	1979	119.04	Designated	National	Federal or national ministry or agency

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Namuluku	1986	0.1	Designated	National	
Nanyungu	1986	0.22	Designated	National	
Ndatai	1960	0.15	Designated	National	
Ndotos Range	1956	932.05	Designated	National	
Nduluni-kalani	1960	1.06	Designated	National	
Ngaia	1959	43.14	Designated	National	
Ngamba	1961	11.41	Designated	National	
Ngare Ndare	1932	55.77	Designated	National	
Ngong Hills	1985	30.81	Designated	National	
Ngong Road	1932	10.39	Designated	National	
Njuguni	1959	19.87	Designated	National	
Njukini East		1.1	Proposed	National	
Njukini West		1.95	Proposed	National	
North Nandi	1936	113.45	Designated	National	
Northern Tinderet	1932	262.85	Designated	National	
Nthangu	1960	8.45	Designated	National	
Ntugi	1959	13.86	Designated	National	
Nuu	1961	25.32	Designated	National	
Nyambeni	1959	54.54	Designated	National	
Nyamweru	1941	8.03	Designated	National	
Nyeri	1932	12.14	Designated	National	Federal or national ministry or agency
Nyeri Hill	1944	2	Designated	National	
Nyeri Municipality	1987	0.12	Designated	National	
Nzaui	1960	10.01	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Ol-arabel	1941	97.38	Designated	National	
Ol-bolossat	1938	32.69	Designated	National	
Ol-pusimoru	1957	172.58	Designated	National	
Ole Lengishu		46.74	Proposed	National	
Ololua	1941	6.39	Designated	National	
Pemwai	1949	1.32	Designated	National	
Perkerra Catchment	1962	44.14	Designated	National	
Rangwe		10.11	Proposed	National	
Rumuruti	1932	65.51	Designated	National	
Saimo	1949	7.27	Designated	National	
Sanao	1949	2.92	Designated	National	
Sekenwo	1962	8.63	Designated	National	
Sekerr		78.9	Proposed	National	
Sekhendu	1977	8.04	Designated	National	
Shimba	1956	189.68	Designated	National	
Shimba Lease		0.27	Proposed	National	
Sogotio	1941	35.55	Designated	National	
Sokta Hill	1949	1.7	Designated	National	
South-western Mau	1932	841.29	Designated	National	
South Laikipia	1932	35	Designated	National	
South Nandi	1936	195.68	Designated	National	
Southern Mau	1941	1.28	Designated	National	
Tana River (Herimani I and II)		978.13	Proposed	National	
Tana River (Wayu I,II,III)		419.65	Proposed	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Tarambas Hill	1949	3.86	Designated	National	
Taressia	1936	3.75	Designated	National	
Thunguru Hill	1959	5.54	Designated	National	
Thuuri	1959	7.32	Designated	National	
Timau	1950	2.95	Designated	National	
Timboroa	1932	58.13	Designated	National	
Tinderet	1932	281.67	Designated	National	
Tingwa Hill	1954	9.05	Designated	National	
Toropket	1941	1.2	Designated	National	
Transmara	1941	344.57	Designated	National	
Tulimani	1960	3.28	Designated	National	
Tumeya	1961	5.77	Designated	National	
Turbo	1968	108.14	Designated	National	
Tutwoin	1949	0.11	Designated	National	
Uaso Narok	1960	19.66	Designated	National	
Ururu	1936	4.38	Designated	National	
Utangwa	1960	0.56	Designated	National	
Utunene	1960	1.74	Designated	National	
Waiya	1960	3	Designated	National	
Wanga	1986	0.95	Designated	National	
West Molo	1932	2.77	Designated	National	
Western Mau	1932	227.48	Designated	National	
Witu	1962	40.02	Designated	National	
CONTROLLED HUNTING AREAS					

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Kisumu Impala	1992	0.34	Designated	National	
Makurian (Oreteti)	2010	64.64	Designated	National	Local communities
LOCALLY AND NATIONALLY MANAGED MARINE AREAS					
Kuruwitu	2005	0.29	Designated	National	Local communities
Majoreni	2011	11.9	Designated	National	Local communities
Mkokoni	2009	3.1	Designated	National	Local communities
Msambweni	2011	0.46	Designated	National	Local communities
Pate Island	2008	2.72	Designated	National	Local communities
Shimoni	2011	3.08	Designated	National	Local communities
Tiwi	2009	0.125	Designated	National	Local communities
Vanga	2011	12.23	Designated	National	Local communities
Wasini	2004	3.23	Designated	National	Local communities
Kisite	1978	28	Designated	National	Federal or national ministry or agency
Mallindi	1968	6	Designated	National	Federal or national ministry or agency
Mombasa	1986	10	Designated	National	Federal or national ministry or agency
Watamu	1968	10	Designated	National	Federal or national ministry or agency
Diani Chale	1995	75	Designated	National	Federal or national ministry or agency
Malindi	1968	213	Designated	National	Federal or national ministry or agency
Mombasa	1986	200	Designated	National	Federal or national ministry or agency
Mpunguti	1978	28	Designated	National	Federal or national ministry or agency
Watamu	1968	32	Designated	National	Federal or national ministry or agency
NATIONAL PARKS					
Aberdare	1950	765.7	Designated	National	Federal or national ministry or agency
Amboseli	1974	392	Designated	National	Federal or national ministry or agency

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Arabuko Sokoke	1990	6	Designated	National	Federal or national ministry or agency
Central Island	1983	5	Designated	National	Federal or national ministry or agency
Chyulu Hills	1983	734.27	Designated	National	Federal or national ministry or agency
Hell's Gate	1984	93	Designated	National	Federal or national ministry or agency
Kisite	1978	28	Designated	National	Federal or national ministry or agency
Kora	1989	1787	Designated	National	Federal or national ministry or agency
Lake Nakuru	1968	188	Designated	National	Federal or national ministry or agency
Malka Mari	1989	876	Designated	National	Federal or national ministry or agency
Meru	1966	870	Designated	National	Federal or national ministry or agency
Mt. Elgon	1968	169	Designated	National	Federal or national ministry or agency
Mt. Kenya	1968	704.72	Designated	National	Federal or national ministry or agency
Mt. Longonot	1983	52	Designated	National	Federal or national ministry or agency
Nairobi	1946	117	Designated	National	Federal or national ministry or agency
Ndere	1986	4.2	Designated	National	Federal or national ministry or agency
Ol Donyo Sabuk	1967	18	Designated	National	Federal or national ministry or agency
Ruma	1983	120	Designated	National	Federal or national ministry or agency
Saiwa Swamp	1974	2	Designated	National	Federal or national ministry or agency
Sibiloi	1973	1573.92	Designated	National	Federal or national ministry or agency
South Island	1983	39	Designated	National	Federal or national ministry or agency
Tsavo East	1948	11747	Designated	National	Federal or national ministry or agency
Tsavo West	1948	9065	Designated	National	Federal or national ministry or agency
Marsabit		145	Proposed	National	Federal or national ministry or agency
NATIONAL RESERVES					
Arawale	1974	533	Designated	National	Federal or national ministry or agency

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Bisanadi	1979	606	Designated	National	Federal or national ministry or agency
Boni	1976	1339	Designated	National	Federal or national ministry or agency
Buffalo Springs	1985	131	Designated	National	Federal or national ministry or agency
Chepkitale	2000	178.2	Designated	National	Federal or national ministry or agency
Diani Chale	1995	75	Designated	National	Federal or national ministry or agency
Dodori	1976	877	Designated	National	Federal or national ministry or agency
Kakamega	1985	44.7	Designated	National	Federal or national ministry or agency
Kamnarok	1983	87.7	Designated	National	Federal or national ministry or agency
Kerio Valley	1983	66	Designated	National	Federal or national ministry or agency
Kiunga	1979	250	Designated	National	Federal or national ministry or agency
Laikipia	1991	165	Designated	National	Federal or national ministry or agency
Lake Bogoria	1970	107	Designated	National	Federal or national ministry or agency
Lake Kanyaboli	2010	41.42	Designated	National	Federal or national ministry or agency
Losai	1976	1806	Designated	National	Federal or national ministry or agency
Marsabit		1373	Designated	National	Federal or national ministry or agency
Masai Mara	1974	1510	Designated	National	Federal or national ministry or agency
Mpunguti	1978	11	Designated	National	Federal or national ministry or agency
Mt. Kenya	2000	2124	Designated	National	Federal or national ministry or agency
Mwea	1976	68	Designated	National	Federal or national ministry or agency
Nasolot	1979	92	Designated	National	Federal or national ministry or agency
Ngai Ndethya	1976	212	Designated	National	Federal or national ministry or agency
North Kitui	1979	745	Designated	National	Federal or national ministry or agency
Nyambene	2000	640.6	Designated	National	Federal or national ministry or agency
Rahole	1976	1270	Designated	National	Federal or national ministry or agency

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Samburu	1985	165	Designated	National	Federal or national ministry or agency
Shaba	1974	239	Designated	National	Federal or national ministry or agency
Shimba Hills	1968	192.51	Designated	National	Federal or national ministry or agency
South Kitui	1979	1833	Designated	National	Federal or national ministry or agency
South Turkana	1979	1091	Designated	National	Federal or national ministry or agency
Tana River Primate	1976	169	Designated	National	Federal or national ministry or agency
Kisumu Impala	1992	0.34	Designated	National	Federal or national ministry or agency
Lake Elementaita	2010	25.339	Designated	National	Federal or national ministry or agency
Lake Simbi	2000	0.417	Designated	National	Federal or national ministry or agency
Maralal	1988	5	Designated	National	Federal or national ministry or agency
Naivasha Wildlife Sanctuary (East Part)	2000	3.99	Designated	National	Federal or national ministry or agency
Naivasha Wildlife Sanctuary (West Part)	2000	2.29	Designated	National	Federal or national ministry or agency
Arabuko Sokoke	1979	43.32	Designated	National	
South-Western Mau	1961	430.32	Designated	National	
PRIVATE PROTECTED AREAS AND RESERVES					
Segera	2007	200		National	Non-profit organisations
Ngorare	2013	0		National	For-profit organisations
Ol Pejeta Conservancy	1989	365		National	Non-profit organisations
Borana	1990	141	Designated	National	Non-profit organisations
Loisaba Wilderness	2000	150	Designated	National	Non-profit organisations
Ol Jogi Ranch	1985	267		National	Non-profit organisations
Solio Ranch and Rhino Sanctuary	1970	200	Designated	National	Non-profit organisations
Boabab Farm		4	Designated	National	
Chololo Ranch		59.5	Designated	National	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Dawida Ranch	1987	44.52	Designated	National	
Enganani Ranch		21.04	Designated	National	
Galana Ranch		6474.84	Designated	National	
Kisima Farm Rumuruti		178.06	Designated	National	
Konza Ranching and farming Co-operative		200	Designated	National	
Kuku Group Ranch	1988	96	Designated	National	
Lisa Ranch		22.33	Designated	National	
Male Ranch		79.24	Designated	National	
Mbulia Group Ranch	1993	157.83	Designated	National	
Ngata Taik Ranch		200	Designated	National	
Ol Ari Nyiro Conservancy	1974	411.15	Designated	National	
Ol Doinyo Lamboro		72.64	Designated	National	
Ol Maisot Ranch		120.19	Designated	National	
Tarda Emali Ranch		8.5	Designated	National	
RASMAR SITES					
Lake Baringo	2002	314.69	Designated	International	
Lake Bogoria	2001	107	Designated	International	
Lake Elmenteita	2005	108.8	Designated	International	
Lake Naivasha	1995	300	Designated	International	
Lake Nakuru	1990	188	Designated	International	
Tana River Delta Ramsar Site	2012	1636	Designated	International	
BIOSPHERE RESERVES					
Amboseli National Park	1991	4832.06	Designated	International	
Kiunga	1979	600	Designated	International	

NAME	YEAR EST.	AREA IN SQ KM	STATUS	DESIGNATION TYPE	MANAGED BY
Malindi-Watamu	1979	196	Designated	International	
Mount Elgon	2003	2088.21	Designated	International	
Mount Kenya	1978	717.59	Designated	International	
Mount Kulal Biosphere Reserve	1978	7000	Designated	International	
WILDLIFE SANCTUARIES					
Taita Hills	1973	113.4	Designated	National	Non-profit organisations
Lumo	2001	430.96	Designated	National	Local communities
WORLD HERITAGE SITES					
Kenya Lake System in the Great Rift Valley	2011	320.34	Inscribed	International	
Lake Turkana National Parks	1997	1614.85	Inscribed	International	
Mount Kenya National Park/Natural Forest	1997	2023.34	Inscribed	International	

Source: World Database on Protected Areas (WDPA) https://www.protectedplanet.net/'

ANNEX E: IMPORTANT BIRD AREAS IN KENYA[167]

National Name	Criteria
Aberdare Mountains	A1, A2, A3
Amboseli National Park	A3
Arabuko-Sokoke Forest	A1, A2, A3
Boni and Dodori National Reserves	
Busia grasslands	A1, A3
Cherangani Hills	A3
Chyulu Hills forests	A1, A2
Dakatcha Woodland	A1, A2, A3
Dandora ponds	A4i
Diani Forest	A1
Dida Galgalu desert	A1, A2, A3
Dunga swamp	A1, A3
Dzombo Hill Forest	A1, A2
Gede Ruins National Monument	A1
Hells Gate National Park	
Kakamega forest	A1, A2, A3
Kaya Gandini	A1, A2
Kaya Waa	A1
Kianyaga valleys	A1, A2
Kikuyu Escarpment forest	A1, A2, A3
Kinangop grasslands	A1, A2
Kisite island	A4i
Kisite island - Marine	A4i
Kiunga Marine National Reserve	A4i
Koguta swamp	A1, A3
Kusa swamp	A1, A3
Kwenia	A1
Lake Baringo	A3
Lake Bogoria National Reserve	A1, A4i, A4iii
Lake Elmenteita	A1, A2, A4i, A4iii
Lake Magadi	A1, A4i, A4iii
Lake Naivasha	A1, A2, A4i, A4iii
Lake Nakuru National Park	A1, A2, A4i, A4iii
Lake Ol' Bolossat	A1, A2, A3
Lake Turkana	A4i, A4iii
Lower Tana River Forests	A1, A2, A3
Machakos valleys	A1, A2
Marenji Forest	A1, A2, A3
Masai Mara	A1, A2
Masinga reservoir	A4i, A4iii

[167] BirdLife International (2017) Country profile: Kenya. Available from http://www.birdlife.org/datazone/countrykenya.

Mau forest complex	A3
Mau Narok - Molo grasslands	A1, A2
Meru National Park	A1, A2, A3
Mida Creek, Whale Island and the Malindi - Watamu coast	A4i
Mount Elgon (Kenya)	A1, A2, A3
Mount Kenya	A1, A2, A3
Mrima Hill Forest	A1, A3
Mukurweini valleys	A1, A2
Mwea National Reserve	A1, A2
Nairobi National Park	A1
North Nandi forest	A1, A2, A3
Ol Ari Nyiro	A1
Ol Donyo Sabache	A1
Ruma National Park	A1
Sabaki River Mouth	A4i
Samburu and Buffalo Springs National Reserves	A3
Shaba National Reserve	A1, A2, A3
Shimba Hills	A1, A2, A3
Sio Port swamp	A1, A3
South Nandi forest	A1, A3
South Nguruman	A1, A2
Taita Hills Forests	A1, A2
Tana River Delta	A1, A3, A4i, A4iii
Tsavo East National Park	A1, A3
Tsavo West National Park	A1, A3
Yala swamp complex	A1, A3

IBA Criteria

A1. Globally threatened species – The site is known or thought regularly to hold significant numbers of a globally threatened species.

A2. Restricted-range species – The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area or Secondary Area.

A3. Biome-restricted species – The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.

A4. Congregations – The site is known or thought to hold congregations of ≥1% of the global population of one or more species on a regular or predictable basis.

ANNEX F: BIOGRAPHICAL SKETCHES OF TEAM MEMBERS

Michael Minkoff *(Team Lead, Washington, DC, USA)*
Mr. Minkoff (The Cadmus Group, Inc.) is an Associate at Cadmus. An international environmental management specialist, Mr. Minkoff is expert on USAID environmental compliance requirements, including FAA Sections 118 and 119, with 9 years of field- and desk-based environmental, natural resource management, and international development experience. He has leveraged his background in international environmental policy and political economy to conduct environmental impact assessments for development projects in sub-Saharan Africa and Eastern Europe, for sectors including natural resource management, agriculture, and rural road rehabilitation. Mr. Minkoff has conducted trainings on USAID's environmental compliance and resource management requirements across multiple locations in Sub-Saharan Africa and the Middle East, reaching more than 250 USAID staff and partners. Mr. Minkoff has a B.A. in Political Philosophy from the University of Wisconsin and an M.A. in Law and Diplomacy from the Fletcher School of Law and Diplomacy, at Tufts University.

Raymond Von Culin *(Deputy Team Lead, Washington, DC, USA)*
Raymond Von Culin is an international environmental and social management specialist, with over 8 years' experience working in emerging and developing economies on matters related to infrastructure development, land tenure and resource rights, natural resource management, biodiversity, disaster response and recovery, urban planning, health, and pollution. His expertise focus is performing assessment scoping exercises, developing safeguard instruments to ensure compliance with host country and donor safeguards requirements, and improving institutional capacity and procedures to guide future project design and policy implementation. Mr. Von Culin has undertaken environmental and social impact analysis, monitoring, and due diligence auditing services for projects across a wide range of sectors and industries including agriculture, transportation, water, and energy. With strong Geographic Information Systems skills and a comprehensive understanding of international environmental and social safeguards policies and standards, Mr. Von Culin has successfully completed projects with the World Bank, USAID, the Millennium Challenge Corporation, and the Smithsonian Conservation Biology Institute. Mr. Von Culin has a B.A. International Business and Management from Dickinson College and an M.S. in Sustainable Urban Planning form George Washington University.

Ed Toth *(Biological Diversity, Natural Forest Management, and Integrated Resource Planning Specialist, New Bern, North Carolina, USA)*
Mr. Toth is a private consultant with 47 years of professional experience in natural resource management. His specific areas of expertise include biological diversity, wildlife and forest management, protected area management, land use planning, project design, and environmental assessments. A retired career employee with the USDA Forest Service, he has extensive experience in sub-Saharan Africa. He served with USAID as the African Bureau's Natural Resource Advisor and played a key role in the development of USAID's biological diversity program for sub-Saharan as well as that for Madagascar and Rwanda. Mr. Toth worked for several years in Kenya with its Range Management Division. His master's thesis focused on the economic impacts of wildlife on Maasai and Kamba Group and Co-operative Ranches. He also served as assistant Game Warden for the Mole National Park in Ghana. Mr. Toth successfully carried out short-term assignments with International Programs, USDA Forest Service and the International Branch of the U.S. Park Service including assignments in Somalia and the Dominican Republic. He holds a Master's Degree from the University of Massachusetts in wildlife management and integrated resource planning.

Jane Kahata *(Community-based Natural Resource Management Specialist, Nairobi, Kenya)*
Ms. Jane Kahata, is an accomplished Natural Resources Management/Environmental specialist with over 20 years' professional experience. Ms. Kahata has a BSc. Degree in Botany and Zoology from the University of Nairobi and a MSc. Degree in Resource Management from the University of Edinburgh, U.K. Ms. Kahata has served as a member of the Task Force that developed the National Environmental Impact Assessment Guidelines and Procedures for Kenya between 1994 and 1996; in 2009, she was the Team Leader for the Review of the Environmental (Impact Assessment and Audit) Regulations of 2003. Jane has extensive experience in Protected Area Planning and Management, having worked as a field officer and as a Resource Planner in the Kenya Wildlife Service (KWS) from 1985 -1997, and fully understands the challenges/issues that affect wildlife in Kenya. In addition, Ms. Kahata is a specialist in Community Based Natural Resources Management (CBNRM). Ms. Kahata has served as the Team Leader for the preparation of a Situational Analysis Report (SAR) and Atlas of Community Based Natural Resources Management (CBNRM) in Kenya (2011/2012), and is currently preparing a Status Report on Conservancies in Kenya. Ms. Kahata has participated in numerous evaluations for NRM projects for various donors, including USAID, SIDA, GOK/IFAD, and GOK/World Bank. She has also supported extensive environmental compliance work for USAID, such as conducting training and carrying out Environmental Best Practice Reviews (BPRs) (e.g., for Uganda, Rwanda, and USAID/East Africa), over the past 12 years. In 2014, Ms. Kahata supported the analysis and development of the FAA 118/119 Tropical Forests and Biodiversity Assessment for USAID South Sudan.

Rob Ng'ethe *(Forestry and Natural Resource Management Specialist, Nairobi, Kenya)*
Mr. Ng'ethe is a professional Forestry consultant and NEMA Lead EIA expert no 2099 with extensive experience and expertise in forestry/natural resource management, governance, environmental monitoring, applied research, conservation, monitoring and evaluation and alternative livelihoods. He is a member of the Forestry society of Kenya, Africa Forest Forum, Environment Institute of Kenya, Secretary Gums and Resins Association, Institute of Environment of Kenya and the network of natural gums and resins in Africa. Mr. Ng'ethe has over 17 years consulting experience in Kenya, Somalia, Southern Sudan, Djibouti, Rwanda, Burundi, Uganda, Tanzania and Zimbabwe. Mr. Ng'ethe has consulted for IGAD, USAID, SIDA, FAO, AU, World Bank, ADB, and has extensive knowledge of East Africa and Greater Horn of Africa, with professional, civil society and government institutions networks throughout the region. He is a board member and chairman research and development committee of the Kenya Forestry Research Institute; Kenya Environment Development Initiatives, Agfor Technical Services LTD; member of the Kenya Forestry Working Group.

Dishon Murage *(Integrated Coastal Zone Management Specialist, Mombasa, Kenya)*
Mr Murage is a Fisheries Development Expert with over 15 years professional experience in formulation and implementation of natural resource conservation and development projects/programs with particular focus on participatory natural resource management, resource planning and governance. He previously worked with the WWF and the East African Wildlife Society as the Program Manager for their Fisheries, Coastal and Marine Resources program. Mr. Murage has also led and participated in providing consultancy services within the Western Indian Ocean on fisheries, marine resource management, project development and evaluation for numerous international organizations such as the European Union, the World Bank, USAID, Indian Ocean Commission (IOC), International Union for Conservation of Nature (IUCN), WWF and NEPAD. He is currently the East Africa Representative for Seacology Foundation covering Kenya, Uganda, Tanzania and Seychelles. Mr Murage has a Master's Degree from the University of Nairobi (Kenya) and specialized training in Integrated Sustainable Coastal

Development from the Goteborg University (Sweden) and Fisheries Governance from Wageningen University (Netherlands).

Simon K. Ole Seno, Ph.D. *(Wildlife and Fisheries Sciences, Wildlife Conservation and Rangeland Management Specialist, Narok, Kenya)*

Prof. Simon ole Seno is a wildlife biologist with a rich background in rangelands management and wildlife conservation. He has a B.Sc. in Agriculture specializing in Range Science and a M.S. in Wildlife and Fisheries Ecology from New Mexico State University and a Ph.D. in Wildlife and Fisheries Science, (Minor in Cultural Anthropology) from University of Arizona. During his University teaching career spanning over 33 years, Seno has developed and taught numerous Rangelands Ecology, Wildlife Biology and Wildlife-Human related courses and supervised Ph.D. and Masters research projects. He has served in various leadership capacities including Head of Department, Director, Dean and currently he is the Deputy Vice-Chancellor, Administration, Finance and Planning at Maasai Mara University. Seno is an accomplished researcher and has published widely in areas of tourism, wildlife and pastoralism.

ANNEX G: CALCULATIONS AND SOURCES FOR VALUATION OF ECOSYSTEM SERVICES

		Year given	Source/Notes
Provisioning			
Timber			
Montane Forests			
272,000	KSh/ha	2010	SOURCE: UNEP, The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy, 5 November 2012,
Riparian Dryland Forests			
2,400	KSh/ha	2007	SOURCE: Barrow, Edmund and Morgaka, Hezron. "Kenya's Drylands – Wastelends or an Undervalued Economic Resource?" IUCN, 2007
850	KSh/ha	2007	SOURCE: Barrow, Edmund and Morgaka, Hezron. "Kenya's Drylands – Wastelends or an Undervalued Economic Resource?" IUCN, 2008
Mangroves			
2,150.00	KSh/ha	2010	SOURCE: UNEP. Economic Analysis of Mangrove Forests: A case study in Gazi Bay, Kenya. 2011.
Fodder			
11,000	KSh/ha	2007	SOURCE: Barrow, Edmund and Morgaka, Hezron. "Kenya's Drylands – Wastelends or an Undervalued Economic Resource?" IUCN, 2008
Fish			
Lake Victoria			
150125	Metric tons	2013	DATA: http://www.fao.org/fishery/facp/KEN/en
150,125,000	kg	2013	calculated
150	KSh/kg	current	SOURCE: Personal interview with resident of western Kenya, price is relatively stable annually
22,518,750,000.00	KSh	2013	Total value of kg
68000	km2		Total size of Lake Victoria
0.06			Kenya's share of Lake Victoria
4080	km2		Kenya's surface area of Lake Victoria
408000	ha		Kenya's surface area of Lake Victoria
55,193.01	KSh/ha		Calculated
55,193	**KSh/ha**	**2013**	
Lake Turkana			
4075	Metric tons	2013	Calculated from http://www.fao.org/fishery/facp/KEN/en of all non-LV inland fisheries, assumed to all be Turkana
3667500	kg	2013	Calculated
640500	ha		Surface area of Turkana 1
756000	ha		Surface area of Turkana 2
698250	ha		Rationale: Turkana has variable surface area seasonally. Simple average, not weighted by month

150	KSh/kg	current	SOURCE: Personal interview with resident of western Kenya, price is relatively stable annually
550,125,000.00	KSh	2013	total value of LT fish
787.86	**KSh/ha**	**2013**	
Marine			
8,980.00	MT		SOURCE: http://www.fao.org/fishery/facp/KEN/en
8,980,000.00	Kg		
150	KSh/kg	current	SOURCE: Personal interview with resident of western Kenya, price is relatively stable annually
1,347,000,000.00	**KSh total value**	**2013**	**TOTAL VALUE**
Of which are mangroves			
0.32	Mangrove share of fishery yield		SOURCE: Aburto-Oropeza O, 2008. Mangroves in the Gulf of California increase fishery yields, PNSA Vol. 150 no. 30
431,040,000.00		**2013**	
DIRECT LOSS OF WATERSHED SERVICE VALUE FROM DEFORESTATION			
730,000.00	Ksh		SOURCE: UNEP, The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy, 5 November 2012,
TOTAL WATERSHED SERVICE PROVISION VALUE - WATER TOWERS			
1,142,400	Ksh		SOURCE: UNEP, The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy, 5 November 2012,
1,360,000	Ksh		SOURCE: UNEP, The Role and Contribution of Montane Forests and Related Ecosystem Services to the Kenyan Economy, 5 November 2012,