



## GEF-6 PROJECT IDENTIFICATION FORM (PIF)

PROJECT TYPE: Medium-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

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### PART I: PROJECT INFORMATION

Project Title:	<b>Enhancing sustainability of Protected Area systems and stabilizing agro-production in adjoining areas through improved IAS management</b>		
Country(ies):	Malawi	GEF Project ID: <sup>1</sup>	9539
GEF Agency(ies):	UNEP	GEF Agency Project ID:	01438
Other Executing Partner(s):	Environmental Affairs Department, Ministry of Natural Resources, Energy and Mining, with CABI	Resubmission Date:	December 1, 2016
GEF Focal Area(s):	Biodiversity	Project Duration (Months)	60
Integrated Approach Pilot	IAP-Cities IAP-Commodities IAP-Food Security	Corporate Program:	
Name of parent program:		Agency Fee (\$)	142,739

### A. INDICATIVE<sup>2</sup> FOCAL AREA STRATEGY FRAMEWORK AND OTHER PROGRAM STRATEGIES

Objectives/Programs (Focal Areas, Integrated Approach Pilot, Corporate Programs)	Trust Fund	(in \$)	
		GEF Project Financing	Co-financing
BD-1 Program 1	GEFTF	701,255	3,000,000
BD-2 Program 4	GEFTF	801,256	1,950,000
Total Project Cost		1,502,511	4,950,000

### B. INDICATIVE PROJECT DESCRIPTION SUMMARY

Project Objective: To prevent new invasions and reduce the current impacts of invasive alien species (IAS) in protected areas and adjoining agro-ecosystems in Malawi						
Project Components	Financing Type <sup>3</sup>	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Establishing a national framework and capacity to enhance IAS management in protected areas and associated agro-ecosystems	TA	Outcome 1.1. Strengthened national IAS policy and improved national capacity and coordination amongst different government agencies and the private sector to respond to existing and new invasive species problems throughout Malawi, with a focus on protected areas and their adjoining agro-ecosystems	1.1.1. National framework for the cross-sectoral management of IAS operational and supporting long-term development planning: <ul style="list-style-type: none"> <li>National Invasive Species Strategy and Action Plan addresses IAS threats, especially those to protected areas</li> <li>High risk pathways and most damaging species in Malawi, especially those threatening protected area systems, identified</li> <li>IAS Risk Analysis procedures established, including ones for protected areas</li> <li>National vigilance and surveillance systems, including rapid response to alerts (if/when they occur)</li> </ul> 1.1.2. Evidence base established and communicated for IAS prevention and management in and around PAs	GEFTF	342,260	1,000,000

<sup>1</sup> Project ID number will be assigned by GEFSEC and to be entered by Agency in subsequent document submissions.

<sup>2</sup> When completing Table A, refer to the excerpts on [GEF 6 Results Frameworks for GETF, LDCF and SCCF](#).

<sup>3</sup> Financing type can be either investment or technical assistance.

			<ul style="list-style-type: none"> <li>• Costs and benefits of 3-5 IAS, including ‘conflict’ species present in agro-ecosystems adjoining protected areas.</li> <li>• National inventory on presence and distribution of priority invasive plants in National Parks and Wildlife Reserves</li> <li>• Results targeting policy and decision makers through communications (see 3.1.2)</li> </ul>			
2. Strengthening IAS management in existing protected areas and adjoining agro-ecosystems	TA/IN	<p>Outcome 2.1. Reduced IAS impacts in five selected protected areas resulting in enhanced conservation outcomes for endangered and threatened species</p> <ul style="list-style-type: none"> <li>• GEF TT scores up with 50% on IAS management &amp; 20% up on PA METT</li> <li>• Increased budgets for IAS management in five protected areas, involving a total of 75,000 ha under IAS management</li> <li>• Invaded areas (150 ha total) in three protected areas cleared and restored</li> </ul> <p>Outcome 2.2. Reduced IAS impacts in adjoining agro-ecosystems of five selected protected areas contributing to improved livelihoods and biodiversity conservation</p> <ul style="list-style-type: none"> <li>• Invaded areas (total 150 ha.) adjoining three protected areas cleared and restored, through expanded partnership between PAs and farmers</li> <li>• ...% enhanced tree cover in PA buffer zones (baseline to be set at PPG)</li> <li>• Sustainable farming practices adopted by 50 households and incorporating IAS prevention and control</li> </ul>	<p>2.1.1. Five revised PA Management Plans including strategies and budgets for IAS prevention and control</p> <p>2.1.2. Tested management plans for six IAS, including IAS control and habitat restoration in three of the five protected areas (see Table 2)</p> <p>2.1.3. Capacity of fifty protected area staff improved and applied in the identification and management of IAS</p> <p>2.1.4. Biocontrol Working Group established and operational leading to the introduction of three host specific and damaging biocontrol agents</p> <p>2.2.1. Invaded areas (150 ha. total) in agro-ecosystems of 3 adjoining protected areas cleared and restored</p> <p>2.2.2. Increased collaboration between PA managers and farmers with regard to IAS management including the promotion of native trees to enhance crop and livestock production</p> <p>2.2.3. Sustainable farming practices, including Farmer Managed Natural Regeneration (FMNR) adopted and promoted by 50 households</p> <p>2.2.4. One hundred farmers trained in the identification and management of IAS.</p>	GEFTF	670,000	2,240,000
3. Knowledge management and broader adoption	TA	<p>Outcome 3.1. Lessons learnt, documented and disseminated and awareness programs to facilitate replication and broader adoption in the Malawi National PA system established.</p>	<p>3.1.1. Communication strategy developed and implemented for PAs and agro-ecosystems</p> <p>3.1.2. Outreach campaigns including use of media, workshops, and meetings, targeting government officials, protected area staff and affected communities</p> <p>3.1.3. National information sharing procedures including the development of a Guide on the identification and management</p>	GEFTF	353,659	1,215,000

			of invasive plant species in Malawi. 3.1.4. Project M&E program developed, IAS monitoring capacity built and implemented in PAs and their agro-ecosystems.			
			Subtotal		1,365,919	4,455,000
			Project Management Cost (PMC) <sup>4</sup>	GEFTF	136,592	495,000
			<b>Total Project Cost</b>		<b>1,502,511</b>	<b>4,950,000</b>

### C. INDICATIVE SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE, IF AVAILABLE

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Amount (\$)
Recipient Government	Ministry of Natural Resources, Energy and Mining	Grants	500,000
Recipient Government	Ministry of Natural Resources Energy and Mining	In-kind	1,300,000
Recipient Government	Ministry of Agriculture, Irrigation and Water Development	Grants	450,000
Recipient Government	Ministry of Agriculture, Irrigation and Water Development	In-kind	400,000
Recipient Government	Ministry of Science and Technology	Grants	150,000
Recipient Government	Ministry of Science and Technology	In-kind	400,000
Recipient Government	Ministry of Information, Tourism and Culture	Grants	200,000
Recipient Government	Ministry of Local Government and Rural Development	In-kind	600,000
GEF Agency	United Nations Environment Programme (UNEP)	In-kind	100,000
Others	African Parks Foundation	In-kind	25,000
Others	BirdLife International	In-kind	50,000
Others	Mulanje Mountain Conservation Trust	In-kind	80,000
Others	Wildlife and Environmental Society of Malawi	In-kind	50,000
Others	Lilongwe Wildlife Trust	In-kind	25,000
Others	Action for Environmental Sustainability	In-kind	50,000
Others	Coordination Unit for the Rehabilitation of the Environment	In-kind	50,000
Others	Nyika Vwaza (UK) Trust (NVT)	In-kind	50,000
Others	Total Landcare	In-kind	100,000
Others	University of Cape Town, South Africa	In-kind	50,000
Others	Queensland Biosecurity, Australia	In-kind	20,000
Others	ARC- Plant Protection Research Institute, South Africa	In-kind	50,000
Others	Centre for Agriculture and Biosciences International (CABI)	In-kind	250,000
<b>Total Co-financing</b>			<b>4,950,000</b>

### D. INDICATIVE TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES) AND THE PROGRAMMING OF FUNDS <sup>a)</sup>

GEF Agency	Trust Fund	Country/ Regional/ Global	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing (a)	Agency Fee (b) <sup>b)</sup>	Total (c)=a+b
UNEP	GEFTF	Malawi	Biodiversity		1,502,511	142,739	1,645,250
<b>Total GEF Resources</b>					<b>1,502,511</b>	<b>142,739</b>	<b>1,645,250</b>

### E. PROJECT PREPARATION GRANT (PPG)<sup>5</sup>

Is Project Preparation Grant requested? Yes  No  If no, skip item E.

<sup>4</sup> For GEF Project Financing up to \$2 million, PMC could be up to 10% of the subtotal; above \$2 million, PMC could be up to 5% of the subtotal. PMC should be charged proportionately to focal areas based on focal area project financing amount in Table D below.

<sup>5</sup> PPG requested amount is determined by the size of the GEF Project Financing (PF) as follows: Up to \$50k for PF up to \$2m (for MSP); up to \$100k for PF up to \$3m; \$150k for PF up to \$6m; \$200k for PF up to \$10m; and \$300k for PF above \$10m. On an exceptional basis, PPG amount may differ upon detailed discussion and justification with the GEFSEC.

**PPG AMOUNT REQUESTED BY AGENCY(IES), TRUST FUND, COUNTRY(IES) AND THE PROGRAMMING OF FUNDS**

Project Preparation Grant amount requested: \$50,000					PPG Agency Fee: \$ 4,750		
GEF Agency	Trust Fund	Country/ Regional/Glob	Focal Area	Programming of Funds	(in \$)		
					PPG (a)	Agency Fee (b)	Total c = a + b
UNEP	GEF TF	Malawi	Biodiversity	(select as applicable)	50,000	4,750	54,750
<b>Total PPG Amount</b>					<b>50,000</b>	<b>4,750</b>	<b>54,750</b>

**F. PROJECT’S TARGET CONTRIBUTIONS TO GLOBAL ENVIRONMENTAL BENEFITS**

Provide the expected project targets as appropriate.

Corporate Results	Replenishment Targets	Project Targets
1. Maintain globally significant biodiversity and the ecosystem goods and services that it provides to society	Improved management of landscapes and seascapes covering 300 million hectares	75,150 Hectares <sup>6</sup>

**PART II: PROJECT JUSTIFICATION**

1. *Project Description.* Briefly describe:

**1.1 The global environmental problems, root causes and barriers that need to be addressed**

IAS Threats & Impacts in Malawi

Invasive alien species (IAS) are those plants, animals and microbes which are introduced to new regions, mainly through human activities, where they establish and spread, impacting negatively on biodiversity, agriculture, water resources, and human health (Pimentel et al., 2001). IAS pose one of the most important threats to biodiversity in Malawi. Malawi’s Clearing House Mechanism under the CBD identifies four major threats to biodiversity -- habitat loss and fragmentation, invasive alien species, population pressure and poverty – and further states that “the major threats to biodiversity are from invasive plants.” Both protected landscapes and productive landscapes in Malawi are vulnerable to IAS. Productive lands are frequently subject to land degradation from human activities such as unsustainable agriculture and livestock grazing, overharvesting of forests, etc., which makes them more vulnerable to IAS, as healthy ecosystems are generally more resilient to plant invasions. As IAS establish and spread in degraded productive lands, reductions in crop yields and pasture production due to IAS impacts will increase the reliance of local communities on resources within protected areas. Therefore, in order to protect globally significant biodiversity within PAs, it is critical to not only manage invasive plants within PA sites, but also to restore degraded lands to improve productivity and increase resilience to re-invasion of cleared areas. Conversely, IAS within protected areas may invade adjoining agro-ecosystems, increasing tensions between communities and protected area managers. In addition, protected areas are important for maintaining ecosystem services on productive lands, as they provide regenerative material for land restoration, either through active re-planting or propagule dissemination into adjoining agro-ecosystems. There is also increasing evidence that plants used in restoration activities are more likely to establish and thrive if sourced from adjoining areas. Thus, successful IAS management in Malawi must address IAS within both protected areas and adjoining productive landscapes.

IAS in Malawi produce negative impacts across numerous economic and social sectors within the country. For example, water weeds such as water hyacinth provide habitat for a host of vectors of water-borne diseases such as malaria and bilharzia, reduce fish populations and fisheries production, and negatively impact water resources and hydro-electricity generation (Mailu, 2001). The invasive *Parthenium* weed, which has recently been recorded in Malawi, is expected to spread widely and threaten biodiversity as well as produce negative health impacts on humans and livestock. In many cases, the intentional use of non-native species has resulted in the spread of IAS in Malawi. The Nile tilapia (*Oreochromis niloticus*) and the Nile perch (*Lates niloticus*) were both

<sup>6</sup> Total of an average of 15,000 ha of formally protected zones, including multiple use/buffer zones in 5 targeted PAs, plus a total of 50 ha of restored HCVF & agriculture land adjoining 3 of the 5 PAs through a combination of IAS control measures, improved prevention, early detection and rapid response of new infestations, as well as monitoring of IAS.

introduced to Lake Victoria and are thought to have been responsible for the loss of over 200 endemic cichlid species. Two invasive fish, *Oreochromis niloticus* and *O. leucostictus*, believed to have escaped from aquaculture facilities have recently been found in the Lake Malawi catchment in Tanzania (Genner et al., 2015), and the introduction of other freshwater fish for aquaculture, such as *Cyprinus carpio*, *Micropterus salmoides*, and *Salmo gairdnerri*, is cause for additional concern. Numerous endemic, endangered and threatened aquatic fish species in other lakes and rivers in Malawi will be lost unless measures are put in place to prevent the introduction and spread of these invasive fish species. Lake Malawi, which is known for its high endemism (over 800 endemic cichlid species), and the Lake Chilwa wetland (a Ramsar site), are threatened by water hyacinth (*Eichornia crassipes*), giant salvinia (*Salvinia molesta*), and water lettuce (*Pistia stratiotes*), which threaten biodiversity through alteration of the microclimate and displacing the indigenous aquatic flora and fauna.

The intentional use of non-native species has also created negative IAS impacts in terrestrial landscapes. These introduced species are often referred to as “conflict” species as they represent a perceived benefit for some stakeholders (e.g. wood for fuel and construction) while also incurring costs for other stakeholders (e.g. degraded water resources, habitat destruction, etc.). However, the absence of comprehensive cost-benefit analyses reduces understanding and limits government action on the problems produced by these IAS. For example, because of widespread deforestation in the country (which itself facilitates the spread of IAS into natural landscapes), a multitude of fast growing trees have been planted in an attempt to provide communities with alternative sources of fuelwood and building materials. However, many of these introduced species, such as *Acacia mearnsii* and *Prosopis juliflora*, are invasive and put a significant strain on water resources and displace many valuable native plant species. Mulanje Mountain, a major centre of diversity is threatened by invasions of *Rubus ellipticus* and *Pinus patula*. Other terrestrial alien species such as *Gmelina arborea*, *Lantana camara*, *Rubus fruticosus*, *Acacia mearnsii* and *Jatropha curcas* are identified in the CHM as IAS that negatively affect natural ecosystem functions. A host of fodder plants have also been introduced in order to provide landowners with alternate sources of fodder for their livestock, and many of these species are now invasive in Malawi. The need to improve soil fertility in the absence of commercial fertilizers, which is largely unaffordable for most farmers, has resulted in the introduction of a large number of nitrogen-fixing trees, many of which have subsequently become invasive and now pose a threat to the very resources on which poor communities depend. Poor landowners also rely on invasive plant species as hedges (e.g. *Lantana camara*, *Tithonia diversifolia*, *Thevetia peruviana*, various cactus species and others), and these provide a seed source for invasions that ultimately impact on the natural resource base. Many invasive plant seeds have also been accidentally introduced as contaminants of food aid, while poor quarantine procedures have contributed to the unintentional introduction of seed contaminants in a large number of traded goods. A large number of invasive invertebrate species, particularly agricultural pests, have been inadvertently introduced in the country and threaten food production and commercial forestry. The inability of communities to effectively manage introduced pests increases their reliance on resources within protected areas, leading to further biodiversity loss, while the increased use of pesticides in itself has negative impacts on biodiversity.

Both productive and protected landscapes are faced with potential increased threats from IAS due to the development of road infrastructure in Malawi, which increases access to previously remote areas and also facilitates the movement of goods (that may contain IAS) within the country and from neighboring countries. Climate change is also likely to exacerbate the problem of IAS (Low, 2008). Invasive species are more likely to establish and proliferate in disturbed habitats - extreme weather events such as floods, droughts and forest fires are predicted to occur more often or with greater severity (IPCC, 2007) which will facilitate invasions by introduced species. “Weeds will thrive on climate change” as a result of increased disturbance and higher carbon dioxide levels and temperatures (Kriticos and Filmer, 2007). For example, the invasive shrub *Acacia nilotica*, in Australia, is likely to benefit from increases in water-use efficiency as a result of increased CO<sub>2</sub> concentrations, allowing it to invade more xeric sites, and increased temperatures will allow it to complete its reproductive life cycle in areas which are currently too cool to sustain populations (Kriticos et al., 2003). Various studies have also indicated that biomass accumulation under elevated CO<sub>2</sub> is higher in invasive species than in woody natives. More IAS will therefore establish and spread while those IAS already present in Malawi are likely to increase their distribution and impacts.

Although national estimates on the costs of IAS in Malawi do not exist, reports from other countries indicate that IAS incur significant costs to the country. For example, the water hyacinth (*Eichornia crassipes*) is widespread in the Shire River where it affects the generation of hydroelectric power and irrigation programs. The Malawi Compact Environment and Natural Resource Management Project estimates that power shutdowns caused by water hyacinth and other waterweeds that clog up the turbines cost US\$27,000 per day and lead to industrial losses worth ten times this amount. Weeds, most of which have been introduced, pose one of the most significant threats to food production by reducing crop yields, especially in developing countries (Oerke, 2006; Gianessi, 2009) such as Malawi, while also contributing to the erosion of ecosystem services (Turpie, 2004; van Wilgen et al., 2008; Strayer (2012). Reduced crop yields also often result in additional land being transformed for crop production, further contributing to biodiversity loss. Studies undertaken in other parts of Africa have revealed that invasive alien plants can reduce pasture production by as much as 71% if not controlled (van Wilgen et al., 2008). For example, the invasive plant *Chromolaena odorata*, in South Africa, can reduce livestock carrying capacities from 6 ha./livestock unit (LSU) to 15 ha./LSU (Goodall and Erasmus, 1996).

Community elders, during a socio-economic survey in NW Tanzania to assess the impact of chromolaena, stated that “chromolaena has killed us because it has killed our crops and our livestock” (Witt *et al.*, unpublished). In a similar study in Indonesia villagers claimed that forage availability was reduced by 75% as a result of the presence of chromolaena. *Parthenium hysterophorus* can reduce pasture carrying capacities by as much as 90%. Livestock production (dependent on pasture) contributes about 20% of the total value of agricultural production in Malawi, consisting mainly of subsistence grazing of sheep, cattle, goats, poultry and pigs (WTO, 2002). IAS also produce significant negative social impacts; in Malawi the vast majority of the population depend on natural resources for food, livelihoods, energy security, as well as a healthy living environment, and the degradation of ecosystem services and productivity from IAS is a major concern. For example, it is estimated that in Malawi more than 250,000 people depend primarily on fish as a source of food and livelihood, with the freshwater fisheries sector itself providing 60-70% of total animal protein (Malawi Clearing House Mechanism; CHM), but the variety and abundance of fish is threatened by the possible introduction of exotic species that prey on and outcompete native species. Any activities which prevent the introduction and spread of IAS and mitigate the impacts of those that are already present will therefore benefit the most vulnerable members of Malawian society, especially the poor who are the least able to cope with the negative impacts of IAS on their livelihoods.

### Globally Significant Biodiversity in Malawi

As a result of its varied topography and range of habitats, this relatively small country has high levels of biodiversity and endemism. The Njika plateau in Malawi is part of the Eastern Afromontane Hotspot, which encompasses several widely scattered but biogeographically similar mountain ranges in eastern Africa. Endemism levels in the hotspot are high, with 31% of plants, 21% of mammals, 30% of reptiles, 30% of amphibians, and 69% of fish occurring nowhere else in the world. The Njika Plateau supports more than 215 orchid species, of which four species and two subspecies are thought to be endemic. Lake Malawi, a UNESCO World Heritage Site, is home to more than 1,000 fish species, nearly 90% of which are endemic, including an amazing diversity of cichlids. Of the 172 species of molluscs found in Malawi, 47 species are endemic, and the country has 12 species of reptiles and 7 species of amphibians found nowhere else in the world. Of the approximately 6,000 plant species present in Malawi, 14 species are considered to be endangered, 89 vulnerable, and 25 critically endangered. Malawi also harbors 648 species of birds; 456 of these are resident and a further 94 are intra-African migrants of regular occurrence. The greatest diversity of bird species are in Malawi’s protected areas, and the country also has identified 22 Important Bird Areas (IBAs). Information on biodiversity within the five protected areas targeted by the project is summarized in the table below, and described in further detail in Annex 1.

### Protected Areas

Malawi’s system of protected areas includes 5 National Parks, 4 Wildlife Reserves, and 88 Forest Reserves, which together occupy an area of 2,018,198 ha<sup>7</sup>. The protected area system is a key element in the Malawi’s efforts to conserve biodiversity, but increased development and a proliferation of invasive species in adjoining areas are resulting in increased encroachment into PA units by people and invasive plants and animals. Ninety percent of Malawi’s estimated population of 11 million people live in rural areas; most are small-scale farmers growing maize, millet and cassava to groundnuts, tobacco, cotton, tea and coffee. The population density varies from less than 25 people/km<sup>2</sup> in some northern areas, such as around the Nyika NP and Misuku Hills Forest Reserve, to more than 500 people/km<sup>2</sup> in parts of the central and southern areas, in the vicinity of the other targeted protected areas. This large rural population, which is growing at 3.3% per annum, is putting increased pressure on the natural resource base, including the protected areas, which cover about 21% of Malawi’s land area. This land pressure has already resulted in significant deforestation and land degradation, disturbances which drive plant invasions. Loss of biodiversity and sustainable land-use practices have also led to increased pesticide use, contributing to increased chemical pollution from agricultural run-off. To enhance biodiversity protection within the targeted protected areas the project will work with communities in some of the adjoining farmlands, which include mosaics of production land with HCVF areas. All of these activities will be undertaken in collaboration with various stakeholders, including the Department of National Parks and Wildlife (DNPW) who manage all of the NP’s and Wildlife Reserves and the Forestry Department, who are responsible for all Forest Reserves. Below is a brief overview of the five protected areas targeted by this project, including a description of the biodiversity within each PA site and the invasive species that are already established within them (Table 1). Potentially invasive species being grown in tourism facilities and staff villages will be removed (eradicated) from all of these PA’s. However, only three species, *Pteridium aquilinum*, *Rubus ellipticus* and *Lantana camara* in Nyika NP, Mount Mulanje Forest Reserve and Misuku Hills Forest Reserve, respectively will be targeted for active physical or chemical control while *Pistia stratiotes*, *Acacia mearnsii* and *Lantana camara* or *Mimosa diplotricha* will be targeted for biological control (Table 2).

**Table 1: Biodiversity and IAS Issues in Protected Areas targeted by the Project**

<sup>7</sup> 2010 Report to the CBD

Protected Areas	Overview of PA Sites and their Globally Significant Biodiversity	Threats / Impacts of IAS in PA Sites
<b>Nyika National Park</b>	The Nyika National Park covers 310,000 hectares, encompassing the largest mountain complex in Malawi and consisting primarily of gently rolling grasslands, along with small patches of montane forest, rainforest, and drier woodlands (total forest cover in the park is approximately 6,000 ha.). Nyika NP borders the Zambian Nyika National Park. Nyika is an important catchment area and contains the source of four large rivers which drain into Lake Malawi. A total of 1,927 plant species and subspecies have been identified in the park, of which 33 are endemics only found in the park and a further 13 are considered near-endemics. The park harbours globally significant mammals such as Leopard ( <i>Panthera pardus</i> ), Common Eland ( <i>Tragelaphus oryx</i> ) (LR/cd), Roan Antelope ( <i>Hippotragus equinus</i> ) (LR/cd), and Southern Reedbuck ( <i>Redunca arundinum</i> ) (LR/cd). Nyika's butterfly fauna is the richest in Malawi, with some 120 of the 200 species present in the country. Over 420 species of birds have been recorded in the park.	Biodiversity within Nyika NP is threatened by the invasive plant species <i>Rubus ellipticus</i> , <i>Pinus patula</i> , <i>Acacia mearnsii</i> , <i>Lantana camara</i> , and others. The fern <i>Pteridium aquilinum</i> is also abundant in the PA and spreading to the detriment of native flora and fauna. Rivers and streams in the park have been colonised by <i>Pistia stratiotes</i> and <i>Azolla nilotica</i> .
<b>Mount Mulanje Forest Reserve</b>	Mount Mulanje is the highest massif in the country, located in the southeast near the border with Mozambique. The Mount Mulanje Forest Reserve occupies 60,000 hectares, including montane grassland and shrubland, small patches of <i>Widdringtonia</i> cedar forest, and lowland, mid-altitude and montane rainforest. The Reserve provides important habitat for numerous bird species, and it is the most important centre of plant endemism in Malawi, with about 30 endemic plant species. Mulanje is the only known locality in Malawi for the rodent ( <i>Aethomys namaquensis</i> ) and has the second-most important forest butterfly fauna in Malawi, with some 111 species.	Invasive species in the Mulanje reserve include <i>Pinus patula</i> , <i>Rubus ellipticus</i> and <i>Lantana camara</i> . <i>Eucalyptus</i> species have been planted in and around the reserve, but their current level of invasiveness is unknown. The bracken fern <i>Pteridium aquilinum</i> has benefitted from increased disturbance and now occupies much of the Forest Reserve to the detriment of other native flora and fauna.
<b>Misuku Hills Forest Reserve</b>	The Misuku Hills Forest Reserve is situated in the extreme north of the country near the Tanzanian border. The Reserve covers 2,700 hectares and includes areas of montane rainforest and small areas of montane grassland. The forests of the Misuku Hills are the most floristically diverse in the country (with over 150 species of trees recorded). The bat <i>Glauconycteris argentata</i> , the flying squirrel <i>Anomalurus derbianus</i> and the rodent <i>Otomys anchietae</i> are not known anywhere else in Malawi. Over 100 species of birds have been recorded in the Misuku Hills.	Invasive alien species such as <i>Lantana camara</i> are widely grown as hedge plants on the edge of the forest and have subsequently invaded the forest, threatening native plant and animal species. <i>Caesalpinia decapetala</i> , another hedge plant, has also escaped cultivation. Invasive herbs such as <i>Ageratum conyzoides</i> , <i>Argemone</i> spp. and <i>Senna</i> spp. are invading forest edges, while <i>Mimosa diplotricha</i> poses a significant threat to biodiversity and crop and pasture production <sup>8</sup> .
<b>Malawi Hills Forest Reserve</b>	The Malawi Hills Forest Reserve covers 400 hectares at the southern tip of the country. The hills are covered with transition woodland and rock-loving floral communities ( <i>Aloe</i> , <i>Obetia</i> , etc.). More than 35 species of butterflies have been identified in the Reserve, including <i>Salamis cacta</i> , <i>Acraea quirina</i> and <i>Pentila tropicalis</i> , which have not been found elsewhere in the country. A species of dwarf chameleon ( <i>Rampholeon chapmani</i> ) unknown anywhere else is facing extinction in the Malawi Hills. Almost 100 species of birds have been recorded in the Reserve.	Biodiversity is threatened by invasions from exotic plants such as <i>Toona ciliata</i> , <i>Lantana camara</i> , <i>Senna occidentalis</i> , <i>S. obtusifolia</i> and <i>Caesalpinia decapetala</i> . In addition, forest regeneration is prevented by the invasion of these species.
<b>Ntchisi Forest Reserve</b>	Ntchisi Mountain is one of several peaks in the Dowa Hills, but it is the only one still bearing forest in this densely cultivated and eroded region. The Ntchisi Forest Reserve covers 9,712 hectares, including areas of montane rainforest, mid-altitude rainforest, and miombo woodland. More than 180 species of birds have been recorded in the Forest. Ntchisi is the only Malawi locality for the bat <i>Rhinolophus swinnyi</i> , and two butterfly species, <i>Charaxes ameliae</i> and <i>Hypolycaena hatita</i> , reach their southern limit in the Reserve.	This biodiversity is threatened by, among others, invasive alien plants such as <i>Lantana camara</i> , <i>Tithonia diversifolia</i> , <i>Senna occidentalis</i> and various <i>Eucalyptus</i> species.

<sup>8</sup> “*M. diplotricha* is a big threat to forest ecosystems, agricultural land and pastures. It causes heavy damage in crops like sugar cane, coconut, rubber, cassava, tea, pineapple and upland rice. Thick growth of *Mimosa* prevents the regeneration, reproduction and growth of indigenous species to all infested areas. All parts of the plant are toxic to herbivores if ingested. It produces a toxin, which can cause vascular endothelial damage, necroses of the heart and liver and anemia in cattle” from Invasive Pest Fact Sheet – *Mimosa diplotricha*, see <http://www.fao.org/forestry/13377-0977cb34791475aa6a7a360640f09778.pdf>

**Table 2: List of species targeted for control in the respective PA's**

Target Species	Control	Notes
<i>Pteridium aquilinum</i>	Physical control	Much work has been undertaken on the control of this species from other parts of the world – those that worked best will be trialed in Nyika.
<i>Rubus ellipticus</i>	Physical/chemical control	Has been targeted for control in other parts of the world – as such effective methodologies are known such as cut-stump treatment. These will be tested and adapted for local conditions. Has short-lived seed bank.
<i>Lantana camara</i>	Physical/chemical control	Has been frequently targeted for control in other parts of the world – and effective methodologies are known such as cut-stump treatment. These will be tested and adapted for local conditions. Has short-lived seed bank.
<i>Pistia stratiotes</i>	Biocontrol agent <i>Neohydronomus affinis</i>	This agent has been released in many neighbouring countries where it has brought water lettuce under control. Easy to rear and establish
<i>Acacia mearnsii</i>	Biocontrol agent <i>Dasineura rubiformis</i> , a flower-bud galling midge which does not affect vegetative growth	This agent virtually “sterilizes” shrubs/trees. Host specific and damaging, it is now widespread in South Africa. May be some difficulties in rearing and establishing this agent.
<i>Lantana camara</i>	Biocontrol agent <i>Aceria lantanae</i> , a flower-bud galling mite	This agent virtually “sterilizes” shrubs. Host specific and damaging, it is now widespread in South Africa. May be some difficulties in rearing and establishing this agent.
<i>Mimosa diplotricha</i>	<i>Heteropsylla spinulosa</i> , a psyllid which feeds on the leaflets	This agent is specific and damaging. Has not been released in Africa yet but is present in Australia and elsewhere. Easy to rear and establish.

Root causes and barriers that need to be addressed:

**Barrier 1: Inadequate policy and institutional framework and capacities for managing IAS:** The Government of Malawi is cognizant of its shortcomings with regard to IAS management, and has identified a number of gaps, overlaps and inconsistencies in existing policies, regulations, strategies, and institutional arrangements related to IAS in the country. One critical issue is that Malawi does not have a single institution that is primarily responsible for dealing with IAS issues. The lack of clear institutional ownership or an overarching policy on IAS has led to ineffective coordination amongst various agencies, especially those in agriculture, forestry and the environment, and often leads to conflicting recommendations made by different agencies and institutions that constrain the government’s ability to generate a unified response to IAS control. For example, the Forestry Department may advocate and promote the introduction of agro-forestry species that are, or have the potential, to become invasive. In South Africa the Australian wattle, *Acacia mearnsii*, was actively promoted for agro-forestry but it is now considered to be one of the most costly invasive species. A cost-benefit analysis has indicated that the costs of this invasive tree outweigh the benefits that accrue from its use. The very same species has been intentionally introduced to Malawi. In an attempt to promote protein production, various Fisheries Department’s around Africa and elsewhere, have promoted the introduction of exotic fish. In most cases these fish have become invasive to the detriment of biodiversity. These issues can be dealt with if there is an overarching policy with effective coordination. Even Malawi’s more general efforts at biodiversity conservation are carried out without a comprehensive structural and legal framework, apart the guidance provided by the National Biodiversity Strategy and Action Plan (NBSAP). Another critical barrier to effective IAS management is the fact that Malawi has very few policies or laws specifically established for the management of invasive species, which is instead addressed primarily through sectoral policies and legislation that deal with biodiversity generally. In addition, sectorial policies often promote or encourage the introduction of exotic species without evaluating their potential risk, especially to biodiversity. For example, government departments and NGOs often promote the introduction of exotic agroforestry species without adequate evaluation of the potential costs and benefits. It is therefore critical that a national policy be developed so that IAS can ultimately be managed across the country and across all sectors rather than in isolation. For example, Environmental Impact Assessments undertaken by relevant agencies generally do not consider the impacts of IAS, including EIAs for restoration activities, which often involve the use of IAS. In terms of laws and regulations, only two laws in Malawi make specific reference to and promote the management of invasive alien species in the country, both of which fall under the mandate of the Ministry of Agriculture and Food Security. One of these is the Plant Protection Act (Cap 64.01), which provides for the “eradication of pests and diseases

destructive to plants to prevent the introduction and spread of pests and diseases destructive to plants, and for matters connected therewith and incidental thereto.” The other is the Noxious Weeds Act (Cap 64:02), which governs the management of declared noxious weeds. However, the existing Acts and their subsidiary regulations are seriously outdated; for example, the list of declared weeds has not been updated since the 1960s. In addition, enforcement of the Acts is weak and as a result many invasive species are imported and distributed in Malawi “often without the knowledge of the Plant Protection Services”. A number of other laws and policies pertaining to biodiversity conservation exist in Malawi, including the Forestry Act (1997), the National Fisheries and Aquaculture Policy (2001), the Fisheries Conservation and Management Act (1997), the National Wildlife Policy (2000), the National Parks and Wildlife Act (1992), the Water Resources Management Policy (1994), the Water Resources Act (1969), the National Land Resources Management Policy and Strategy (2000), and the National Herbarium and Botanic Gardens Act (1987), but none of these instruments makes specific reference to IAS management. Further, according to Malawi’s CHM, private sector participation in prevention, control and eradication of invasive species is minimal, a shortcoming which will be mitigated by the project. More than 50% of invasive plant species have been introduced as ornamentals by the horticultural industry; many agro-forestry species have been introduced by private forestry, plantations and other companies; and international trade and cargo agencies play an important role in the accidental introduction of invasive plants and animals by not following correct or appropriate procedures. Finally, there is little capacity to develop and implement effective management strategies for IAS already present and impacting on communities, the PA system and various economic sectors. There is no, to very little information, available on which IAS are present, their distribution or impacts. The Department of National Parks and Wildlife (DNPW) and the Forestry Department don’t have prior experience or capacity to conduct proper risk analysis of IAS already in and around PA’s in addition to not having integrated the management of IAS into their PA/Forest Reserve management plans and annual budgets. The Environmental Affairs Department, Ministry of Natural Resources, Energy and Mining has no surveillance systems in place nor monitoring data on the main pathways as to how these species were initially introduced, how new IAS may be introduced, and how they are currently being moved to new localities. There is also little to no knowledge in Malawi on the current policies or regulations in the various Government Departments amongst those responsible for IAS management, which prevents the agencies to coordinate and collaborate on matters of prevention and management of IAS of key national importance due to their far reaching economic and environmental impacts. Without adequate baseline data it is not possible for Malawi to develop or implement effective IAS management strategies, at a national, regional, local or even PA level. These capacity issues and knowledge gaps need to be addressed. For example, IAS prevention and management is not incorporated in the agriculture development, poverty alleviation programs nor in PA management directives or budgets; not clearly targeted in the (agriculture) quarantine and pest management systems

*Barrier 2: Limited experience and capacity to implement IAS management (prevention, control and restoration) in protected areas and adjoining landscapes:* Implementation of IAS prevention and control strategies in Malawi is inadequate to support the conservation of biodiversity and the maintenance of ecosystem services and functions. For example, the Government of Malawi takes precautions with regard to the intentional and unintentional introduction of pests under the Plant Protection Act, but it is mainly concerned with those that pose a risk to agriculture and human health rather than those that may threaten biodiversity. Malawi does not have adequate systems in place to monitor or detect new invasions, or to take effective steps to eradicate them, except in the case of some agricultural pests. Control programs for well-established and widespread IAS are also often inadequate, mainly owing to lack of information, capacity and resources relating to the methodologies for management (mechanical/manual, chemical, biological and restoration). Shortages of institutional, human and physical resources all limit Malawi’s ability to address IAS effectively.

*Barrier 3: Insufficient information and understanding of IAS threats and impacts is preventing informed and strategic decision-making for IAS management:* Information resources on biodiversity in general and invasive alien species in particular are very limited in Malawi. Malawi has comprehensive lists of mammals and birds, but there is no comprehensive and easily accessible database or list of IAS present in Malawi or their distribution in the country, and virtually nothing is known about the impacts of IAS. For the most part, knowledge of IAS in the country is based on anecdotal evidence or unpublished reports, and the understanding of IAS impacts is largely limited by a lack of technical information, and by a failure to understand the potential damage to ecosystem services and functioning caused by IAS and the consequent economic losses and possible hazards to human health. Introduced species can benefit communities but at the same time they frequently threaten ecosystem services and functions as well as the economic activities of other communities / stakeholders, but because Malawi has undertaken almost no analyses of the costs associated with the negative impacts of IAS, the benefits that accrue from these species are almost always considered to outweigh their costs, with no scientific assessment ever being undertaken. Furthermore, without clear information on IAS, it is not possible to prioritize species for action or to develop and implement national management strategies especially with regard to early detection and rapid response. Another result of this lack of knowledge is unwillingness among policy makers and resource managers to interfere in the commerce and trade of exotic species. A further constraint is that the weak policy and institutional environment for IAS management in Malawi means that critical information needed for informed decision-making is not widely shared among national stakeholders and therefore does not inform decision-making. Few of the

senior managers responsible for PA system planning and management have extensive knowledge of IAS, and as a result, protected areas in general have demonstrated little willingness to act in dealing with IAS threats and impacts. Similarly, the general population of Malawi, including the inhabitants of agricultural areas adjoining PAs, have little awareness or understanding of IAS issues.

## **1.2 Baseline scenario or any associated baseline projects**

Most of the past efforts of national institutions and international agencies to address IAS issues in Malawi have dealt with IAS in a peripheral way or as secondary/tertiary objective. As a result, impacts and problems related to IAS persist in the country, with negative impacts on effective conservation and management of PAs, the maintenance of critical ecosystem services and landscape productivity, and the protection of community interests. Nevertheless, the proposed project will seek to coordinate with and benefit from lessons learned under other programs and projects on IAS management, including those of project co-financing partners.

The Government of Malawi (GoM) is supporting efforts to strengthen (agriculture) quarantine requirements and to create awareness among relevant staff and other stakeholders about the threats posed by IAS, however no specific IAS prevention and control programs related to PA management – specifically biodiversity protection, are being funded through government right now. However, several other related government programs constitute a good baseline investment to build up and improve focus as well as additional activities towards IAS aspect. Under the Government’s National Development Program, support is being provided to protected areas, mainly in the form of staff training and under the anti-poaching activities (see below). It is envisaged that training in the identification and management of key invasive alien plants will be included within this government training program through support by the GEF project. Over the next five years from 2015/2016 to 2018/2019 the GoM through its Ministry of Natural Resources, Energy and Mining is supporting several environment related programs including “Environment and Climate Change Management” (US\$ 8,941,513) and “Wildlife Conservation and Management” (US\$ 3,224,300), the latter much focused on species protection, anti-poaching, tourism development, and some activities related to management of their habitat. A very meagre US\$ 21,326 of this will be available for biodiversity conservation and management, which is the government program coming closest to IAS issues. Notwithstanding the low level of available government funding set aside specifically for BD conservation, the various ongoing and planned program activities under this latter baseline program offers much scope for collaboration and incremental activities focused on IAS prevention, management and control, including training, awareness building, inventory of IAS in (wildlife) reserves, (economic) impact analysis of emerging IAS to game tourism, as well as development of the national IAS strategy through partnership, also because the same Ministry is at the helm of both this as well as the GEF project. Because of the lack of Malawi Government resources to meet the management costs of all PA's, they are entering into agreements with the private industry, bilateral donor and e.g. GEF support. Other projects of this ministry relevant to the GEF IAS and agro-ecosystems work include the “Sustainable management of Nyika Transfrontier Conservation” (US\$ 366,398), “Combating deforestation and forest degradation for sustainable rural development” (US\$ 70,461), as well as “Improved forestry management for sustainable livelihoods” (US\$ 70,461), all relevant to the GEF IAS project. The Ministry of Agriculture, Irrigation and Water development in its 2016-2017 Program Budget Statement includes two Strategic Objectives: (i) To ensure sustained food security; and (ii) To ensure increased agro-based incomes, which are closely related to both the prevention as well as control of invasive pest species. Its Agricultural Productivity and Risk Management program budget is large at USD 177,598,400 over the next three years. The Ministry of Local Government and Rural Development will invest a minimum of USD 8,158,789 in rural development of which a small part may benefit the project through the planned livelihood improvement initiatives potentially benefitting communities involved in the agro-ecozones around the protected areas. The GoM also plans to achieve improved IAS management in order to meet its CBD obligations (Target 9 of the Aichi Biodiversity Target) by undertaking a range of activities requiring estimated funding in the range of US\$6,500,000, which will be requested from a number of agencies including UNEP, UNDP, NORAD, FAO, DFID, USAID, IrishAid, GIZ and the private sector (NBSAP, 2015-2025). To assist the GoM in achieving its mandate many private-public partnerships around the management of protected areas have already been developed. For example, 3 NP's in Malawi are now contractual parks, managed by the African Parks Foundation. This provides the proposed project with the opportunity to not only raise awareness among private and public stakeholders about the threat of IAS, but also to accrue resources from both sectors for the management of IAS. The Electricity Supply Commission of Malawi continues to support programs to reduce the impact of introduced waterweeds in the Shire River using Environmental Management Funds. Both the Blantyre and Lilongwe city assemblies are also involved in manual removal of *Salvinia molesta* that is threatening their water reservoirs.

Among international development partners, UNEP and UNDP are supporting the second phase (2014-2017) of the Poverty-Environment Initiative (PEI) program, which is designed to fight poverty in Malawi by promoting the sustainable use of natural resources and ecosystems on which poor people rely for their livelihoods. The PEI works with key government partners to raise awareness, influence policy-making and strengthen the mainstreaming of poverty-environment into budget processes, sector

programs and sub-national planning. The overall aim is to bring about lasting institutional change and to catalyze key actors to increase investment in pro-poor environmental and natural resource management.

The Government of Malawi's Wildlife Policy (Malawi Ministry of Tourism, Parks and Wildlife 2000) stresses the "development of partnerships with all interested parties to effectively manage wildlife both inside and outside protected areas and the encouragement of the participation of local communities, entrepreneurs, Non-Governmental Organizations (NGOs) and any other party with an interest in wildlife conservation". Among non-governmental organizations, the Malawi Environmental Endowment Trust (MEET) and the Mulanje Mountain Conservation Trust (MMCT) provide sustainable sources of financing for the management of protected areas (MMCT continues to support implementation of the management plan for the Mulanje Mountain Forest Reserve). In addition, the Nyika-Vwaza (UK) Trust Fund also is funding conservation and community projects in the Nyika NP and Vwaza Marsh Wildlife Reserve, including the management of IAS. Protected areas in the Lower Shire, namely Lengwe, Mwabvi and Majete, have also established various Natural Resources Management Trusts around protected areas. The previous 10-year agreement between the Department of Forestry and FZS for the protection of the Dabaga/Ulangambi Forest Reserve and the conservation of Mangoche Forest Reserve may provide additional lessons with regard to the challenges and benefits of conservation trust funds, which in this case may benefit additional work in the Mangoche Forest Reserve and its buffer zones towards IAS prevention and management. WWF and IUCN have been involved in a number of Projects concerned with biodiversity conservation in Malawi, although none have focused primarily on invasive species management. The Wildlife and Environment Society of Malawi (WESM), a Birdlife International partner, supports the management of protected areas in Malawi in areas such as lobbying the government to establish protected areas; promotion of environmental education; infrastructure development; re-introduction and game management; promotion of effort-based law-enforcement; snare bounty scheme; research activities; and ecotourism. More recently they were involved in a NORAD-funded, which was active, amongst others in the Ntchisi Forest Reserve, with the specific objectives of improved governance structures in and around IBAs; improved community-based natural resources management; monitoring bird species and habitats and increased incomes from NRM-based enterprise development. The Wildlife Action Group (WAG) works on nature conservation and management in the Central Region of Malawi. Its main objectives are to protect Malawi's wildlife and environment, and to assist and support the Malawi Government in the protection of National Parks, Game and Forest Reserves. Total Friends supports Liwonde National Park with fencing, firebreaks and road network maintenance within the rhino sanctuary. 'Endangered species of Malawi Circle' attached to J&B's 'Care for the Rare' Programme is also involved in a number of conservation efforts. Finally, Lead-Southern and Eastern Africa, the Forestry Department and World Fish Centre are implementing the Lake Chilwa Basin (LCB) Climate Change Adaptation Program in collaboration with Machinga, Phalombe and Zomba district councils. The program is designed to secure the livelihoods of 1.5 million people in the Lake Chilwa Basin and enhance resilience of the natural resource base through the development and implementation of a basin-wide climate change adaptation program that will enhance the capacity of communities to adopt sustainable livelihood and natural resource management practices. The program includes the management of invasive species.

In agro-ecosystems CABI is working together with the Department of Agriculture in the Plantwise Program, whereby extension officers are trained to assist farmers in the identification of pests, including IAS, and how best to manage them. Advice focusses on the reduction of pesticide use through integrated pest management, of which biocontrol is an important component. The Plant Clinics, which have been established as part of the Program, play an important role with regard to early detection and rapid response and will be an integral component of the proposed Project. The Project will also work closely with Total LandCare, an NGO established in 1999, with a mandate "to improve the livelihoods of smallholder farmers in the region with a focus on community based approaches to increase agricultural production, food security and incomes within a context that ensures sound management of their natural resources." The Project will also benefit from previous interventions, including the Manda Wilderness Agricultural Project, which was initiated, with funding from CEPF, to introduce 360 subsistence farmers and their families to the concepts of conservation and sustainable agricultural practices in an attempt to protect the Manda Wilderness Area, an area of approximately 250,000 hectares.

### **1.3 The proposed alternative scenario, GEF focal area<sup>9</sup> strategies, with a brief description of expected outcomes and components of the project**

The Project Objective is "to prevent new invasions and reduce the current impacts of invasive alien species (IAS) in protected areas and adjoining agro-ecosystems in Malawi". Previous invasive species programmes and projects in Malawi have primarily focused on individual sectors, e.g. agriculture or forestry or protected landscapes. Recognizing that IAS cannot be managed in isolation and that IAS populations and impacts move between protected and productive areas, the proposed project adopts a

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<sup>9</sup> For biodiversity projects, in addition to explaining the project's consistency with the biodiversity focal area strategy, objectives and programs, please also describe which [Aichi Target\(s\)](#) the project will directly contribute to achieving.

landscape approach to IAS prevention and control by including sectors and stakeholders concerned with protected area management and the management of agro-ecosystems in areas adjacent to protected areas. Specifically, the project aims to assist Malawi in the development of effective national IAS policies, especially those pertaining to protected areas and surrounding agro-ecosystems, capacity building, awareness raising, IAS control and management field testing, and sharing knowledge and experiences through collaboration. This will be achieved by engaging with stakeholders at all levels, and within all socio-economic groups, thereby providing these groups with the necessary skills to control and manage IAS in their areas. A greater understanding of the problems caused by IAS, and participation in the management and control of the species by all socio-economic groups, will lead to greater benefits in terms of preserving local biodiversity and protecting new areas from invasion. The Project will also provide the opportunity for improved cross-sectoral management, and access to additional resources, by working with multiple Government sectors, especially Agriculture and the Environment, and communities living adjacent to protected areas. In addition, increased coordination between existing projects will be achieved by hosting annual meetings/workshops and establishing joint Working Groups, and by sharing of information in order to foster cooperation and avoid duplication.

***Component 1: Establishing a national framework and capacity to enhance IAS management in protected areas and associated agro-ecosystems***

In order to gain support for the development and implementation of IAS policies and regulations, it is critical that all stakeholders have a solid understanding of the impacts and benefits associated with IAS and their management. To that end, analyses will be undertaken to determine the costs and benefits of managing selected IAS, including selected “conflict” species, which have a negative impact on the natural resource base but also have some beneficial attributes in terms of use by local communities. The project will train relevant staff in these analyses so that these evaluations can be undertaken in the future to prevent the introduction of species whose costs may outweigh any perceived benefits. Prevention is generally the most cost-effective IAS management option because it stops the introduction of species that, once established, can have an enormous negative impact on natural resources and ecosystem services.

**Outcome 1.1.** Strengthened national IAS policy and improved institutional capacity and coordination amongst different government agencies and the private sector to respond to existing and new invasive species problems throughout Malawi, with a focus on protected areas and their adjoining agro-ecosystems

**Outputs** will include:

- An approved National Invasive Species Strategy and Action Plan that addresses threats to protected areas and adjoining agro-ecosystems
- Rules requiring that Environmental Impact Assessments consider the impacts of IAS, including for the use of IAS in restoration activities
- Surveys will be undertaken to identify the most problematic IAS and to map their distribution, as well as to identify the highest risk pathways for their introduction and/or spread within the country. This will be geographically focused on protected areas and associated agro-ecosystems. And although surveys will target particularly those IAS that are known to threaten BD, other IAS found will be recorded as well, also to maximize the optimum use of survey funds. This information will be made available in an Identification Guide (see Component 3), which will contribute to the early detection of new incursions.
- IAS risk analysis criteria established so that IAS which pose a threat to biodiversity, ecosystems or livelihoods can be rejected prior to introduction into Malawi. IAS risk analysis criteria also will be developed specifically for protected areas, where IAS are often introduced for beautification or restoration. For intentional introductions, the project will support the adoption of Pest Risk Assessments (PRAs) prior to importation, or at the port of entry, to identify species that pose a threat to biodiversity or economic development, PRA systems will be developed for use in PAs to ensure that no invasive or potentially invasive species that are already present in Malawi spread into PAs. Relevant staff at the national and local (PA) levels will receive training in the use of PRA.
- Establish a surveillance system (Early Detection and Rapid Response (EDRR) system) to detect and control invasive species before they become widespread and abundant. The system will not only apply to new introductions, but also to non-native species that may have been benign for decades but have the potential, as a result of climate change or increased disturbance, to spread from cultivated areas and become invasive. Unless these species and those that have been accidentally introduced are detected early, long-term impact and management costs will be significant.
- Carry out cost-benefit analyses of three to five species, including some “conflict” species. As part of project activities to carry out the analyses, the project will provide training so that similar studies can be undertaken on other species.
- Raise awareness among policy-makers of all project outputs, especially with regard to the presence of invasive plants and

their impacts, the benefits of controlling problematic plant species, and the costs associated with the promotion and dissemination of “conflict” species whose costs outweigh their benefits.

- Undertake surveys in conjunction with local partners to identify critical IAS, while simultaneously raising awareness on IAS issues and increasing capacities on how best to identify IAS. Information generated from the surveys will contribute to the development of an IAS Field Guide.

### **Component 2: Strengthening IAS management in existing protected areas and adjoining agro-ecosystems**

Under Component 2, IAS management and control will be institutionalized into PA management. Information gathered in the baseline surveys (Component 1) will aid the development and implementation of management and control strategies (mechanical/manual, chemical and biological, integrated pest management) since methodologies are often site-specific. There will be enhanced understanding of the impacts of IAS and how best they can be managed. Invaded areas will be restored for the benefit of biodiversity conservation. Communities living adjacent to protected areas will be capacitated with regard to the identification and management of IAS and in so doing the project will contribute to increased yields and improved pasture production as well as improved biodiversity conservation in areas adjoining protected areas. The project will ameliorate pressures on protected areas and improve collaboration between farmers and protected area staff.

Biological control as a safe and effective management strategy will be prioritized. Biological control, which is a cost effective approach to IAS control, should form an important component of any IAS management strategy in developing countries such as Malawi that do not have significant resources for chemical and mechanical control. Furthermore, biocontrol agents are optimal for use in PAs and adjoining agro-ecosystems as they reduce the excessive and unnecessary use of pesticides that have negative impacts on biodiversity and on human health. The project will promote the use of biocontrol measures in croplands adjoining PAs, and specifically the use of biocontrol agents that are known to be host-specific and damaging and that have been released elsewhere in Africa; these could include agents for the control of *Pistia stratiotes*, *Acacia mearnsii*, *Lantana camara* or *Mimosa diplotricha*. The Project will facilitate their possible introduction by undertaking Risk Assessments, followed by the compilation of all relevant reports, which will be submitted to the Regulatory Authorities for their approval before the implementation of any biocontrol activities. Approved agents will be introduced, mass reared and released in the most widespread and dense infestations in order to facilitate initial establishment.

**Outcome 2.1.** Reduced IAS impacts in five selected protected areas resulting in enhanced conservation outcomes for endangered and threatened species

The proposed project will strengthen IAS management capacities in five protected areas in Malawi: Nyika National Park and the Mount Mulanje, Misuku Hills, Malawi Hills, and Ntchisi Forest Reserves. These PA’s have been selected because they meet the criteria for defining globally significant sites for biodiversity conservation (see GEF 6 Biodiversity Strategy, Annex III and Annex I of this PIF to see how selected PAs qualify). Proposed activities, especially those in the Nyika NP and Mount Mulanje Forest Reserve will consolidate and build-on past IAS projects. For example, much of the previous work undertaken in Nyika NP focused on research activities, the results of which now need to be implemented, enabled through partnership building (e.g. between PA management, local government and agro-communities), focused capacity building and demonstration how IAS prevention and control works at field level, as well as mainstreaming of IAS objectives and activities in the management of the PAs. The majority of invasive species already present in Malawi and the wider region have the potential to invade these protected areas and threaten their biodiversity and ecosystem services, a problem that will likely be exacerbated by climate change and increased disturbance in areas adjoining these protected areas.

**Outputs** will include:

- Revised Protected Area Management Plans (all five) including strategies for the prevention and management of IAS in immediate surrounding landscapes/bufferzones. Protected Area Management Plans for the selected PAs will include: i) an effective IAS communication strategy for PA staff and surrounding interested and affected parties and other stakeholders; ii) strategies and policies to effectively prevent the introduction of IAS to the PA and adjoining agro-ecosystems; iii) effective control plans for the existing priority IAS including chemical, mechanical and biological control; iv) a comprehensive information management system which supports informed and timely management decisions; v) a system of monitoring and evaluating the implementation of the plan and its effectiveness; and vi) a mechanism for securing sufficient funding for development and implementation of the program.
- Tested species-specific management plans for six IAS in three of the five protected areas (target species will be confirmed during the project preparation; some of the species present in the target PAs are listed in Table 1 above, and in Annex 1, and those we intend to target are listed in Table 2, including three or four targets for biological control). Management

activities under the plans will take the form of demonstration trials so that protected area managers and staff can familiarize themselves with control methodologies, their efficacy and benefits. Project efforts will focus on the habitats of the most threatened species and/or impacted areas, provisionally 50 hectares in each of the three selected PAs. This will include clearing all IAS from tourism facilities and staff quarters; but may also include any buffer zones or multiple-use zones – if being formally part of the PA management area. Parts of the sites where IAS management has taken place will be restored, resulting in increased habitats for threatened and endangered species. The PPG has to decide on targeted species, and to conduct a feasibility assessment on how much hectares can be restored with the available resources.

- Protected Area staff trained in the identification and control of IAS. Training will largely be undertaken “on-the-job” in conjunction with IAS management activities to identify invasive species and their pathways for entry and spread, and to address invasive species through on-the-ground control measures.
- A single national Biocontrol Working Group established, with involvement of the government national Regulatory Authorities, to support the use of biological control methods, which will reduce the costs associated with conventional control methodologies and more importantly reduce the use of herbicides that can have a negative impact on fauna and flora.

**Outcome 2.2.** Reduced IAS impacts in adjoining agro-ecosystems of five selected protected areas contributing to improved livelihoods and biodiversity conservation.

**Outputs** will include:

- Farmers trained in the identification and management of invasive plants in agro-ecosystems
- Invaded areas (50 ha each.) in agro-ecosystems adjoining the three of the selected PA’s areas cleared and 10 ha. in each of the cleared areas restored through demonstration. Clearance and restoration (Farmer Managed Natural Regeneration) will be carried out in partnership with local community members in order to provide them with practical experience and understanding of best management practices, and will function as a pilot demonstration for IAS management in agro-ecosystems.
- Increased collaboration on IAS management between protected area managers and farmers in order to leverage complementary skills and resources and to take an ecosystem approach to IAS management that addresses the potential migration of IAS between protected and productive landscapes.
- Sustainable farming practices adopted and promoted by communities. This will reduce the incidence of poor land-use practices and improve livelihoods by restoring degraded land, improving crop yields and livestock carrying capacities and reducing pesticide use to contain crop pest – many which are IAS, and excessive fertilizer inputs. These activities will be undertaken in collaboration with Total LandCare, other Malawi-based agencies and CABI’s Plantwise Program ([www.plantwise.org](http://www.plantwise.org)). The Plantwise Program specifically focuses on providing farmers with information on best pest management practices, including IAS, in order to reduce chemical use and enhance sustainability. The Project will also increase the tree cover within croplands and buffer zones, importantly focused between farmland and protected areas, by promoting crop integration, agro-forestry and rotation, with the benefit of establishing a vegetation cover and production system which both reduces the incidence of IAS as well as supporting local income. Practices such as Farmer Managed Natural Regeneration (FMNR), a “low-cost, sustainable land-restoration technique used to combat poverty and hunger amongst poor subsistence farmers in developing countries by increasing food and timber production, and resilience to climate extremes, will be implemented.

### **Component 3: Knowledge management and broader adoption**

National and site specific awareness/communication strategies will be developed in consultation with all relevant sectors, including government officials, conservation agencies and rural communities. It will target those individuals and agencies which can contribute to the long-term sustainability of project interventions. Efforts will also be made to target potential IAS “champions” who will be able to drive the IAS agenda into perpetuity. Depending on the target audience, a range of awareness materials will be developed including, but not limited to, posters, brochures, pamphlets, TV documentaries, and radio programmes. Information generated as a result of project activities will be made available through the various communication channels developed during the project. One of the main outputs will be an Identification Guide that will include descriptions of invasive plants, their distribution and management. The Guide will be made available to extension officers, PA managers and associated staff, quarantine officers, researchers, staff from the Forestry Department, private individuals in the plant nursery and associated trades, and others. Monitoring and evaluation will be critical in measuring the success of project interventions, and an M&E will continue throughout project implementation, especially with regard to changes in awareness levels. All monitoring and evaluation activities will collect gender-disaggregated data, and where appropriate, women-only focus group discussions will be held regarding the impact of project activities on women’s time (e.g. less or more time spent weeding).

**Outcome 3.1.** Lessons learnt, documented and disseminated and awareness programs to facilitate replication and broader adoption in the Malawi national PA system established.

**Outputs** will include:

- A Communication and Outreach Strategy developed and implemented regarding IAS management in PAs and agro-ecosystems, focused on information and messages that will produce the most cost-effective changes in awareness amongst target audiences.
- Under the overall strategy, outreach campaigns, including the use of media, workshops, and meetings, which will target government officials, protected area staff and affected communities.
- Development of an Identification Guide on IAS, based on surveys carried out under Component 1, will be undertaken in collaboration with local partners to consolidate all information on the presence and distribution of invasive plants and fauna. The Guide also will include information on IAS management options.
- Monitoring and Evaluation processes to support adaptive management approaches and to measure the efficacy of project outcomes.

#### **1.4 Incremental/additional cost reasoning and expected contributions from the baseline, the GEFTF, LDCF, SCCF, and co-financing**

**Baseline Scenario:** The management of IAS in Malawi is not yet effectively addressed in terms of policies and legislation, professional capacities, and active management of IAS introduction and spread, and as such both the current impacts of IAS and the threats of future IAS introductions/incursions remain very high. Furthermore, these threats are only likely to increase due to factors such as climate change, land degradation, and an escalation in trade, travel and tourism, and thus the longer that Malawi waits to address critical IAS management priorities, the greater the likelihood of severe negative impacts from IAS on biodiversity, ecosystem services, and livelihoods and the greater the costs will become to address those impacts. In the baseline scenario, existing sector policies will continue to promote or encourage the introduction of exotic species without evaluating their potential risk, especially to biodiversity. Efforts to implement IAS management will continue to be uncoordinated, with little collaboration/communication between various stakeholders, especially those in agriculture, forestry and the environment, and duplication or inaction by one sector will contribute to a continued waste of resources. In the absence of a national inventory of IAS, it will be impossible to identify and address the most urgent IAS issues in a strategic manner. IAS will continue to be intentionally and unintentionally introduced into protected areas and adjoining agro-ecosystems, while IAS already present within these areas will continue to spread and multiply to the detriment of threatened and endangered species and crop and pasture production. IAS within protected areas may invade adjoining agro-ecosystems and thereby increase tensions between communities and protected area managers, and protected area managers in turn will remain powerless to prevent invasions from agro-ecosystems. A reduction in crop yields or pasture production due to IAS impacts will also place increasing pressure on protected areas from people living adjacent to them. IAS control activities that do get carried out will continue to rely primarily on costly chemical and/or manual control methodologies, and may not be sustained as a result. Resource managers and other stakeholders will remain unaware of many IAS impacts and unable to identify important IAS or the pathways for their introduction and spread, and as a result IAS will continue to be introduced and existing infestations will continue to proliferate. The lack of information and coordination mechanisms and strategies will limit the ability of the Government of Malawi to convey knowledge and information generated on IAS threats and management strategies to communities and protected area staff.

**Alternative Scenario:** Project interventions will result in changes in policies, enhanced capacities, and increased awareness which will significantly enhance IAS management. The project will support the development of a National Invasive Species Strategy and Action Plan (NISSAP), cost-benefit analyses of selected IAS, and the development of a national invasive plant inventory, all of which will increase the knowledge base on IAS in the country and the ability of stakeholders to address IAS in a strategic manner. Risk Analyses and Early Detection and Rapid Response systems will be put into place that will enable early and effective detection and identification of priority potential invaders, the rapid sharing of information among all stakeholders, and monitoring and control techniques that will prevent the spread and establishment of potential invasive species. At the site level, the development and implementation of IAS management plans that include control and restoration activities will reduce the negative impacts of IAS on key biodiversity habitat and important agro-ecosystems, while also reducing existing and potential conflicts over the intentional introductions / uses of non-native species that may become invasive. Communication and awareness activities will greatly increase understanding and awareness among resource managers and local communities on IAS and their impacts, thereby producing increased support for IAS management and increased participation and allocation of resources to reducing IAS introduction and spread. In summary, the project will result in a scenario where the status of biodiversity, ecosystem services and agro-ecosystem production levels and livelihoods support are all more effectively protected from existing and potential future IAS impacts at the national level and at the level of targeted demonstration areas with adjoining protected and productive landscapes.

Co-financing: Contributions totaling US\$4.0 million will be provided to the project by a variety of partners, including several Ministries, a number of NGOs and institutes, and UNEP.

### **1.5 Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)**

The expected global benefits of this project include contributions to reducing the loss of biodiversity and reducing the negative impacts of IAS on national economies and local livelihoods. Annex 1 describes the many IUCN Red-Listed Species, as well as the endemic and threatened species in each of the five protected areas, whose conservation will benefit directly from project interventions. Communities will also benefit from the project's IAS management interventions, as IAS have a significant impact on the goods and services provided by ecosystems (Turpie, 2004; Strayer, 2012; van Wilgen et al., 2013), and management of IAS can contribute significantly to sustaining ecosystem functions and services (van Wilgen et al., 2013). By addressing IAS management among communities living in areas adjacent to protected areas, the project also will reduce negative IAS impacts on the protected areas themselves, both by removing IAS populations that might spread into PAs, and by protecting agricultural production from negative IAS impacts and thereby reducing the reliance of rural communities on resources within PAs. The Project will help Malawi in meeting its obligations to the Convention on Biological Diversity (CBD), including Article 8(h), which commits member countries to 'prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.' The project contributes to the goals of the CBD in implementing activities identified in Malawi's National Biodiversity Strategy and Action Plans, and it will directly assist Malawi with achievement of the Aichi targets 1, 7, 9, 11, 12, 14 and 19, in particular Target 9: Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

### **1.6 Innovation, sustainability and potential for scaling up**

*Innovation:* The project proposes an innovative landscape approach to IAS management that recognizes and addresses the interaction of IAS populations and their impacts between protected areas and adjoining productive landscapes, in this case primarily agro-ecosystems. The project will provide opportunities to enhance and develop closer cooperation between PA managers and adjoining communities, as well as among PA managers for the five PA units targeted by the project. By targeting the shared interests of both stakeholder groups, the management effectiveness of the PAs will be strengthened and the economic opportunities and security of neighboring communities will be enhanced. In addition, by undertaking cost-benefit analyses of "conflict" IAS where costs and benefits must be assessed and also weighed in terms of their distribution and impact on different stakeholders, the project will enable Malawi to use a comprehensive approach to target IAS management activities and address IAS impacts that spread across livelihoods, local economies and biodiversity.

*Sustainability:* Capacity building and awareness creation will contribute to the sustainability of institutional and policy support for IAS management, while tools such as the IAS Identification Guide, which will also include information on best management practices, will facilitate more cost efficient and effective IAS management interventions. The successful introduction of damaging and host-specific bio-control agents will provide a mechanism whereby target species can potentially be controlled in perpetuity without additional activities or costs required. It is expected that working together with the private sector will contribute to the sustainability of IAS management activities in a manner similar to what has been achieved in Malawi with regard to PA management, where the private sector has been involved in lobbying the government to establish PAs, environmental education, infrastructure development, re-introduction and game management, promoting effort-based law-enforcement, a snare bounty scheme, research activities, and ecotourism (Mauambeta, 2003). The existence of PA financing mechanisms will contribute to the financial sustainability of IAS management in Malawi; existing mechanisms such as the Nyika Trust, the Mulanje Mountain Conservation Trust (MMCT), and Natural Resources Management Trusts for the Lengwe, Mwabvi and Majete PAs, as well as the pending trust fund for Liwonde National Park, will provide PA managers with at least some of the funding required to address critical IAS issues. The Malawi Environment Endowment Trust (MEET) also finances a range of environmental programs in Malawi and may be expected to allocate more funding to IAS issues as their profile in the country increases through the activities of the proposed project.

*Scaling Up:* The project will lay the foundations to ensure that there will be potential for scaling up in the future. The development and implementation of policies, capacity building and awareness creation will all contribute to scaling up of IAS management activities in Malawi in the future. This model has worked well in other African countries such as Ethiopia and Uganda, supported through GEF, e.g. under the Removing Barriers to Invasive Plant Management in Africa (GEF 2140). The development of baseline data on the distribution of IAS and their impacts, together with some cost-benefit analyses, will provide policy makers and

government officials with the necessary information to develop and implement additional policies together with financing mechanisms to manage IAS more effectively. The revised Protected Area Management Plans including strategies for the prevention and management of IAS in surrounding landscapes and agro-production zones; the partnership with Local Government and communities in the control of IAS; and the experience in habitat restoration through Farmer Managed Natural Regeneration, will enable the Department of National Parks and Wildlife (DNPW) and the Forestry Department to establish surveillance and monitoring systems for new and existing IAS in other PA's in Malawi, as well as target particular species for containment and control through their routine PA programs and budgets. The development of identification tools will also make more information available on how to identify and best manage IAS, information largely lacking to date in Malawi.

2. **Stakeholders.** Will project design include the participation of relevant stakeholders from [civil society organizations](#) (yes  /no ) and [indigenous peoples](#) (yes  /no ) If yes, identify key stakeholders and briefly describe how they will be engaged in project preparation.

Stakeholder participation from a range of sectors is critical in ensuring the success of this project. Local communities living around the PA who are often dependent on the ecosystem goods and services provided by PA's will benefit from these proposed interventions. In some PA's, particularly Forest Reserves, communities are permitted to collect non-timber products and undertake other activities such as bee-keeping. However, with increasing population pressure many of these activities are not sustainable and interventions are required to improve land productivity and reduce land degradation in surrounding agro-ecosystems. In order to garner support for proposed interventions the Project will work with Local Governments, Village Chiefs and established NGO's. The Project will also work through Farmer Field Schools (FFS) which are well established throughout Malawi. Much of the training at FFS will focus on the "training of trainers" and development and implementation of demonstration trials to demonstrate the efficacy of various interventions.

National institutions will play a critical role in providing in-kind and financial support for the project, and the support of Government Ministries and their respective departments and agencies, especially with regard to the implementation of strategies and action plans, is critical at the national level. The National Executing Agency will be the Environmental Affairs Department within the Ministry of Natural Resources, Energy and Mining, which will be involved in day-to-day project activities. Staff from the Department will be involved in coordinating activities within country while CABI will provide guidance and technical backstopping. The involvement of the Department of Forestry, Department of Agricultural Research Services, Forestry Research Institute of Malawi, National Herbarium and Botanical Gardens, National Commission for Science and Technology, and the Ministries of Trade and Industries; Agriculture, Irrigation and Water Development; Science and Technology; Information, Tourism, and Culture; Local Government and Rural Development; and Finance also will be key to ensuring the sustainability of project initiatives. Staff from the Forestry Research Institute, National Herbarium and Botanical Gardens and National Commission for Science and Technology will be tasked with compiling a list of all IAS in and around PA's. The Ministries of Trade and Industries will be asked to compile a list of all relevant regulations and policies pertaining to IAS and trade, including quarantine. Local Government and Rural Development together with other agencies will compile information on all IAS policies and regulations in force at a local level. The Ministry of Agriculture, Irrigation and Water Development will be responsible for collating all data on IAS present in Malawi and current measure to manage them.

### List of potential partners and roles

Partner	Activity
Ministry of Natural Resources, Energy and Mining	National Executing Agency – Coordination, reporting, etc.
Ministry of Agriculture, Irrigation and Water Development	Assist in working with farmers in adjoining agro-ecosystems, especially extension staff, to reduce pesticide use and develop and implement sustainable agricultural practices. Will also contribute to the development of database on IAS affecting crop and pasture production in Malawi. Will also be involved in collating information on past and current IAS policies
Ministry of Science and Technology	Collating information on all known IAS present in Malawi and contribute to awareness raising
Ministry of Information, Tourism and Culture	Tourism is an important revenue source in Malawi. That said tourism facilities are often the main source of invasive species. The Ministry will be involved in awareness creation and possibly also the development of policy related to the planting of exotic plants, especially invasive species.
Ministry of Local Government and Rural Development	Will be an important partner in getting support for project initiatives. They will also be involved in implementing any policy initiatives, including the NISSAP and any local by-laws. Also involved in awareness

	creation.
United Nations Environment Programme (UNEP)	International Implementing Agency
African Parks Foundation	Coordination amongst PA's and logistical support
BirdLife International	Awareness creation and working with communities
Mulanje Mountain Conservation Trust	Key partner for work in Mount Mulanje Forest Reserve
Wildlife and Environmental Society of Malawi	Awareness creation and facilitation of IAS management activities
Lilongwe Wildlife Trust	Incorporating IAS learning material/modules in school education programs
Action for Environmental Sustainability (AFES) Malawi	Working with communities in and around Misuku Hills Forest Reserve
Coordination Unit for the Rehabilitation of the Environment	Working with communities in agro-ecosystems to develop and implement sustainable crop production strategies
Nyika Vwaza (UK) Trust (NVT)	Key partner for work on IAS management in Nyika NP
Total Landcare	Developing best management practices for <i>Pteridium aquilinum</i> and interventions in agro-ecosystems, especially conservation agriculture
Centre for Agriculture and Biosciences International (CABI)	International Executing Agency
Queensland Biosecurity, Australia	Supply of biocontrol agents
ARC-Plant Protection Research Institute, South Africa	Supply of biocontrol agents
University of Cape Town, South Africa	Supply of biocontrol agents

A number of international and national organizations active in social and environmental aspects of biodiversity conservation in Malawi will contribute to the project in various ways. A key partner will be WESM, which is affiliated with the International Union for the Conservation of Nature (IUCN) and BirdLife International, and is one of the principal NGOs working on wildlife and environmental conservation in Malawi. WESM will provide guidance in the design of project activities on scientific analyses, environmental education and awareness, and the formation of village level institutions to integrate biodiversity conservation with development and poverty reduction (WESM is already working with nine Local Conservation Groups, and the project will work together with these established groups and other community groups adjoining the target PAs in IAS management and awareness raising activities). Total LandCare (TLC) will assist the project in undertaking agricultural and natural resource management programs, based on its experience in implementing the USAID-funded Malawi Agroforestry Extension Project. The Malawi Environmental Endowment Trust (MEET), Mulanje Mountain Conservation Trust (MMCT), Nyika-Vwaza (UK) Trust Fund and other Natural Resources Management Trusts will help the project to explore options for sustainable financing of IAS management. The Wildlife Action Group (WAG) and Total Friends will provide guidance on strategies for the protection of the National Park and Forest Reserves targeted by the project.

A host of academic institutions in Malawi also contribute to research and knowledge generation concerning IAS and will assist in the design and implementation of IAS management activities and policies and in activities to generate knowledge and increase awareness. These include Chancellor College (Biology Department, Natural Resources and Environment Centre, Leadership for Environment and Development-Southern and Eastern Africa), Bunda College (Forestry and Horticulture Department, Natural Resources Management Department, Crop Science Department and Aquaculture and Fisheries Science Department), Mzuzu University (Biological Sciences Department and Forestry Department), Natural Resources College, and the Malawi College of Forestry and Wildlife.

**3. Gender Equality and Women's Empowerment.** Are issues on [gender equality](#) and women's empowerment taken into account? (yes  /no ). If yes, briefly describe how it will be mainstreamed into project preparation (e.g. gender analysis), taking into account the differences, needs, roles and priorities of women and men.

Gender issues are considered under each of the components described above. For example, the cost-benefit analysis of three 'conflict' species under Component 1 will assess gender-specific impacts, costs and the role of women in their management and control through agricultural practices. Under Component 2, strengthening of IAS management will include supporting community participation, and a communication and outreach to those living in and around protected areas will target not only community leaders but also women and women's groups. This approach will be extended to the national awareness programs under Component 3, ensuring that the whole community learns which plants are invasive, how to manage them, and how to reduce the negative impacts and prevent the spread of IAS. Targeting women is key to the control of IAS weeds in agricultural landscapes, as women are typically responsible for weeding and their constant presence in the fields makes them likely to identify IAS more quickly than others in the community. At the same time, IAS control plans developed by the project will take account of the potential burden that could be placed on women if they become responsible for IAS control activities. Women-only focus

group discussions will be held at the community level to ensure that women have the information necessary and a forum to discuss their roles in IAS management. The project manager will be responsible for the monitoring and review of gender sensitivity in the training workshops and the application of gender-disaggregated indicators. To ensure that the progress of gender mainstreaming can be monitored throughout the project, gender disaggregated targets will be developed and used to monitor indicators.

**4 Risks.** Indicate risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, propose measures that address these risks to be further developed during the project design (table format acceptable).

Risks	Rating	Mitigation Measures
Rapid changes in climate conditions could outstrip the ability of Malawi to successfully manage IAS	Low	Climate adaptation is an integral consideration in this project, as climate change is one of the main drivers in the increased spread of IAS, while at the same time the successful management of IAS can strengthen the resilience of natural ecosystems to climate change impacts. By taking an integrated approach to IAS management that includes prevention, control and restoration, and by working to strengthen national policies, institutions and capacities as well as demonstrating site-level approaches, the project will strengthen Malawi's capacity to reduce the introduction and spread of IAS even in the face of climate change, and in so doing will help to protect natural ecosystems so that they remain resilient to climate change impacts.
Lack of interest and support from key national stakeholder groups and organizations in IAS management	Low	Training and awareness-raising activities will improve communication and coordination as well as increasing stakeholder engagement, including the communities involved through support towards sustainable agriculture practices and pest management (communities will be eager to collaborate if the project is benefitting their day-to-day interests). The implementation of a communication strategy will facilitate a better understanding of IAS issues amongst all stakeholders and as such contribute to improved and decision making.
Insufficient funding and Government support to continue implementation of IAS activities after the project ends	Moderate	Several factors will increase the likelihood that increased funding and support will be available for IAS management post-project. First, the Government of Malawi has highlighted the need to improve IAS management in various official documents and is also obligated to do so under various international Conventions. The Government is also aware that the majority of its people are dependent on natural resources and that enhanced management of pests will contribute to improved livelihoods. The project will increase awareness and understanding of decision makers on the full range of benefits provided by IAS management, not only in terms of agricultural production and livelihoods but also in terms of hydrological services and other ecosystem functions and services. In addition, IAS management in agricultural practices will demonstrate to local communities the tangible economic and social (e.g. health) benefits of effective IAS prevention and control practices, while the introduction of host-specific and damaging biocontrol agents will result in cost-effective and sustainable control of invasive plants, which together will incentivize local communities to continue these practices even in the absence of external support.
Conflicts of interest where certain invasive alien plants provide benefits to particular individuals or groups (e.g. for fuelwood)	High	The project will develop and disseminate information regarding the pros and cons of various IAS. Cost-benefit analyses (CBA) will be undertaken - specifically on those species characterized as 'conflict' IAS, to inform all stakeholders of the true costs of these species, including impacts on livelihoods, ecosystem services, and biodiversity, and a comparison of the benefits they provide. In addition, participatory and consultative approaches will be used to get a consensus among stakeholders on policies towards conflict IAS, and to raise awareness of alternative natural resources to conflict IAS. Results of the CBA will be communicated as part of Component 3 activities to policy and decision makers at national level related to PA, agriculture, forestry management..
Farmers and others living adjacent to PAs may expect to receive remuneration for their involvement in IAS management	Moderate	The project will mitigate this risk by providing farmers with information regarding the long-term benefits they will accrue by participating in IAS management actions, and by providing farmers with non-monetary incentives in the form of fruit trees and other valuable native plant species, including valuable medicinal plants (in the PA buffer zones), to support sustainable agricultural production activities.
Environmental damage from IAS management	Low	Despite the fact that the project will make a positive contribution to biodiversity conservation, it should be recognized that IAS management activities, such as the use of agrochemicals and large-scale clearance in control /eradication activities, can sometimes result in negative environmental impacts. The project will undertake risk analyses with regard to the introduction of any potential biocontrol agents, and environmental & social impact

	assessments (ESIA) to examine the possible negative consequences of any proposed interventions, and propose measures to reduce/mitigate these. The ESIA's will be publicly disclosed in draft form prior to undertaking appraisal.
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**5. Coordination.** Outline the coordination with other relevant GEF-financed and other initiatives.

This project will complement and enhance existing invasive species activities and build on past projects by assisting the process of drawing them into a comprehensive national framework, linking production and conservation-based initiatives, and providing regionally-facilitated efficient and effective support-raising, information-sharing, research and management mechanisms, while building national capacity and helping to establish financial sustainability for invasive species management in Malawi. Sustainability will be built through increased awareness as to the threats posed by IAS and by providing Park Managers as well as communities with the tools as to how best IAS can be controlled. Biological control is also the most cost-effective and sustainable IAS management option. Invasive alien species cannot be managed in isolation and a national approach is required in order to enhance IAS management in key biodiversity hotspots. The lessons and support to be drawn from existing and past GEF IAS projects will be invaluable. The project will support coordination between existing projects by hosting annual meetings/workshops and establishing joint Working Groups, which will facilitate the sharing of information, foster cooperation and avoid duplication.

Coordination and exchanges of best practices will be sought with several regional/global GEF projects underway elsewhere, in various stages of development and implementation. The regional UNEP-GEF Project “Removing Barriers to Invasive Plant Management in Africa”, although it ended four years ago, can still provide experiences and lessons learnt relevant to the proposed project, particularly since both projects synergies include a focus on strengthening policy, building capacity, and creating awareness. Several other projects, all of which involved the participation of CABI and/or its partners, have focused on awareness creation, capacity building, strengthening of IAS policy and the development of best management practices for selected target species, and can provide valuable lessons and potential coordination and information sharing with the proposed project. These other GEF projects including the regional project Mitigating the Threats of Invasive Alien Species in the Insular Caribbean (which ended in early 2014); the project in Cameroon Development and Implementation of a National Monitoring and Control System (framework) for Living Modified Organisms (LMOs) and Invasive Alien Species (IAS) under the GEF Biosafety Program; the project Prevention, Control, and Management of Invasive Alien Species in the Pacific Islands; and the project Removing Barriers to Invasive Species Management in Production and Protection Forests in SE Asia.

At the national level, the proposed project aims to build on the successes of several previous GEF-funded projects that contributed to the management of IAS in various ways. The Lake Malawi/Nyasa Biodiversity Conservation Project (GEF ID 51) resulted in the introduction of three agents for the biological control of water hyacinth (*Eichhornia crassipes*). The project has provided models, processes and lessons to facilitate the introduction of additional agents for other target species and systems, and processes have been developed and implemented to allow for this. The WB and GEF-funded Malawi Compact Environment and Natural Resource Management Project and Shire River Basin Management Project provided inputs into the control of water hyacinth in the Shire River, Lake Malawi and Lake Malombe. These programs developed strategies to acquire and raise bio-control organisms, to train members of local communities in the release of these agents in infested areas, to manually remove the alien plant where it was abundant, and to conduct awareness campaigns through the production of posters. The Mulanje Mountain Conservation Project (GEF ID 640) enhanced the capacity of communities around the Mulanje massif to identify and manage invasive alien plants. Although the project was unable to effectively manage *Pteridium aquilinum*, which is the biggest threat to floral diversity on Mulanje Mountain and the Nyika plateau, lessons on what did and did not work will be invaluable for developing new control strategies under the proposed project, supported by improved policy and legal frameworks and capacities that did not exist under the previous project.

The project will seek to coordinate with a number of ongoing GEF-funded projects in Malawi that are pursuing complementary activities with regard to conservation of biodiversity and ecosystem services and functions. One of these is the project Effective Management of Nkhotakota Wildlife Reserve (GEF ID 3692), which is assisting with the development of an Ecosystem Management Plan (EMP) for the reserve to enhance the management of invasive species. The development of this EMP will provide a model for the development of Protected Area Management Plans for five Protected Areas under the proposed project. The Nkhotakota project is also developing a watershed management plan to ensure that water flows remain unaffected by the potential invasion of “thirsty” invasive trees this effort can also provide valuable lessons for the proposed project. The Mount Mulanje Conservation Trust (MMCT), an endowment trust funded by the World Bank through the GEF, aims to provide long-term reliable support for biodiversity research, conservation of biological diversity and sustainable utilization of natural resources. MMCT is currently supporting the eradication and management of invasive species on Mulanje Mountain by enhancing the capacity of communities to identify and manage invasive alien plants around the massif. The proposed project can build on existing knowledge and contribute to the enhanced management of woody invasives through the introduction of host specific seed-

feeding agents – this intervention will not impact on the useful attributes of some woody invasive species – a win-win solution in the sense that communities will still have access to fuelwood but the exotic trees will no longer be invasive. The project will also coordinate on PA management and agricultural management with the project Shire Natural Ecosystems Management (GEF ID 4625), which is focused on i) improved management effectiveness of existing and new PAs, ii) improved agricultural management, iii) enhanced cross-sector enabling environment for integrated landscape management and, iv) good management practices applied in existing forests. The Sustainable Management of the Nyika Transfrontier Conservation Area (GEF ID 3618) has initiated the mechanical control of bracken fern and *Pinus patula* across the Nyika plateau, integrating research and management in dealing with bracken fern by frequent slashing of the undesired plant on the plateau in sampled areas, and will provide lessons learned to benefit the proposed project.

Finally, the project will coordinate activities with the recently endorsed GEF Project Enhancing the Resilience of Agro-ecological Systems Project (ERASP) which will be implemented by IFAD and executed at a national level by the Ministry of Agriculture, Irrigation and Water Development. This project will focus on integrated catchment management; scaling up catchment level, sustainable land management practices; and monitoring and assessment of ecosystem services, resilience and food security. The project does not make direct reference to any activities focussing on invasive species management, even woody invasives, which pose the biggest threat to water resources, especially if they are present in water catchments or riparian zones. The promotion of fast growing species in woodlots is also recommended with no reference being made to the risks associated with the planting of some of these non-native species. The issue of improved food production, through the effective management of pests, by implementing integrated pest management programs is also not directly addressed. Through increased collaboration between the IFAD project and what we are proposing outcomes will be significantly enhanced, resulting in improved benefits to rural communities and enhanced biodiversity conservation. As such we will look into program synergies and shared interest in supporting sustainable farming practices in shared agro-ecosystems, specifically those in vicinity of the targeted PAs'.

**6. Consistency with National Priorities.** Is the project consistent with the National strategies and plans or reports and assessments under relevant conventions? (yes  /no  ). If yes, which ones and how: NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, etc.

Malawi's 3rd National Report to the CBD identifies the need for programs and activities to address: mechanisms for national and cross-sectoral coordination; review of policy, legislation and institutions (since there is no single policy framework that specifically addresses the control, prevention and management of invasive species); and development of policies and tools to promote activities to reduce the threats of IAS. These goals are also reflected in other documents such as the Forest Ecosystems Biodiversity Conservation Action Plan and the NBSAP. In the revised NBSAP (2015-2025), Target 9 is "By 2025, invasive alien species and their pathways are identified and prioritized for control and prevention from movement and spreading in and out of the country", and identifies the following targets/actions related to IAS that need to be achieved by 2025: 1) compile documentation and maps on IAS in Malawi including an inventory of invasive alien species prevalent in the country 2) develop a national invasive species management plan for management of IAS; iii) conduct awareness campaigns and build capacity of different stakeholders on how to identify, track and prevent IAS in their localities and on the threats of invasive alien species to biodiversity (cross-border inspection, quarantine and certification); iv) procure and upgrade inspection infrastructure for tracking and identifying IAS in Malawi; v) conduct capacity building initiatives on invasive alien species monitoring; vi) monitor the entry and spread of invasive alien species; and vii) regulate and control movement and spreading of IAS. The focus of Poverty Reduction Strategies in Malawi includes agricultural development and environmental conservation (ecosystem services), both of which are threatened by invasive species. The Malawi National Strategy for Sustainable Development (MNSSD) sets out to manage the environment responsibly, provide healthy life for all, protect the rights of the future generations, and conserve and enhance biological diversity in order to meet the MDGs. The objective of Malawi's Millennium Development Goal (MDG) II is to continue reducing poverty through sustainable economic growth and infrastructure development. The MDG II identifies nine key priority areas, many of which are relevant to this proposed project since IAS is a cross-cutting issue, including Agriculture and Food Security; Education, Science and Technology; Public Health, Malaria and HIV and AIDS Management; Integrated Rural Development; Green Belt Irrigation and Water Development; and Climate Change, Natural Resources and Environmental Management

With regard to International Conventions, Malawi is a signatory to the Convention on Biological Diversity (CBD), and the proposed project clearly supports Article 8(h) of the CBD, which calls on signatories to: Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats and species. The project also supports the Aichi Biodiversity Targets, in particular Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment. The

project also supports Malawi to achieve targets outlined in the Global Strategy for Plant Conservation 2011-2020, including “Effective plans in place to prevent new biological invasions and to manage important areas that are invaded for plant diversity” and to priorities identified in the International Plant Protection Convention (IPPC). Malawi is a member of the WTO, which has produced numerous relevant International Standards for Phytosanitary Measures (ISPMs); ISPMs are defined as legislation, regulation or official procedure aimed at preventing the introduction or spread of plant pests (which include invasive plants and other pests). Finally, Malawi is a signatory to the Convention on Wetlands of International Importance (the Ramsar Convention), which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources; the convention calls upon all Contracting Parties to, wherever possible, address the environmental, economic and social impact of invasive species on wetlands within their jurisdictions.

**7. Knowledge Management.** Outline the knowledge management approach for the project, including, if any, plans for the project to learn from other relevant projects and initiatives, to assess and document in a user-friendly form, and share these experiences and expertise with relevant stakeholders.

Knowledge management is a key part of the Project strategy and is the primary focus of project Component 3, which includes a special emphasis on delivering effective communication campaigns and training, especially with regard to the identification, impact and management of invasive plant species and the results of cost-benefit analyses for various IAS. Social media will be used to highlight the impacts of invasive plant species in Malawi. The Project will establish tools and mechanisms to systematically collect data, document lessons learnt, and to share information and lessons with national, regional and international partners. All data recorded with regard to the presence and distribution of invasive plant species will also be made available to regional and international databases. The Project will also include appropriate monitoring of all activities to ensure that collected data is of a sufficiently high quality so that it can contribute to national and international databases and be used in the compilation of publications for inclusion in high-impact journals. Project participants will also attend international meetings, workshops and conferences to communicate project findings.

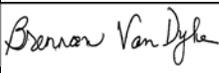
**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT<sup>9</sup> OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S):**  
(Please attach the [Operational Focal Point endorsement letter](#)(s) with this template. For SGP, use this [SGP OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Dr. Shamiso Najira	Chief Environmental Officer, GEF Operational Focal Point	Environmental Affairs Department, Ministry of Natural Resources, Energy and Mining, Malawi	8 January 2016

**B. GEF AGENCY(IES) CERTIFICATION**

**This request has been prepared in accordance with GEF policies<sup>10</sup> and procedures and meets the GEF criteria for project identification and preparation under GEF-6.**

Agency Coordinator, Agency name	Signature	Date (MM/dd/yyyy)	Project Contact Person	Telephone	Email
Brennan Van Dyke Director, GEF Coordination Office, UNEP		December 1, 2016	Max Zieren Task Manager – Asia, UNEP/DEPI/ GEF, Bangkok	+66-2-288 2101	<a href="mailto:max.zieren@unep.org">max.zieren@unep.org</a>

**C. ADDITIONAL GEF PROJECT AGENCY CERTIFICATION (APPLICABLE ONLY TO NEWLY ACCREDITED GEF**

## Annex 1

**Table 1: Globally Significant Biodiversity within 5 Target Protected Areas**

Protected Areas	Globally Significant Biodiversity
<b>Nyika National Park</b>	<p>A total of 1,927 plant species and subspecies have been identified in Nyika NP, of which 33 are endemic species only found in the park and a further 13 species are considered to be near-endemics. The park contains approximately 150 terrestrial and c.50 epiphytic species of orchids, four of which are endemic and two others near-endemic. Several montane forest trees (including <i>Hagenia abyssinica</i>, <i>Euphorbia obovalifolia</i>) reach their southern limits of distribution here. Mammal species for which the Nyika is especially important include Leopard (<i>Panthera pardus</i>), Common Eland (<i>Tragelaphus oryx</i>) (LR/cd), Roan Antelope (<i>Hippotragus equinus</i>) (LR/cd), and Southern Reedbuck (<i>Redunca arundinum</i>) (LR/cd). Nyika is the only known locality in Malawi for the greater dwarf shrew (<i>Suncus lixus</i>), the lesser dwarf shrew (<i>S. varilla</i>), the fruit bat (<i>Plerotes anchietae</i>) and the rodents <i>Otomys typus</i> and <i>O. denti</i>. Nyika's butterfly fauna is the richest in Malawi, with some 120 of the 200 species present in the country, including four species believed to be endemic (<i>Charaxes dowsetti</i>, <i>Axiocerces nyika</i>, <i>Lepidochrysops handmani</i>, <i>L. chalceus</i> and <i>L. nyika</i>). Endemic amphibians include the black-striped sedge frog (<i>Hyperolius quinquevittatus mertensi</i>), the Nyika dwarf toad (<i>Mertensophryne nyikae</i>), and the Nyika Squeaker (<i>Arthroleptis xenodactyloides</i>), while endemic reptiles include the Nyika variable skink (<i>Mabuya varia nyikae</i>), Hilda's skink (<i>Mabuya hildae</i>), and Goetz's Nyika chameleon (<i>Chamaeleo goetzi nyikae</i>). Over 420 species of birds have been recorded in Nyika NP, including Malawi's largest breeding population of wattled cranes (<i>Bugeranus carunculatus</i>) (VU), a large breeding population of Denhan's bustard (<i>Neotis denhami</i>) (NT), and a breeding population of Blue Swallow (<i>Hirundo atrocaerulea</i>) (VU) in Nyika NP estimated at 300 pairs. Several bird species including Red-winged Francolin (<i>Francolinus levaillantii</i>), Mountain Yellow Warbler (<i>Chloropeta similis</i>), Churring Cisticola (<i>Cisticola njombe</i>), Scarlet-Tufted Sunbird (<i>Nectarinia johnstoni</i>), Montane Widowbird (<i>Euplectes psammocromius</i>) and Baglafaecht Weaver (<i>Ploceus baglafaecht</i>) occur nowhere else in Malawi. <i>Circus macrourus</i> is a common winter visitor, while <i>Falco naumanni</i> and <i>Gallinago media</i> are annual visitors in small numbers, and <i>Crex crex</i> is recorded occasionally. The endemic and very isolated race <i>whytei</i> of <i>Nectarinia graueri</i> breeds commonly in montane shrubland. The little-known swift <i>Schoutedenapus myoptilus</i> is locally common over the larger patches of forest.</p>
<b>Mount Mulanje Forest Reserve</b>	<p>The Reserve provides important habitat for a number of bird species, including <i>Alethe choloensis</i>, the Spotted Ground Thrush (<i>Zoothera guttata</i>), the White-winged Apalis (<i>Apalis chariessa</i>), the Bar-throated Apalis (<i>Apalis thoracica</i>; endemic to this site and the Zomba area), the Blue Swallow (<i>Hirundo atrocaerulea</i>), and the Olive-flanked Ground Robin (<i>Cossypha anomala</i>), which is confined to this site and adjacent Namuli and Chiperoone mountains in Mozambique. Mulanje is the most important centre of plant endemism in Malawi, with about 30 endemic plant species. Two species of <i>Widdringtonia</i> cedars are present on the mountain: the tall tree (<i>whytei</i>) is endemic while the shrubby 'variant' (<i>W. nodiflora</i>, syn. <i>W. cupressoides</i>) is widespread elsewhere in southern Africa. Another two trees are apparently endemic: <i>Rawsonia burtt-davyi</i> and <i>Ficus modesta</i>. The fern flora is exceptionally diverse (with over 100 species recorded in the forests) and contains two probably new species (in the genera <i>Asplenium</i> and <i>Elaphoglossum</i>). Three lithophytic <i>Streptocarpus</i> and the cycad <i>Encephalartos gratus</i> are also endemic, as well as several other plants of non-forest vegetation (the total number varies according to taxonomic treatment). In terms of reptiles and amphibians, a chameleon (<i>Chamaeleo mlanjensis</i>), two geckos (<i>Lygodactylus rex</i> and <i>L. bonisi</i>) and two races of frogs are apparently endemic. Mulanje is also the only known Malawi locality for the rodent (<i>Aethomys namaquensis</i>) and has the second-most important forest butterfly fauna in Malawi, with some 111 species, including the endemics <i>Charaxes margaretae</i>, <i>Cymothoe melanjae</i> and <i>Baliochila nyasae</i>.</p>
<b>Misuku Hills Forest Reserve</b>	<p>The forests of the Misuku Hills are the most floristically diverse in the country (with over 150 species of trees recorded); the main emergents are <i>Aningeria adolfi-friedericii</i> and <i>Entandrophragma excelsum</i>. Five montane forest trees (including <i>Cylicomorpha parvifolia</i> and <i>Mitragyna rubrostipulata</i>) and several epiphytic orchids occur nowhere else in Malawi, reaching the southern limits of their distribution in the Misukus. The bat <i>Glauconycteris argentata</i>, the flying squirrel <i>Anomalurus derbianus</i> and the rodent <i>Otomys anchietae</i> are not known anywhere else in Malawi. A species of limited montane distribution that is well represented here is the squirrel <i>Paraxerus lucifer</i> (also present in Nyika). Three butterfly species (<i>Papilio fuelleborni</i>, <i>P. thurau</i> s.s. and <i>Deudorix (Virachola) montana</i>) reach their southern limits, and others known nowhere else in Malawi include <i>Acraea cerasa</i> and <i>Danaus formosa</i>. On present evidence, <i>Charaxes nyikensis</i> reaches its northern limit here. In terms of birds, over 100 species have been recorded in the Misukus. Several pairs of <i>Hirundo atrocaerulea</i>, which is listed as vulnerable, are present at Wilindi in the summer months. Three forest species, <i>Modulatrix stictigula</i>, <i>Andropadus masukuensis</i> and <i>Batis mixta</i> occur nowhere else in Malawi as they reach their southern limits of distribution in the Misuku's. The local population of <i>Stactolaema olivacea</i> (particularly numerous in Mugesse) belongs to the race <i>rungweensis</i>, confined to this site and Rungwe Mountain in southern Tanzania.</p>

<b>Malawi Hills Forest Reserve</b>	Plants in the Reserve include a species of <i>Tricalysia</i> and of <i>Wrightia</i> that appear to be unique to Malawi with no similar species present in the country. More than 35 species of butterflies have been identified in the Reserve, including <i>Salamis cacta</i> , <i>Acraea quirina</i> and <i>Pentila tropicalis</i> , which have not been found elsewhere in the country. A species of dwarf chameleon ( <i>Rampholeon chapmani</i> ) that is not known anywhere else is facing extinction in the Malawi Hills. Almost 100 species of birds have been recorded in the Reserve, including a population of Woodward's Batis ( <i>Batis fratum</i> ), which was estimated at over 100 pairs more than 30 years ago. The species was otherwise only recorded in the Thangadzi valley (where riparian forest has been destroyed) and Lengwe where it was much scarcer and is probably extinct today.
<b>Ntchisi Forest Reserve</b>	A tree in the genus <i>Garcinia</i> , found commonly throughout the forest, is closely related to <i>G. semseii</i> (a rare tree from eastern Tanzania). Two butterfly species, <i>Charaxes ameliae</i> and <i>Hypolycaena hatita</i> , reach their southern limit in Ntchisi Forest Reserve. Ntchisi is also the only Malawi locality for the bat <i>Rhinolophus swinnyi</i> . More than 180 species of birds have been recorded in the Forest. The Forest is the southern limit of distribution of the Yellow-Streaked Greenbul ( <i>Phyllastrephus alfredi</i> ).

**Table 2: Some of the known endemic species in Malawi**

Mammals	Birds	Reptiles	Amphibians	Insects	Other Invertebrates	Plants
<ul style="list-style-type: none"> <li>• <i>Graphiurus johnstoni</i></li> <li>• <i>Epomophorus anelli</i></li> <li>• <i>Myosorex gnoskei</i></li> <li>• The Kalwe Galago is a possible undescribed species in the genus <i>Galagoides</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Apalis flavigularis</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Nadzikambia mlanjensis</i></li> <li>• <i>Rampholeon chapmanorum</i></li> <li>• <i>Cordylus nyikae</i></li> <li>• <i>Platysaurus mitchelli</i></li> <li>• <i>Lygodactylus rex</i></li> <li>• <i>Eumecia johnstoni</i></li> <li>• <i>Trachylepis hildae</i></li> <li>• <i>Trachylepis mlanjensis</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Ptychadena broadleyi</i></li> <li>• <i>Amietia johnstoni</i></li> <li>• <i>Hyperolius friedemanni</i></li> </ul>	<p>Many insect species including:</p> <ul style="list-style-type: none"> <li>• <i>Cooksonia aliciae</i></li> <li>• <i>Charaxes martini</i></li> <li>• <i>Euphaedra murphyi</i></li> <li>• <i>Cymothoe zombana</i></li> <li>• <i>Oreocnemis phoenix</i></li> <li>• <i>Xerophytavorus furcillatus</i></li> <li>• <i>Camponotus lambornii</i></li> <li>• <i>Diopsis malawiensis</i></li> <li>• <i>Chlaenius ruthmuelleri</i></li> <li>• <i>Chimarra</i> spp.</li> <li>• <i>Enyaliopsis ilala</i></li> <li>• <i>Enyaliopsis mulanje</i></li> <li>• <i>Eulioptera bilobata</i></li> <li>• <i>Dioncomena bulla</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Ceratogyrus hillyardi</i></li> <li>• <i>Ninetis russellsmithi</i></li> <li>• <i>Umwani anymphos</i></li> <li>• <i>Pandinus pantinii</i></li> <li>• <i>Potamonantes montivagus</i></li> <li>• <i>Achatina nyikaensis</i></li> <li>• <i>Gulella systemanaturae</i></li> <li>• <i>Melanoides polymorpha</i></li> </ul>	<p>50 endemic vascular plant species including:</p> <ul style="list-style-type: none"> <li>• <i>Aerangis distincta</i></li> <li>• <i>Habenaria livingstonia</i></li> <li>• <i>Polystachya minima</i></li> <li>• <i>Polystachya johnstonii</i></li> <li>• <i>Widdringtonia whytei</i></li> <li>• <i>Gladiolus bellus</i></li> <li>• <i>Geranium mlanjense</i></li> <li>• <i>Impatiens shirensis</i></li> <li>• <i>Aster milanjanus</i></li> <li>• <i>Helichrysum whyteanum</i></li> <li>• <i>Alloeochoete oreogena</i></li> <li>• <i>Euphorbia mlanjeana</i></li> <li>• <i>Lotus mlanjeanus</i></li> <li>• <i>Cleome densifolia</i></li> <li>• <i>Osteospermum nyikensis</i></li> <li>• <i>Phyllanthus nyikae</i></li> <li>• <i>Monechma varians</i></li> <li>• <i>Vernonia awoziensis</i></li> <li>• <i>Cyphia nyikensis</i></li> <li>• <i>Peucedanum articulatum</i></li> </ul>

**Table 3: Red List Category summary**

	Critically endangered	Endangered	Vulnerable	Near threatened	Lower risk/near threatened	Data deficient	Least Concern
<b>Plants</b>	1	7	17	5	1	2	227
<b>Animals</b>	7	29	111	37	0	48	1372