Capacity strengthening for management of invasive alien species in South Africa to enhance sustainable biodiversity conservation and livelihoods improvement

Part I: Project Information

GEF ID
10524

Project Type
FSP

Type of Trust Fund
GET

CBIT/NGI
CBIT **No**
NGI **No**

Project Title
Capacity strengthening for management of invasive alien species in South Africa to enhance sustainable biodiversity conservation and livelihoods improvement

Countries
South Africa

Agency(ies)
UNEP

Other Executing Partner(s)
Department of Environment, Forestry and Fisheries (DEFF)

Executing Partner Type
Government

GEF Focal Area
Biodiversity

Taxonomy

Biodiversity, Focal Areas, Protected Areas and Landscapes, Terrestrial Protected Areas, Productive Landscapes, Species, Livestock Wild Relatives, Animal Genetic Resources, Invasive Alien Species, Plant Genetic Resources, Crop Wild Relatives, Wildlife for Sustainable Development, Threatened Species, Forest, Drylands, Land Degradation, Food Security, Land Productivity, Land Degradation Neutrality, Sustainable Land Management, Sustainable Agriculture, Influencing models, Stakeholders, Gender Equality, Capacity, Knowledge and Research

Sector

Rio Markers

Climate Change Mitigation

Climate Change Mitigation 0

Climate Change Adaptation

Climate Change Adaptation 0

Submission Date

4/9/2020

Expected Implementation Start

1/1/2023

Expected Completion Date

12/31/2027

Duration

60In Months

Agency Fee($)

324,106.00

A. FOCAL/NON-FOCAL AREA ELEMENTS

Objectives/Programs	Focal Area Outcomes	Trust Fund	GEF Amount($)	Co-Fin Amount($)
BD-2-6	Prevent and control invasive alien species	GET	3,411,644.00	22,844,660.00
		Total Project Cost($)	**3,411,644.00**	**22,844,660.00**

B. Project description summary

Project Objective

The efficient and effective management of high-risk invasive alien species (IAS) directly mitigates their negative impacts on South Africa?s biodiversity assets, and indirectly contributes to the improvement of rural food security and livelihoods

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)
1. Strengthened IAS detection and surveillance capacities at key national ports of entry	Technical Assistance	Outcome 1 South African authorities adopt new tools and methods of high-risk IAS surveillance at key national ports: - There is enhanced capacity at key national ports of entry to conduct integrated and coordinated surveillance of high risk IAS; - Durban harbour is able to mitigate the unintentional risks of introductions of the priority invasive species from container ships and break bulk cargo; and - Affected ports of entry are utilizing biosecurity detection dogs for detection of high risk invasive species; -New and emerging invasive species are under effective monitoring and control	Output 1.1 An inter-agency ?Biosecurity Risk Assessment/ Targeting Centre (BRA/TC) is established and operational Output 1.2 A sea container and break-bulk cargo biosecurity risk management system is developed and piloted Output 1.3 A small team of biosecurity detection dogs and their handlers are operational at key ports of entry Output 1.4: New	GET	1,342,150.00	12,998,892.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)
2. Enhanced biosecurity communications and information flows	Technical Assistance	Outcome 2 Stakeholders partner with and support state biosecurity agencies in pre-border and post border risk analysis, surveillance, detection, reporting and control of high-risk IAS: - IAS Key stakeholders are aware and supporting state biosecurity agencies in surveillance, detection, reporting and control of high risk IAS; - A centralized Biosecurity Information and Risk Analysis System is actively being utilized to engage communities about the importance of pre- and post-border biosecurity and influence public perception about biosecurity -Tsitsa and	Output 2.1 A ?biosecurity awareness and involvement campaign? is developed and implemented as a leverage point through which to engage the community about the importance of pre- and post-border biosecurity and influence public perception about biosecurity Output 2.2 A centralized Biosecurity Information and Risk Analysis System is operational and freely	GET	933,556.00	3,709,346.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)
3. Improved effectiveness of control measures for high risk IAS	Technical Assistance	Outcome 3.1: Relevant agencies have increased capacity to secure and manage a rodent-free status at the Prince Edward Islands (comprising Marion Island and Prince Edward Island) -Area of Marion Island under improved management through eradication of the invasive House Mouse -Relevant agencies have adequate capacity to manage and maintain rodent-free status at the Prince Edward Islands	Output 3.1.1: Invasive House Mice are eradicated from Marion Island Output 3.1.2: Improved biosecurity protocols developed for the Prince Edward Islands	GET	802,897.00	3,464,758.00
		Outcome 3.2: South Africa contains the spread of high-risk invasive plant species -Area of landscapes under improved management through control	Output 3.2.1: Biocontrol agents for			

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)
Component 4: Project Monitoring and Evaluation		Outcome 4.1: Project deliverables and results meet accountability requirements, and promote learning, feedback, and knowledge sharing -Number of project inception, review and planning meetings -Level of routine outcome and output indicator monitoring conducted Outcome 4.2: Project results are relevant, performance is effective and efficient and provides evidence for impact and sustainability -Number of external monitoring and evaluation processes conducted	Output 4.1.1 Project scope, objectives, approach, outputs and roles clarified to staff and stakeholders Output 4.1.2 Project milestones and targets achieved according to plan Output 4.2.1 Project mid-term progress towards planned outputs documented Output	GET	170,582.00	956,997.00

Project Component	Financing Type	Expected Outcomes	Expected Outputs	Trust Fund	GEF Project Financing ($)	Confirmed Co-Financing($)
				Sub Total ($)	**3,249,185.00**	**21,129,993.00**
Project Management Cost (PMC)						
	GET		162,459.00		1,714,667.00	
	Sub Total($)		**162,459.00**		**1,714,667.00**	
	Total Project Cost($)		**3,411,644.00**		**22,844,660.00**	

Please provide justification

C. Sources of Co-financing for the Project by name and by type

Sources of Co-financing	Name of Co-financier	Type of Co-financing	Investment Mobilized	Amount($)
Recipient Country Government	Department of Environment, Forestry and Fisheries (DEFF)	In-kind	Recurrent expenditures	5,300,000.00
Recipient Country Government	Agricultural Research Institute (ARC)	Public Investment	Investment mobilized	100,253.00
Recipient Country Government	Agricultural Research Institute (ARC)	In-kind	Recurrent expenditures	2,000,110.00
Recipient Country Government	South African National Biodiversity Institute (SANBI	In-kind	Recurrent expenditures	13,008,238.00
Recipient Country Government	Department of Water and Sanitation (DWS)	In-kind	Recurrent expenditures	586,059.00
Donor Agency	International Union for Conservation of Nature (IUCN)	In-kind	Recurrent expenditures	500,000.00
Civil Society Organization	Birdlife South Africa	Grant	Investment mobilized	1,350,000.00
			Total Co-Financing($)	**22,844,660.00**

Describe how any "Investment Mobilized" was identified

Where 'investment mobilized' has been indicated, it refers to co-financing that excludes recurrent expenditures, as defined in the guidelines. The Government of South Africa investments mobilized are extrapolated from the MTEF project/programme-based budget allocations for the contributing Departments and Public Institutions. Grants received from NGOs and the academia were considered investment mobilized. The Academia/NGOs? co-financing is based on work related to IAS and are grants received from various sources. In addition, funds that need to be budgeted for annually like the Natural Resource Management (NRM) programme Fund were also considered investment mobilized (excluding recurrent costs). The budget allocated to the Natural Resource Management (NRM) programme from the Environment Protection (EP) Fund is disbursed to partners and government departments that implement environment related work. This indicated by the DEFF public investment funding. The other government

funding indicated as public investment (and investment mobilized) are donor funding received by the institutions for work on IAS-related activities.

D. Trust Fund Resources Requested by Agency(ies), Country(ies), Focal Area and the Programming of Funds

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNEP	GET	South Africa	Biodiversity	BD STAR Allocation	3,411,644	324,106	3,735,750.00
				Total Grant Resources($)	**3,411,644.00**	**324,106.00**	**3,735,750.00**

E. Non Grant Instrument

NON-GRANT INSTRUMENT at CEO Endorsement

Includes Non grant instruments? **No**

Includes reflow to GEF? **No**

F. Project Preparation Grant (PPG)

PPG Required **true**

PPG Amount ($)

150,000

PPG Agency Fee ($)

14,250

Agency	Trust Fund	Country	Focal Area	Programming of Funds	Amount($)	Fee($)	Total($)
UNEP	GET	South Africa	Biodiversity	BD STAR Allocation	150,000	14,250	**164,250.00**
				Total Project Costs($)	**150,000.00**	**14,250.00**	**164,250.00**

Core Indicators

Indicator 1 Terrestrial protected areas created or under improved management for conservation and sustainable use

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
33,400.00	33,400.00	0.00	0.00

Indicator 1.1 Terrestrial Protected Areas Newly created

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)
0.00	0.00	0.00	0.00

Name of the Protected Area	WDPA ID	IUCN Category	Total Ha (Expected at PIF)	Total Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)
Akula National Park	125689	Select				

Indicator 1.2 Terrestrial Protected Areas Under improved Management effectiveness

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)
33,400.00	33,400.00	0.00	0.00

Name of the Protected Area	WDPA ID	IUCN Category	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)	METT score (Baseline at CEO Endorsement)	METT score (Achieved at MTR)	METT score (Achieved at TE)

Name of the Protected Area	WDPA ID	IUCN Category	Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Total Ha (Achieved at MTR)	Total Ha (Achieved at TE)	METT score (Baseline at CEO Endorsement)	METT score (Achieved at MTR)	METT score (Achieved at TE)
Akula National Park Prince Edward Island Special Nature Reserve	**125689** 555563456	**Select**Strict Nature Reserve	33,400.00	33,400.00			70.00		

Indicator 4 Area of landscapes under improved practices (hectares; excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
300000.00	300000.00	0.00	0.00

Indicator 4.1 Area of landscapes under improved management to benefit biodiversity (hectares, qualitative assessment, non-certified)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)
300,000.00	300,000.00		

Indicator 4.2 Area of landscapes that meets national or international third party certification that incorporates biodiversity considerations (hectares)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Type/Name of Third Party Certification

Indicator 4.3 Area of landscapes under sustainable land management in production systems

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 4.4 Area of High Conservation Value Forest (HCVF) loss avoided

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Documents (Please upload document(s) that justifies the HCVF)

Title	Submitted
Core Indicators 4	

Indicator 5 Area of marine habitat under improved practices to benefit biodiversity (excluding protected areas)

Ha (Expected at PIF)	Ha (Expected at CEO Endorsement)	Ha (Achieved at MTR)	Ha (Achieved at TE)

Indicator 5.1 Number of fisheries that meet national or international third party certification that incorporates biodiversity considerations

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)

Type/name of the third-party certification

Indicator 5.2 Number of Large Marine Ecosystems (LMEs) with reduced pollutions and hypoxia

Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (achieved at MTR)	Number (achieved at TE)
0	0	0	0

LME at PIF	LME at CEO Endorsement	LME at MTR	LME at TE

Indicator 5.3 Amount of Marine Litter Avoided

Metric Tons (expected at PIF)	Metric Tons (expected at CEO Endorsement)	Metric Tons (Achieved at MTR)	Metric Tons (Achieved at TE)

Indicator 6 Greenhouse Gas Emissions Mitigated

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)	0	8703692	0	0
Expected metric tons of CO?e (indirect)	0	0	0	0

Indicator 6.1 Carbon Sequestered or Emissions Avoided in the AFOLU (Agriculture, Forestry and Other Land Use) sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)				
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting				
Duration of accounting				

Indicator 6.2 Emissions Avoided Outside AFOLU (Agriculture, Forestry and Other Land Use) Sector

Total Target Benefit	(At PIF)	(At CEO Endorsement)	(Achieved at MTR)	(Achieved at TE)
Expected metric tons of CO?e (direct)		8,703,692		
Expected metric tons of CO?e (indirect)				
Anticipated start year of accounting		2023		
Duration of accounting		20		

Indicator 6.3 Energy Saved (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Total Target Benefit	Energy (MJ) (At PIF)	Energy (MJ) (At CEO Endorsement)	Energy (MJ) (Achieved at MTR)	Energy (MJ) (Achieved at TE)
Target Energy Saved (MJ)				

Indicator 6.4 Increase in Installed Renewable Energy Capacity per Technology (Use this sub-indicator in addition to the sub-indicator 6.2 if applicable)

Technology	Capacity (MW) (Expected at PIF)	Capacity (MW) (Expected at CEO Endorsement)	Capacity (MW) (Achieved at MTR)	Capacity (MW) (Achieved at TE)

Indicator 11 Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment

	Number (Expected at PIF)	Number (Expected at CEO Endorsement)	Number (Achieved at MTR)	Number (Achieved at TE)
Female	420	420		
Male	200	200		
Total	620	620	0	0

Provide additional explanation on targets, other methodologies used, and other focal area specifics (i.e., Aichi targets in BD) including justification where core indicator targets are not provided

The project will improve the management of Prince Edward Islands Special Nature Reserve (33,400 ha) by supporting the eradication of the house mouse (Mus musculus) from Marion Island and implementing biosecurity protocols to prevent future introductions of the house mouse to Marion Island and Prince Edward Island. The project will seek to reduce the impact of eight Category 1b plant invasive species over a total area of at least 300,000 ha (Table 1). The project will contribute to achieving Achi Target 9 (?By 2020, invasive species and their pathways should be identified and prioritized?) under Strategic Goal B (?Reduce the direct pressures on biodiversity?) of the CBD?s Strategic plan for Biodiversity 2011-2020. The project will further contribute to meeting Target 15.8 (?By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species?) of Goal 15 (?Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss?) of the UN Sustainable Development Goals (SDGs) under the strategic framework of The 2030 Agenda for Sustainable Development

Part II. Project Justification

1a. Project Description

PART II: PROJECT JUSTIFICATION

DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN WITH THE ORIGINAL PIF

The final project design is aligned to the original PIF; it preserves its main objective, strategy and structure. However, some adjustments were made to the outcomes and outputs based on discussions with expert reviewers, project partners, experts and key stakeholders during the PPG, aiming to improve precision in outputs and indicators so as to best achieve the outcomes and the overall objective. While the original number of outputs were eight (8), these have been increased to twelve (12) by including one additional output (Output 2.3) as recommended at PIF stage, and creating five outputs for Component 3 out of the two which were originally contained in the PIF. The single outcome in Component 3 (*Outcome 3: South Africa eradicates house mouse from Marion Island and contains the spread of high-risk invasive plant species*) has been split into two because it was apparent that it made reference to two different issues i.e. house mouse and invasive plant species. Therefore, two outcomes were created viz. *Outcome 3.1: Relevant agencies have increased capacity to secure and manage a rodent-free status at the Prince Edward Islands (comprising Marion Island and Prince Edward Island)* and *Outcome 3.2: South Africa contains the spread of high-risk invasive plant species*. Two outputs were generated for Outcome 3.1, namely: *Output 3.1.1: Invasive House Mice eradicated from Marion Island, Output 3.1.2: Improved biosecurity protocols developed for the Prince Edward Islands*. Three outputs were generated for Outcome 3.2, namely: *Output 3.2.1: Biocontrol agents for priority invasive plant species developed and released, Output 3.2.2: Existing biocontrol agents for T. stans and A. cordifolia mass-reared and released, 3.2.3 Capacity of researchers in the development of biocontrol agents enhanced.* A summary and pointed justification of the above mentioned changes are provided in Table 2 below:

Table 2. Changes in alignment with the project design with the original PIF

PIF	CEO ER	Comments on changes
Output 2.3 Craft an output on reducing impact of IAS on livelihoods for rural communities	Output 2.3: Invasive alien species are controlled at key sites with the involvement of rural communities using the Adopt-a-River approach	At PIF stage, it was recommended that an additional output on reducing impact of IAS on the livelihoods of rural communities be crafted. Therefore, Output 2.3 was crafted and will utilize the Adopt-a-River (AaR) which is a highly participatory approach that has been used in South Africa and elsewhere to help local communities improve their livelihood through community action. This output will use this approach to involve local communities along two river systems to clear invasive alien species to enhance their access to fish and water resources and thereby improve their livelihoods.

Outcome 3: South Africa eradicates house mouse from Marion Island and contains the spread of high-risk invasive plant species	Outcome 3.1: Relevant agencies have increased capacity to secure and manage a rodent-free status at the Prince Edward Islands (Marion Island and Prince Edward Island) Outcome 3.2: South Africa contains the spread of high-risk invasive plant species	Outcome 3 in the PIF was very relevant to the problem of IAS in South Africa. However, it referred to two different aspects i.e. house mouse and invasive alien plant species. It was therefore adjudged that it would be more practical to have these two issues separated, hence the two new outcomes that were created.
Output 3.1 The spread of the house mouse on Marion Island is eradicated and protocols are developed to prevent future introductions in Marion Island and Prince Edward Island	Output 3.1.1: Invasive House Mice eradicated from Marion Island Output 3.1.2: Improved biosecurity protocols developed for the Prince Edward Islands	Output 3.1 at PIF stage referred to two separate issues i.e. eradication of the house mouse, and development of protocols to prevent future introductions. These two issues were therefore separated into two different outputs. However, they still address the intent of the original output that had been developed at PIF stage.

Output 3.2 Biocontrol agents for priority invasive plant species are developed and released	Output 3.2.1: Biocontrol agents for priority invasive plant species developed and released Output 3.2.2: Existing biocontrol agents for T. stans and A. cordifolia mass-reared and released 3.2.3 Capacity of researchers in the development of biocontrol agents enhanced	Output 3.2 was split into three outputs to address three critical areas of biocontrol i.e. development and release of new biocontrol agents, mass rearing and release of already existing biocontrol agents, and enhancing the country?s capacity in biocontrol research.

1a. Project Description.

1.1 Global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description)

South Africa, with a total land area of 1.2 million square kilometres (approximately 2% of the world's land area) and a population of 54 million people (50.73% of whom are women), shares its expansive and highly geographically diverse land border environment with six neighbouring countries (Namibia, Botswana, Zimbabwe, Mozambique and Eswatini. South Africa entirely encloses the sovereign state of Lesotho). The country has a unique climate with diverse plant vegetation biomes, but almost two-thirds of the country is of a rather arid climate with very little rainfall. The exceptional climatic diversity is also reflected in the high species diversity (10% of the world's plants; 7% of the reptiles, birds and mammals; and 15% of known coastal marine species) and endemism that occurs throughout the country's ecosystems. It is surrounded by 2 oceans (the Atlantic Ocean and the western Indian Ocean) and comprises 9 unique vegetation landscapes or biomes, 3 of which have been declared global biodiversity hotspots, namely, Cape Floristic Region, Succulent Karoo (shared with Namibia) and Maputaland-Pondoland-Albany hotspot (shared with Mozambique and Swaziland). South Africa is also home to an entire floral kingdom, the smallest, richest and most threatened of the world's six floral kingdoms - the Cape Floral Kingdom (CFK) - which occurs nowhere else in the world. All this makes the country a very popular tourist destination and a nature lover's paradise. Unfortunately, it also helps the easy establishment of a large variety of invasive alien species in all the different biomes (from forest biomes to semi-desert areas).

South Africa has 72 official ports of entry through which travellers, goods and conveyances enter the country. Nearly twenty million (19,7m) international travellers arrived at the ports of entry in 2013. The top 10 ports of entry accounted for 84% of all arrivals, with OR Tambo International Airport (ORTIA) and Beit Bridge border post topping the list. In 2019, that figure had grown to 4.5 million arrivals at ORTIA. In terms of cargo, the top 10 ports of entry accounted for 87% of revenue in 2013, with Durban Harbour and ORTIA seeing the highest value of cargo imports. In 2019, the total value of goods imported via ORTIA was R222bn. Durban Harbour saw a throughput of 2.8 million twenty-foot container equivalents (TEUs), approximately 60 per cent of the total number of containers handled at South African ports. Increasing volumes of trade and travel, particularly within Africa, represent enormous opportunities for South Africa's economic development but increases the risk of importing invasive species. It is estimated that three new alien taxa arrive in South Africa accidentally or illegally every year, and 559 alien species are already listed as invasive in the national Alien and Invasive Species Regulations. The USA, Canada, UK, Australia, and New Zealand (the Border Five countries which are global leaders in risk-based compliance management at the border) analyse pre-port data to target and minimise inspections at ports of entry thereby ?pushing out? their borders. South Africa, on the other hand, tries to maximise the number of inspections conducted. However, despite the best efforts of biosecurity officials, the sheer volume at ports of entry is impossible with limited resources. For example, of the 4.5 million travellers arriving at ORTIA in 2019, only eighty thousand (80,000) inspections could be conducted. More than 500 Heavy Goods Vehicles (HGVs) per day pass through Beit Bridge Border Post and none of these are inspected for invasive species.

For a little over a century, the South African ecosystem and biodiversity has been under a growing threat brought about by Invasive Alien Plant species (IAPs), either introduced as ornamentals, windbreaks, dune stabilisers, timber materials or accidentally introduced during imports of agricultural products and food aid to neighbouring countries. South Africa's extensive and well-functioning transport networks facilitate the transportation of a large, and increasing, amount of goods and people; and so once an alien taxon has been introduced to South Africa, further dispersal or natural spread is highly likely. It is estimated that approximately 2% of introduced plant species have become invasive in South Africa. About 10 million ha, or 8.28% of South Africa has already been invaded (Le Maitre et al. 2000) by more than 180 invading plant species accruing to a loss of approximately 6.7% of mean annual surface runoff (Le Maitre et al. 2002). Large numbers of Invasive Alien Species (IAS) have relatively restricted distributions (at the scale of quarter degree grid cells [QDGC]) across the country, and only in the case of plants and birds are there widespread species found. At least one alien reptile (*Python natalensis* x *molurus*) and two alien terrestrial invertebrate species (*Cornu aspersum* and *Vanessa cardui*) are relatively widespread. Alien species in other taxa (amphibians, freshwater invertebrates and mammals) appear to be less widespread. There is a rapid southward movement of the gastropod (*Tarebia granifira*), virtually replacing the indigenous bristled river snail (*Bellamaya capilata*) in Lake Sibaya. There are however no reliable data to illustrate the distribution of freshwater fish, crustaceans, fungi and microbial species at the scale of the QDGC.

The global significance of invasive alien species varies widely in type and magnitude and is dependent on the species, their invasive potential, the extent to which they have invaded the nature of the invaded environment, socio-economic contexts and the likely interaction with other global changes such as climate change, land degradation, pollution, etc. The greatest impacts associated with invasive alien species in terrestrial habitats are due to invading plants. Depending on the species, they can:

i). *Reduce rangeland condition and carrying capacity.* Invasive alien plant infestations are estimated to have reduced the potential for South Africa to support grazing stock by just over 1%, though this varies between biomes. If no remedial action is taken, however, impacts are projected to become much larger (up to a 71% loss of grazing in some biomes);

ii). *Reduce surface water runoff and groundwater recharge.* At a national scale, the combined impacts of invasive alien plants on surface water runoff have been estimated at between 1,444 to 2,444 million m^3 per year. Primary catchments most affected (i.e. > 5% reduction in mean annual runoff) are in the Western and Eastern Cape, and KwaZulu-Natal. If no remedial action is taken,

reductions in water resources could rise to between 2 589 and 3 153 million m3 per year, about 50% higher than estimated current reductions;

iii). *Increase fire hazards.* Invasion of natural ecosystems by alien plants can change the structure and biomass of vegetation, adding fuel and supporting fires of higher intensity. Increased fire intensity can, in turn, increase the damage done by fires, as well as the difficulty of controlling fires; and

iv). *Erode biodiversity.* Reductions in biodiversity intactness as a result of biological invasions in South Africa's terrestrial biomes were highest (3%) in the fynbos biome. Under a scenario where invasive alien plants are allowed to reach their full potential, biodiversity intactness is predicted to decline dramatically, by around 70% for the Savanna, Fynbos and Grassland biomes, and even more (by 87% and 96%) for the two Karoo biomes.

The threats posed by invasive alien species to biodiversity include: i) habitat modification ? for example, the fynbos is one of the most invaded biomes,[1] especially in the lowlands where a high proportion of vegetation has been transformed or is threatened by invasion by alien plants such as *Acacia* spp. and *Pinus* spp.[2],[3], ii) competition for resources ? for example, the alien tree *Schinus molle* has been reported to outcompete the native dominant trees (*Acacia tortilis* and *Rhus lancea*) in the semi-arid savannas in South Africa,[4] and the invasive *Prosopis* competes for groundwater with *Acacia erioloba,*[5] iii) predation ? for example, *Oncorhynchus mykiss* (Rainbow Trout) causes decline, and in some cases local extirpation, of native invertebrates, frogs and fish through predation,[6] iv) hybridisation ? for example, native *Oreochromis* fish species such as *O. mossambicuss* are under threat from hybridisation with *O. niloticus* (the Nile tilapia),[7] v) herbivory ? for example, the invasive common mynah *Acridotheres tristris*, a member of the starling bird family eats the fruits of many plant native species in west and northern Kwa Zulu Natal,[8] vi) pathogens ? for example, the Indian house crow, *Corvus splendens*, is a vector for pathogens that cause cholera, typhoid and dysentery[9].

The three most important drivers of potential impacts of biological invasions until the mid-21st century are trade and transport, climate change and socio-economy. 1) Trade and transport are important in species invasions as alterations in trade (e.g. in terms of volume, regions of origin and destination, composition of traded goods) will increase the number of potential new arrivals and might increase propagule pressure of IAS[10],[11]. Therefore, national prevention efforts, such as at ports of entry, can be explicitly developed to counter the increased propagule pressure associated with an increase in diversity and frequency of trade and transportation[12],[13]; 2) Climate change, is undoubtedly poised to shape the impacts of biological invasions on biodiversity in the future. Climate change is responsible for climatically suitable areas for alien species[14],[15],[16] and increased establishment rates of IAS[17]; and 3) Socio-economic activity (including land use, resource and energy use, etc.) is sometimes used as a variable for per capita gross domestic product, human footprint index or human development index. Projected future increases in these are likely to cause favorable conditions for IAS.

South Africa's long-term solution to effectively mitigate the threats and drivers (root causes) identified above requires a win-win approach where invasive species can still deliver benefits, but adverse impacts are reduced. This will be achieved through the application of innovative solutions to the threats and root cause of the following barriers:

? **Barrier 1: Weaknesses in the capacities and inter-agency coordination in biosecurity measures at key national ports of entry**. There are 72 official ports of entry through which people, goods and transport vessels can enter the country. Eight of these are maritime ports, ten are airports and 54 are land border posts. Unfortunately, control measures are still not in place for many of these pathways. Only one of the ports of entry ? OR Tambo International Airport ? has adequate biosecurity measures in place, while the remaining ports of entry have limited, or sporadic deployment, of biosecurity capacity. The import of goods such as live plants and food to the country is increasing, and although some control measures are in place to prevent the accidental introduction of commodity contaminants, the rate at which alien taxa are being introduced through these pathways is growing. In South Africa, the accidental introduction of alien taxa as stowaways on transport vessels (and their

containers) is playing an important role that is likely to increase in the future. The mandate to manage several aspects of biosecurity at national ports of entry is currently fragmented across several government departments and their agencies. It is not yet clear the degree to which the approach among the various departments is co-ordinated to avoid duplication of effort and increase efficiency. The detection and surveillance skills, expertise and knowledge (across numerous disciplines such as natural and social sciences, legal and law enforcement) of biosecurity officials to ensure compliance with the A&IS Regulations at these ports of entry remains very limited.

? **Barrier 2: Key knowledge gaps in, and low levels of awareness and involvement of the broader society in, pre-and post-border biosecurity.** Biosecurity in South Africa tends to be thought of as the domain of governments and industry agencies, with its importance less well recognized among the broader society, especially those rural communities who are vulnerable to the threats posed by invasive species. Biosecurity information also exists in several different databases that are often dispersed and not easily accessible. In addition, these databases were created for different purposes and vary in completeness and information content. Furthermore, there are some key gaps in the available information on pathways of introduction and dispersal. In many traditional rural settings in South Africa, women are largely excluded from governance and decision-making relating to natural resources. Furthermore, women are typically disadvantaged from accessing input subsidies and benefits for land use and environmental management interventions.

? **Barrier 3: Inefficient and expensive IAS control measures.** Only 136 out of 556 listed invasive alien taxa (24.3%) are subjected to regular management. This management also reaches only a small proportion (~1% per year) of the populations of each managed invasive species. Besides a small proportion (6.4%) of species that have either been eradicated or brought under biological control, populations of most species continue to grow, indicating that interventions are ineffective at a broad scale. Only 0.36% of invaded land is subjected to active management. Based on a limited number of studies, 8% of this area is effectively managed, 58% is partially effectively managed, and 34% is ineffectively managed. Mechanical and chemical control measures have largely failed to check plant invasions[18]. Despite considerable investments, and some localized or technique-specific successes, control measures have by-and-large failed to reverse the spread of invasive species. By comparing the costs of biological control research and implementation to the benefits of restored ecosystem services, or avoided costs, and avoided ongoing control costs, biological control has been shown to be extremely beneficial in economic terms: estimated benefit: cost ratios ranged from 8:1 up to 3,726:1. This essentially means that for every one rand invested into control, losses of between USD 8?3,700 were prevented.

Addressing the above barriers will require open dialogue among stakeholders, trade-offs and compromises. Where the impacts outweigh perceived benefits, the project will negotiate trade-offs and compromises that minimise the impact of the invasive species but retain a large proportion of their amenity values. In some cases, such as the use of biological agents to control invasive plants species, the project will employ strategies to try and effectively communicate the risks through open dialogue among stakeholders.

1.2 Baseline scenario and any associated baseline projects

1.2.1 Baseline scenario

Alien species introductions may be intentional or unintentional and occur through a variety of mechanisms and pathways. Pathways can be divided into primary and secondary pathways. Primary pathways refer to those vectors and routes which move species to new regions or provinces across major oceanic, landmass or climatic barriers (i.e., trans-oceanic and intercontinental pathways), while secondary pathways help spread and disperse invasive marine species between points within or between neighboring regions (e.g., the routes used by domestic and local ?hub? shipping, fishing vessels or trailered boats). Species can also expand their range through natural dispersal, and this can

play a significant role in the secondary spreading of an alien species once introduced to a new region or country.

In South Africa, pathways of introduction are an important source of invasive alien species, especially since there are 72 official ports of entry, through which transport vessels carrying goods and people regularly travel. A vast majority of these are land border posts (54), while the rest are either airports (10) or maritime ports (8). From 2006 to 2016, there was a marked increase in air, road and sea transport. While the increase in the first two was measured in the millions, the greatest change in proportion was that of sea travel ? which seemed to undergo a seven-fold increase over time (Figure 1).

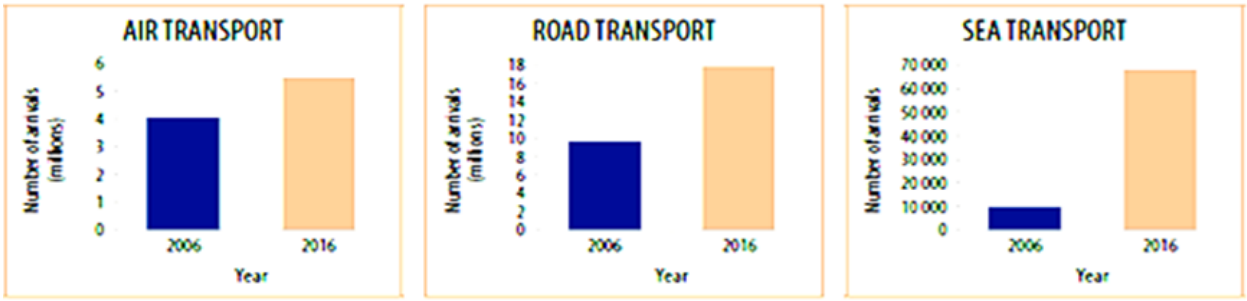

Figure 1. The number people arriving in South Africa by air, road and sea transport in 2006 and 2016.

Large numbers of invasive alien species have relatively restricted distributions (at the scale of quarter degree grid cells [QDGC]) across the country, and only in the case of plants and birds are there widespread species found. At least one alien reptile (*Python natalensis* x *molurus*) and two alien terrestrial invertebrate species (*Cornu aspersum* and *Vanessa cardui*) are relatively widespread[19]. Alien species in other taxa (amphibians, freshwater invertebrates and mammals) appear to be less widespread. There are however no reliable data to illustrate the distribution of freshwater fish, fungi and microbial species at the scale of the QDGC. The past decade has seen a significant increase in the number of insect pests and plant pathogens (pests) of tree species in South Africa[20]. In the last five years the Myrtaceae rust pathogen, *Puccinia psidii*, the Cycad Asian Scale (CAS), *Aulacaspis yasumatsui*, and several damaging insect pests of plantation forestry species (such as *Euwallacea fornicates*, the Polyphagous Shot Hole Borer,) appeared in the country. The previously recorded non-native pathogens, *Phytophthora cinnamomi* and *Armillaria mellea* have spread into natural environments, threatening native ecosystems.

A total of 2033 alien species were found to be present in South Africa. Of the 2033 alien species recorded (or assumed to be present) outside of cultivation or captivity in South Africa, 775 are known to be invasive, 388 are known to be naturalised but not invasive, and 355 are present, but not naturalised. There are a further 516 species where there is insufficient information on which to assign them to one of the basic introduction status categories. Biological control agents have been established on 60 invasive alien plant species in South Africa. Of these, 15 species (eight succulent cacti, four aquatic plants, two herbs and one shrub species) are currently under complete control; 19 species (nine tree or shrub species, eight succulent cacti, one aquatic plant and one herb) are under a substantial degree of control; a negligible degree of control has been achieved on 15 species (11 tree or shrub species, two herbs and two climbers); while the degree of control has not been determined for the remainder (three tree and shrub species, four succulent cacti, two herbs and two climbers). This success is further aided by mass-rearing programs[21].

Approximately 126 plant taxa are currently being targeted for mechanical (and chemical) clearing by the DFFE?s Natural Resource Management (NRM) programmes. Most of this clearing effort is being directed towards eight taxa - *Solanum mauritianum*, *Acacia mearnsii*, *Prosopis* spp., *Acacia dealbata*,

Pinus species, *Cereus jamacaru*, *Lantana camara*, and *Eucalyptus* species (albeit with limited success in containing their spread or reducing their rate of invasion). To date, 42 eradication projects have been initiated[22], or are under consideration, in South Africa. Most of these (32) are aimed at terrestrial or freshwater plants. Of these projects, 23 are under consideration, pending the outcome of a risk analysis or the development of a detailed plan, and 10 are ongoing [eight against plants, one targeting a bird species (*Corvus splendens*), and one targeting a mammal (*Hemitragus jemlahicus*)].

Although well-documented cases are rare, in freshwater ecosystems, invasive fish and crustaceans, as well as the diseases they carry, are known to have large impacts on indigenous freshwater biota. This includes predation of indigenous biota (e.g. depletion in the abundance of endemic Cape Floristic Region fishes through size-selective predation by *Oncorhynchus mykiss*), competition, habitat alteration, disease transfer and hybridisation. As the most widespread and abundant marine invaders (*Mytilus galloprovincialis*, *Semimytilus algosus* and *Balanus glandula*) occur on rocky shores of the west and south coasts of South Africa, this habitat is considered to be the most highly impacted in South Africa. Because of the impacts associated with *Ficopomatus enigmaticus* (estuarine tubeworm) in estuaries, this habitat is considered to be moderately impacted, while harbour environments typically experience lower impacts.

A systematic and comprehensive evaluation of the impacts of individual invasive alien species in South Africa has not yet been conducted. However, 25 species were recently assessed by experts (see Zengeya et al., 2017) as having a severe impact, and 82 as having a major impact. Of these 107 species, most (80) are terrestrial or freshwater plants, eight are mammals, five each are freshwater fish, freshwater invertebrates and terrestrial invertebrates, two are amphibians, and there is one bird and one marine plant species.

Detection

The process of species detection in South Africa has remained elusive and characterized by a high degree of uncertainty. There is no specific guiding and predictive framework for the detection and management of emerging invasive alien species in South Africa[23]. Detection practitioners often target areas that are hypothetically associated with a high probability of new introductions (known as ?high-risk sites) such as botanical nurseries and dumping sites. Various atlassing projects are recording alien species on an ongoing basis (e.g., Southern African Plant Invaders Atlas and the South African National Bird Atlas). Ensuring the long-term sustainability of these is a thus priority. Much more still needs to be done to integrate these datasets with citizen science platforms and to consider other species that are not currently covered by a specific atlassing project.

In terms of determining the extent of plant invasions at different sites, some exploratory work has been initiated using remote sensing, and some general guidelines are available on the types of data that need to be collected[24]. However, there are still very few reliable data sources on the relative abundance (cover, biomass or population size) of alien species at specific sites. A process to source and interpret data from national and provincial conservation agencies is noted as a priority if change over time is to be tracked. Without detailed maps at national and local scales, estimates of the impact of invasions remain crude. Therefore, it is not possible to appropriately prioritize interventions across sites. Furthermore, the ability to adapt interventions to respond more efficiently to invasions before they become widespread and damaging is limited. The detection of alien species is also much harder when applied to an aquatic environment. Most of the marine and estuarine invasive alien species in South Africa arrive through transport vessels, such as through the ballast water and hull fouling of ships. While this could be easy to detect if certain vessels are examined, it becomes much harder with larger vessels ? or if the number of inspections per unit of time is too great.

While detection can be difficult to accomplish thoroughly, it also has an especially difficult constraint ? that of limited resources. While most ports of entry use policies and searching practices to detect invasive species coming into South Africa, these are still limited. There does not appear to be enough

resources (money and trained manpower) to fund the search for alien species within the country ? especially when there are already policies in place to monitor species that are already in South Africa. This lack of data can also hinder the development of effective invasion indicators, which would make it harder for researchers to find out if an invasive species is in an area, and what negative impacts to look for. Such indicators have also not been tested yet, despite research having been done on them[25].

Surveillance

Surveillance can either be active (where deliberate attempts are made to find specific species, survey a particular area, or monitor a particular pathway) or passive (where new incursions are found by chance). While established populations of alien species can be monitored more efficiently once they are detected, the locations most in need of proper surveillance are where pathways of introduction are at their most prominent. Such pathways can either bring in new species or reinforce the populations that are already present. Knowledge of rates of introductions is largely based on observations of alien species post-border, rather than interceptions at the border. It is not always possible to determine dates of introduction based on dates of the first record because only data on inputs and not on outputs are recorded. The Department of Forestry, Fisheries and the Environment (DFFE) maintain a unit dedicated to surveillance for alien and invasive species at one port of entry, namely OR Tambo International Airport (ORTIA), and have limited capacity and resources to cover all ports of entry. Only a small percentage of incoming travellers can be inspected, particularly at land border posts. For consignments, the Department of Agriculture, Land Reform and Rural Development (DALRRD) inspectors aim (as is done in other countries) to inspect 2% of all consignments, but this is not always possible and varies depending on the commodity and the inspection capacity. Animal and animal products can only be imported through certain ports of entry due to limited skills and service, where the veterinary import permit and veterinary health certificate, and any other specified documents are inspected by DALRRD (either the South African State Veterinarian or their representative, or agricultural import official). Potentially invasive species may also enter the country via fishing equipment, ship machinery and equipment, ballast water, hull fouling, and land vehicles, but there are currently no surveillance mechanisms on these pathways.

The inspection protocol used is usually random inspections. The effectiveness of these operations cannot be confidently assessed due to a lack of skills, lack of standardised protocols, information on those protocols, and good detailed inspection data (positive and negative interceptions). Along with monitoring the movements and status of invasive species in the country, there is also a need to record all related data. Such data would be vital to monitoring the abundance and distribution of the species in the country, which could allow for further investigation ? e.g., prioritisation of certain species and populations over others. Sources of citizen science data should also not be discounted as the individuals collecting the data may provide surveillance data from across the country but bring with them a preference for images with species that they are either personally interested in or add to the aesthetics of the landscape and image.

Management

A lack of data on a species can hinder the ability to effectively manage it. Therefore, collection of relevant data is of paramount importance to improve management strategies and policies. Key data that is required by the country is on which areas throughout the country are occupied by which species. While some data is available, there is still a lack of information on alien species that occupy an invaded landscape over time, their impacts, and the cost to remove them. Such data could provide more details on invasive species that could support the creation of more effective management plans and policies ? both on a local and global scale.

Data on impacts are essential if control measures are to be prioritised and to track the effectiveness of interventions (e.g., in terms of increasing the resilience of South African cities, towns, and rural communities to droughts and fires; ensuring agricultural sustainability; and protecting our natural capital for future generations). A systematic method for assessing the impacts of biological invasions at a site is needed (i.e., the combined impacts of all alien species present). Such assessments will require directed research to estimate the impacts of biological invasions in economic and social terms. Consideration should also be given to the value of long-term monitoring to track impacts and how they change in response to different interventions (Table 3).

One of the larger gaps in the management of invasive species lies in the creation of policies, and their implementation. These need to be well informed to provide effective mandates, and their solutions must be based on methods that are based on transparent and proven research. South Africa lacks a government policy that is solely dedicated to the management of biological invasions; so being able to produce the research and an evidence-based policy would be very helpful in increasing management efficiency. In addition to there being no comprehensive policy or strategy addressing biological invasions in South Africa, there is also very little or no intergovernmental coordination among environmental authorities and other organs of state responsible for biological invasions.

Table 3. Key Invasion Process Stages and relevant intervention measures including capacity requirements for management of biological invasions in South Africa.

Stage of invasion	**Management interventions required**	**Aspects where capacity needs to be strengthened**
Stage 1 ? pre-introduction	Risk analyses	Capacity to review applications for import permits
	Surveillance at points of entry	Strengthening and expansion of surveillance capacity
Stage 2 ? initial incursion	Early detection	Species detection improves e.g., the use of drones in species surveys to improve spatial coverage. Improved knowledge of Taxonomy and Invasion Science. Use of citizen science platforms ? co-running existing database for data sharing. Increase staff complement.
	Eradication feasibility assessments	Effective process? monitoring and evaluation and increased budget for post-clearing follow-up.
	Eradication projects	
Stage 3 ? expansion	Labour-intensive control	Prioritization of sites Assessment of achievable goals Development of realistic goal-oriented management plans Monitoring and adaptive management
	Biological control	Identification and prioritization of target species Capacity to conduct identification and screening of suitable agents Capacity to monitor impacts and outcomes
	Ecosystem restoration	Prioritization of sites Assessment of achievable goals Development of effective approaches to restoration
Stage 4 ? dominance	Asset protection and value-added products	

Marion Island?s terrestrial ecosystem has been radically transformed by introduced mice, which are now threatening the island?s globally important seabird and shorebird populations. The project eradication efforts will start during early winter, when mouse numbers are falling due to lack of food and cold conditions, increasing the likelihood of all animals consuming bait. These mice also cease breeding on Marion from late May to August, reducing the chances of semi-independent young in the den failing to encounter bait. Winter also coincides with the period of lowest numbers of brown skuas and giant petrels (*Macronectes* spp.) present on the island, which might be killed accidentally by either primary or secondary poisoning. Aerial baiting is a cost-effective method to eradicate mice in the island which will be done by helicopter bait drop to achieve wide application of bait. The method has also been tested and proven effective in the eradication of house mice from South Georgia (UK), Macquarie Island (Australia) and several other sub-Antarctic Islands. A preliminary expert assessment commissioned by Birdlife South Africa has confirmed that eradication of mice from Marion Island is entirely feasible, with manageable risks to non-target species.

Action on IAS is prioritised under the GEF-7 Biodiversity Strategy as a key means of addressing biodiversity loss in areas of global biodiversity significance. The project will contribute to a reduction in the loss of this globally important biodiversity and in countering the negative impacts and costs of IAS on livelihoods and economic development. By mitigating the impacts of IAS, the project will help to sustain the populations of critically endangered, threatened and endemic species in at least 12 listed Critically Endangered Ecosystems, 6 Endangered Ecosystems in South Africa (see Government Notice 34809 of 2011, *Threatened Ecosystems in South Africa**[26]***) and in one global biodiversity hotspot (Maputaland-Pondoland-Albany hotspot); protect the resilience of natural ecosystems to the impacts of climate change; and contribute to natural disaster risk reduction. It will contribute to containing the threats to about 10 million ha of land already being impacted by IAS across the country. It will specifically target a reduction in the impact of seven Category 1b plant invasive species over a total area of at least 300,000 ha. It will also contribute to improving the conservation status of a number of threatened seabird species in the Southern Ocean (Sooty Albatross, Light-mantled Albatross, Grey-headed Albatross, Grey Petrel, White chinned Petrel and Kerguelen Tern), including nearly half of the world?s population of Wandering Albatrosses.

The proposed IAS project will focus on various aspects of biocontrol of seven selected target IAPs. The baseline analysis and gap analysis of the seven IAPs, which have all been declared category 1b weeds[27], are provided below:

•*Tecoma stans* (L.) Juss ex Kunth var. stans (Bignoniaceae), commonly known as yellow bells, is an evergreen shrub or a small tree native to Central America, including Mexico, the Caribbean Islands, and the southern United States (southern Florida). A leafy evergreen shrub or small tree up to 4m high. *Tecoma stans* was planted as an ornamental in warmer climates throughout the world because of its showy yellow flowers and pinnate foliage. It spreads rapidly by means of winged seeds, which are dispersed through wind, floods and felling. In South Africa, *T. stans* has been naturalized throughout the country and it invades roadsides, urban open spaces, watercourses, and rocky sites in subtropical and tropical savannah.[28] *Tecoma stans* is one of the fastest spreading invasive trees in South Africa and the neighboring countries. It competes with, and has the potential to replace, indigenous species. It invades hot and dry savanna where it reduces grazing for wildlife and livestock. The two established biocontrol agents are not effective in curbing the spread of the weed. There is a need to search for flower-and seed-attacking agents in the native range in central American countries.

•*Cestrum laevigatum* and *C. parqui* (Solanaceae) or Inkberry: *Cestrum laevigatum* is an evergreen shrub or tree growing 1-2 m high (but reaching 15 m or more along the coastal regions). *C. parqui* grows up to 3m tall, with leaves measuring about 2 cm wide. *Cestrum* species are evergreen, multi-branched shrubs, and their leaves emit an unpleasant pungent odor when bruised or crushed. Seeds are dispersed by birds, water and dumped garden waste. *Cestrum laevigatum* is the most invasive species in South Africa and is prevalent along the coastal regions of KwaZulu-Natal (KZN) and the Eastern Cape (EC) provinces. *Cestrum parqui* is the second most invasive species of this genus and commonly found in the inland provinces of South Africa, including in Gauteng (GP), North West (NW), Limpopo (LP), Free State (FS) and Mpumalanga (MP) provinces where it invades grasslands and sub-urban

areas. *Cestrum* spp. are habitat transformers and compete against indigenous plants and crops. All *Cestrum* species are generally toxic to humans and animals, including cattle, sheep, horses, pigs, and poultry.[29] Plants may be extremely toxic to cattle, especially during the winter months of June and July, and early spring when palatable forage is scarce.[30] An increase in research capacity through training is required to fast-track the pre-release evaluations of potential agents. Whilst NRM Programmes co-fund the development of agents, more funding is required to boost research capacity through training of researchers.

•*Xanthium strumarium* (Asteraceae), commonly known as Cocklebur is a summer annual weedy herbaceous shrub with native range of South, Central to North America. *Xanthium strumarium* coppice only through seeds that are highly dependent on summer rains for germination and grows up to 1.5 m in height. In addition, cocklebur seeds along the water-ways are easily spread by water during floods while farm tools, animals and implements also spread the seeds between farms. Cocklebur is distributed throughout all provinces in South Africa, particularly the eastern regions. It is one of the invasive alien species posing negative impacts on the country?s rural livelihoods, and has been listed as a noxious and major weed of row crops such as soybeans, cotton, maize and groundnuts in many parts of the world. Its spiny burs adhere to the wool of sheep and becomes entwined in tails, manes and coats of domestic livestock, causing the animals much discomfort. The burs lodged in animal hair and sheep wool are difficult to remove when the wool is processed after shearing, thereby reducing wool quality. It readily invades overgrazed pastures and spreads at the expense of the indigenous species. Cocklebur also has an economic impact in pastures, where cattle, sheep and pigs may be poisoned by eating young plants.[31] Although cocklebur may be controlled using mechanical and chemical methods, these are labor intensive and require follow-up treatments while herbicides pose non-target effects. To alleviate the impacts of *X. strumarium* on environment and agriculture, it is proposed that a biocontrol programme against this noxious weedy plant be initiated in South Africa.

•*Biancaea decapetala* (Syn. *Caesalpinia decapetala*) (Fabaceae), commonly known as Mauritius thorn, is a woody, perennial, evergreen scrambling shrub that has been distributed around the world primarily as an ornamental plant. It is a thorny evergreen shrub which grows from 2-4 m high (or climbs to 10 m or higher). It often forms dense thickets. Mauritius thorn is a widespread, highly invasive weed, sprawls over and out compete indigenous vegetation and crops in KwaZulu-Natal, Mpumalanga, and Gauteng. Whilst Mauritius thorn is restricted to the moist and eastern parts of the country (Henderson 2020), the weed nevertheless poses a significant risk to the biodiversity of several vulnerable and sensitive ecosystems. In addition to these habitats, the weed has also invaded disturbed areas including roadsides and urban open spaces, rangelands, and commercial forestry plantations where it impedes operations and increases the risk of fire. Mauritius thorn infestations have been estimated to occupy some 24,000 ha in South Africa. Mechanical and chemical control alternatives are impractical for all but the smallest infestations. There is only one seed-feeding agent released against Mauritius thorn but its establishment and impact is poor. New biocontrol agents are required.

•*Anredera cordifolia* (Basellaceae), also known as Madeira vine, is a vigorous climbing vine that can also be a scrambling shrub or ground cover in the absence of support. It is a long-lived (perennial), twining or climbing plant growing over taller plants. It reproduces primarily through long lived propagules (underground and aerial tubers), as well as leaves and stem fragments and prolific growth. Growth of up to 1m per week has been reported in high light environments. Madeira vine has a wide distribution in South Africa, ranging from the Western Cape Province, through the Eastern Cape to KwaZulu-Natal, Mpumalanga and Gauteng at altitudes ranging from 10-1800m.[32] Weedy vines such as *A. cordifolia* are particularly problematic and are labeled as transformer species, acting as agents of ecosystem change.[33] *Anredera cordifolia* competes for space, light, and water and thus responsible for smothering and even replacing indigenous vegetation. Madeira vine is difficult to control with herbicides and manual clearing. A leaf-feeding beetle *Plectonycha correntina* was released in 2016. However, its establishment has been poor. Mass-rearing of *P. correntina* and an additional subterranean and aerial tuber attacker could improve biocontrol of *A. cordifolia*.

•*Schinus terebinthifolius* (Anacardiaceae) also known as the Brazilian peppertree is an evergreen, large perennial shrub that can grow up to 15 m high. The plant has wide-spreading horizontal branches and is

a prolific producer of seeds which are effectively dispersed by birds or other wildlife. *Schinus terebinthifolia* is invasive in the Eastern Cape, Mpumalanga and Limpopo, and along the KZN coast. It is reported to have a broader ecological tolerance in regions where it has been introduced, enabling it to colonize a wide range of habitat types, including farm land, mangrove, pineland, grassland, coastal wetlands, riparian systems, forests and roadsides. Consumption of foliage by horse and cattle can cause hemorrhages, intestinal compaction and fatal colic.[34] Its ability to form large and dense thickets has the potential to reduce pasture carrying capacity, limit stock access to water and cause stock fatalities, which could lead to reduction in yield. It is a host of major diseases and pests of important fruit crops. The low seed infestation rate of 22% caused by a seed-feeding wasp *Megastigmus transvaalensis* is not curbing the spread of the invasive shrub in South Africa. Therefore, biocontrol agents which are either released or considered for release in the USA should be targeted for further quarantine evaluation and possible release in South Africa.

•*Arundo donax* (Poaceae), hereafter referred to as Arundo, is also known as giant reed or Spanish reed. Arundo is a grass-like plant that grows from 3-10 m high, with hollow stems of 2-3 cm diameter. It grows densely enough to reduce the carrying capacity of small waterways by constricting and narrowing the channel from both banks. Arundo has been nominated as among 100 of the "World's Worst" invaders. Arundo is present in all provinces of South Africa,[35] and uses considerable amounts of water. It is one of eleven IAPs in the fynbos biome in South Africa that occur in more than 50 quarter degree squares, and it has the potential to invade more than a million hectares of the fynbos biome. It quickly colonizes disturbed areas, like those left bare after flooding or fires, and dominates riverbanks and estuaries. Arundo is highly flammable and can increase the frequency, intensity and spread of fires, particularly during dry periods and in dry regions. In turn, fire promotes thickening and dominance of Arundo. The two promising biotypes of *Tetramesa romana* (Hymenoptera: Eurytomidae) from Spain and France need to be released to supplement the established biotype in SA. *Rhizaspidiotus donacis* (Hemiptera: Diaspididae) should be imported from Europe. Whilst NRM Programmes co-fund the development of agents, more funding is required to boost research capacity through training of researchers.

1.2.2. Associated baseline projects

In 1995, the South African government initiated a program to assist land managers, both government and private, in their attempts to bring alien plant invasions under control in the areas for which they were responsible. There are widespread attempts to control invasive alien plant invasions across South Africa, and the South African government has been spending over 66 million US dollars per year on these efforts across all nine provinces. This is an underestimate as it does not include data from conservation agencies, NGOs, and the private sector. As of 2020, of the 556 invasive taxa listed in South Africa?s NEM:BA Alien and Invasive Species Regulations, 189 taxa were subjected to some form of management. The spending per species is however highly skewed ? 77.2% of all money spent was directed at only ten species over the past three years. South African legislation requires landowners to control listed invasive alien species on their land. Managers of state-owned land, in particular national parks, provincial protected areas and municipal nature reserves are required to budget for and implement alien plant control programs, but in reality they cannot afford to do this on the scale required. Private landowners are simply expected to pay for the control of listed invasive species on their land even though they may not have been responsible for the introduction of the species in the first place. The national government has sought to address these shortfalls in funding and resources by providing both private and state landowners with assistance in the form of teams of workers who can clear invasive alien species. The workers are drawn from the ranks of disadvantaged people in mainly rural areas, where unemployment is rampant. It has been possible to justify expenditure on this

program (dubbed ?Working for Water?, hereafter WfW) because it addresses multiple goals by providing developmental opportunities, alleviating unemployment, and dealing with an important environmental problem.

South Africa has a rich history of managing invasive alien animal populations. The country initiated and completed the largest invasive mammal eradication by removing Domestic Cats (*Felis catus*) from Marion Island in 1991. On the mainland, two introduced invertebrate species have been eradicated successfully, the Khapra beetle (*Trogoderma granarium*) and the Freckled Edible Snail (*Otala punctata)* in the late 1980s and early 1990s.[36] Eighty invasive alien animal species are listed in the NEM:BA Alien and Invasive Species Regulations, and thus must be controlled. Of these, 24 are currently being controlled with the aim of eradication or containment. Three further invertebrate species are currently controlled through integrated pest management (*Bactrocera dorsalis*, the Oriental Fruit Fly) or nest removal (*Vespula germanica*, the German Wasp and *Polistes dominula*, the European Paper Wasp). Among vertebrates, 12 freshwater ?sh species have been controlled in localized areas, according to their speci?c listing in legislation and protected area management priorities; two amphibians, two bird and ?ve mammal species are currently subject to control using a wide variety of techniques. Inter-institutional working groups have played a signi?cant role in guiding invasive alien animal species management in South Africa. Three working groups (KwaZulu-Natal Invasive Alien Species Forum, CAPE Invasive Alien Animal Working Group in the Western Cape and the national Marine Alien and Invasive Species Working Group) are actively addressing issues related to the management of invasive alien animal populations. These groups are valuable for improving the ?ow of information between environmental managers in local and provincial government, researchers and NGOs, and contribute to networking and building and maintaining working relationships between individuals and institutions involved in invasive animal control. However, there is further work to be done in public engagement, media relations, social media, and the nature and timing of publicity in projects supported by the working groups.[37]

This GEF7 funded project is closely aligned with the Mouse-Free Marion (MFM) Project and will form an important part of that project. The lead agency DFFE is co-leading the MFM Project with BirdLife South Africa (BLSA), and together they will carry out the eradication operation and all related activities. A suite of fund-raising initiatives is being used to ensure that the eradication and related activities are sustainably and fully funded. The MFM Project?s ?Sponsor a hectare? crowd-funding initiative aims to raise funds towards the costs of the project. The eradication of House Mice from Marion Island has been recommended by research teams who have worked on the Prince Edward Islands mouse or seabird populations (e.g. Jackson & Van Aarde 2003[38]; Wanless et al. 2007[39]; De Villiers & Cooper 2008[40]; Angel et al. 2009[41]; McClelland et al. 2018[42]). In 2014, a feasibility study found that eradication was possible with careful planning and adequate funding, human capacity and logistical support (Parkes 2014)[43]. The foundational work towards eradication started in 2012, and the DFFE-BLSA partnership intends to carry out the operation in the Austral winter of 2024. Comprehensive Project and Operational plans have been drafted and are in the process of being reviewed and updated to reflect progress by the partner organizations (Springer 2018a[44], 2018b[45]).

Through the Natural Resource Management (NRM) programmes of DFFE (formally, the *Working* for *Water* Programme), Plant Health and Protection unit of the Agricultural Research Council (ARC-PHP) initiated a biocontrol programme for *Tecoma stans* in 2003. This involved the introduction of insects and fungus from central America and Mexico. Since the initiation of the biocontrol program of *T. stans* in South Africa, five species have been successfully screened as potential biocontrol agents but only two species have been found suitable for release in South Africa. The two agents, a leaf-feeding lady beetle *Mada polluta* (Mulsant) (Coleoptera: Coccinellidae) and a leaf-mining fly *Pseudonapomyza* sp. Hendel (Diptera: Agromyzidae), are fully established following their release in 2013 and 2014, respectively. Pre-release evaluation has been concluded on a root-feeding flea beetle, *Heikertingerella* sp. (Chrysomelidae: Galerucinae), and an application permit to release this beetle is being prepared for submission to relevant authorities. The DFFE: NRM funding is expected to continue funding the mass-rearing, release and post-release evaluation of *M. polluta*, *Pseudonapomyza* sp. and *Heikertingerella* sp. Despite their establishment, the two biocontrol agents are unlikely to curb the spread of *T. stans* in

South Africa. Hence, a need to search for flower-and seed-attacking agents in the native range in central American countries.

The Plant Health and Protection unit of the Agricultural Research Council (ARC-PHP) initiated a biocontrol programme for *Cestrum* species using pathogens in 2007.[46] However, the pathogen project was shelved in 2010 due to lack of capacity. Through funding from the NRM programmes of the DFFE, the *Cestrum* biocontrol programme was resumed in 2017. The NRM financial support enabled ARC-PHP to identify a number of natural enemies associated with *Cestrum* species in Argentina. One of these was the leaf feeding flea beetle *Epitrix* sp. Foudras (Chrysomelidae: Galerucinae: Alticini) which was eventually introduced to South African quarantine for further screening (host-specificity testing) as a potential agent. Red Meat Research and Development South Africa (RMRD SA), through the Centre for Biological Control (CBC) at Rhodes University, has committed to contribute about 3% of funding to the *Cestrum* biocontrol project but this will only fund Argentine-based graduate students who will conduct studies on natural enemies associated with *Cestrum* in Argentina and their potential as biocontrol agents in South Africa. It is expected that DFFE-NRM Programmes will continue to fund the operation costs of cestrum project, and this could include the costs of foreign surveys and importation of potential agents, screening of agents in quarantine and the release of suitable biocontrol agents. This will necessitate an increase in research capacity to fast-track the pre-release evaluations of these potential agents.

The biocontrol programme against *Biancaea decapetala* in South Africa was initiated by ARC-PHP in 1991 but has been constrained by a lack of research capacity and suitable natural enemies.[47] From previous native-range surveys in India, six insects were identified as having potential as biocontrol agents and four were imported into quarantine in South Africa for further testing. Of these, *Acrocercops hyphantica* (Gracillariidae), *Eurema andersoni ormistoni* (Pieridae) and *Lacera noctilio* (Noctuidae) could not be successfully cultured and only the seed-feeding beetle *Sulcobruchus subsuturalis* (Chysomelidae) underwent complete host-specificity testing. The beetle *S. subsuturalis* was approved for release into South Africa in 1999.

Through funding from the NRM programmes of DFFE, ARC-PHP has conducted research on the adventive shoot-tip-galling wasp (*Tetramesa romana*: Hymenoptera: Eurytomidae), a biocontrol agent for the invasive *Arundo donax*, from 2018 to 2021. The studies have included comparison of host-specificity and impacts of three genotypes (*i.e.,* adventive, French and Spanish) of *T. romana* on arundo. Trials showed that the French and Spanish genotypes performed better than the adventive genotype, suggesting that the two could be considered for release in South Africa. Researchers in the US reported similar results, with the Spanish *T. romana* genotype now widely established in Florida. Also funded by NRM, ARC-PHP is also conducting research on the rhizome-feeding scale insect, *Rhizaspidiotus donacis* (Hemiptera: Diaspididae), one of the most promising candidate biocontrol agents for Arundo.

The proposed IAS project will leverage and build on these past and on-going interventions by adopting good practices, replicating successful approaches, drawing on existing expertise and integrating with existing Government-led coordination and project implementation arrangements.

1.3 Proposed alternative scenario with a brief description of expected outcomes and components

In the proposed alternative scenario, the project will contribute to strengthening the national capacity to implement South Africa?s National Invasive Species Strategy and Action Plan (NISSAP). The project will focus GEF investments on addressing some of the key gaps in managing the first three stages of invasion (introduction, establishment and expansion) through a combination of species-based, area-based and pathway-based approaches. It will however emphasize the strengthening of biosecurity along high risk introduction pathways and specifically target activities that result in the protection of globally significant terrestrial, aquatic, coastal and marine biodiversity (species, habitats and ecosystems) from the impacts of biological invasions.

The project objective will be achieved through the key inputs under three targeted Components, viz.: 1) Strengthened IAS detection and surveillance capacities at key national ports of entry, 2) Enhanced biosecurity communications and information flows, and 3) Improved effectiveness of control measures for high risk IAS. The three project components are inter-related and will lead to improved capacity of decision makers, users and beneficiaries to manage invasive alien species. They have also been designed to assist the Government and key stakeholders in the development of appropriate management systems and tools on invasive alien species that will ultimately lead to improved conservation of South Africa?s biodiversity.

Component 1: Strengthened IAS detection and surveillance capacities at key national ports of entry. Total Cost: USD 14,341,042 (GEF/TF: USD 1,342,150; Co-financing: USD 12,998,892)

Component 1 is focused on improving the operational management of high-risk introduction pathways for the priority alien invasive species considered to have a detrimental impact on South Africa?s globally significant biodiversity, and that also constitute a significant risk to rural livelihoods. The outputs and activities under this component will collectively contribute to strengthening the country?s surveillance capacity at key entry points (i.e. points of import) in the form of border controls, monitoring, early detection and quarantine measures.

Outcome 1: South African authorities adopt new tools and methods of high-risk IAS surveillance at key national ports

Under Output 1.1 the project will pilot the establishment and operations of an inter-agency ?Biosecurity Risk Assessment/Targeting Centre (BRA/TC)?[48] to be hosted and managed by DFFE, for the surveillance of the priority invasive alien species at key national ports of entry. It is anticipated that this BRA/TC will then enable a more coordinated approach in the coherent and consistent

implementation of protocols and procedures related to IAS biosecurity monitoring, prevention, early detection and emergency response at national ports of entry. The BRA/TC will also provide an increased ability and capacity to better manage and integrate multiple information and intelligence flows on pre-border IAS introductions. It will further facilitate closer linkages between intelligence and front-line operational activities (such as Biosecurity Inspection and Compliance and Plant and Veterinary Health Inspection). The outputs and activities proposed to achieve this outcome are described below.

Activity 1.1.1: Develop IAS risk indicators

A prohibited and restricted (P&R) list linked to tariff codes is currently the primary means of IAS detection at PoE for declared goods. Otherwise, as many random inspections as possible are conducted. International best practice however is to profile and target high risk travellers, goods, and conveyances for inspection using risk engines to run indicator rules against data sets. Indicators of IAS risk may be related to import pathways, transport vectors, sites along the import pathway, and biosecurity compliance behaviour of economic operators and travellers. Under Activity 1, DFFE will develop a database of IAS risk indicators, required data, data sources, and data owners through a series of facilitated workshops with biosecurity experts and other PoE stakeholders. The database will drive the development of the operating model, technology architecture, regulations, and governance model of the BRA/TC in later activities (Activities 2 to 4). A consultant will be appointed by month 2 to facilitate the workshops and develop the database. The Biosecurity Risk Indicator database will be progressively developed over 4 months (until month 6) with inputs from biosecurity experts for selected IAS at the three pilot PoE. PoE stakeholders will also be consulted to refine the database and get their buy-in. The database will evolve over time as risks and indicators change.

Activity 1.1.2: Develop an operational model for the Biosecurity Risk Assessment/Targeting Centre

The operating model will establish ?business? requirements for the BRA/TC from which detailed technical specifications will be derived in Activity 3. It will also be used for focused engagement with Port of Entry (PoE) stakeholders on Memoranda of Understanding (MoUs) in Activity 4. The operating model will define amongst other aspects the mandate and value proposition of BRA/TC, design principles, key business metrics, functions, organizational components, overall technology architecture and interoperability, modes of operation, support concept, and governance. It will elaborate on the interaction of the BRATC with BIRAS the centralized Biosecurity Information and Risk Analysis System (output 2.2) as data user, and the proposed sea container and break-bulk cargo biosecurity risk management system (output 1.2) for which BRATC will profile and target specific containers for inspection. Skill sets required to develop the operating model will therefore span the business, information, organization, and technology domains. A consultant will be appointed by month 2 to develop a draft document by month 6. The draft document will be used to consult extensively with all PoE stakeholders to ensure a common understanding of the mandate, operations, and interaction of the BRA/TC with external processes and systems. Stakeholder inputs during the consultations will be incorporated into the final operating model by month 9. Early inclusion and buy-in from stakeholders will be critical to ensure ease of development of the regulations and MoUs in Activity 4.

Activity 1.1.3: Develop detailed technical specifications for the different components of the BRA/TC

Technical specifications will be developed for the purpose of procuring the various components of the BRA/TC, and integration of the components to achieve the overall performance of the BRA/TC. The System Specification to be developed over 6 months (by month 12) will define the overall functional architecture and physical layout, performance measures, and interfaces with external systems. Data requirements and interoperability protocols will be included in the interface definition and will form the basis of regulations to be developed in Activity 4. The System Specification will allocate performance requirements and constraints to sub-systems which Sub-System Specifications will decompose to lower levels of detail. Sub-System Specifications will be developed by month 18 to be included in the technical section of procurement documentation to be developed in Activity 6. The appropriate consultant will be appointed by month 6 and their skill sets will span the business, information, organization, and technology domains (as for Activity 2). The appointed System Consultant will be involved in all further activities to varying degrees and could be (but not necessarily) the same as the Operating Model Consultant appointed in Activity 2.

Activity 1.1.4: Develop regulations to facilitate the exchange of required data/information with other stakeholders

Development of regulations under the current National Environmental Management: Biodiversity Act, 2004 is required to facilitate the exchange of data between the BRA/TC and various public and private entities, and to ensure that exchanged data is accorded the proper legal weight. Data is the ?life-blood? of the BRA/TC analysed against business rules to identify high risk travellers, consignments, or conveyances at ports of entry. Data sources include electronic declarations from travellers or economic operators such as importers or shipping agents. Independent sources of data such as open-source databases are also required to validate electronic declarations. Existing processes within Customs and Immigration already provide for some of this data but regulations and MoUs are still needed to bridge departmental mandates. Data requirements and sources will be defined during the development of the biosecurity risk indicator database (Activity 1) and refined during the development of the operating model (Activity 2) and System Specification (Activity 3). A Legal Consultant will be appointed by month 9 to draft regulations by month 18, supported by the System Consultant. Extensive review and consultation of the draft regulations will follow before finalization by month 36. The extensive consultation with all PoE stakeholders will enable the drafting and signing of MoU?s by month 39.

Activity 1.1.5: Install requisite infrastructure and equipment for the BRA/TC

Activity 5 will start in the second quarter of year 2 coinciding with National Treasury?s budget planning process. Procurement documentation will be prepared by month 20 with support from the System Consultant. Sub-Systems Specifications developed during Activity 3 will be included in the technical section of the procurement documentation. An existing Government facility will be sourced and conversion to the required layout is expected to commence by month 30. It will be furnished and equipped with large display screens, desktop computers, servers, and network infrastructure. The most complex components will be the risk engine software, and gateway to external data sources conforming to cyber security and disaster management protocols. Sixteen (16) months have been allowed to procure these components and conclude support agreements with suppliers by month 36. Individual components will be tested and accepted against component acceptance criteria, before installation level tests are performed and documented by the System Consultant in a Physical Configuration Audit Report (PCAR) in month 42.

Activity 1.1.6: Integrate and test the BRA/TC

Integration of the BRA/TC with external data sources (including the databases of other PoE stakeholders and the Biosecurity Information and Risk Analysis System [BIRAS] will be conducted in accordance with an Integration Plan. The activity will overlap slightly with installation (Activity 5) and run until month 45 when functional testing of a fully integrated BRA/TC will commence. Functional testing in accordance with a Functional Test Specification (FTS) will continue until month 53. The performance of the BRA/TC in all modes and states including degraded modes will be assessed against expected results specified in the System Specification (Activity 3). Root causes of anomalies or any required modifications will be addressed by the System Consultant or component suppliers depending at which level the problem arises. A successful Functional Configuration Audit performed by the System Consultant will conclude Activity 6 at the end of month 54.

Activity 1.1.7: Develop training manuals and train personnel

A Technical Publication Writer will be appointed by month 39 to develop integrated operator manuals (including Standard Operating Procedures), maintenance manuals and training manuals by month 48 supported by the System Consultant. Equipment suppliers will also provide inputs to the manuals for their equipment and support the training program led by the System Consultant. Personnel from DFFE and DALRRD will be trained as operators and maintainers of the BRA/TC on an equal opportunity basis. A ?train-the-trainer? program will also be run for departmental personnel. Training will commence by month 48 and run until month 57. Trainees will have hands on exposure to a functional BRA/TC from month 52. BRATC personnel will be based at a central national facility and will not perform operational duties at the ports of entry.

Activity 1.1.8: Commission an operational BRA/TC

Commissioning of the BRA/TC against the business requirements developed in Activity 2 will commence in month 54. A Commission Consultant will be appointed by month 51 to develop a Commissioning Test Specification and perform the commissioning tests until month 60. The System Consultant may also perform the role of the Commissioning Consultant if the Department so chooses. Personnel with preliminary training by month 54 will complete their training 3 months into commissioning. A positive Commissioning Test Report will conclude Activity 8 with a fully operational BRA/TC. The Commissioning Consultant will also conduct a Physical Configuration Audit to verify the configuration of the BRA/TC is in accordance with the internal layout diagram and Bill of Materials.

Output 1.2: A sea container and break-bulk cargo biosecurity risk management system is piloted

Under Output 1.2 the project will strengthen capacities of DFFE, DALRRD and the Department of Transport (Maritime Transport Branch) to mitigate the risk of unintentional introduction of priority invasive species along the sea container and break-bulk cargo pathway. GEF funding will be used to develop, and test the implementation of, a sea container and break-bulk cargo biosecurity risk management system at Durban harbor which has the highest invasion probability.[49] The system will be based on the Australian biosecurity system comprising offshore management of risk, accurate profiling and targeting of high risk containers or break bulk for inspection, protocols for inspection, and decontamination where necessary. The pilot implementation will entail the profiling and targeting of high-risk sea containers by the BRATC developed under output 1.1, inspection of the containers in accordance with the protocols developed under activity 1.2.2, and the external decontamination of containers under activity 1.2.3.

Activity 1.2.1: Develop biosecurity policy strategies, and actions on sea container and break-bulk cargo risk management

Activity 1.2.1 will develop policy strategies and actions on sea container and break-bulk cargo biosecurity risk management. These will address offshore management of biosecurity risks with partner countries, accurate profiling and targeting of high-risk containers or break bulk for inspection, protocols for inspection, and decontamination where necessary. The policy will be consistent with the policies of leading nations like Australia.

The project will undertake a review of existing policies (including regulations and guidelines) relevant to sea containers and break-bulk cargo in South Africa and the Border Five countries (US, UK, NZ, AU, CA). A national consultative workshop will then be held to elicit stakeholder views and inputs. Individual consultations with relevant stakeholders will also be held. A second national consultative (validation) workshop will be convened to present the views and recommendations collected to relevant stakeholders. The comments and views gathered from the validation workshop will then be consolidated into the first draft of the national sea container and break-bulk cargo policy.

The DFFE and Project Management Unit will then organize a one-day High Level Policy Dialogue (HLPD) in which a presentation will be made to the relevant Ministers of the Government of South Africa, the heads of the technical departments or directorates, the relevant Policy and Planning Divisions of the ministries, as well as the members of the relevant committees of Parliament. Following this HLPD, agreed changes will be implemented and the final draft policy will be submitted to DFFE for appropriate ministerial action.

Activity 1.2.2: Develop protocols for visual inspections of medium and high-risk sea containers and break-bulk cargo at Durban harbour and Beit Bridge border post

The development of standardized protocols for the visual inspection of containers and bulk cargo will be vital for the success of the proposed system and will enable its efficacy to be assessed. To determine possible contamination and appropriate documentation, the following aspects of high-risk containers or bulk cargo will be visually inspected: i) The external surfaces of both loaded and empty containers; ii) The internal surfaces of both loaded and empty containers; 3) The cargo (whether in a container or as transported as break-bulk); 4) Any packaging associated with the cargo.

Visual inspections of all six outer surfaces of containers will be performed before the container is opened in the presence of an inspector. The proportion of containers flagged as high or medium risk that should undergo visual inspection will be determined based on the capacity available. Given similar experiences elsewhere, e.g. in New Zealand, approximately 10% of the high risk sea containers and break-bulk cargo passing through Durban port will be randomly visually inspected. If a non-compliant container is found, then all containers in the consignment will be visually inspected. In New Zealand, all high-risk containers are inspected, but this may not be possible in South Africa given resource and capacity constraints. In addition, a time limit in which visual inspection must have occurred after the container or bulk cargo has landed will need to be determined. This time limit may need to vary based on the mobility of the organisms that could be transported along with the container or bulk cargo. Alternatively, other arrangements must be made to mitigate the risk of mobile species moving off the containers or cargo while it is waiting to be inspected. Results of these inspections will need to be entered into an electronic system, such that they can inform the development of future risk profiles. For this system to be highly efficient, staff should have access to electronic equipment for recording the results of inspections while they are being undertaken. It will also be important when developing these protocols to consult biosecurity agencies in other parts of the world, so that the lessons learned there can be implemented in South Africa.

DFFE will internally draft inspection protocols after a best practice review of the Border Five (B5) countries. The draft inspection protocols will be reviewed by one or more of the Border Five countries under existing bilateral agreements. Review comments will be implemented to finalize the document.

<u>Activity 1.2.3: DFFE will install and operate an automated high-pressure container cleaning facility at Durban for sea containers failing visual inspections</u>

Sea containers profiled and targeted for inspection by the BRATC will be inspected in accordance with the protocols developed under Activity 1.2.2. Those containers with high levels of external soil contamination will be directed to a demarcated area of Durban harbor?s container precinct for cleaning prior to release back into the import pathway. A high level of soil contamination is of such depth and quantity that the inspecting biosecurity officer cannot easily remove the soil adhering to the container; or is inaccessible; or can only be removed by mechanical methods.

Manual washing can take up to three hours after which a biosecurity officer will re-inspect the container. Automated high-pressure container cleaning however can clean six sides of a twenty-foot container in approximately 5 minutes operating 24 hours a day, 7 days a week. Throughput through the port will therefore be significantly improved without increasing biosecurity risk. Spot fines will be used as a deterrent and cost recovery mechanism.

Contaminated containers will be stacked separately from other containers before being hoisted individually and fully laden onto the washing machine (see Figure 2). The machine uses high-pressure, high-volume water through a series of different water jets and moving heads to clean the different locations on the containers from the corner pockets to all the channel sections underneath to the upper surfaces of containers. The machine follows the contour of the container to achieve a consistent result all over with both washing and sanitizing spray. Rainwater is collected in water tanks for the wash-downs and is then degreased and filtered for re-use, significantly reducing mains water consumption. Filtered material will be treated as biohazardous waste for disposal.

A technical consultant will be appointed to identify a suitable site in partnership Transnet National Ports Authority (TNPA), the port landlord. The container washing facility will be incorporated into the current port modernization plan to increase container handling capacity to more than 11 million TEU.

The technical consultant will also develop technical specifications for the civil and electrical work, water system, washing machine, and overall integration and performance of the system. Documentation will be prepared to procure the components of the automatic container washing system under an open tender process, and maintenance and support agreements will be concluded with suppliers. The technical consultant will support the entire procurement process including acceptance testing of the system components against defined acceptance criteria. Installation level tests will then be performed and documented. Functional testing, compilation of training manuals, staff training, and commissioning tests will follow.

Figure 2: Automated sea container washing facility

Output 1.3: A small team of biosecurity detection dogs and their handlers are operational at key ports of entry

Given the high rate of arrivals and limited capacity to conduct biosecurity inspections at ports of entry, the operationalization of detection dogs has the potential to improve biosecurity measures at key ports of entry. Dogs are increasingly being used as detection tools in a wide array of situations worldwide. Particularly, for purposes of biosecurity. Studies in New Zealand have suggested that dogs outperform human detectors when searching of invasive alien plants[50]. Particularly, if the plants are small. Dogs mainly use sent to detect species, and for effective implementation of this strategy a variety of other

detection techniques, such as DNA analysis should be in place, as DNA is the only way to confirm species identification, especially if only a subset of the sample is present (for example, leaves, seed, root, piece of an animal tissue). Initially, dogs will need to be trained to detect any plant, animal or fish samples and later can be trained to distinguish between species to make detection more efficient. The following major ports of entry can be used to pilot the use of detection dogs: OR Tambo International Airport, Durban harbour, and Beitbridge.

Under Output 1.3 the project will support the establishment of a small professional team of biosecurity detection dogs (targeting high-risk invasive alien plant and animal species) and their handlers to be deployed at national ports of entry (in support of existing measures to detect high risk invasive species at national ports of entry). The project will support the following suite of activities:

Activity 1.3.1: Develop certification standards and standard operating procedures (SOP[51]) for biosecurity detection dogs and their handlers

There are examples of best practices for policy, standard operating procedures, training, and certification of canine teams (for example for explosive and firearm evidence detection[52]). Both Australia and New Zealand, as island nations, have developed particular expertise with regard to the detection of potentially harmful species. Similar standards for biosecurity detection will be developed for South Africa. This will be achieved through the following actions:

a) Contacts will be established with customs officials in Australia and New Zealand to obtain the relevant certification standards and standard operating procedures for biosecurity detection dogs and their handlers that are used at airports and harbors in those countries;
b) Customs officials in the United States of America to obtain the relevant certification standards and standard operating procedures for biosecurity detection dogs and their handlers at land border posts with Mexico and Canada;
c) Investigate the possibility of training dog handlers in one or more of those countries to the required standards.

Activity 1.3.2: Select, train and certify dog handlers

The selection of suitable dog handlers will be done with the assistance of the SARS Customs Detector Dog Unit. The prospective dog handlers will be selected on the basis of qualifications (at least a matric or (preferably) a post-matric), patience and confidence. Efforts will be made to ensure gender equity among the persons to be selected as dog handlers. The dog handlers that are appointed will be trained locally, with additional training in Australia and New Zealand.

Activity 1.3.3: Select, acquire and train suitable dogs

Detection dogs require a particular set of attributes. The dog breeds most often used for detection work include Beagles, Labrador retrievers and German shepherds. However, it is more important to test dogs on the basis of their physical and behavioural characteristics when assessing their suitability for detection work. Candidate dogs will therefore be selected based on their performance, which is often correlated with their breed. Multiple screening tests will be employed to evaluate and indicate a dog?s future working performance. The desirable behavioural and physical traits on which selection will be based include: a) highly play motivated; b) high level of cooperativeness; c) boldness; d) obedience but independent when off-leash; and e) high athleticism. Nervous or anxious individuals and those with poor olfactory abilities will be avoided. The selected dogs will then be trained by the SARS Customs Detector Dog Unit.

Activity 1.3.4: Deploy dogs and their handlers to selected ports of entry

The trained detection dogs and their handlers will be deployed at OR Tambo International Airport (ORTIA), Durban Harbour and the Beit Bridge border post. The ORTIA receives by far the most international arrivals, the port at Durban is the busiest harbour in the country, and Beit Bridge is southern Africa?s busiest inland border post. At each of the ports, four trained dogs and their handlers will be deployed.

Activity 1.3.5: Provide operational support to dogs and their handlers

The detection dogs and their handlers will be provided with kenneling, care and exercise facilities, as well as transport equipment. Additional support will also be provided, as appropriate, for the disposal and retirement of dogs, as well as for transfer of ownership in cases where dogs are no longer needed or effective.

Activity 1.3.6: Provide dog health requirements and dog veterinary needs
Suitable veterinarians and animal hospital facilities will be identified, and consultations or treatments will be carried out according to the established protocols.

Activity 1.3.7: Develop surveillance skills for dogs and their handlers
Additional surveillance skills that would be specifically needed for the specialized detection of targeted groups of invasive species that have been assessed to have high risk and high impact will be necessary for the dogs and their handlers. To achieve this, the following tasks will be done:
a) A review of the efficacy of the dog units in achieving pre-determined goals will be conducted, and the need for additional surveillance skills for dogs and their handlers identified;
b) Workshops to develop additional skills will be conducted.

Output 1.4: New and emerging invasive species monitored and controlled

Emerging invasive species can be defined as those that are still in the early stages of invasion and are limited to small areas. Before species can be listed, a significant amount of research on the biology of the species as well as investigation of the impacts needs to be conducted. At times, this process can take long and by the time the species is finally listed, the spread is already beyond the possibility of eradication. Often, propagules are discarded from the gardens into natural areas and new populations emerge in almost every flowering season and this makes eradication impossible. Therefore, new and emerging invasive alien species need to be controlled and monitored immediately after detection. Six activities are proposed to support the achievement of this output, including actions that will need to be taken, and factors that will need to be considered.

Activity 1.4.1: Procure relevant equipment for monitoring and control of new and emerging invasive species.
The following equipment will be required for detection and eradication work: i) Data collection: Handheld GPS (Global Positioning System) units, cameras, and measuring tapes; ii) IT Equipment: Laptops (with 3G cards for out-of-office internet access), wireless mouse, and portable hard drives; iii) Herbarium collection equipment: secateurs, plant pressers (with flimsies, drying paper, corrugated cardboard sheets, straps and D-rings), printed herbarium field labels, and plastic bags; iv) Clearing equipment: knapsack sprayers, handheld sprayers, slashers, machetes, small axes, measuring jugs, loppers, tongs (for cactus and spiny plant handling), bow-saws and chainsaws (best suited for clearing work), and herbicides; v) Personal Protective Equipment (PPE): conti-suits (overall), safety boots, safety helmets, safety glasses, reflective vests, sunhats, gumboots, gloves, raincoat, respirators (when applying herbicides), rubber aprons and gloves apron (for mixing herbicides), chainsaw operators? PPE (i.e., gloves, safety and pants) and first-aid kits.

Activity 1.4.2: Detect alien invasive species
The most effective way to minimize the impacts of invasive alien species is to prevent their initial incursion. Once these species get into a new area, they have the ability to establish rapidly. Successful control of these IAS often depends directly on a timely and rapid response. For effective listing of potential invasive alien species, a Species Under Surveillance ? Possible Eradication or Containment Targets (SUSPECT) list was developed in 2013. This list includes species where there is sufficient documented evidence to warrant in-depth investigation, and management. The SUSPECT list is frequently updated, and species added to this list are accompanied by: (1) an initial risk assessment; (2)

a specimen lodged in a South African collection; (3) a short background dossier on life-form and invasive tendencies elsewhere in the world; and (4) a detailed project plan including information on current distribution in South Africa, an assessment of management options, and an outline of proposed research. Subsequent to the SUSPECT list, a watch list for South Africa was developed using a simple, rapid, and inexpensive method[53]. This project will focus on these existing lists; and new species will be added as they are detected.

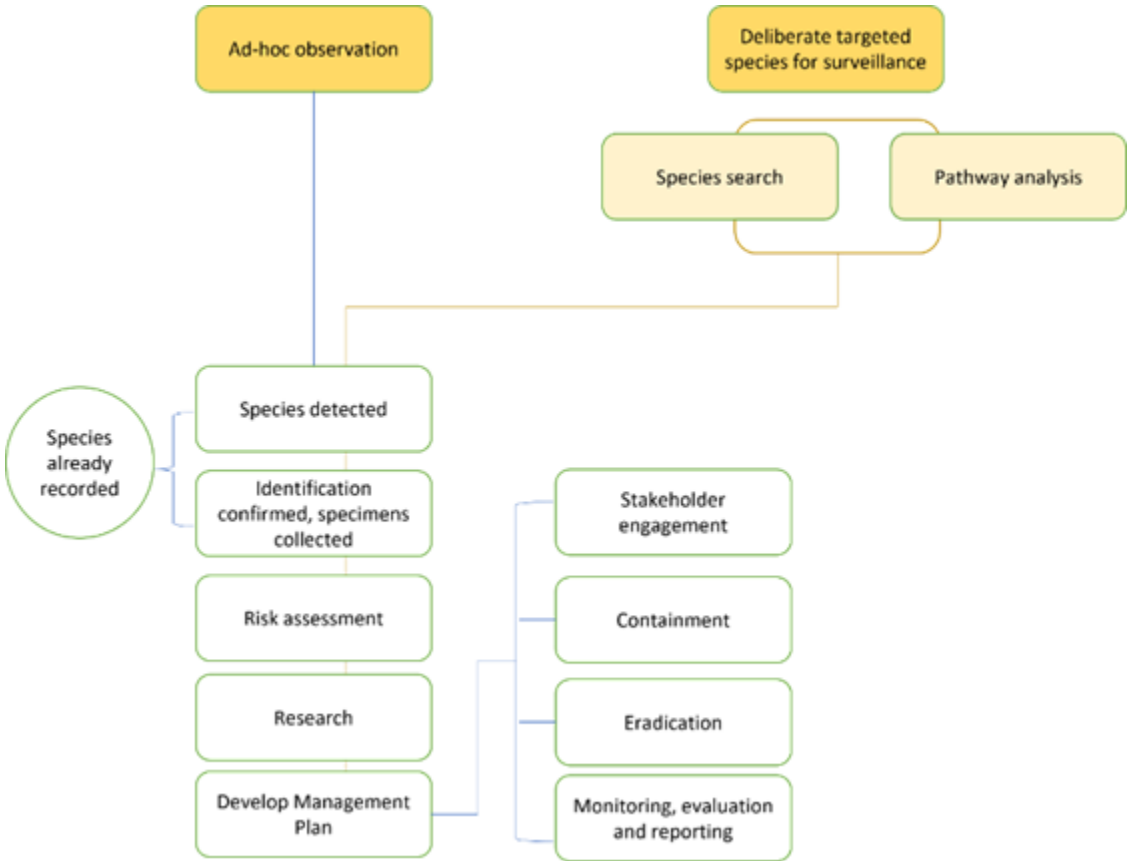

Figure 3. Process for detecting and management new and emerging invasive alien species

A detection programme for at least 29 species (updated as new species are detected) will be implemented across the country (Table 4, Figure 3). Different survey methods and techniques such as site-specific surveys (sites likely to have high propagule pressure such as dump sites, rivers, and roadsides), species-specific surveys, random surveys, and revisiting historical records (either from herbarium specimens or databases) will be implemented. Other survey techniques, including the use of a dedicated email address for reporting new records (invasivespecies@sanbi.org.za), iNaturalist, as well as social media platforms will be used. To achieve effective detection on each site, teams will walk in parallel transects to identify invasive species (including taking GPS coordinates, pictures, and specimens) until each site has been completely surveyed.

Table 4. Species scoped for the project for monitoring

1	*Acacia viscidula*	16	*Melaleuca liniaris*
2	*Banksia ercifonia*	17	*Melaleuca quadrifida*
3	*Banksia integrifolia*	18	*Melaleuca rugulosa*
4	*Brasiliopuntia brasiliensis*	19	*Melilotus albus Medik*

5	*Callitris* spp.	20	*Physalis peruviana*
6	*Crataegus mexicana*	21	*Physalis viscosa*
7	*Elephantopus mollis*	22	*Salix ? fragilis*
8	*Euphorbia pulcherrima*	23	*Salix babylonica*
9	*Hypericum forrestii*	24	*Salvia coccinea*
10	*Hypericum patulum*	25	*Solidago sp*
11	*Ipomoea quamoclit*	26	*Thunbergia grandiflora*
12	*Leucanthemum vulgare*	27	*Ulmus parvifolia*
13	*Melaleuca armillaris*	28	*Verbascum thapsus*
14	*Melaleuca cruenta*	29	*Verbesina encelioides*
15	*Melaleuca densa*		

Activity 1.4.3: Verify sightings reported by the public.

Sightings reported by the public will be verified, and the IAS populations quantified. Where possible, the reporting party will be provided with a feedback on the results of the verification, and steps that will be taken going forward.

Activity 1.4.4. Collect herbarium specimens for positive identification

For positive identification of all species, a herbarium specimen will be presented for identification by taxonomists at any SANBI herbarium. For each plant species under investigation, herbarium specimens containing reproductive structures will be collected for all major populations and pressed according to standard herbarium methods. All herbarium specimens will be accompanied by an appropriately curated DNA sample to facilitate molecular identification, and to contribute to the expansion of the DNA library. Collecting DNA samples will not only expand the library, but will contribute to human capital development, and also strengthen the collaboration between SANBI and the African Centre for DNA Barcoding.

Activity 1.4.5. Conduct preliminary research on the ecology of the species, and assess risk

Preliminary research on the biology of each species including, ecology, reproductive strategy, patterns of distribution, impacts and feasibility of eradication will be conducted by researchers working on biological invasions at SANBI to produce a dossier of relevant information on the species. Furthermore, a risk analysis using the Risk Analysis for Alien Taxa (RAAT) framework will be conducted for each species to facilitate possible listing in the NEM:BA Alien and Invasive Species Regulations[54]. Risk analysis is a systematic process of evaluating the potential risks that maybe associated with a particular species. Such risk analyses are aimed at distinguishing potentially harmful species from those that are not.

Activity 1.4.6. Develop species-specific management plans

Five-year species-specific management plans will be developed by the regional coordinators, para-ecologists, and technicians in consultation with researchers working on biological invasions. These management plans (including species distribution maps) will be updated annually to track progress towards stated management goals.

Activity 1.4.7. Implement species-specific management plans and collect data for research

Species-specific management plans will be implemented throughout the project, and concurrently with research. Para-ecologists will be responsible for implementing the species-specific management plans and collecting data. Four para-ecologists in each region will comprise a species-specific management plan implementation unit. One person in the unit will be responsible for data entry, one person will be responsible for herbicide application (where relevant), and the other two will focus on species identification and removal. Members of each management unit will walk parallel transects to identify (taking GPS coordinates), collect biometric data using datasheets, and remove individuals of each target species until each site has been completely surveyed. Data will be digitized and stored in a national database. These data will be used to update the management plans outlined in activity 1.4.6 above. Data on biological invasions will be analyzed and results published in reputable peer-reviewed journals.

Component 2: Enhanced biosecurity communications and information flows. Total Cost: USD 4,642,902 (GEF/TF: USD 933,556; Co-financing: USD 3,709,346).

Component 2 is focused on strengthening the role of the broader community in biosecurity activities, particularly in pre-border and post-border risk analysis, surveillance, detection and reporting.

Outcome 2: Stakeholders partner with and support state biosecurity agencies in pre-border and post border risk analysis, surveillance, detection, reporting and control of high-risk IAS

The movement of invasive alien species is commonly human-mediated; hence, increasing awareness levels of citizens on biological invasions and their impacts, and the role that they can play in their management is likely to aid measures to reduce the introduction and spread of invasive alien species. Despite major impacts of biological invasions on South African ecosystems, significant research efforts, legislation, and large-scale management efforts, existing research suggests that there are currently low levels of awareness on biological invasions among the citizens of the country[55],[56],[57],[58]. Particularly, stakeholder groups who produce or trade in products based on alien species (e.g., foresters, farmers, pet traders, plant nurseries, aquaculturists, and mariculturists).

The low levels of awareness are predominantly a result of few awareness raising and engagement activities on biological invasions targeting the public on a scale that matches the problem of biological invasions in the country. Furthermore, such activities have been disproportionately conducted across the country, with more efforts directed towards certain provinces such as the Western Cape and Gauteng. This is mainly caused by a shortage of funding and capacity[59]. That is, there are low levels of investment in awareness-raising and engagement activities related to biological invasions in South Africa. Limited awareness on biological invasions may hinder their control; thereby, leading to increased spread and associated impacts, and potentially lead to greater conflicts over their management if the species in question provide significant socio-economic benefits[60],[61]. Therefore, a biosecurity awareness campaign targeting the broader community is urgently needed.

Output 2.1: A ?biosecurity awareness and involvement campaign? is developed and implemented as a leverage point through which to engage the community about the importance of pre- and post-border

biosecurity and influence public perception about biosecurity

The *Biosecurity Awareness and Involvement campaign* will consist of gender responsive actions aimed at increasing awareness and changing perceptions about biological invasions in South Africa. The *Biosecurity Awareness and Involvement campaign* will provide a basis for relationship building among the private sector, disadvantaged local communities and environmental community groups. This action plan (that will include a gender sensitive approach) hopes to maximise our reach to identified target audiences by detailing what we are trying to achieve, who to target with our chosen methods of communiqu?, honing the message we are aiming to get across and lastly how we are going to disseminate that message. We aim to: (1) raise the profile of the importance of biosecurity among the South African community; (2) encourage full participation of all stakeholders, in the process of awareness raising and communicating; (3) educate communities on the impacts of biological invasions in this country; (4) promote the initiatives of the South African government in reducing the impacts of invasions, and working towards a structured biosecurity system; (5) ensure that landowners and conservation agencies, Non-Governmental Organisations, civil society organisations that have a presence in the field, are aware of the impacts of biological invasions, know the biosecurity processes, key contacts, how to assist in monitoring biological invasions, and why; (6) make funders and policy makers aware of biosecurity, its purpose, and to regularly communicate on its success; and (7) develop partnerships with appropriate stakeholders and relevant institutes in order to eliminate duplication, ensure relevant knowledge is disseminated, and collaborate on communications campaigns.

In Output 2.1 the project will assist in raising the profile of biosecurity by improving communications and awareness at all levels. It will develop and launch ? using a range of media, web and new technologies[62] - a ?biosecurity awareness campaign? as a leverage point through which to engage the community about the importance of pre- and post-border biosecurity and influence public perception about biosecurity. GEF financing will also be used under this output to initiate a more focused engagement programme with selected stakeholders, principally targeting: (a) the private sector; (b) disadvantaged local communities in the sites where IAS control interventions are implemented; and (c) environmental community groups. Four activities are proposed to support the achievement of this output, including actions that will need to be taken, and factors that will need to be considered.

Activity 2.1.1. Select specific stakeholder groups to be targeted and their locations

Although the awareness campaign will target the broad stakeholder groups such as: (a) private sector; (b) disadvantaged local communities; and (c) environmental community groups, there will be need to identify and select specific categories within each group. For example, the private sector comprises of specific groups such as nursery owners, pet traders, aquaculturalists, game farmers, and mariculturalists. Similarly, disadvantaged communities can be found in rural and urban areas across all provinces in the country. Therefore, the awareness campaign will start by selecting specific stakeholder groups to be targeted (within the broader categories), and their locations.

During the selection of stakeholders, emphasis will be placed on ensuring that the awareness campaign reaches all nine provinces of South Africa, and places priority on reaching all the key stakeholders (i.e., groups who produce or trade in products based on alien species). The reasoning behind ensuring that all key stakeholder groups are reached as a matter of priority is that they directly deal with alien species on a regular basis, and are likely to spread them on a bigger scale compared to other stakeholders. However, this will not translate to the exclusion of other stakeholders as the campaign aims to be inclusive.

Provisionally, the following specific groups or organisations have been scoped for the campaign (note that this list is meant to be indicative rather than exhaustive): (1) South African Nursery Association; (2) South African Green Industries Council; (3) South African Landscapers Institute; (4) fruit and nuts

import and export companies; (5) forestry industry; (6) fishing industry; (7) farmers (commercial and small-holder farmers); (8) urban communities (with emphasis on disadvantaged individuals); (9) rural communities (with emphasis on disadvantaged individuals); (10) environmental clubs or societies; (11) conservancies; and (12) pet trade industry.

Activity 2.1.2. Develop specific messages for the awareness campaign

Specific messages for he awareness campaign will be developed based on the following questions: (1) what is an invasive species?; (2) how do species become invasive?; (3) what are the impacts of invasive species?; (4) what does the South African legislation say about invasive species?; (5) what is South Africa doing to manage invasive species and reduce their impacts?; and (6) what role can you play in the management of invasive species in South Africa (including the use of iNaturalist)? The messages around question six will significantly differ based on the stakeholder group and/or location. Therefore, the specific message for the campaign will be tailored to suit the stakeholders chosen in activity one.

The specific messages of the awareness campaign will be drafted by the researchers at the South African National Biodiversity Institute (SANBI) working on biological invasions. This will be done to ensure that the messages are consistent with the best available scientific evidence, and management practice. As part of question six, all stakeholders will be encouraged to download the iNaturalist application on their smart phones (if available), and use it to record sightings of invasive species. iNaturalist is a popular easy-to-use application that helps you identify the plants and animals around you (and in the process take records of their occurrence) by taking pictures of them[63].

A short (three minutes) video explaining how to use iNaturalist that has been produced by SANBI will be shared with all interested stakeholders. Involvement of a wide range of stakeholders in monitoring and reporting on biological invasions through iNaturalist will increase the amount of data available for the Centralized Biosecurity Information and Risk Analysis System that will be developed as part of this GEF-funded project. By doing this, the aim of increasing the involvement of the broader community on biosecurity issues; particularly, monitoring and reporting on biological invasions will be largely achieved. The use of iNaturalist will be encouraged and explained to all stakeholder groups as part of question six.

Activity 2.1.3. Develop a communication plan

Identifying the appropriate communication tools for specific target audiences is essential for spreading the message of biosecurity. A balance of communication tools and techniques ensures that each target audience can receive tailor-made messaging through a medium catered to their needs. It is essential that communication practices are divided into ?non-participating? and ?participating? tools. Non-participating methods are where target audiences find the information both online and offline (e.g., websites or information requests). ?Participating? tools include those activities where the information is brought to the target audience. For example, through direct communication activities, presentations and workshops as part of community events. The project management team will therefore develop a communication plan as part of this activity. It is worth noting that the communication plan will be largely influenced by the choice of specific stakeholder groups in activity one.

Activity 2.1.4. Implement the communication plan (including adaptive management)

The communication plan developed under activity three will then be implemented. Adaptive management will be applied in the event that certain actions in the communication plan are found to not be working as effectively as anticipated. The campaign will focus on (1) broadcast media; (2) internet media; (3) print media; (4) workshops; and (5) presence at high profile stakeholder events, as described below:

? **Broadcast media:** The awareness campaign will target the top community radio station in each of the nine provinces in the country, the South African Broadcasting Commission channel one, two, and three, and e-TV. Three adverts on biological invasions will be run on each channel every week at high traffic times to reach a wider audience (one advert in the morning, afternoon, and evening slot) for the entire duration of the project. The contents of these adverts will be revised every six months to ensure that they remain relevant. Furthermore, the campaign will select the most watched local soap opera in

the country (i.e., Uzalo in 2021), and negotiate with the producers to incorporate a story line on biological invasions once every year throughout the project. For example, a story line on how invasive species are threatening the country?s water resources can be appropriate for such a platform.

? **Internet media:** Social media accounts will be set-up on Twitter, Instagram, Facebook, and Tik Tok as part of the campaign. These accounts will provide content on biological invasions (at least one post per day on each account), and be used to promote relevant activities of the campaign (e.g., workshops with specific stakeholders). Furthermore, these accounts can promote other initiatives of this GEF-funded project, such as the Centralised Biosecurity Information and Risk Analysis System, and be retrievable from the system. One post per month will be ?promoted? (paid) on each of the social media accounts to reach a wider audience.

? **Print media:** The campaign will develop awareness raising material (i.e., flyers and booklets) that will be shared with stakeholders; particularly at in-person workshops or events. Furthermore, the campaign will identify five of the top community newspapers in each province, and run advertorials on biological invasions once every year throughout the project. The contents of these advertorials will be revised every six months to ensure that they remain relevant. The campaign will also develop a newsletter on biological invasions that will be published once every quarter throughout the project. All the material produced as part of the campaign?s print media will be digitised for inclusion in the Centralised Biosecurity Information and Risk Analysis System.

? **Workshops with specific stakeholders:** The campaign will target specific stakeholders through in-person workshops as this is the best way to engage well defined and structured stakeholder groups. For example, nursery owners, pet traders, aquaculturists, game farmers, and mariculturists can be engaged through such workshops as they have well defined structures that could facilitate their engagement. However, it is worth noting that location of such stakeholder groups will have to be taken into account. Therefore, the campaign will conduct five workshops in each province with relevant stakeholders each year throughout the project.

? **Presence at high profile stakeholder events:** Certain high profile stakeholder events are widely attended in the field of science or conservation (including biological invasions). For example, Cape Floral Kingdom Expo, and Scifest Africa. Five high profile stakeholder events will be selected, and the project management team will attend these events, set up exhibition stands, interact with and distribute awareness material to different stakeholders who attend the events.

Output 2.2: A centralized Biosecurity Information and Risk Analysis System is operational and freely accessible to all responsible public biosecurity institutions

Over the years the South African government has made substantial investments to tackle the issues of biosecurity in the country to protect the environment and human well-being. However, the country has experienced challenges in its ability to respond to the increasing number, scale and scope of biosecurity risks. The current landscape of systems for managing biosecurity is characterised by several databases and inventories[64]. These databases are administered by various entities, such as governmental or parastatal organizations, non-profit organizations, research institutions, and independent researchers. They are managed based on various mandates, priorities and areas of intervention and research. As such, the format in which the data are stored often differs from one database to another, making their

interoperability rather complex. Presenting multiple systems to the user community presents a capricious user experience.

It is therefore important to develop and maintain a centralized Biosecurity Information and Risk Analysis System, coordinated at the national level. Such a system should be characterised by technical and scientific tools that are easily accessible to the stakeholders and the competent authorities to support the decision-making process, particularly for Early Detection & Rapid Response (EDRR) actions towards new invasions. DFFE will be responsible for implementation of this output. To establish a centralised Biosecurity Information and Risk Analysis System, the following activities will be undertaken:

Activity 2.2.1: Design and scope the requirements for a system that will allow for the collection, collation and analysis of information to support biosecurity activities.
The system will demand agile development methodologies in order to operate effectively. A scalable and flexible data publishing framework/interface is fundamental, and the design criteria will include: a) Automated integration of data partner content/datasets; b) Automated semantic enriched data through the system applications; c) Accommodate unstructured data; and d) Ease of use. Many information tools that have already been developed in South Africa and the rest of the world could guide the design and development of the system, such as the Southern African Plant Invaders Atlas (SAPIA), National Biodiversity Information System (NBIS) and Global Biodiversity Information Facility (GBIF).

A ?one-stop-shop? search system will be designed to provide coordinated access to data collections coming from different resources (e.g. data partners and citizen scientists). The system will have options for two views, applicable on mobile phones and computers, (1) a clean and simple interface (similar to the Google search tool) which would hide the complexity introduced by the multiple, and diverse data sources; (2) a classic view like that of Global Biodiversity Information Facility (GBIF) system which presents the user with key selection criteria[65].

The system will be based on a common and agreed data shell[66], and include the information already made available by the existing projects. Besides, on the basis of experiences carried out in South Africa, particularly in implementing the SAPIA project and developing associated tools, it is possible to define the structure of a comprehensive and dynamic system, including specifying priority data and updating mechanisms.

The following components (in no particular order) will be included in the system: (i) the taxonomic backbone linked to a central comprehensive national Alien and Invasive Species list; (ii) the document/research repository; (iii) spatial data (over and above the occurrence data); (iv) metadata[67]; (v) tools for data and information exchange[68]; (vi) citizen science platform (PC & mobile application such as iNaturalist); (vii) expert register; (viii) species identification tools; and (ix) data capturing templates.

Activity 2.2.2: Standardize electronic data forms and workflows for recording details of surveys, inspections and control measures.
The application of data standards provides for consistency, facilitating data management, aggregation and interoperability, saving time and providing users with a greater degree of confidence in data. Several data standards, tailored for a specific task and process, will be used in the system data workflow. Some may apply only to a particular process or data type and there will be variable adoption of standards across the data workflow landscape. The use of standards-compliant recording tools will assist the process, e.g., facilitating format compliance, or ensuring that sample metadata are captured. While there is an on-going debate among professional and volunteer participants regarding the extent of the benefits of applying data standards universally and more uniformly, the system will accept the standards that are in accordance with the FAIR principles, such as the DARWIN Core template which is primarily based on taxa, their occurrence in nature as documented by observations, specimens, samples, and related information.

An essential element central to an optimal system is a comprehensive register of IAS. The IAS register should be an up-to-date, extensive and dynamic inventory built upon:
? Robust definitions of alien species status including classification schemes that can be applied across the alien taxa in marine, freshwater and terrestrial ecosystems;
? Formats and standards for recording information agreed to at the national level in order to maximise interoperability, compatibility and coordination with and among initiatives operating at the national, regional and global levels.

The proposed data workflow model is based on the concept of a central data warehouse and curation tools (see Figure 4)[69], which is fed by data from data partners (recorders) and recording groups (such as bioblitz citizen scientists) as well as harvesting of records from social media. Verifiers have access to the central data source to provide quality assurance alongside automated approaches. Data users access the central data source through dataset services, giving a range of data access points. The BRA/TC that is being developed as part of this GEF-7 project in output 1.1 will be one of such key data users.

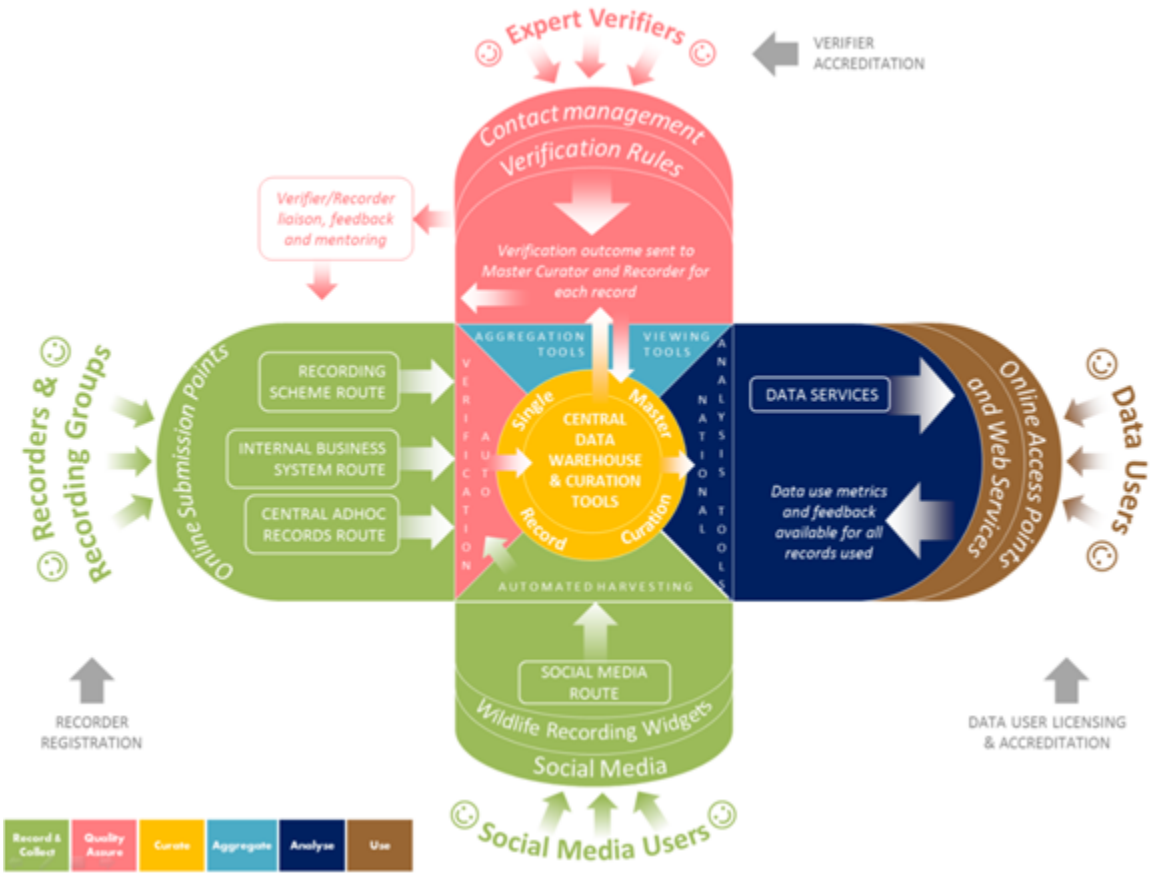

Figure 4. Data workflow (Source: Wilson et al., 2018)

<u>Activity 2.2.3: Develop data analytical capabilities to improve reporting and decision-making</u>
Data analytics is the process of identifying patterns and generating insights to inform decision-making and automated reports. Data analytics provides more innovative and forward-thinking decision-making that goes beyond traditional Key Performance Indicators for monitoring and reporting. The Biosecurity

Information and Risk Analysis System (BIRAS) will include data analytical capabilities to generate interactive dashboards or data visualization (tables, graphs, maps and modelling, and reports). These data analytical capabilities will be developed as part of this activity.

The preparation of data analytics will be undertaken in activity 1 (system development) and activity 2 (templates and standards for capturing data). These steps are crucial for ensuring that data is organised, accurate, and actionable by identifying and collecting data relevant to address the problem.

Activity 2.2.4: Establish a National Reference and Advisory Committee for coordination of the BI RAS
A sound implementation of the system will require cooperation by all stakeholders involved in biosecurity related activities. The implementation of the system will be carried out by the technical team. To ensure sufficient coordination and strategic direction, a central coordination body should be established. Such a single coordinating body should be established in the form of a National Reference and Advisory Committee (RAC) on biosecurity. As part of the implementation, the RAC will create an enabling platform in which high-level buy-in will be required to ensure (1) the continuous flow of information from stakeholder and (2) cooperation by all stakeholders.

The RAC will be a nationally recognised body, with a clear mandate and terms of reference, composed of a team of specialists, represented by competent officers and ?leading experts?. In order to guarantee a sound implementation of the system, the RAC will be constituted by the key representatives of the national authorities responsible for biosecurity information, and the key stakeholders, including all relevant experts and related scientific institutions. The essential role of such a body will be to provide coordination; access to high-level expertise on all different and crucial aspects of biosecurity; and support to decision making on prevention measures (from awareness-raising to trade regulations).

The RAC will be chaired by the DFFE, supported by a Secretariat and a Steering committee or Council, as well as a scientific authority working in collaboration with experts. In addition, there will be ad-hoc thematic working groups involving key stakeholders or their representatives. In principle, the establishment of the RAC will guarantee an optimal circulation of information. Specific protocols for reporting and relevant mechanisms to circulate information will be developed and implemented. For this purpose, the RAC will work in close collaboration with all the stakeholder in charge of the biosecurity activities.

Output 2.3: Invasive alien species are controlled at key sites with the involvement of rural communities using the Adopt-a-River approach

Presence of invasive alien plants in most catchments constitutes one of the greatest threats to ecological infrastructure and water security in South Africa. At a national scale, the combined impacts of invasive alien plants on surface water runoff have been estimated at between 1,444 to 2,444 million m^3 per year. The Adopt-a-River (AaR) Programme was initiated in 2008 with the aim of playing a vital role in encouraging citizens to learn about water resources, and become involved in the protection and management of these resources in their particular area. Adopt-a-River (AaR) projects have been implemented in all the nine provinces of South Africa since its inception. Once awareness of the water resource (and its benefits and problems) is created, stakeholders (including volunteers) can gain knowledge and insight into the causes of the problems affecting the quality of the water resources in their particular area.

The specific objectives of the AaR Programme are: i) Awareness raising, education, and the development of a catchment approach to water resources, using hands-on experience and grass roots education that highlight the linkages between landscape and water resources from the source to the sea, including people and their dependency and impact on rivers; ii) Provide a platform for advocacy and recourse; thereby, creating further opportunities for communities to be involved in the management of their water resources; iii) Active involvement of diverse communities in the improvement and protection of water resources; iv) Implement various training programmes to build capacity and skills, and develop career opportunities in the water resources and environmental sector, especially within previously marginalized communities and the youth; v) Implement a hybrid model that allows for citizen involvement and volunteerism as well as the possibility of job creation; vi) Identify causes of river pollution and disturbance and engaging parties (through workshops or roundtable discussions) responsible for such pollution and disturbance; and vii) Restore, rehabilitate, and monitor water resources.

Under this output, invasive alien plants will be cleared at selected sites with the involvement of communities through the AaR approach to conserve water resources and improve human livelihoods. The AaR activities will be implemented in the Gauteng (Tolwane river) and Eastern Cape (Tsitsa river) provinces. Under this output, regional task teams will be formed to implement activities leading to the achievement of this output. The DWS will be responsible for implementation of this output. The following activities will be implemented to achieve this output:

Activity 2.3.1: Engage relevant stakeholders on the project

To facilitate project support and participation, all relevant stakeholders will be engaged by each Regional Task Team through a series of meetings and workshops. These engagements will focus on explaining the aims of the project, how it will be implemented, benefits that can be derived and how different stakeholders can contribute to the project.

Activity 2.3.2: Survey and document state of livelihoods

In order to assess the value of this project in terms of reducing impact of invasive alien plants and improving human livelihoods of people in the area, it will be necessary to compare the levels of livelihoods at the start and finish of the project. A study will therefore quantify various factors related to human livelihoods in the areas, including: i) The number of livestock currently supported on the land; ii) Levels of income generated per hectare from use of the land; iii) Levels of ground water; and iv) Benefits derived from the rivers (including the invaded areas). This study will be done by researchers from the Water Research Commission in collaboration with each Regional Task Team. An end-line survey will then be conducted at the end of project implementation to document resultant improvement in livelihoods. During the end line survey, the outcomes of the project will be compared to the baseline established at the start of the project. The results of this survey will be made widely accessible through publication in appropriate outlets.

Activity 2.3.3: Develop a management plan for the control of IAS at each site

A five-year management plan with clear, achievable and measurable goals will be drawn up for each site. This plan will set goals in line with the available funding. The plan should meet the following criteria: i) It must be based on an adequate survey of the extent of invasions and the resources necessary to bring the problem down to a maintenance level[70]; ii) It must have clear goals in terms of both outputs (e.g. hectares cleared) and outcomes (reductions in cover of the invasive alien species, and improvements in the delivery of ecosystem services that would lead directly to improvements in livelihoods); iii) It must describe the best-practice methods to be used, and iv) It should allocate sufficient resources so that the stated goals can realistically be achieved. The management plan will be drafted by each Regional Task Team in collaboration with the researchers from the Water Research Commission.

Activity 2.3.4: Identify and recruit project participants (members of the local communities comprised of 55% women and youth, and 2% disability)

Recruitment of project participants will be coordinated by the Regional and Local Coordinator as they will have the required knowledge of the communities within the area where the project will be done.

The project is aiming at mainly improving the lives of the youth (with emphasis on women) living with or without disability. The composition (i.e. percentage of women and men living with or without disabilities) will be determined by the Regional and Local Coordinator.

Activity 2.3.5: Provide training and capacity building to recruited project participants

Project participants will be provided with training on citizen science tools and their implementation, methods to clear and monitor invasive alien plants and fish, as well as entrepreneurship and developmental skills. The following training courses have been scoped for the project: (1) safety skills and knowledge on the dangers of working in rivers and how to minimize or avoid such dangers (e.g. level one first aid training and river safety); and (2) specialized training requirements categorized into technical skills (e.g. identification of invasive alien plants and operation of relevant machinery such as chainsaws and brush cutters) and monitoring skills (e.g. assessing and monitoring river health using miniSASS). The training needs in each province will be determined by the Regional and Local Coordinator. Additional training and capacity building will also be provided on an ongoing basis during the duration of the project as needs and opportunities arise. Potential project champions will be identified by the Regional and Local Coordinator of each province and provided with advanced training that will set them on a career path and enable them to emerge as graduates or professionals. This includes, (1) project management; (2) data collection and reporting; (3) Environmental Educators training; (4) advanced water safety and first aid; and (5) computer skills for reporting to implementing agencies.

Activity 2.3.6: Monitor progress towards goals

Progress towards the goals for control of IAS contained in the management plan will be monitored on a regular basis, at least every six months. If the management goals are not being met, then management needs to be adjusted to become more effective; alternately, if it becomes apparent that the goals are not realistic, they can be re-set to more achievable levels, a process known as strategic adaptive management[71]. It would be important to practice adaptive management because our understanding of how to effectively manage alien plant invasions is imperfect, and experience gained through trial and error needs to be formally assessed to improve management practices efficiently and rapidly. Furthermore, emphasis will be made on monitoring water quality, river health, riparian vegetation, and geomorphological state of a river at pre-determined intervals through citizen science. To this end, the following citizen science tools have been developed, and will be used throughout the project: (1) miniSASS; (2) clarity tube; (3) Transparent Velocity Head Rod; (4) Riparian Health Index; and (5) Weather Station Citizen Science tool (including rain gauges and wind pressure plates). The Regional and Local Coordinator will be responsible for coordinating all monitoring activities.

Component 3: Improved effectiveness of control measures for high risk IAS. Total Cost: USD 4,823,318 (GEF/TF: USD 802,897; Co-financing: USD 4,020,421).

Invasive alien species pose a direct threat to the economic, social and biodiversity capital of South Africa. Currently, South Africa is host to over 1400 alien species, and controlling biological invasions costs the country over USD 1 billion per year. Fifty two species are listed in the NEMBA list of alien and invasive species as requiring eradication or control. However, the South African government lacks the capacity to implement control of all the species requiring control, and skills and resources need to be developed to facilitate improved management of biological invasions.

Component 3 is focusing on supporting efforts to improve the effectiveness of control measures that address individual species, with an emphasis on the eradication and biological control of targeted invasive alien species considered a high risk to South Africa?s global biodiversity values and food security.

Outcome 3.1: Relevant agencies have increased capacity to secure and manage a rodent-free status on

Marion Island

Marion and Prince Edward Islands are accorded the highest protection status possible in South Africa and are recognised as Wetlands of International Importance under the Ramsar Convention, providing further impetus for the eradication attempt. The DFFE, in partnership with BirdLife South Africa and the Mouse-Free Marion non-profit company developed the Mouse-Free Marion project with the aim of freeing South Africa?s sub-Antarctic Marion Island from a devastating rodent invasion, consolidating conservation gains and positioning South Africa as a leader in Antarctic conservation and invasive species management. The ?Mouse-Free Marion: Saving Marion Island?s Seabirds? project consists of a comprehensive set of actions to remove the invasive House Mouse (*Mus musculus*) from Marion Island and maintain the island group (Marion Island and Prince Edward Island) in a rodent-free state. According to the project plan (Springer 2018a),[72] the objectives of the project target the restoration of ecological systems (plant, animal and soil) on Marion Island to a condition consistent with those existing prior to the introduction of mammalian pests (cats and mice). These objectives are to be achieved by: (a) The eradication of house mice, (b) Implementation of biosecurity measures designed to prevent re-introduction of mice (and other alien) species, and (c) Increased agency capability in managing island vertebrate pest populations.

The support from the GEF7 project will add considerable value to and form a crucial part of the DFFE?s role in the eradication project of the House Mouse from Marion Island. The activities proposed for the GEF project will complement the efforts of the MFM project and specifically build the capacity of DFFE to manage invasive alien species more effectively by: (a) establishing a longitudinal (pre- and post-eradication) monitoring programme based on capacity building of early career and trainee researchers, and (b) enhancing biosecurity and incursion response protocols to prevent future introduction of rodents or other non-native species to the Prince Edward Islands.

Output 3.1.1: Invasive House Mice eradicated from Marion Island

Under Output 3.1 the project will support the eradication of the House Mouse (*Mus musculus*) from Marion Island in the Prince Edward Islands archipelago, South Africa?s only remote territory, located in the Southern Ocean. The Prince Edward Islands are home to several threatened seabird species, including nearly half of the world?s Wandering Albatrosses. Twenty eight species of seabirds and shorebirds are threatened by an unlikely, but voracious predator, the House Mouse. Mouse attacks on 18 species of burrow-nesting and surface-breeding seabirds at Marion Island are pervasive and increasing; left uncontrolled, House Mice may cause the local extinction of these burrow-nesting and surface-breeding birds. Aside from the shorebirds and seabirds, the entire ecology of Marion Island has suffered severely from the negative impacts caused by the mice ? disrupting nutrient cycles and energy flows, and adversely impacting the native invertebrate and plant communities.

Research studies to support the eradication and to track the restoration process will be carried out, spanning the range of taxa present on the islands and the range of impacts that have been identified in the biotic and abiotic environments. This data will be used to build the evidence base in support of eradication and to guide management of the islands after the eradication attempt.

<u>Activity 3.1.1.1: Conduct House Mouse eradication on Marion Island (co-financed activity)</u>
This activity will be financed by the MFM project and coordinated by DFFE in partnership with BirdLife South Africa. Mice will be eradicated from Marion Island using an anti-coagulant rodenticide distributed from spreading buckets slung underneath helicopters (aerial baiting), which will be guided by Global Positioning Systems to ensure accuracy of bait coverage over the island. Two baiting sessions separated by at least two weeks will ensure that all mice not baited in the first run are baited in the second run.[73] The eradication operation will take place in the Austral winter of 2024 (approximately April to September). The chosen methodology and products to be used are based on

what has proved to be successful in many previous operations of a similar nature, and internationally agreed best practice for eradicating mice from large sub-Antarctic islands.[74]

Activity 3.1.1.2: Conduct focused, paired baseline surveys on the status of House Mouse impacts and the restoration trajectory on Marion and Prince Edward Islands

Early career and trainee researchers will be recruited to carry out research projects that contribute to building the evidence base in support of eradication and to guide management of the islands after the eradication. Three-year projects are envisaged, with researchers spending the first year on Marion Island collecting data and the following two years analysing and writing up the studies, including producing publications, popular articles and management briefs that can be used in the eradication and restoration projects.

It is imperative that the research carried out is usable by managers and produced in a form that can be incorporated into the eradication and confirmation monitoring planning. The Monitoring Coordinator (consultant) will be an experienced researcher or research manager based in a collaborating institution such as BirdLife SA, and will be tasked with ensuring that research meets the needs of managers and decision-makers and there is integration between studies on different taxa and systems on the islands. In particular, the Coordinator will lead the process of producing and feeding back research findings to government and private sector entities involved in activities at the islands.

Activity 3.1.1.3: Produce a plan for confirmation monitoring of the House Mouse on Marion Island after the eradication activity

A comprehensive plan for confirmation monitoring will be developed by the MFM project team prior to the monitoring period. The confirmation monitoring plan will ensure that monitoring is conducted according to international best practice, and should include duration, timing, methods to be used and resources required.

Activity 3.1.1.4: Carry out confirmation monitoring surveys

Confirmation monitoring surveys will be carried out by dedicated teams surveying the entire island exhaustively to determine whether House Mice are still present after the eradication attempt. As a result of the surveys described above, a decision will be made about the success or failure of the House Mouse eradication attempt and communicated to the use community.

Rodent detection dogs are able to work under the extremely challenging conditions that prevail in the sub-Antarctic. In the 2014 eradication of House Mice on South Georgia island (UK territory), a rodent detection dog team was contracted from New Zealand to carry out confirmation monitoring. This was judged to be a more cost-effective solution than developing a rodent detection dog capability de novo for use in a single eradication operation.

In addition to rodent detection dogs and experienced handlers, other techniques such as traps and attractants can be used to detect mice across this large island of almost 30 000 ha. The use of helicopters will be essential to transport survey teams and biosecurity dog teams around the island during confirmation monitoring.

Activity 3.1.1.5: Communicate the outcome of confirmation monitoring to all funding and partner organisations and the public

The success or failure of the House Mouse eradication operation will be finally communicated at the end of the project by DFFE and BirdLife SA/MFM. This is a crucial way of ?closing the loop? with funders and partners who have invested heavily in the eradication attempt and documenting learning for similar eradication attempts that will be carried out in future.

The outcome needs to be conveyed to funders, government agencies and international bodies who provided advice and support for the eradication. It is also important to inform interested groups and the public about the outcome of the project.

The success or failure of the eradication attempt will inform subsequent management options for the islands, whether a further eradication attempt will be made or other control options considered for the invasive populations on the island.

Output 3.1.2: Improved biosecurity protocols developed and implemented for the Prince Edward Islands (Marion Island and Prince Edward Island)

Output 3.1.2 focuses on improving the biosecurity system at the islands to ensure that the islands are not re-invaded by rodents in future. This will include improving existing quarantine systems, planning for early detection and rapid response and upgrading the island?s communication system for use during crucial phases of the eradication project.

Activity 3.1.2.1: Develop and implement an Incursion Response Plan for Marion and Prince Edward Islands

There is currently no emergency response or contingency plan that would provide guidance in the event of arrival of a non-native species, such as a rodent, insect or plant pest, at the islands. The formulation of an Incursion Response Plan was recommended in the Prince Edward Islands Management Plan (Department of Environmental Affairs and Tourism 2014), but has not been implemented yet. Drafting and implementing an Incursion Response Plan is primarily the responsibility of DFFE: Branch: Oceans and Coasts, but several other role players would be involved in implementation. For example, temporary DFFE staff working on the island (overwintering team members) as well as DFFE staff on the mainland.

Rapid response to incursions requires an effective watch system, efficient communication and appropriate methods and equipment to capture, identify, locate or eliminate potential invasive organisms. The plan should stipulate in detail the surveillance actions and incursion response procedures required in the event of an unplanned landing on the islands or a breach of biosecurity.[75] A variety of templates and guidelines based on international best practice in biosecurity and island management are available to inform the development and implementation of the Incursion Response Plan. The planning process must include assigning responsibilities of personnel and training. All visitors to the islands must be aware of the requirements stipulated in the Incursion Response Plan.

The Incursion Response Plan needs be in place before the baiting operation implemented by the Mouse-Free Marion Project takes place, so that the biosecurity of this extraordinary operation, in addition to routine activities at the islands, is assured.

Activity 3.1.2.2: Provide and maintain Incursion Response Kits

The Incursion Response Plan will include establishing and maintaining Incursion Response Kits for each island, containing the tools, storage containers, pesticides and protective personal equipment required to deal with invasive organisms. These kits need to be stored in an accessible facility on Marion Island and maintained in a workable condition at all times, especially during cargo offloading at the Marion Island base.

Incursion Response Kits for use by the teams located on the island, and containing the emergency equipment needed for incursion response, such as pesticide, herbicide, personal protective equipment, sample storage and recording equipment and monitoring logs must be available at all times on the islands. The kits will need to be checked and maintained to ensure they are ready for use.

Activity 3.1.2.3: Train key staff and visitors in incursion response procedures

Gender compliant training in incursion response procedures and use of the Incursion Response Kits must be provided for key staff such as overwintering team leaders and environmental conservation officers travelling to Marion Island for overwintering or take-over purposes, and responsibilities for surveillance and response measure must be included in their performance agreements. Any other relevant staff involved in island environmental management should also be included in the training programme as it is important to have widespread and general understanding of the need to keep watch and rapidly respond to novel organisms appearing on the islands. All visitors to the island should be made aware of the incursion response reporting procedures. It is much more cost-effective in the long term to respond early and completely to incursions than to delay action until populations have expanded to unmanageable levels. Training in incursion response procedures and use of the Incursion Response Kits will encompass both Marion and Prince Edward Islands, as the latter island is also occasionally visited by research teams. Training will be provided by a skilled biosecurity trainer (consultant).

Activity 3.1.2.4: Provide a reliable backup system to ensure effective communications on Marion Island

Upgrades to the communications infrastructure on Marion Island are required to facilitate the eradication operation and provide extensive, rapid communication capabilities between the research base, outlying field huts and remote sites from which the baiting operation will be run. DFFE is currently upgrading the communications infrastructure on the island but a reliable backup system is needed for key periods of the eradication. Satellite phones should be purchased or leased according to the most suitable option available at the time the phones are required. Alternative methods of satellite-based communication may be available by the time this activity is underway (e.g. Elon Musk?s Starlink system) and should also be considered based on suitability and cost-effectiveness.

The communication system to be used during the baiting operation and confirmation monitoring will be tested and rolled out by the MFM project team prior to the required period of use, so that any performance issues can be addressed in good time. The communication system should be ready for use in the field before the eradication operation takes place.

Activity 3.1.2.5: Support the development of a Biosecurity Handbook for Marion and Prince Edward Islands

A Biosecurity Handbook is being developed by DFFE to inform all visitors to the island, including staff and contractors, about the biosecurity protocols that must be followed. The Prince Edward Islands Advisory Committee intends to publish the Biosecurity Handbook to augment the Prince Edward Islands Management Plan that is already in place and regularly updated.

The Biosecurity Handbook will be a user-friendly tool for improving communication about biosecurity procedures on the islands, and will be compulsory reading for all island visitors. In addition it will form an important reference on quarantine procedures for island managers (DFFE staff) and those involved in the supply chain in any way.

Under this activity, the handbook will be published and disseminated using brochures, movie clips and other media that can be used for raising awareness of biosecurity procedures on the islands. In tandem with the publication of the Biosecurity Handbook, capacity requirements will be analysed and roles allocated formally to personnel (e.g. through performance agreements and Key Performance Indicators).

Activity 3.1.2.6: Train staff and stakeholders in Biosecurity Handbook implementation

Dedicated biosecurity training will be supplied to all visitors to the island including all relevant staff at DFFE and partner departments (e.g. Department of Public Works and Infrastructure) and private sector contractors involved in the supply or transport of provisions to the islands. The overwintering team and all other visitors to the island will be trained either during the existing team training process prior to embarkation or during the ship?s voyage. This activity will be managed by DFFE in collaboration with a consultant engaged to conduct training.

Outcome 3.2: South Africa contains the spread of high-risk invasive plant species

This outcome will focus on various aspects of biocontrol of seven selected target Invasive Alien plant Species (IAPs) in South Africa. For five of the target IAPs (*T. stans, B. decapetala, A. cordifolia, X. strumarium,* and *S. terebinthifolius*), new candidate biocontrol agents will be imported from their native ranges with the aim of evaluating (host-specificity testing), as well as mass-rearing and release of host-specific and potentially effective agents. Although two (*X. strumarium,* and *S. terebinthifolius*) of the seven IAPs will involve introduction of biocontrol agents that had already been proven to be successful in other countries/ regions, the selected agents will still be subjected to quarantine host-specificity testing to ensure the safety of indigenous and ornamental plant species. To enhance biocontrol of *T. stans* and *A. cordifolia*, the existing biocontrol agents of these species will be mass-reared, released and a post-release evaluation will be undertaken. This is aimed at increasing the dispersal rate of these agents. Finally, the project will also enhance the research capacity of South Africa to fast track the screening of potential agents involving *Cestrum* spp., *S. terebinthifolius* and *Arundo donax*.

Output 3.2.1: Biocontrol agents for priority invasive plant species developed and released

Under this output, the project will support the development and controlled release of biocontrol agents for targeted Category 1b (established, destructive invasive species that need to be actively managed) invasive plant species known to have a significant impact on native biodiversity and rural economies.

<u>Activity 3.2.1.1: Identify potential biocontrol agents from their native ranges for control of the invasive plant species</u>

Potential biocontrol agents for *T. stans, B. decapetala, A. cordifolia, X. strumarium,* and *S. terebinthifolius* will be sought in their respective native ranges and be introduced to South Africa for further host-specificity testing in quarantine. The first step will be the establishment of collaborations with foreign-based research institutions located in native ranges of the species. This is crucial for facilitating the processing of relevant collection and export permits of life material, and for fostering cooperative pre-release studies with ARC researchers. The import permits of life material from the native ranges to South African quarantine facilities will also be obtained from the DALRRD.

When all the necessary permits have been obtained, a minimum of two researchers will undertake a 2-3-week field survey in the native range of each species searching for potential agents. The native range for *T. stans, A. cordifolia, X. strumarium* and *S. terebinthifolius* covers the North, Central and South America. For *T. stans* and *A. cordifolia*, potential agents associated with reproductive organs of the plants will be targeted to complement the existing agents. Collaboration with the Fundaci?n para el Estudio de Especies Invasivas (FuEDEI) (Argentina) will be established and this will facilitate the processing of relevant permits in Argentina. Through collaboration with the Agricultural Research Services of the United States Department of Agriculture- (USDA-ARS), biocontrol agents for *S. terebinthifolius* which are either released or considered for release in USA will be collected from that country and introduced to South Africa for further screening. For *X. strumarium,* the rust fungi *P. xanthii* will be imported from Australia for further evaluation in quarantine. Through collaboration with USDA-ARS, surveys will be initiated in the USA to identify potential biocontrol agents for *X. strumarium*. Alternatively, *X. strumarium* surveys will be conducted in the North and Central American countries such as Mexico and the Caribbean. Research work undertaken on *B. decapetala* will involve surveys and search for potential agents in India and Malaysia. Collaboration with Kerala Forest Research Institute, India, will be established to facilitate native-based studies. Potential biocontrol agents brought

from a target weed?s native range will be introduced to quarantine in the country for further host specificity testing.

Activity 3.2.1.2: Collect and propagate *S. terebinthifolius* and *X. strumarium* and indigenous and ornamental plant species in the plant families *Anarcadiaceae* and *Asteracea*.
Because both *S. terebinthifolius* and *X. strumarium* will targeted for biocontrol for the first time, test plants, including indigenous and ornamental plant species in the families *Anarcadiaceae* and Asteraceae, will be collected and propagated in the nursery prior to the introduction of potential agents.

Activity 3.2.1.3: Evaluate the potential biocontrol agents for host-specificity under quarantine.
All imported potential biocontrol agents involving *T. stans, B. decapetala, A. cordifolia, X. strumarium* and *S. terebinthifolius* will be subjected to host specificity testing (screening) in quarantine. Host specificity testing, also referred to as risk assessment, is aimed at determining the safety of a potential biocontrol agent prior to release into the new region. For safety reasons, host specificity testing is conducted under strict quarantine conditions. The role of quarantine is not only to prevent an agent from escaping unintentionally but to also provide a conducive growing environment for both the agent and target plant. The series of tests conducted in quarantine will include no-choice, choice and multi-choice tests, and that each potential agent will be subjected to these tests. To determine the potential efficacy of each potential agent, assessment of its impact on plant growth will also be conducted in quarantine.

Once host-specificity test results conclude that an agent is host-specific, it could be released on condition that permission from relevant state department, DALRRD, is granted. The application for permission to release an agent will be compiled in the form of a comprehensive report with an exhaustive list of indigenous plant species belonging to the same family as that of the target weed, but also crop plants, as well as some plants in closely related families, particularly those of economic importance.

Activity 3.2.1.4: Conduct mass-rearing of the effective biocontrol agents
Upon approval of applications to release biocontrol agents of *T. stans, B. decapetala, A. cordifolia, X. strumarium* and *S. terebinthifolius*, their mass-rearing (mass production) and distribution will commence outside quarantine. Mass-rearing of agents will entail placing and confining a number of adult insects with the host plant in cages to allow oviposition and development of their life stages. Not only does a large population size of an agent increase the chances of establishment, but it also accelerates the distribution and impact on the target plant species. Mass-rearing is therefore essential for the establishment of permanent, self-sustaining field populations of biocontrol agents.

Activity 3.2.1.5: Release biocontrol agents to control the spread of priority alien invasive species
Release of new biocontrol agents of *T. stans, B. decapetala, A. cordifolia, X. strumarium* and *S. terebinthifolius* will be conducted at study (experimental) sites which will be randomly selected within the distribution range of the IAP. The agents will be monitored to determine their establishment and spread from the study sites. Based on their performance at these sites, further release and distribution of the agent will be done throughout the distribution range of the IAP.

Activity 3.2.1.6: Develop guidelines for release and post-release of the biocontrol agents and associated biotypes in South Africa
A guideline detailing all the necessary steps followed during mass-rearing and release of each biocontrol agent will be compiled by the relevant experts. Based on the information gathered at release study sites, the optimum number of agents released per site and the release techniques will be developed and described in the guidelines. The guidelines should explain the suitable habitats, climatic conditions and host conditions necessary for successful establishment of the agent. Some stakeholders, including land owners and conservancies may be keen to participate in the mass-rearing and release of biocontrol, and hence the guidelines will be shared with them through Plant Health and Protection unit of the Agricultural Research Council (ARC-PHP) newsletter.

Output 3.2.2: Existing biocontrol agents for T. stans and A. cordifolia mass-reared and released

Activity 3.2.2.1: Conduct mass propagation of host plants for mass-rearing of biocontrol agents of *T. stans* and *A. cordifolia*
In preparation for mass rearing of agents, *T. stans* and *A. cordifolia* will be propagated and maintained in the nursery. Seeds of *T. stans* will be collected from different *Tecoma* trees in the field , and will be sown in germination trays, filled with standard soil mixture of one part sand, one part Styrofoam and one part compost (1:1:1). The germination trays will be kept at 50% shade and will be irrigated with overhead sprinklers. *Anredera cordifolia* will be propagated from stems. When *T. stans* seedlings are a month-old, and *A. cordifolia* cuttings have rooted, each seedling or cutting will be transplanted into a 10-L pot filled with the standard soil mixture. As the plants develop, they will be treated with fertilizer (N:P:K).

Activity 3.2.2.2: Conduct mass-rearing of biocontrol agents of *T. stans* and *A. cordifolia*
The existing biocontrol agents of *T. stans* (leaf beetle *Mada polluta*) and *A. cordifolia* (leaf beetle *Plectonycha correntina*) are slow spreaders and are largely confined to their original release sites. Mass-rearing and redistribution of these agents will improve biocontrol of the two IAPs. In addition to mass-rearing techniques, field cages will be erected at release sites to confine the insects with their host, thus allowing the build-up of agent population prior to their spread. Establishment success and spread of biocontrol agents is related to the number of propagules (number of insects) released and the number of releases made.

Activity 3.2.2.3: Conduct field impact assessment of biocontrol agents
Assessment of field impact of existing *T. scans* and *A. cordifolia* biocontrol agents will be conducted at release sites by measuring their spread and effect on plant growth (i.e. vegetative and reproductive output) and plant population (e.g. plant density or aerial cover).

Output 3.2.3 Capacity of researchers in the development of biocontrol agents enhanced

As part of the implementation modalities for this output, senior researchers from the Agricultural Research Council?s (ARC) Plant Health and Protection (PHP) Unit will mentor three post-graduate students who will work on aspects of foreign exploration and biocontrol agent screening (host-specificity testing) in quarantine. The specific activity described below will lead to the achievement of this output.

Activity 3.2.3.1: Train 3 researchers (including females) in the use of bio-control agents in the management of IAS
Through financial support from NRM programme of DFFE and Red Meat Research and Development South Africa (RMRD SA), it is anticipated that a number of potential biocontrol agents for *Cestrum* spp. and *A. donax* will be identified and introduced into quarantine for further host-specificity testing. This will necessitate an increase in research capacity in the form of researchers to fast-track the pre-release evaluations of these potential agents in quarantine. Therefore, GEF funding will be utilized for training of 3 (preferably female) researchers through payment of their tuition, stipend and travelling to conferences. The trainee researchers will conduct pre-release evaluations of biocontrol agents of the three IAPs (*Cestrum* spp., *A. donax* and *S. terebinthifolius*) as part of their post-graduate projects.

1.4 Alignment with GEF focal area and/or Impact Program strategies

The project is consistent with the eligibility criteria and priorities of the GEF Trust Fund (GEF-TF) as it will support the Government of South Africa to strengthen the management of invasive alien species, and therefore enhance sustainable biodiversity conservation and livelihoods. The project will, wherever practicable, direct its efforts to the management and control of those invasive species that also impact on food security, human health and the livelihoods of rural communities (notably in the fishing, forestry and agriculture sectors), particularly in the areas where the poorest people may be dependent on biodiversity-based products for food, fuel and construction material. In addition, the project will facilitate pilot projects targeting local communities for eradication of invasive species through the use of the innovative Adopt-a-River approach to encourage citizens to learn about the impact of invasive alien species on water resources and livelihoods. Lessons from this project will be used to replicate the project activities in other areas of South Africa.

The project addresses the GEF-7 BD Strategy ?to maintain globally significant biodiversity in landscapes and seascapes. It will directly contribute to meeting Objective 2 of the GEF-7 BD Strategy ?Address direct drivers to protect habitats and species? through Programme 4 ?Prevent and control invasive species?. The project targets a sub-selection of high priority alien invasive species considered to have a severe detrimental impact on South Africa?s globally significant biodiversity, and that also constitute a significant risk to rural livelihoods. The project will also contribute to the 2030 Agenda for Sustainable Development by protecting, restoring and promoting sustainable use of terrestrial ecosystems in the Republic of South Africa.

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

The biodiversity of South Africa is of global significance at ecosystem, species and genetic levels. At the same time, the development strategies of the country rely heavily on the sustainable conservation and utilization of biodiversity, particularly in the agricultural, forestry and tourism sectors. This project therefore aims at protecting this diversity from IAS for local, national and global benefit in the areas of food security and sustainable livelihoods.

The overall baseline conditions against which the project was designed are that: (i) there is increasing rate at which alien taxa are being introduced; (ii) the detection and surveillance skills, expertise and knowledge of biosecurity is very limited; (iii) inter-agency coordination for biosecurity is currently fragmented/not clear across several government departments and their agencies; (iv) of the 8 maritime ports, 10 airports and 54 land border posts in South Africa, only OR Tambo International Airport has adequate biosecurity measures in place; (v) there exists key knowledge gaps in, and low levels of awareness and involvement of the broader society (especially rural communities who are vulnerable to the threats posed by invasive species) in, pre-and post-border biosecurity; (vi) existing biosecurity information is dispersed in several different databases (created for different purposes and varying in completeness and information content) which are not easily accessible; (vii) as a result, only 24.3% of the 556 listed invasive alien taxa in South Africa are subjected to regular management. 6.4% of IAS

populations that have either been eradicated or brought under biological control continue to grow, indicating that interventions are ineffective. Only 0.36% of invaded land is subjected to active management. Mechanical and chemical control measures have largely failed to check plant invasions.

This project goes beyond the protection of one species or one area and seeks to invest in a coordinated suite of activities to address the existing baseline situation in the country, with a focus on capacity strengthening for management of invasive alien species in South Africa.

Component 1: Strengthened IAS detection and surveillance capacities at key national ports of entry

Component 1 seeks to improve the IAS detection and surveillance capacities at key national ports of entry, with pilots at OR Tambo International Airport, Durban and Beit Bridge. This component therefore seeks to enhance 1) the processing of biosecurity risk information, 2) coordination of IAS surveillance at key ports of entry, 3) establish a biosecurity risk management system based on a national biosecurity risk policy and involving high-pressure container cleaning and washing, automated inspections and implementing a cost recovery module. The incremental benefits are in several impact outputs, namely: 1) An inter-agency ?Biosecurity Risk Assessment/ Targeting Centre (BRA/TC) is established and operational. This will ensure that there is enhanced capacity at key national ports of entry to conduct integrated and coordinated surveillance of high-risk IAS; 2) A sea container and break-bulk cargo biosecurity risk management system is piloted. The system will be piloted at Durban and Beit Bridge ports, making them able to mitigate the unintentional risks of introductions of the priority invasive species from container ships and break bulk cargo; 3) A small team of biosecurity detection dogs and their handlers are operational at key ports of entry. This will ensure that ORTIA, Durban and Beit Bridge ports of entry are utilizing biosecurity detection dogs for detection of high-risk invasive species; and 4) New and emerging invasive species monitored and controlled. The additional increment from this output is that South Africa will then be able to actively controlling the new and emerging invasive species through five-year species-specific management plans.

Component 2: Enhanced biosecurity communications and information flows

This component aims to address the low level of awareness of several stakeholders on their role in the biosecurity and the problem of biological invasions in the country. The aim is to involve stakeholders such as nursery owners, Green Industries Council, Landscapers Institute, fruit and nuts import and

export companies, forestry and fishing industry, farmers? urban and rural communities, environment clubs, conservancies and pet trade industry in active awareness and participation in biosecurity. This component will therefore: 1) develop and implement a ?biosecurity awareness and involvement campaign? as a leverage point through which to engage the community about the importance of pre- and post-border biosecurity and influence public perception about biosecurity. This will ensure that key stakeholders are aware and supporting state biosecurity agencies in surveillance, detection, reporting and control of high risk IAS; 2) establish and make accessible a centralized Biosecurity Information and Risk Analysis System to all responsible public biosecurity institutions. Such a system will influence public perception about biosecurity; 3) involve local communities in the control of invasive alien species at key sites. This will be done in the Tsitsa and Tolwane river systems in the Eastern Cape and Gauteng provinces respectively, which are composed of between 10 ? 60% invasive alien species. The additional increment is that these river systems will be clear of invasive alien species.

Component 3: Improved effectiveness of control measures for high risk IAS

This component is focused on supporting efforts to improve the effectiveness of control measures that address individual species, with an emphasis on the eradication and biological control of targeted invasive alien species considered a high risk to South Africa?s global biodiversity values and food security. This component therefore seeks to: 1) increase national capacity to manage invasive rodents on Marion Islands, and 2) control the spread of high-risk invasive plant species. The additional increment is that 1) the spread of the House Mouse on Marion Island will be eradicated, 2) relevant agencies will have adequate capacity to manage and maintain a rodent-free status on Marion and Prince Edward Islands, 3) the spread of high risk invasive plant species (incl. *Tecoma, Biancea, Anredera, Xanthium* and *Schinus*) will be controlled, and 4) local scientists will have more capacity to develop and implement biocontrol measures against IAS.

1.6 Global environmental benefits (GEFTF) and/or adaptation benefits (LDCF/SCCF)

By mitigating the impacts of IAS, the project will help to sustain the populations of critically endangered, threatened and endemic species in at least 12 listed Critically Endangered Ecosystems, 6 Endangered Ecosystems in South Africa and in one global biodiversity hotspot (Maputaland-Pondoland-Albany hotspot). It will also contribute to improving the conservation status of a number of threatened seabird species in the Southern Ocean (Sooty Albatross, Light-mantled Albatross, Grey-headed Albatross, Grey Petrel, White chinned Petrel and Kerguelen Tern), including nearly half of the world's population of Wandering Albatrosses. The project will also improve the management of Prince

Edward Islands Special Nature Reserve (33,400 ha) by supporting the eradication of the House Mouse *(Mus musculus)* from Marion Island and implementing biosecurity protocols to prevent future introductions of the House Mouse to Marion Island and Prince Edward Island.

The project will also improve the management of Prince Edward Islands Special Nature Reserve (33,400 ha) by supporting the eradication of the House Mouse *(Mus musculus)* from Marion Island and implementing biosecurity protocols to prevent future introductions of the House Mouse to Marion Island and Prince Edward Island. The project will seek to reduce the impact of eight Category 1b plant invasive species over a total area of at least 300,000 ha.

1.7 Innovativeness, sustainability and potential for scaling up

1.7.1 Innovativeness

The project will promote and influence policy on the control and management of IAS at subnational and national level. The project will strengthen capacity for management of invasive alien species in South Africa to enhance sustainable biodiversity conservation and livelihoods improvement. To incentivize awareness and promote adoption and up scaling, the project will promote community involvement in IAS control and management through the Adopt-a-River approach as a means of livelihood restoration. The project will address threats generated by IAS on the environment and the livelihoods of communities.

1.7.2 Sustainability

The Project has been designed to remove the identified barriers and improve the capacity of decision makers, users and beneficiaries to manage invasive alien species. In addition, the project will assist Government and key stakeholders in the development of appropriate management systems and tools on invasive alien species that will ultimately lead to improved conservation of South Africa?s biodiversity. The capacitated government institutions, communities and stakeholders will be able to give continuity to the activities undertaken by the Project. Measures will be put in place to harmonize South Africa?s implementation of the IAS project and other existing initiatives. The project will also work with the private sector, districts and lower local governments to establish a private-public partnership on control and management of IAS. Specifically, the following factors that encourage social, environmental, economic and capacity development sustainability dimensions will be addressed by the project:

a) *Environmental sustainability:* By mitigating the impacts of IAS, the project will help to: i) reduce the loss of this globally important biodiversity in South Africa; ii) sustain the populations of critically endangered, threatened and endemic species in at least 12 listed Critically Endangered Ecosystems, 6 Endangered Ecosystems in South Africa and in one global biodiversity hotspot (Maputaland-Pondoland-Albany hotspot); iii) protect the resilience of natural ecosystems to the impacts of climate change; iv) contribute to natural disaster risk reduction; v) strengthen the biosecurity along high risk introduction pathways and specifically target activities that result in the protection of globally significant terrestrial, aquatic, coastal and marine biodiversity (species, habitats and ecosystems) from the impacts of biological invasions, and vi) improve the conservation status of a number of threatened seabird species in the Southern Ocean (Sooty Albatross, Light-mantled Albatross, Grey-headed

Albatross, Grey Petrel, White chinned Petrel and Kerguelen Tern), including nearly half of the world's population of Wandering Albatrosses. The project will promote sustainability by sharing lessons learned and good practices on sustainable natural resources management practices which enables adoption, replication and scaling up and out. Local communities and farmers will also be trained in the management of IAS using the Adopt-a-River approach as a sustainability, adoption and replication strategy. The project will strengthen and operationalize the national policy, legal and regulatory framework on Invasive Alien Species in South Africa, build capacity for their implementation through a range of training, awareness-building and supportive information management and guidance outputs, and demonstrate best practices through community involvement, such as the Adopt-a-River approach. This will make it possible to develop incentives for conservation of biological diversity and sustainable use of its components, which will contribute to efforts community to halt the loss of biodiversity and avoid incursions by invasive species.

The project will support the control and management of invasive alien species in natural habitats for biodiversity conservation, ecosystem services and carbon stocks thus enabling South Africa to contribute to international action and national actions towards reducing GHG emissions for better global climate. In this regard, the project target is to: (a) Eradicate IAS from 159,022 ha of landscape using the Adopt-a-River approach through the following activities: (i). Selective removal of noxious IAS that cover 10% of an area covering 15,902 ha. (ii). Proactive restocking of indigenous vegetation in an area covering 47,707 ha. (iii). Leaving an area of wooded grassland covering 95,413 ha to remain in the same perennial state under natural regeneration. (b). Rear and disperse biological control agents against IAS at 13 sites (see map in Annex E of the CEO ER) covering an area of 140,978 ha. The vegetation will be left natural under the dynamic control of the bioagents for the removal of IAS over the implementation as well as capitalization phase of the project. These activities will result in the improved control of IAS which will benefit biodiversity and also mitigate against the emission of GHGs with a target of at least 8,703,692 metric tons of carbon dioxide equivalent (tCO2e) avoided/sequestered so as to reduce the impacts of climate change through avoidance/sequestration.

b) *Financial and economic sustainability:* The project will direct its efforts to the management and control of invasive species that also impact on food security, human health and the livelihoods of rural communities (notably in the fishing, forestry and agriculture sectors), particularly in the areas where the poorest people may be dependent on biodiversity-based products for food, fuel and construction materials. The activities promoted by the project will contribute to the financial and economic sustainability of the national and local/municipal governments as well as the rural beneficiaries by reducing the cost of persistent management of IAS and improving local community livelihoods. Enhanced capacity in the management of IAS in South Africa will improve long-term financial sustainability through training, upfront investment and risk management. The project will promote inter-institutional collaboration, networking and coordination that will enable the increase of resources channelled through monetary and non-monetary mechanisms to the control and management of IAS in South Africa. These initiatives are implementable and will ensure adoption, replication and scaling up and out.

c) *Social sustainability*: Project social sustainability will be achieved through: (i) Capacity development; (ii) Gender equality and gender mainstreaming at institutional and community levels; (iii) Participatory approaches; and (iv) Ownership; by the project:

i). Facilitating pilot activities targeting local communities for eradication of invasive species through the use of the innovative Adopt-a-River approach to encourage citizens to learn about the impact of invasive alien species on water resources and livelihoods.

ii). Applying the gender sensitive approach in all the three project components. In this regard, the project conducted a gender analysis during its design and will implement gender mainstreaming and support opportunities to include women in the project activities? implementation. Furthermore a gender sensitive approach towards capacity development and trainings will be incorporated as a fundamental principle.

iii). Strengthening the governance and technical capabilities of the national and sub-national government institutions, private sector and local communities so as to maximize the institutionalism of multiple public and private sector stakeholders in the control and management of

IAS. Lessons learned will also contribute to capacity development sustainability and scaling up and out.

iv). Improving the ?ow of information between environmental managers in local and provincial government, researchers and NGOs, and contribute to networking and building and maintaining working relationships between individuals and institutions involved in invasive species control. This will be done through public engagement, media relations, social media, and the nature and timing of publicity in projects supported by the working groups.

1.7.3 Replication

The design of the project and choice of project sites and implementing partners provides good opportunity for replication, elsewhere in South Africa. Although each project site has its own particular challenges, the three broad categories of barriers to effective IAS management identified and analysed during the PIF and project development stage are likely to pertain in other places in South Africa. The replication strategy of the project comprises three components; dissemination of project outputs; involvement of personnel from relevant and pertinent institutions in project activities; promotion of replication through related community initiatives, such as the Adopt-a-River approach. Dissemination activities, in the context of replication will target other local governments/municipalities and agencies/institutions in South Africa and will be the responsibility of DFFE. Dissemination will also target private sector, civil society and non-government organisations. The implementing partner institutions will involve personnel from other stakeholder organisations, where appropriate. This will include activities such as workshops, pilot site control and restoration activities, biological and socio-economic surveys. In addition, appropriate persons from other interested institutions will be invited to visit the focus project sites on study tours to learn about different aspects of the project activities. The DFFE will promote the uptake and replication of project experiences, lessons learned and outputs through links to related initiatives and programmes. This project therefore presents opportunities for institutional learning and places South Africa in a very strong position to conduct these operations in future, thus strengthening the ability of environmental agencies such as DFFE to implement environmental legislation effectively.

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employment models; and conflicts over species that have commercial or other value, but also cause significant environmental damage

[19]Although the data coverage is poor, so there is a low level of confidence in these estimates.

[20]The unregulated trade in non-native ornamental plants is a major contributor to the local spread of pests in South Africa

[21]In some cases biological control agents do not disperse quickly or it takes time for populations to build up. In order to expedite control, agents are mass-reared. Mass-rearing involves the establishment of a breeding facility, and a programme of targeted distribution of agents to field-sites.

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[62]Key message areas for the biosecurity awareness campaign will include: (i) the benefits of biosecurity; (ii) the importance (in terms of market access and maintaining biodiversity) of keeping pests, weeds and diseases out of the country; and (iii) the consequences of pest, weed and disease outbreaks for the country?s economy, food security, sustainability, environment, biodiversity and lifestyle.

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[65] https://www.gbif.org/

[66] A command code that allows for automated integration of information from different sources

[67] Metadata describes how (and by who) datasets were created, content, quality, condition and characteristics of a dataset, as well as what the intended use for the dataset. Any legal or technical constrains or limitations are also indicated.

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1b. Project Map and Coordinates

Please provide geo-referenced information and map where the project interventions will take place.

The project addresses IAS Management at national and municipal/district sites with a specific focus on:

a) Improving the operational management of high-risk introduction pathways for priority alien invasive species at the following port of entries:

i). OR International Airport (26? 08? 00? S, 028? 15? 00? E)

ii). Beitbridge (22? 13? 51.6?? S, 29? 59? 13.2?? E)

iii). Durban Habour (29? 52? 24? S, 31? 01? 28? E)

b) Increasing the capacity to secure and manage a rodent-free status on Marion Island (46? 53? 19? S, 37? 44? 08? E), one of the two Prince Edward Islands in the southern Indian Ocean, about 1190 miles (1920 km) southeast of Cape Town.

c) Controlling Invasive Alien Species at key sites with the involvement of rural communities using the Adopt-a-River approach at two river systems:

i). Tsitsa river of the Uzimvumbu catchment in the Eastern Cape at the following sites: Mpetsheni 31? 5' 17" S, 28? 40' 8" E; Sibomvaneni 31? 5' 1" S, 28? 37' 51" E; PG Bison Plantations 31? 9' 35" S, 28? 12' 31" E and Nontlangatshe 30? 45' 49" S, 28? 3' 23" E), and

ii). Tolwane river catchment (25? 28' 53" S, 28? 1' 56" E) in Winterveldt in Gauteng province.

d) Containing the spread of high-risk invasive plant species at thirteen sites across the provinces of:

i). Gauteng (Gerotek: 25? 45' 40? S; 28? 1' 27? E),

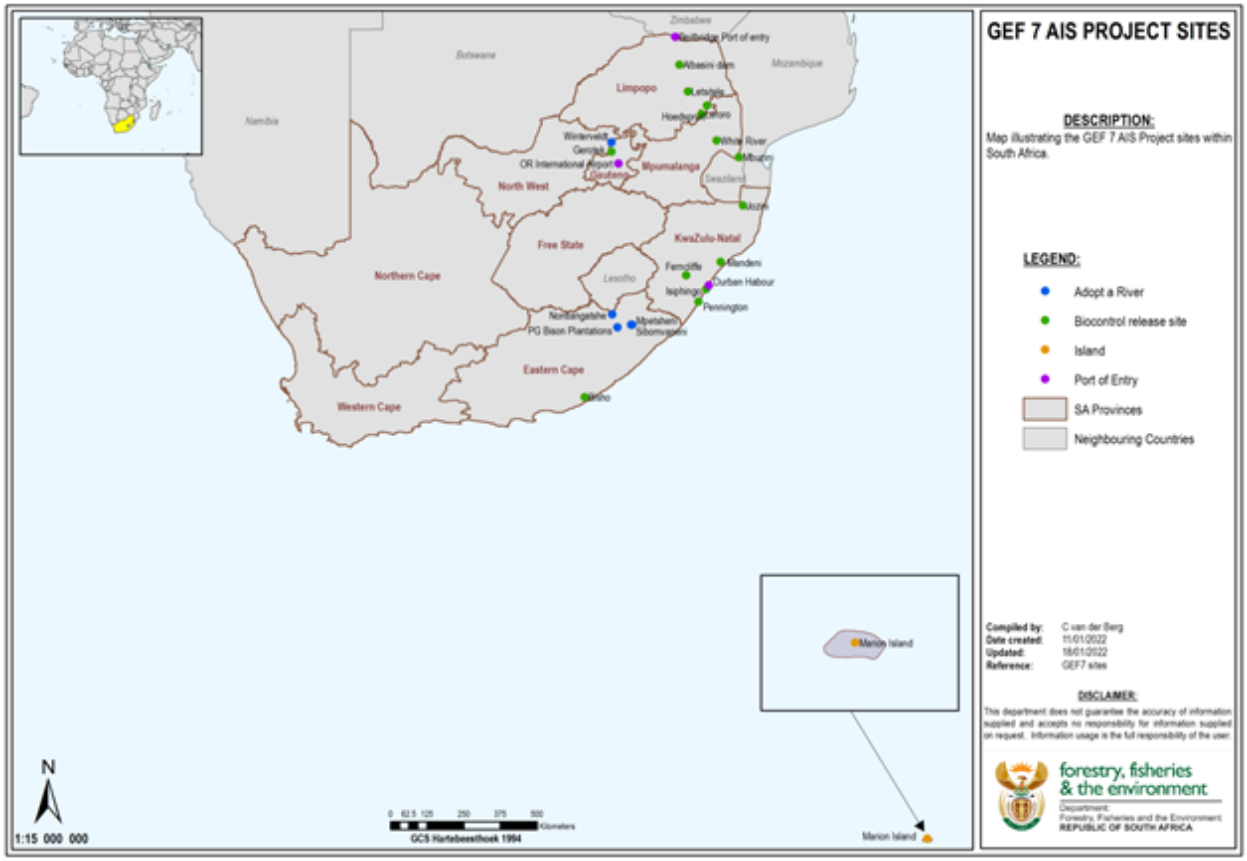
ii). Limpopo (Letsitele: 23? 54' 32? S, 30?22'34.1? E; Hoedspruit: 24? 21' 0" S, 30? 58' 0? E; Leroro: 24? 36? 33? S, 30? 47? 19? E; Albasini dam: 23? 05? 16.5? S, 30? 06? 45.8? E),

iii). Mpumalanga (Mbuzini: 25? 55' 48" S, 31? 57' 0" E; White River: 25? 25? 21? S; 31? 15? 54? E),

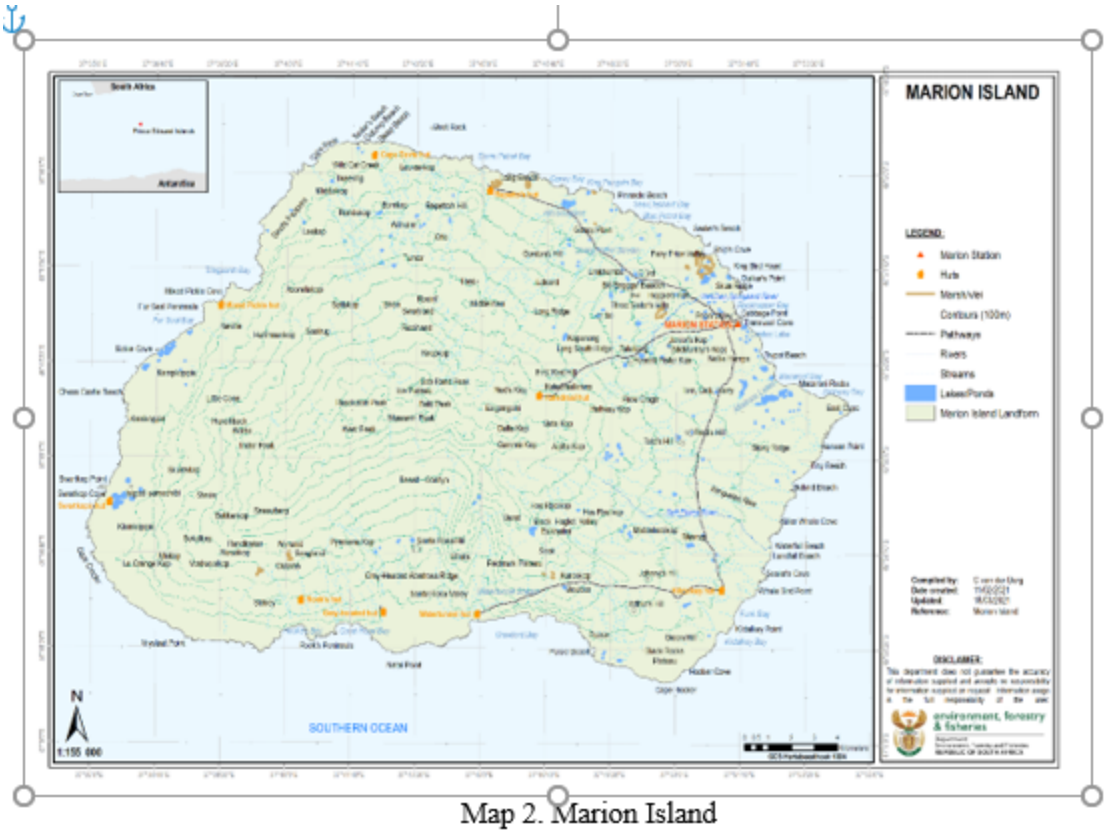
iv). KwaZulu Natal (Mandeni, 29? 9' 8? S, 31? 23' 15.9? E; Jozini: 27? 15' 7" S, 32? 23' 23" E; Pennington: 30? 22? 41? S, 30? 42? 1? E; Ferncliffe: 29? 33? 33.7? S, 30? 19? 31.4? E; Isiphingo: 29? 59? 16.9?? S, 30? 56? 15.87?? E), and

v). Eastern Cape (Near Bisho: 33? 30? 83?? S; 27? 20? 89?? E).

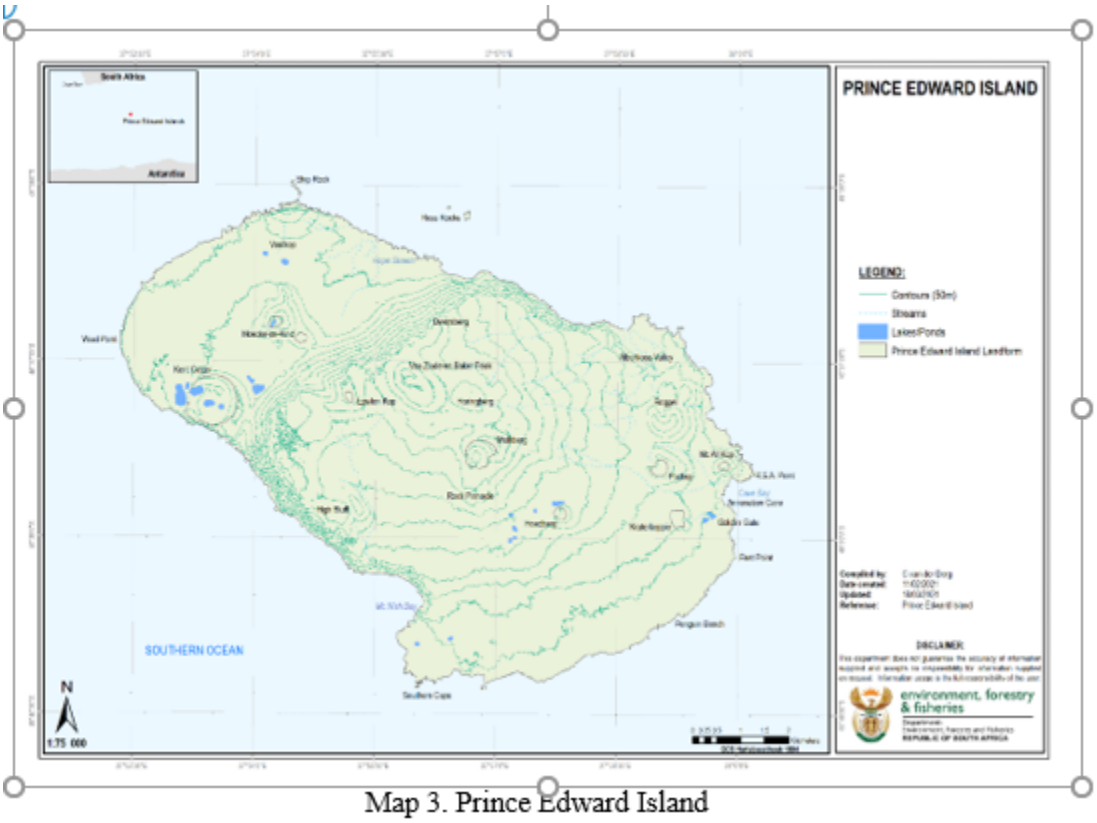
A synoptic map of the locations of the above mentioned project sites is presented as Map 1 below.



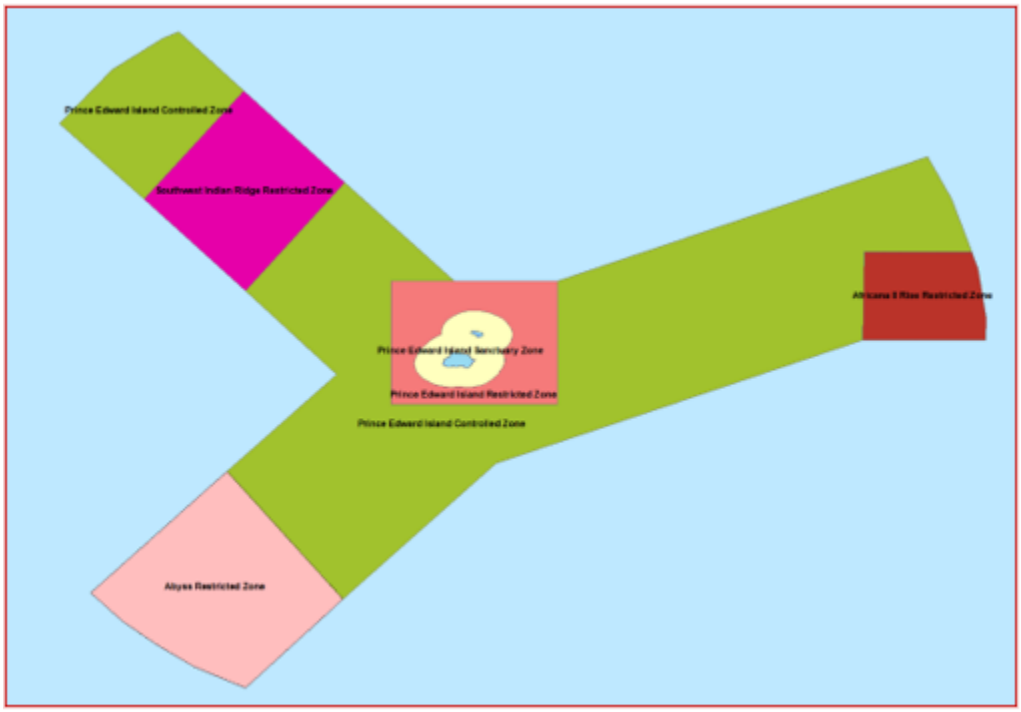
Map 1. Location of project sites across South Africa



Map 2. Marion Island



Map 3. Prince Edward Island



Map 4. Prince Edward Islands Marine Protected Area

1c. Child Project?

If this is a child project under a program, describe how the components contribute to the overall program impact.

N/A

2. Stakeholders

Select the stakeholders that have participated in consultations during the project identification phase:

Civil Society Organizations Yes

Indigenous Peoples and Local Communities Yes

Private Sector Entities Yes

If none of the above, please explain why:

Priority Stakeholders with a direct interest or role in the project

Stakeholder /Institution	Mandate	Role in the Project
1 NATIONAL GOVERNMENT		
Department of Forestry, Fisheries and the Environment	DFFE is mandated to give effect to the right of citizens to an environment that is not harmful to their health or wellbeing, and to have the environment protected for the benefit of present and future generations. To this end, the department provides leadership in environmental management, conservation and protection towards sustainability for the benefit of South Africans and the global community? (https://www.environment.gov.za/aboutus/department; 15 June 2021). DFFE is the Management Authority for the Prince Edward Islands Special Nature Reserve under NEM:PAA (Act no. 57 of 2003) and has constituted the Prince Edward Islands Advisory Committee (see below).	? Project oversight (i.e., establishing and maintaining agreements with implementing partners and relevant institutions; monitoring and evaluation; reporting on project progress to the GEF and other relevant institutions; facilitate conflict transformation where it arises). ? Maintain units dedicated to surveillance for alien species at ports of entry. ? Processing relevant import permits (overall import of alien taxa). ? DFFE will be the co-lead agency for the eradication of house mice (*Mus musculus*) on Marion Island with BirdLife SA, partnering with the MFM Non-Profit to conduct the eradication. DFFE Carries overall responsibility for the project within government ? Regulates and monitors cross-border movement of tourists within the Trans-Frontier Conservation Areas (TFCAs); The protection of indigenous plants and animals is the responsibility of the South African National Parks

Stakeholder /Institution	Mandate	Role in the Project
Department of Water and Sanitation	To ensure that the country?s water resources are protected, managed, used, developed, conserved and controlled by regulating and supporting the delivery of effective water supply and sanitation.	? Establishing and maintaining engagements with local communities at sites targeted for Adopt-A-River projects. ? Facilitate the implementation of Adopt-A-River projects at selected sites. ? Assist with the monitoring and evaluation related to Adopt-A-River projects.
Department of Public Works and Infrastructure (DPWI)	The Department?s mandate is to be the custodian and manager of all national government?s fixed assets, for which other legislation does not make another department or institution responsible. This includes the determination of accommodation requirements, rendering expert built environment services to client departments, the acquisition, maintenance and disposal of such assets? (http://www.publicworks.gov.za/mandate.html; 15 June 2021). Also manages the provision and maintenance of accommodation (operational and residential) and required infrastructure in order to support the border control operations.	? DPWI is responsible for production and maintenance of infrastructure on Marion Island; it may be directly involved in project implementation by: removing the old base buildings and built footprint prior to the eradication operation taking place, installing or upgrading communication infrastructure on the island for the purposes of operational communication or advising on baiting strategies within the research base. ? DPWI is a key biosecurity partner as it regularly transports cargo to the island for maintenance and construction and is active across the island including at the field huts.
Transnet National Port Authority (TNPA)	Main function is to own, manage, control and administer Ports to ensure their efficient and economic functioning; Transnet National Ports Authority (TNPA) was established through the National Ports Act, No 12 of 2005 (the Ports Act) to be a landlord port responsible for the safe, efficient, effective and economic functioning of the national ports system which it manages, controls and administers on behalf of the State.	? Carry out inspections at points of entry in collaboration with DFFE, DALRRD, and South African Revenue Services.

Stakeholder /Institution	Mandate	Role in the Project
National Ports Regulator	The main functions of the Ports Regulator, as provisioned under the National Ports Act, 2005 are to: ? Exercise economic regulation of the ports system in line with government?s strategic objectives ? Promote equity of access to ports and to facilities and services provided in ports ? Monitor the activities of the National Ports Authority to ensure that it performs its functions in accordance with this Act Hear complaints and appeals under the Ports Act	? Carry out inspections at points of entry in collaboration with DFFE, DALRRD, and South African Revenue Services.
National Border Management Coordinating Committee (NBMCC)	National structure for co-ordination of border management functions at ports of entry and borderline. Coordination of operations, risks and intelligence	? Coordination of operations, risks and intelligence
South African Revenue Service (SARS)	Customs controls the movement of goods across borders and collects import, excise and related duties; The mandate of SARS is to collect all revenues due, to ensure optimal compliance with Tax, Customs and Excise legislation and to provide a customs and excise service that will facilitate legitimate trade as well as protect our economy and society. SARS was established in terms of the South African Revenue Service Act, 1997 (Act No. 34 of 1997) as an organ of state within the public administration, but as an institution outside the public service. It is listed as a National Public Entity in schedule 3A of the Public Finance Management Act, 1999, (PFMA). In terms of the SARS Act, 1997, the Commissioner for SARS is the Chief Executive Officer and Accounting Authority of SARS (SARS, Annual Report 2018/19, 2019).	? BRA/TC would require electronic declaration by traders similar to SARS. This implies some duplication if not done through a single trade window, and hence impact ease of doing business. ITAC may block or expedite BRA/TC

Stakeholder /Institution	Mandate	Role in the Project
Border Management Authority (BMA)	The Border Management Authority Act 2 of 2020 mandates BMA to: ? to provide for the establishment, organisation, regulation, functions and control of the Border Management Authority; ? to provide for the appointment, terms of office, conditions of service and functions of the Commissioner and Deputy Commissioners; ? to provide for the appointment and terms and conditions of employment of officials; to provide for the duties, functions and powers of officers; ? to provide for the establishment of an Inter-Ministerial Consultative Committee, Border Technical Committee and advisory committees; ? to provide for delegations; ? to provide for the review or appeal of decisions of officers; ? to provide for certain offences and penalties; to provide for annual reporting; ? to provide for the Minister to make regulations with regard to certain matters; and ? to provide for matters connected therewith.	? Coordination of operations, risks and intelligence
Phakisa, Initiative 5	This initiative was designed to fast track the implementation of solutions on critical development issues. This is a unique initiative to address issues highlighted in the National Development Plan (NDP) 2030 such as poverty, unemployment and inequality. This includes addressing Alien Invasive Species (AIS) and drafting regulations	? Coordination of operations, risks and intelligence
2 PROVINCIAL AND LOCAL GOVERNMENT		

Stakeholder /Institution	Mandate	Role in the Project
Gauteng Department of Agriculture and Rural Development	To economically transform agri-food value chains, and ensure sustainable development for healthy, food secure, integrated, smart and developed urban and rural communities in Gauteng.	? Pilot demonstration sites for the Adopt a River activities in Winterveld will be located in this province. ? Carry out early detection and rapid response activities related to biological invasions in protected areas. ? Set-up, implement, and/or maintain biosecurity measures in protected areas. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.
Eastern Cape Agriculture, Land Reform and Rural Development	Integrated rural development and sustainable agriculture and food security.	? Pilot demonstration sites for the Adopt-a-River activities will be located in Elundini District in this province. ? Carry out early detection and rapid response activities related to biological invasions in protected areas. ? Set-up, implement, and/or maintain biosecurity measures in protected areas. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.
3 ENVIRONMENTAL AND DEVELOPMENTAL NPOs, NGOs AND CSOs		

Stakeholder /Institution	Mandate	Role in the Project
Birdlife South Africa	To conserve birds, their habitats and biodiversity through scientifically based programmes, through supporting the sustainable and equitable use of natural resources and by encouraging people to enjoy and value nature.	? Co-lead agent for the MFM project (Marion Island House Mouse eradication) with DFFE. Participant in the MFM Non-Profit Company. Plays a key advisory role in the project, in support of the management and operational staff employed by the MFM Non-Profit Company (see below). ? Contribute citizen sourced data on new invasions. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.
Tsitsa Project - incorporating Rhodes University, Lima Rural Development Foundation, University of Fort Hare (UFH) and University of the Free State (UFS), and DFFE, as well as multiple local communities in the Eastern Cape.	The Tsitsa Project is a multi-stakeholder initiative centred on a partnership between the Department Forestry, Fisheries and Environment (DFFE), Rhodes University (RU), LIMA Rural Development Foundation (LIMA), University of Fort Hare (UFH) and University of the Free State (UFS). The project works with a wide range of other stakeholders including local catchment residents, traditional authorities, implementers of restoration activities, municipalities, and government departments. The Tsitsa Project has grown considerably and aims at developing and managing both land and water by using sustainable development principles. Sustainable development involves improving the environmental, economic, and the social conditions of the people who live in the Tsitsa catchment.	? Collaboration with the Tsitsa Project can enhance the sustainability of the proposed interventions of both projects. The proposed project will complement the Tsitsa Project restoration activities through the addition of capacity development for IAS control, monitoring, as well as other skills that may contribute to self-development or entrepreneurship opportunities.
The Nature Conservancy	To conserve the lands and waters on which all life depends	? Contribute citizen sourced data on new invasions. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.
Conservation South Africa	To promote and support conservation, restoration, and sustainable land use in South Africa?s biodiversity hotspots.	? Contribute citizen sourced data on new invasions. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.

Stakeholder /Institution	Mandate	Role in the Project
Mouse-Free Marion (MFM) Non-Profit Company	Formally established in March 2021 ?as a single-purpose vehicle to implement the Mouse-Free Marion project? (Dr Anton Wolfaardt, Project Manager, Monthly Progress Report ? March 2021).	? Primarily responsible for the implementation of the Marion Island House Mouse eradication project including planning, funding, baiting operation, pre- and post-eradication monitoring. Overseen by DFFE and BirdLife SA and partnering with DFFE to conduct the House Mouse eradication.
4 LOCAL STAKEHOLDERS INCLUDING ADMINISTRATIVE AND TRADITIONAL AUTHORITIES, LOCAL COMMUNITIES, LANDOWNERS, CBOs,		
Winterveld community and traditional council in Tshwane District, Gauteng	Sustainable management and use of natural resources including control of IAS within community	? Collaboration and support for IAS control in target areas targeted in the GEF project to generate a range of financial and non-financial benefits for the communities. ? The eradication of certain IAS species may influence the availability of species used by rural households and subsistence farmers to meet a range of domestic needs. There may be antagonism to IAS control as they perceive it being in a threat to access to these resources in future if this issue is not addressed through transparent awareness raising and capacity development.

Stakeholder /Institution	Mandate	Role in the Project
Rural communities and traditional councils in Elundini Municipality in Joe Gqabi District, Eastern Cape	Sustainable management and use of natural resources including control of IAS within community	? Collaboration and support for IAS control in target areas targeted in the GEF project to generate a range of financial and non-financial benefits for the communities. ? The eradication of certain IAS species may influence the availability of species used by rural households and subsistence farmers to meet a range of domestic needs. There may be antagonism to IAS control as they perceive it being in a threat to access to these resources in future if this issue is not addressed through transparent awareness raising and capacity development
Local CBOs involved in Invasive Alien Plant clearing teams (for example funded by NRM) across the 9 provinces in South Africa	Local CBOs create employment for unskilled labour to control IAS (mainly using mechanical and chemical control measures). Funding for these CBOs is typically provided by government programmes (for example DFFE NRM Programme or EPWP) or through private sector or donor funding.	? The potential that these CBOs could see the project interventions as competition or a risk to their activities and incomes of the clearing teams. This is not true but if not addressed there may be antagonism to biocontrol as they perceive it being in competition with their operation and therefore a threat to their earnings. This issue needs to be addressed through transparent awareness raising and capacity development
Rural communities and households across areas to be targeted with biocontrol programmes	Use and dependency on a range of natural resources to meet daily livelihood needs including a range of IAS,	? The eradication of certain IAS species may influence the availability of species used by rural households and subsistence farmers to meet a range of domestic needs. There may be antagonism to IAS control as they perceive it being in a threat to access to these resources in future if this issue is not addressed through transparent awareness raising and capacity development.

Stakeholder /Institution	Mandate	Role in the Project
Private landowners across the provinces to be targeted with biocontrol programmes	Sustainable management of land and natural resources, responsible for mechanical and chemical control of IAS as well as supporting establishment of IAS biological control reserve areas.	? Individuals, corporations, trusts, associations, etc. implement invasive management (mechanical, chemical and biocontrol) activities on private land ? Collaboration and support for IAS control in target areas will generate a range of financial and non-financial benefits for the landowners.
Farmers associations across the provinces to be targeted with biocontrol programmes	Farmers associations across all the provinces where intensive (commercial) farming operations occur represent the interests of their members., particularly those concerned with IAS control.	? For example, Mango Gowers Association based in Limpopo and Mpumalanga may be concerned as Mango and *Schinus* (an invasive species targeted by biocontrol agents) belong to the same family (*Anacardiaceae*). Livestock and additional crop production farmers associations will also have relevance.
Tsitsa Project beneficiaries in the Elundini area including local community based organisations (CBOs)	The Tsitsa Project is a multi-stakeholder initiative centred on a partnerships with a wide range of other stakeholders including local catchment residents, traditional authorities, implementers of restoration activities, aims at developing and managing both land and water by using sustainable development principles. Sustainable development involves improving the environmental, economic, and the social conditions of the people who live in the Tsitsa catchment.	? Collaboration with the Tsitsa Project beneficiaries in Elundini can enhance the sustainability of the proposed interventions of both projects. The proposed project will complement the Tsitsa Project restoration activities through the addition of capacity development for IAS control, monitoring, as well as other skills that may contribute to self-development or entrepreneurship opportunities.
5 PRIVATE SECTOR BUSINESS		
Fruit South Africa	To contribute to growing, profitable, sustainable and equitable fruit industry in south Africa within the Context of the national development plan and related strategies and policy.	? Contribute citizen sourced data on new invasions. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.

Stakeholder /Institution	Mandate	Role in the Project
Forestry South Africa	Maintaining sustainable, efficient and effective practices that have the lowest environmental impact and yield the greatest social and economic benefit, while producing an array of renewable and versatile end-products.	? Contribute citizen sourced data on new invasions. ? Assist with advocacy as part of the Biosecurity Awareness Raising Action Plan.
Vessel operator (Smit Amandla/African Marine Solutions ? AMSOL)	?AMSOL is contracted by the Department of Environment, Forestry and Fisheries (DEFF) [sic] to man, manage and maintain the Antarctic Supply Vessel ?S.A. Agulhas II?? This entails the provision of an efficient crewing, procurement, maintenance and management function, delivered to international standards ? and supports DFFE in fulfilling their mandate in the Antarctica & Islands and Oceans & Coasts departments? (http://www.amsol.co.za/environment-first/; 25 June 2021)	? As operator of the Antarctic supply vessel SA Agulhas II AMSOL is responsible for conveying equipment and personnel to and from Marion Island; based at the Port of Cape Town, the vessel receives cargo from the DFFE and DPWI stores in Cape Town (East Pier).
Private Sector Helicopter company (to be contracted)	The helicopters used in the eradication operation will be contracted in by DFFE.	? The company?s role will be to supply helicopters and engineers/technicians as required for the Marion Island House Mouse eradication project; it is expected that the helicopter pilots will be contracted in through a separate process managed by DFFE or the Mouse-Free Marion Non- ? Profit Company.
6 RESEARCH AND ACADEMIC		
Agricultural Research Council	To act as the principal agricultural research institution in South Africa so as to conduct research, drive research and development, drive technology development and the transfer (dissemination) of information in order to: (1) promote agriculture and related industries; (2) contribute to a better quality of life; (3) facilitate or ensure natural resource conservation; and (4) alleviate poverty.	? Facilitate biocontrol interventions and capacity development to achieve the project aims. ? Provide research support to achieve project aims.

Stakeholder /Institution	Mandate	Role in the Project
South African National Biodiversity Institute	The mandate is to explore, reveal, celebrate, and champion biodiversity for the benefit and enjoyment of all South Africans, which includes managing the National Botanical and Zoological Gardens as ?windows? to South Africa?s biodiversity for enjoyment and education? (https://www.sanbi.org/about/sanbi-mandate/; 15 June 2021). SANBI is also nationally responsible for early detection and rapid response related to new biological invasions.	? Carry out detection and rapid response activities related to biological invasions. ? Facilitate the production of risk analyses for alien and invasive taxa. ? Provide research support to achieve project aims. ? Plays a role in updating and distributing data on the status of indigenous and non-native species in South Africa. No specific role in the sub-Antarctic or in the MFM project, but coordinates biodiversity data curation nationally ? e.g. databases of species conservation status, Biodiversity Advisor; lead agent for production of NBSAP and National Biodiversity Assessment, as well as National Status Report on Biological Invasions. ? SANBI is also the Custodian Biosecurity Information and Risk Analysis System (BIRAS) with the Biosecuirty risk engine of the BRA/TC will need to access

Stakeholder /Institution	Mandate	Role in the Project
The South African National Space Agency	?The South African National Space Agency (SANSA) is a public entity under the National Department of Science and Innovation (DSI). SANSA has a mandate to drive the promotion and use of space and cooperation in space-related activities? (https://www.sansa.org.za/about-sansa/; 23 June 2021). Its formation was mandated by the passage of the South African National Space Agency Act of 2008.	? SANSA maintains a permanent presence on Marion Island, with a set of space monitoring instruments on Marion Island to monitor the near-Earth space environment; a SANSA engineer is part of the overwintering team each year to maintain the equipment and record important space data for use by SANSA and international research networks. SANSA will not play a direct role in the House Mouse eradication, but is a stakeholder that will be affected and can influence the project. Current research ? Dr S Lotz: Polar Space Weather Studies. SANSA is a key biosecurity partner as it has permanent personnel on the island and regularly transfers equipment between the mainland and the island.
Centre for Invasion Biology	To reduce the rates and impacts of biological invasions by furthering scientific understanding and predictive capability, and by developing research capacity	? Provide research support to achieve project aims. ? Will not play a direct role in the house mouse eradication project implementation but is a stakeholder that will be affected and can influence the project.
Centre for Biological Control	To determine pathways of new invasions, and the invasion ecology and management of emerging aquatic weeds.	? Provide research support to achieve project aims.
Forest and Biotechnology Institute	To build future human resources in biotechnology, that are crucial to the future of forestry and agriculture in South Africa.	? Provide research support to achieve project aims.

Stakeholder /Institution	Mandate	Role in the Project
Overwintering team members living on Marion Island	The role of the overwintering team is to maintain infrastructure and conduct research and data collection activities for DFFE, SANSA, SAWS or higher education institutions as applicable. Each team member has a specific role and job description.	? The support of the overwintering team, particularly the Team Leader, is crucial at the operational stage of the Marion Island House Mouse eradication project and post-eradication. Additional duties may be imposed on some team members at times to assist with the baiting operation and post-eradication monitoring. The operation may be disruptive to the daily activities of some team members and their duties may have to be suspended at times. Successful eradication of House Mice will be positive for many team members because they will be first hand observers of the resurgence of island biota.
7 DEVELOPMENT PARTNERS AND ADVISORY AGENCIES		
Prince Edward Islands Advisory Committee	This committee advises DFFE on the management and other related aspects of the special nature reserve. Established in terms of Regulation 50 of the Regulations for the proper management of Special Nature Reserves, National Parks and World Heritage Sites (Notice R1061 in Government gazette 28181 of 28 October 2005), the committee is Chaired by Mbulelo Dopolo, Director: Earth Systems Strategies, Branch: Oceans and Coasts.	? The PEIAC will advise DFFE on the Marion Island House Mouse eradication operation, particularly on exemptions required for the PEI Management Plan.
Frederik Paulsen and Ferring Pharmaceuticals	n/a	? Dr Paulsen has been appointed as a Board Member (Director) of the MFM NPC.

Please provide the Stakeholder Engagement Plan or equivalent assessment.

Summary of SEP approaches and actions

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
PIU and PSC	? Information sharing, communication and collaboration to support implementation and long-term sustainability of interventions ? Assess and communicate project performance ? Compile stakeholder issues, input and concerns and providing mechanisms for identifying responses by responsible agents to address	? Meetings, workshops, and other mechanisms for verbal communication. ? Electronic and printed documents (workplans, reports, booklets, factsheets, fliers, etc.). ? Presentations and technical briefings. ? Internet publication (e.g. project website) of notices, articles and background information and material ? Monthly planning and review meetings to monitor and evaluate progress, and adherence to Monitoring and Reporting Systems	National	Project Manager and staff	Weekly, monthly, quarterly and annually.

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
National Government Departments	? Information sharing and communication between and within Departments to enhance collaboration and synergies of complementary actions. ? Assess and communicate project performance	? Electronic communication via emails, articles, technical reports, etc. ? Workshops and meetings ? Personal communication via central information contact person	National	Directors	Quarterly
Provincial and Local Government	? Information sharing and communication between and within Departments to enhance collaboration and synergies of complementary actions. ? Communicate project performance and synergies with activities related to IAS control.	? Electronic communication via emails, articles, technical reports, etc. ? Workshops and meetings ? Publication of information, articles, and publications on website. ? Personal communication via central information contact person	Provincial and local Municipalities	Directors / Heads of relevant departments	Quarterly

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
Environmental NPOs /NGOs / CSOs	? Information sharing ? Communication ? Collaboration and Empowerment	? Workshops, focus groups and key stakeholder meetings ? Advisory / Expert panels and committees ? Imbizo and Indaba ? Legal notices and advertisements ? News articles and press releases ? Background information material ? Technical reports on websites ? Field trips ? Central information contact person / Field offices ? Comments and response sheets ? Participatory rural appraisal /participatory learning and action	National and local levels	Persons mandated by their respective organizations to participate at the project	Quarterly and *Ad Hoc* as required

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
Private sector	? Information sharing ? Communication ? Collaboration and Empowerment	? Public meetings and briefings ? Workshops, focus groups or key stakeholder meetings ? Website with background information material and progress reports ? Legal notices and advertisements ? Magazine or news articles ? Exhibits or displays ? Technical reports ? Central information contact person ? Comments and response sheets	National, provincial and local levels	Business Managers, Persons mandated by their respective organizations to participate at the project	Quarterly and *Ad Hoc* as required

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
Research and Academic	? Information sharing ? Communication ? Collaboration and Empowerment	? Public meetings and briefings ? Expert panels, advisory panels, and committees ? Workshops, focus groups or key stakeholder meetings ? Website with background information material and progress reports ? Legal notices and advertisements ? Technical reports ? Website with background information material and progress reports ? Field trips ? Central information contact person	Research Centres and Universities Project office at national and provincial levels	Directors, Heads of Department, Researchers	Quarterly

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
Development partners and advisory agencies	? Information sharing ? Communication ? Collaboration and Empowerment	? Public meetings and briefings ? Expert panels, advisory panels, and committees ? Workshops, focus groups or key stakeholder meetings ? Website with background information material and progress reports ? Legal notices and advertisements ? Technical reports ? Website with background information material and progress reports ? Field trips ? Central information contact person	National	Directors	Quarterly

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency
Local Administrative and Traditional Authorities, Communities, Landowners, CBOs, and Civil Society	? Collaboration and Empowerment	? Public meetings and briefings ? Oral communications ? Printed material (booklets, leaflets, factsheets, fliers, reports) ? Exhibits or displays ? Technical reports ? Field trips ? Radio or talk shows ? Open days ? Central information contact person and field offices or information centres ? Comments and response sheets ? Surveys, questionnaires and polls ? Interviews ? Participatory rural appraisal (PRA)/participatory learning and action (PLA) ? Workshops, focus groups or key stakeholder meetings ? Imbizo and Indaba	? Pilot sites ? Local Municipalities	? Local traditional authorities or their representatives ? Rural Communities and civil society (including women, youth, vulnerable and marginalised people or groups) ? Landowners	Quarterly and according to project workplan

Stakeholder group	Engagement Purpose	Key Approaches and Materials	Location	Responsible organisation, person	Frequency

In addition, provide a summary on how stakeholders will be consulted in project execution, the means and timing of engagement, how information will be disseminated, and an explanation of any resource requirements throughout the project/program cycle to ensure proper and meaningful stakeholder engagement

The project has the potential to affect as well as be affected by a wide range of stakeholders across South Africa, including government agencies, private sector and rural communities at local pilot and demonstration sites. The purpose of stakeholder engagement will be to create effective dialogue and collaboration between partners and stakeholders who will be involved in the IAS project in South Africa. The fundamental principle that will be applied to the stakeholder engagement process is informed consultation and participation, which will be built through different consultation tools including meetings, website and media, and reports. These tools will incorporate a two-way engagement process that facilitates the participation of stakeholders in decision making processes, and creates opportunities for the stakeholders to raise their concerns or share their opinions (incorporating gender sensitivities and participation by youth and other vulnerable or marginalised groups). The private sector, environmental and developmental Non Profit Organisations (NPOs), NGOs and CSOs will be strategically important stakeholders and partners, and will be engaged to share experiences and knowledge during project implementation.

The success of the stakeholder engagement process centres on clarifying definitions, objectives and responsibilities, as well as selecting the most appropriate approach and technique to meet these objectives. The scale and intensity of stakeholder engagement will be commensurate to the concerns expressed or expected from stakeholders and the magnitude of potential risks. DFFE and project partners have a long experience of work on IAS in South Africa. As such, they have an on-going relationship with the communities in the region. The PMU and project implementing partners will, nevertheless, undertake continuous stakeholder engagements at various levels (see next paragraph below) in order to promptly: (i) identify, capture and adequately address stakeholders? concerns and potential risks; (ii) further and properly consult groups and peoples whose lives might be affected by the project to verify and assess the significance of any impacts and device mitigation measures; and (iii) ensure equitable and gender- balanced and sensitive participation of the affected groups and communities in the development of mitigation measures, decision making processes, and in the monitoring and evaluation of project implementation. Engagement strategies will be tailored to individual stakeholder groups to reflect their concerns and their rights to land and natural resources will entail awareness- raising and capacity-strengthening activities.

Stakeholder engagement will be at different levels: (i) National; (ii) Institutional; (iii) Local municipality; (iv) River catchment; and (v) Village. The local level stakeholder engagement activities will draw extensively on the Department of Water and Sanitation?s Adopt-a-River Division and the ARC-PHP experience in engaging with local landowners and communities for the establishment of IAS control and biocontrol release sites or field study sites, which requires the full participation of relevant

stakeholders to succeed. The plan will also be developed in close consultation with stakeholders who are already active in the target areas for this project (for example the Rhodes University Tsitsa Project in the Eastern Cape). The project team will draw on this experience to develop a detailed stakeholder engagement plan during the inception phase, once the final target sites and the relevant land owners and communities have been identified. A Gender-Responsive approach focusing on the development of women as leaders and decision makers will be employed. The Project will put in place mechanisms for internal controls and enforcement of compliance reinforced by participatory monitoring and evaluation (M&E), and feed-back mechanisms from external parties. This will include establishing participatory M&E frameworks and public disclosure requirements to assure public access to relevant information about the project and mechanisms to capture concerns or grievances related to the project?s lack of compliance. The engagement process will ensure their meaningful consultation in order to facilitate their informed participation on matters that affect them directly, proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Select what role civil society will play in the project:

Consulted only; Yes

Member of Advisory Body; Contractor; Yes

Co-financier; Yes

Member of project steering committee or equivalent decision-making body; Yes

Executor or co-executor; Yes

Other (Please explain)

The project stakeholders include a range of civil society organizations (CSOs) and civil society broadly. CSOs are strategic as partners in implementation, as potential providers of technical and financial support. They are also strategic as they have the potential to provide independent monitoring and observation of project activities, which can add credibility and validation that is important in securing support from broader civil society. Their participation supports transparency in governance, and checks on accountability. The participation of CSOs can also play an important role by facilitating and promoting mutually beneficial linkages between local communities, civil society, and government agencies for biosecurity and IAS control activities. CSOs will be strategic partners to project implementation at a local level in particular. They are often embedded at local level (planning, financing and implementing integrated IAS control activities (mechanical, chemical and biocontrol)), and they therefore have the potential to act as agents for and voices of local communities, to facilitate participation in the implementation and sharing fo benefits from IAS control. They also provide ?citizen science? input data on IAS.

The project will proceed more smoothly with approval and support from civil society, which includes rural communities (including women, youth, vulnerable and marginalised people or groups), private

landowners, and even the general public broadly. Participation by civil society is important for broad spectrum support for biosecurity and IAS control. Participation by civil society and CSOs therefore aims to: 1). Increase awareness, understanding and visibility of the IAS South Africa Project and its relationship with the Convention on Biological Diversity and the Sustainable Development Goals, and 2). Generate support from and strengthen collaboration by civil society and CSOs. This participation by civil society involves a combination of information sharing, consultation, and collaboration and empowerment actions and processes: a) Information sharing: i) Magazine or news articles and press releases, ii) Background information material, iii) Exhibits or displays, iv) Websites and v) Radio or talk shows; b) Consultation: i) Public meetings and briefings, ii) Open days/open house, iii) Surveys, questionnaires and polls, and iv) Participatory rural appraisal (PRA)/participatory learning and action (PLA); c) Collaboration and Empowerment: i) Workshops, focus groups or key stakeholder meetings, and ii) Imbizo and Indaba. Participation by CSOs and civil society will evolve during the course of the project and the processes therefore needs to be adaptable and frequently reviewed and monitored to inform revision as needed.

3. Gender Equality and Women's Empowerment

Provide the gender analysis or equivalent socio-economic assesment.

South Africa is a signatory to regional and international conventions that deal with gender issues. South Africa has developed numerous legislative frameworks which are directly in line with the goal of ending all forms of discrimination against all women and girls everywhere. Major strides have been made in South Africa in addressing gender inequalities since 1994. Legislative frameworks have been developed aimed at ending all forms of discrimination against women and girls. Despite an inclusive Constitution that protects the rights of all, and the enabling policies and laws there is still a challenge in ensuring that the legal and regulatory frameworks that have been put in place are effectively implemented, enforced, monitored and evaluated. South Africa?s Gender Policy Framework highlights that, despite these social safeguards and gender policies, a number of ongoing challenges to gender equality need to be addressed including for example: poverty; access to basic needs and basic resources; access to employment; economic empowerment of women and access to land. Gender equality requires women?s active participation at all levels, including participation in community decision-making structures, such as ward councils or traditional structures. Traditional leadership institutions, customary law, and related legislation must respect the rights and principles of equality enshrined in the Constitution. However, systems on the ground can be far from meeting the requirements of the law. This is illustrated by the continuing lack of gender equality associated with traditional leadership.

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women?s empowerment? (yes /no)

The project will consider the development of people as an essential element of environmental conservation through short-term contract jobs created with the emphasis on endeavouring to recruit women (the target is 60%), youth (20%) and people with disability (5%). By creating an enabling environment for skills training, the project will be investing in the development of the selected communities and will target unemployed women and/or women-headed households. Other opportunities for improving gender equality and strengthening economic empowerment of women may include optimizing opportunities for the employment, training and equipping of women as project management staff (project management), BRA/TC managers, (Output 1.1), control environmental

officers/plant and veterinary health inspectors/IAS border inspectors (Output 1.2), dog handlers (Output 1.3), invasive alien species clearing labourer?s (Output 2.1); BIRAS administrators (Output 2.2), mouse eradication team members (Output 3.1) and biocontrol technicians (Output 4).

At all output levels, the project will ensure collaboration with project-contracted businesses to continually develop and implement mechanisms which may further strengthen the capacities of women. Furthermore, the project implementation will ensure that there is equitable representation of women in the project?s decision-making structures, including the Project Steering Committee (project management). The project has a high-level gender indicator of ?at least 420 women, a direct benefit from project activities as a result of the GEF investment?.

Capacity building will be achieved through action learning in various components of GEF project, for example in biocontrol, detection, training in various short courses such as first aid, herbicide applicator, pest control operator, health and safety, understanding natural environment, and postgraduate students.

South Africa is among the pioneers in adopting Green Economy strategies and has put in place many programmes and policy frameworks in the recent past, to translate the NDP Vision 2030 into action. Efforts to boost the Green Economy and Biodiversity Economy sectors have a significant focus on communities and ensuring that they derive maximum benefits while conserving biodiversity and natural resources. The GEF project will ensure economic benefits to the Small Medium and Micro-Sized Enterprises to assist in the implementation of species-specific eradication management plans, and in collection of baseline data. In all outputs woman-owned and/or managed businesses will also participate equitably in the procurement of project-funded equipment, infrastructure and technical services.
Gender Action Plan is presented as a separate document

If possible, indicate in which results area(s) the project is expected to contribute to gender equality:

closing gender gaps in access to and control over natural resources;

improving women?s participation and decision making; and or

generating socio-economic benefits or services for women.

Does the project's results framework or logical framework include gender-sensitive indicators? (yes /no)

Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women empowerment?

Yes

Closing gender gaps in access to and control over natural resources; Yes

Improving women's participation and decision making Yes

Generating socio-economic benefits or services or women Yes

Does the project?s results framework or logical framework include gender-sensitive indicators?

Yes

4. Private sector engagement

Elaborate on the private sector's engagement in the project, if any.

Invasive Alien Species can take a heavy financial toll on governments, private sector, and private citizens alike. An effective biosecurity regime therefore depends on a strong partnership with the private sector and opportunities for networks need to be create for business and government to work together. Support from the private sector can range from support by integrating biosecurity issues into their respective codes of practice, business plans, and corporate communications, through to funding and technical support for local level livelihood activities from private sector Corporate Social Responsibility (CSR) programmes. Private sector partners will therefore be important stakeholders for supporting this IAS project in South Africa. A range of private sector partners have been identified in the stakeholder analysis and described in the stakeholder engagement plan (see Appendix 13 of the project document). It is important that partnerships are established with these private sector stakeholders at an early stage of the project to ensure their participation in design, decision making and implementation. Participation by the private sector therefore aims to: 1) Increase awareness, understanding and visibility of the IAS South Africa Project and its relationship with the Convention on Biological Diversity and the Sustainable Development Goals, and 2) Support the establishment of networks and strengthen collaboration with private sector stakeholders

A detailed private sector participation plan will be developed, in consultation with private sector representatives, during the inception phase of the project. The private sector participation plan will address private sector participation through: a) Raising awareness about the project and enhance the capacity of the private sector to engage effectively, through conducting publicity events, media campaigns, etc., b) Promoting awareness of biosecurity and IAS issues by convening workshops and seminars targeting private sector stakeholders, c) Encouraging partnerships between public and private sectors in activities to address IAS through their involvement and participation in decision making and planning structures and processes, and d) Ensuring support for the sustainability of IAS prevention and management activities by developing long-term programmes of action that includes funding and technical support from the private sector.

Participation by the private sector includes a combination of information sharing, consultation, and collaboration and empowerment actions and processes, aimed at building active partnerships between the project team and private sector stakeholders. This includes open and frequent dialogue and participation through: i) Workshops and focus group meetings, ii) Advisory panels and committees, and iii) *Imbizo.* The participation of stakeholders will evolve during the course of the project and the process therefore needs to be adaptable and frequently reviewed and monitored to inform revision as needed.

5. Risks to Achieving Project Objectives

Elaborate on indicated risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and, if possible, the proposed measures that address these risks at the time of project implementation.(table format acceptable):

The results framework matrix in Annex A summarises the principal risks and assumptions associated with the project. Every effort has been made to minimise these in the design of the project strategy and its activities and outputs. This has included a review of past and ongoing GEF projects or projects in similar sectors. In addition there has been a wide consultation through review and discussions with the country stakeholders during the project development phase.

The project strategy, described in detail within this project document, identifies the following key risks (Table 5). These risks and the mitigation measures will be continuously monitored and updated throughout the project implementation period.

Table 5: Risks and risk management measures

Risks	**Significance of Risk**		**Mitigation Measures**
	Impact	**Probability**	
1) The government shifts its priorities from financing IAS control, biosecurity monitoring and enforcement which is critical for long-term sustainability of project interventions (Category = Financial)	4	1	**ESS Risk Level = Medium Risk** The project has beed designed so that the country?s capacity to control and manage IAS will be strengthened in parallel with relevant regulations, capacity, inter-government and inter-agency cooperation, and strong connections and engagement with local communities. In this way the sustainability of project interventions will not be reliant solely on government, but a diversity of stakeholders. This puts less pressure on government and allows for finances to be allocated to these key parts of an effective IAS control and management response.
2) Lack of cooperation and coordination between different public institutions in the management of IAS leads to inefficiencies in project implementation *Category = Operational*	4	3	**ESS Risk Level = Medium Risk** It is envisaged that these project-supported interventions would collectively provide sufficient incentive for the public institutions to cooperate with, and actively collaborate in, the project implementation. All affected public institutions have been actively consulted in the project design and development phase, and opportunities for their involvement in project implementation will be optimised wherever practicable. These public institutions will also be co-opted to be represented on, and participate in, the Project Steering Committee.

3) Conflicts between stakeholders over the regulation and management of IAS with perceived benefits undermines the efficacy of IAS control measures *Category = Strategic*	2	2	***ESS Risk Level = Low.*** The project will seek to promote an approach in which parties with different value systems agree on a win-win solution where invasive species can still deliver benefits, but adverse impacts are reduced. This will require open dialogue among stakeholders, trade-offs and compromises, taking into consideration the differences in use and management of natural resources by men and women. Where the impacts outweigh perceived benefits, the project will negotiate trade-offs and compromises that minimise the impact of the invasive species but retain a large proportion of their amenity values. In some cases, such as the use of biological agents to control invasive plants species (see Output 3.2), the project will employ strategies to try and effectively communicate the risks through open dialogue among stakeholders (see Output 2.1). Conflicts will, wherever possible, be resolved by avoiding biocontrol agents that have the ability of causing damage to the useful part of the plant, and instead using only seed-reducing agents (these reduce the reproductive potential of the plants, curb their dispersal and reduce the follow-up work needed after clearing, while still allowing for the continued utilization of the plant).

4) Project interventions will focus on control and management of priority IAS in order to reduce threats to native biodiversity and ecosystem functioning. As such there may be an incidental risk of the project causing damage or introducing/spreading IAS. *(Safeguard Standard 1: Biodiversity, Ecosystems and Sustainable Natural Resource Management; Qs 1.1-1.12)*	2	1	***ESS Risk Level = Low.*** South Africa has practiced biological control for nearly a hundred years, has an exemplary safety and success record, and is a leader in this field internationally. The control of IAS will enhance natural habitats, not contribute to degradation. IAS activities proposed in the project will be undertaken in compliance with policy and legal frameworks. The project will utilize biocontrol agents but this will not involve the introduction of genetically modified organisms. Once biocontrol agents have been collected in the country of origin, they are imported directly into quarantine. Host specificity testing will be carried out ensure that the proposed biological control agent is specific to the target species (a host specificity test list is a list of plants/insects closely related to the target weed or insect pest that is developed by a biological control researcher. The species on the list are exposed to the proposed biological control agent in a quarantine containment facility). Once the agent is considered to be host specific, and safe for release, only then is permission sought from the DEFF for its release.. All newly introduced potential biocontrol agents will be subjected to risk management frameworks such as host-specificity testing under quarantine conditions. Host-specificity testing protocols over the last 30 years have been refined and interpretation of the results is benefiting from an improved understanding of agent behavior. These protocols provide assurances that the agent cannot and will not attack plants other than the target species, and if populations of the host should become extinct locally, that the agent populations will not survive.

5) Climate change may adversely influence the potential outcomes of IAS interventions. *(Safeguard Standard 2: Climate Change and Disaster Risks; Qs 2.1 and 2.6)*	2	2	***ESS Risk Level = Low.*** *These impacts are more likely to arise over the longer-term than the duration of the project. The risk is assessed as low and no specific management responses are needed at this time. The status of the risk will be reassessed during implementation as needed.* The control of IAS is recognized as improving resilience against potential climate change and the impacts of the project will persist beyond the intervention project. IAS control will contribute to enhancing ecosystem resilience and reduce risks of fire, which will increase carbon sequestration potential.The project will strengthen biosecurity measures to prevent the introduction of new IAS (or strains of IAS) as a result of climate change and develop rapid response capacities to monitor and eradicate alien species that may become more invasive due to climate change. These improved biosecurity measures and rapid response capacities will include: implementing a more coordinated approach to biosecurity monitoring, prevention, early detection and emergency responses (Outputs 1.1 and 3.1.2); strengthening the biosecurity capacities (e.g. risk management system, inspection staff, sniffer dogs, cleaning equipment, quarantine facilities) to manage priority pathways of introduction (harbours and airports) to the country (Outputs 1.2 and 1.3); establishing and maintaining a central access point for improved biosecurity-related information and risk analysis (Output 2.2); and broadening the active involvement of the wider community in biosecurity activities along high risk introduction and post-introduction pathways, incorporating gender sensitive approaches(Output 2.1).

6) Management and control of IAS could involve occupational health and safety risks through inappropriate use of chemicals (herbicides, fungicides, pesticides). *(Safeguard Standard 3. Pollution Prevention and Resource Efficiency; Qs. 3.3 and Safeguard Standard 4: Community Health, Safety and Security; Qs 4.2 and 4.5)*	3	2	***ESS Risk Level = Medium.*** The project includes the use of hazardous chemicals for the control of IAS at Marion Island, Durban Harbour, and the local pilot demonstration sites at Winterveld and Elundini. In mitigation the project will include the compliance with protocols for the safe use of the chemicals, and training of people who will use these chemicals in compliance with national policy and legal frameworks, including supply and use of all necessary PPE. The disposal of the chemical containers will also be undertaken in compliance with policy and law. It will be undertaken on a relatively small scale and mitigated by preventative actions such as training and provision of PPE. An Occupational Health and Safety Plan will be prepared during the Inception Phase of the project. Project activities at Durban Harbour for the high pressure washing and fumigation of bulk and/or sea containers could result in water run-off. The safety protocols for these activities will be adhered to in compliance with national law, and the check and monitoring of compliance of these operations will be developed during the inception phase of the project when the chemical list to be used has been confirmed. Project activities will involve transport, storage use of chemicals for IAS control at Marion Island, Durban Harbour and the local pilot demonstration sites at Winterveld and Elundini. However this will be undertaken in compliance with law and the nature of the chemicals used will not create a risk of an emergency event. It will be undertaken on a relatively small scale and mitigated by preventative actions such as training and provision of PPE.

7) Emerging issues, such as COVID-19, particularly the emergence of variants that are resistant to vaccines, may hold up, delay or even jeopardise the implementation of the project altogether. In the **short term,** there is risk of increased COVID transmission due to people movements across project sites, while in the **long term,** there is a possible risk of other climate change-mediated diseases (and pandemics). *(Safeguard Standard 4: Community Health, Safety and Security; Q4.3)*.	3	3	**ESS Risk Level = Medium Risk** The project will take the following actions to mitigate negative results arising from COVID-19 or any other health related risk: a) Identify critical stakeholders the absence of whom can lead to unplanned delays, b) Consider legal and financial implications of COVID-19 and develop a mitigation plan at the inception stage, c) Communicate any disruptions due to COVID-19 or any other disease outbreak to all stakeholders, including staff, UNEP and GEF, d) Conduct scenario analysis and consider alternative delivery methods, such as virtual or online meetings, radio programmes, recorded messages and guidelines, personal protective equipment or any other steps that will allow the project to be completed on time and on budget, even if it is delayed at some stages by COVID-19 or any other widespread health related issue. A gender sensitive approach will be applied in the planning of these mitigating actions, and recognising that the impacts of COVID-19 have reshaped power relations between men and women as well as how they use and manage the environment. In the short term, the project will take preventive measures including protection of staff, partners and people in need by using protective equipment, physical distancing, minimizing physical meetings and use of virtual meetings. The project will also actively encourage staff and communities to take out vaccinations in full. The project will keep in close touch with the COVID-19 task forces established by government as well as health facilities in the project implementation sites to promptly report any incidence of the disease. For long term mitigation, the COVID 19 pandemic provides an opportunity for the local communities, CSOs, NGOs, and government agencies to come together for effective planning to mitigate the impacts associated with such pandemics. The project will take care of this during the implementation phase, by prioritizing it in M&E, as well as project planning activities.

8) Project interventions (e.g. regulations, protocols, IAS control activities e.g. at ports of entry/exit and Adopt-a-River within river catchments) may result in changed access / restrictions on use / temporary loss of access to land and natural resources for local communities. *(Safeguard Standard 6: Displacement and Involuntary Resettlement; Q 6.2)*	3	1	***ESS Risk Level = Low*** Project activities do not involve temporary or permanent displacement or relocation of people. Project activities do not involve economic displacement or relocation of people. Where the control of IAS involves species that are potentially used for economic purposes by local stakeholders the project inception phase will include consultation with the stakeholders to inform decision making and planning, and the necessary mitigation identified.

6. Institutional Arrangement and Coordination

Describe the institutional arrangement for project implementation. Elaborate on the planned coordination with other relevant GEF-financed projects and other initiatives.

The project will be implemented by UNEP and executed nationally by the Department of Forestry, Fisheries and Environment (DFFE). UNEP ? through its GEF Task Manager (TM) and Funds Management Officer (FMO) ? will monitor the implementation of the project, review progress on the realization of the project outputs, and ensure the proper use of GEF funds. UNEP has a long record of implementation of GEF supported IAS projects globally, including GEF465 (Development of Best Practices and Dissemination of Lessons Learned for Dealing with the Global Problem of Alien Species that Threaten Biological Diversity), GEF 9410 (Strengthening National and Regional Capacities to Reduce the Impact of Invasive Alien Species on Globally Significant Biodiversity in the Pacific), GEF9408 (Preventing COSTS of Invasive Alien Species (IAS) in Barbados and the OECS Countries), GEF 3183 (Mitigating the Threats of Invasive Alien Species in the Insular Caribbean), GEF 3651 (Development and Institution of A National Monitoring and Control System (Framework) for Living Modified Organisms (LMOs) and Invasive Alien Species (IAS)) and GEF 3664 (Prevention, Control and Management of Invasive Alien Species in the Pacific Islands) among others. In addition, UNEP has vast experience in project implementation in South Africa, with several completed and ongoing projects, such as GEF10584, GEF10509, GEF10114, GEF998, GEF 9866, GEF 9832, GEF 9817, GEF 9673 and GEF 9525 among others.

In this project therefore, the UNEP TM will be directly responsible for: (i) providing consistent and regular project oversight to ensure the achievement of project objectives; (ii) liaising between the project and the GEF Secretariat; (iii) ensuring that both GEF and UN Environment policy requirements and standards are applied and met (i.e. reporting obligations, technical, fiduciary, Monitoring and Evaluation); (iv) approving budget revisions, certifying funds availability and transferring funds; (v) organizing mid- and end-term evaluations and reviewing project audits; (vi) providing technical, legal and administrative guidance if requested; and (vii) certifying project operational completion. In addition, UNEP will bring to bear its vast scientific and empirical experience of critical relevance to the objectives of the project through sharing experiences of its other projects being supported by GEF or other agencies.

The Department of Forestry, Fisheries and Environment (DEFF) will be the Executing Agency on behalf of the Government of South Africa and will provide overall project coordination and supervision. The DFFE will designate a senior staff member to act as a National Project Director (NPD). The NPD will provide strategic oversight and guidance for efficient and effective project implementation by the Project Management Unit (see below). The DFFE will co-chair with the UNEP country office the Project Steering Committee (PSC) that will ensure the strategic orientation of the project. The DEFF will be accountable to UNEP for the achievement of the project objective and outcomes, according to the approved overall project work plan.

To expedite delivery of outputs, the DFFE will work with project partners in the implementation of project activities through signing of Memoranda of Understanding (MoU). These MoUs will clearly spell out the activities agreed upon and responsibilities of each party in the execution of the project. The mandate, expertise and competencies of the partners are some of the criteria that will be used in identifying activities to be implemented by project partners. This will be concretized at the launch/inception of the project. To minimize delays in the delivery of project outputs by partners, DFFE in consultation with DALRRD will identify how best to support the partners to effectively implement the project activities. The project partners are DALRRD, SANBI, DHSWS and ARC who will contribute to the outcomes/outputs outlined in Table 6 below.

Table 6. Project partners and their responsibilities in the project

Components/Outcomes	**Responsibility Assignment**	
	Lead institution(s)	**Project partners**
Component 1: Strengthened IAS detection and surveillance capacities at key national ports of entry		
Outcome 1: South African authorities adopt new tools and methods of high-risk IAS surveillance at key national ports		
Output 1.1: An inter-agency ?Biosecurity Risk Assessment/ Targeting Centre (BRA/TC) is established and operational	DFFE	SARS, BMA, DOT, Transnet
Output 1.2: A sea container and break-bulk cargo biosecurity risk management system is piloted	DFFE	DALRRD
Output 1.3: A small team of biosecurity detection dogs and their handlers are operational at key ports of entry.	DFFE	SARS
Output 1.4: New and emerging invasive species monitored and controlled	SANBI	DFFE, DWS
Component 2: Enhanced biosecurity communications and information flows		
Outcome 2: Stakeholders partner with and support state biosecurity agencies in pre-border and post border risk analysis, surveillance, detection, reporting and control of high-risk IAS		
Output 2.1: A ?biosecurity awareness and involvement campaign? is developed and implemented as a leverage point through which to engage the community about the importance of pre- and post-border biosecurity and influence public perception about biosecurity	DFFE	SANBI
Output 2.2: A centralized Biosecurity Information and Risk Analysis System is operational and freely accessible to all responsible public biosecurity institutions	SANBI	DFFE
Output 2.3: Invasive alien species are controlled at key sites with the involvement of rural communities using the Adopt-a-River approach.	DWS	SANBI, WRC, Rhodes University
Component 3: Improved effectiveness of control measures for high risk IAS		
Outcome 3.1: Relevant agencies have increased capacity to secure and manage a rodent-free status at the Prince Edward Islands (comprising Marion Island and Prince Edward Island)		
Output 3.1.1: Invasive House Mice are eradicated from Marion Island	DFFE	BLSA
Output 3.1.2: Improved biosecurity protocols developed for the Prince Edward Islands	DFFE	BLSA
Outcome 3.2: South Africa contains the spread of high-risk invasive plant species		
Output 3.2.1: Biocontrol agents for priority invasive plant species are developed and released	ARC	DWS, DFFE
Output 3.2.2: Existing biocontrol agents for T. stans and A. cordifolia mass-reared and released	ARC	DWS, DFFE

Output 3.2.3 Capacity of researchers in the development of biocontrol agents enhanced	ARC	DWS, DFFE

Project Internal Structure

*a) **Project Management Unit***

A Project Management Unit (PMU) will be established and hosted by DFFE to provide strategic oversight and guidance for effective and efficient project implementation. It will comprise of the National Project Coordinator, Project Manager, Monitoring and Evaluation Officer, Finance and Administrative Assistant and a driver. The TORs for staff of the PMU are provided in Appendix 10 of the project document. PMU staff will be supported by national and international consultants who will be recruited during project implementation as needed. The PMU will be responsible for the daily management of the project and for ensuring efficient and timely implementation of the project annual work plans. The PMU will be supported technically by DFFE who will allocate part-time experts according on a needs basis as part of government co?financing. Memoranda of Understanding/Letters of Agreement will be developed with relevant partners as and when required for the coordination of some specific interventions of the project. The PMU will work in close collaboration with UNEP. The functions of the PMU will be to:

? Technically identify, plan, design and support all project activities;
? Liaise with government agencies and regularly advocate on behalf of the project;
? Prepare the Annual Work Plan and Budget (AWP/B) and monitoring plan, and submit them to GEF and PSC for validation;
? Play the role of the Secretariat of the PSC;
? Organize regular meetings and workshops with the PSC;
? Be responsible for the day?to?day implementation of the project in line with the AWP;
? Ensure a gender responsive results?based approach to project implementation, including maintaining a focus on project results and impacts as defined by the results framework indicators;
? Ensure close collaboration with baseline and project partners to maximize synergy and complementarity;
? Ensure the submission of appropriate annual expenditure reports on the budget identified as co?financing by the baseline projects;
? Prepare and submit bi?annual progress reports and contribute to the preparation of UNEP progress reports;
? Continuously monitor and evaluate project progress regarding the Results Framework Targets according to a specific plan validated by DFFE and UNEP, and submit M&E reports regularly to UNEP and PSC;
? Prepare UNEP Project Progress Reports (PPR) and the annual Project Implementation Review (PIR); and
? Facilitate and support the mid?term evaluation/review and final evaluation of the project.

Project External Structure (Project Oversight Mechanism)

a) Project Steering Committee

A Project Steering Committee (PSC) will be constituted to serve as the project oversight, advisory and support organ. The PSC will be formally constituted by the Executive Director, DFFE from high level officials of the rank of Director/Commissioner and above, from the following institutions/organizations: DFFE, DALRRD, SANBI, DHSWS, ARC and UNEP. The specific responsibilities of the Project Steering Committee will be to:

1) Provide strategic guidance and reinforce DFFE?s leadership of the project and coordinating interventions;
2) Provide guidance on possible counter measures/management actions to address specific project related risks;
3) Approve the annual work plans prepared by the Project Manager and Contracted Parties;
4) Provide strategic and technical advice to create synergy and uniformity between supported activities, policies and aligned projects;
5) Promote cross-sectoral, inter-departmental and trans-boundary coordination of project activities to ensure synergies are strengthened
6) Assess project progress and report on project to Senior Management of DFFE and other higher authorities of the Government of South Africa related to project implementation;
7) Publicize the project within their respective Institutions and Ministries.

8) Advise on any conflicts within the project or to any problems with external bodies.

b) Technical Working Group (TWG)

The project will establish a Technical Working Group (TWG). The TWG will be a permanent structure within the project structure, comprised of the technical teams from the project partner institutions. The TWG will oversee and discuss the detailed technical aspects related to the implementation of the project activities to inform the PSC?s technical guidance, oversight and decision-making directions. The specific responsibilities of the TWG will be to:

•Support the PMU in the development of work plans and budgets;

•Support the PMU in the development of Terms of Reference for activities to be undertaken by consultants;

•Collate salient and credible data/information to support the PMU and consultants in the delivery of legitimate reports;

•Assess and advise on implementation of the planned project activities against set timeframes to deliver the following key outcomes of the project:

- Strengthened IAS detection and surveillance capacities at key national ports of entry (Component 1 of the project);
- Enhanced biosecurity communications and information flows (Component 2 of the project);
- Improved effectiveness of control measures for high risk IAS (Component 3 of the project).

•Review and provide input on draft project reports to ensure adequacy in the attainment of the project objectives and deliverables (including targets for equitable participation by women);

•Support the PMU on quality assurance of documents/reports to be presented to the Project Steering Committee (PSC) for consideration; and

•Perform any other duties that may be assigned by PSC or UNEP.

c) Monitoring and Evaluation (M&E)

There will be Annual Stakeholders? Participatory Monitoring and Evaluation Missions of the Project to assess progress towards achievement of the project targets and effectiveness of implementation in terms of achieving project objectives, outcomes and outputs and to discuss and agree on mechanisms to improve project performance. Findings and recommendations of this review will be instrumental in bringing improvement in the overall project design and execution strategy for the remaining period of the project?s term if necessary.

UNEP will arrange for the project?s mid-term and final evaluation in consultation with the Project Management Unit (PMU). The project mid-term and final M&E will, inter alia: a) Review the effectiveness, efficiency and timeliness of project implementation; b) Analyze effectiveness of partnership arrangements; c) Identify issues requiring decisions and remedial actions; d) Propose any mid-course corrections and/or adjustments to the implementation strategy as necessary; and e) Describe the technical achievements and lessons learned derived from project design, implementation and management. The final evaluation will be carried out three months after closure of the project. The aim of the final evaluation will be to identify the project impacts, sustainability of project results and the degree of achievement of long-term results. The final evaluation will also have the purpose of indicating future actions needed to expand on the existing project in subsequent phases if planned, mainstream and up-scale its products and practices. The final evaluation will pay special attention to the outcome indicators.

The reporting requirements and responsibilities in the monitoring and evaluation of the project have been proposed as follows (Table 7):

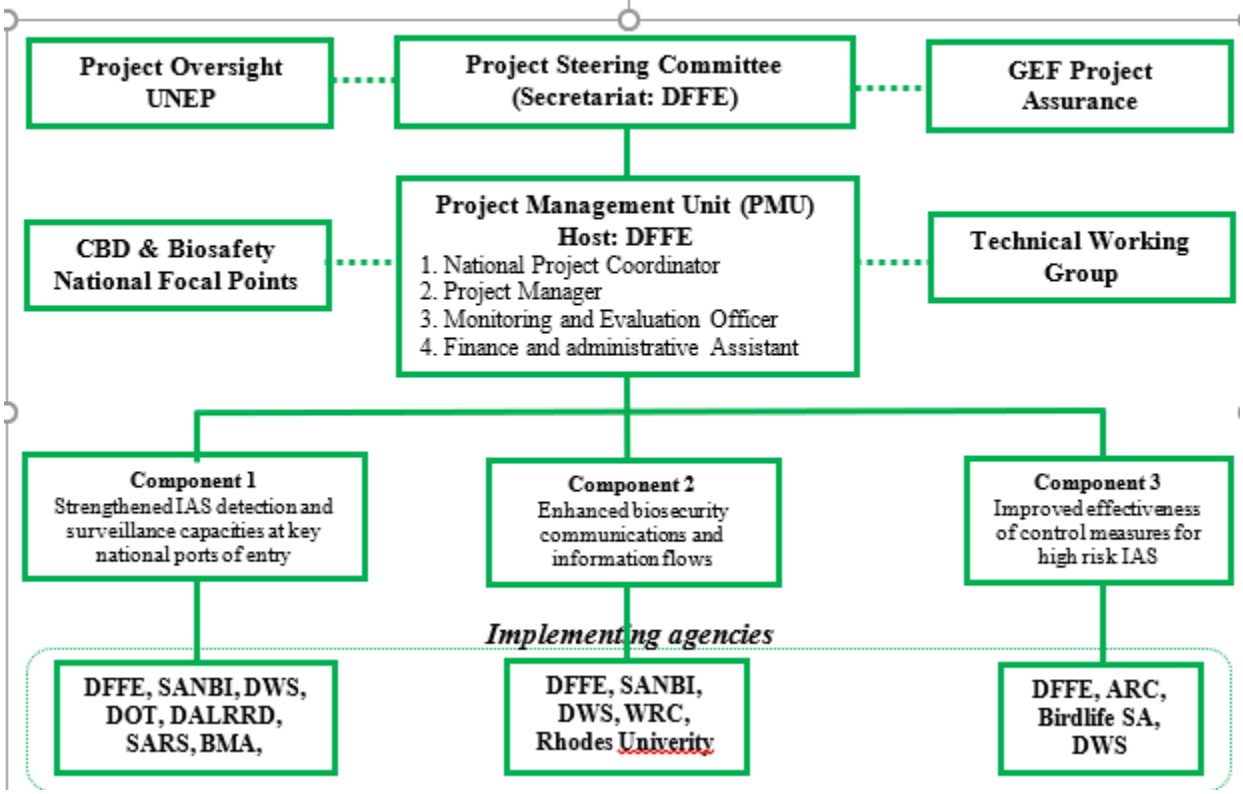
Table 7. M&E reporting requirements and responsibilities

M&E Component/Activity	Responsibility Assignment		Means of Assessment/Monitoring Data Source
	Institution	Project/Agency Officer	

Project Inception	DFFE (PMU) in consultation with UNEP,	Project Manager, Consultant	Inception report with detailed methodology
Steering Committee Meetings	DFFE (PMU)	Project Manager, UNEP Task Manager	Minutes of the meetings
Semi-annual M&E review meetings	DFFE (PMU)	Project Manager, UNEP Task Manager	Minutes of the meetings
Monitoring visits to field sites	DFFE (PMU) in collaboration with the participating institutions	Project Manager, UNEP Task Manager	On site data collection Monitoring reports
Annual Review and Planning Meeting (ARPM)/Project Implementation Review (PIR)	UNEP in consultation with the PMU, and participating institutions/agencies and stakeholders	Project Manager, UNEP Task Manager	On site data collection PIR reports
Mid-Term external evaluation (MTR)	UNEP in consultation with the PMU, and participating institutions/agencies and stakeholders	Independent Consultant	On site data collection Consultant report
End of Project Terminal Evaluation	UNEP in consultation with the PMU, and participating institutions/agencies and stakeholders	Independent Consultant	On site data collection Consultant report

The management structure, as shown in figure 5 below, will respond to the project?s needs in terms of direction, management, control, and communication. As the project is cross-functional and involves various stakeholders, its structure will be flexible in order to adjust to ongoing changes in the context. Staff and consultants will be contracted according to the established rules and regulations of the Republic of South Africa and all financial transactions and agreements will similarly follow the same rules and regulations.

Figure 5. Project organogram



7. Consistency with National Priorities

Describe the consistency of the project with national strategies and plans or reports and assesments under relevant conventions from below:

NAPAs, NAPs, ASGM NAPs, MIAs, NBSAPs, NCs, TNAs, NCSAs, NIPs, PRSPs, NPFE, BURs, INDCs, etc.

The project is fully consistent with Action 1.1.6 (?Monitor and control the spread of alien invasive species that benefit from climate change?) of Outcome 1.1 (?Increased resilience and adaptive capacity achieved in human, economic, environment, physical and ecological infrastructure vulnerability?) under Strategic Intervention 1 (?Reduce human and economic vulnerability, ensure resilience of physical capital and ecological infrastructure and build adaptive capacity?) of the Draft National Climate Change Adaptation Strategy (May, 2019). The project is well aligned with the ?programmatic approach to intervention projects? (refer to Appendix D for the ?Indicative programme of intervention projects?) that is advocated by the National Action Programme (NAP): combatting land degradation to alleviate rural poverty (2004), notably through the Natural Resource Management (NRM) Programmes being administered by DFFE (e.g. Working for Water, LandCare, Working for Wetlands). The project will support the implementation of the IAS management strategies and activities identified in the National Biodiversity Strategy and Action Plan (2015-2020). The project will further contribute to the implementation of Strategy 8(b) of the SADC Regional Biodiversity Strategy (?Improve the region?s capacity to prevent, eradicate and control IAS?) and paragraph 5 of Article 8 (wherein States [Parties] are called upon to ?take measures to ?eradicate, control and prevent the introduction of invasive species?) of the SADC Protocol on Environmental Management for Sustainable Development. The project will also contribute to addressing a number of ongoing gender inequality challenges highlighted in South Africa?s Gender Policy Framework including for example poverty, economic empowerment of women and access to land.

8. Knowledge Management

Elaborate the "Knowledge Management Approach" for the project, including a budget, key deliverables and a timeline, and explain how it will contribute to the project's overall impact.

The Biosecurity Information and Risk Analysis System (BIRAS) envisaged under Output 2.2 will be developed as a national, centralised access point for biosecurity-related knowledge. Once functional, the BIRAS will strengthen the capacity of the Biosecurity Risk Assessment/Targeting Centre (BRA/TC) ? established under Output 1.1 - to better manage and integrate multiple information and intelligence data sources related to monitoring, prevention, early detection and emergency response at national ports of entry. The BIRAS will also provide an analytics functionality for intelligence and front-line biosecurity institutions in the maintenance of watch lists for IAS associated with high risk shipping routes and the generation of risk profiles for incoming sea containers and break-bulk cargo at South Africa?s main shipping harbours

An integral part of the stakeholder engagement programme envisaged under Output 2.1 is broadening the involvement of civil society in biosecurity monitoring, through surveillance, detection and reporting

activities. The project will develop suitable technologies and systems to seamlessly integrate this additional biosecurity knowledge into BIRAS and other national IAS databases (e.g. SAPIA). The project will facilitate the exchange of IAS information with the broader community by supporting the maintenance of the www.invasives.org.za website (and linked Facebook, Instagram, Pinterest, e-newsletter and YouTube media) as a centralised focal point for the invasive species awareness campaign under Output 2.1. The website will continue to be developed as a repository for IAS legislation, academic papers, technical reports, fact sheets, pamphlets, news bulletins, event information, contact information, etc. Communication and knowledge products will be developed taking into consideration gender sensitivity requirements.

Each project output will include the documentation of lessons learnt from the implementation of activities under that output, and a collection of the tools and templates (and any other materials) developed during implementation of that output. Project information will be collated and presented annually at the National Symposium on Biological Invasions. The best practices established, and lessons learned from this project will have significant benefits for the southern Africa region though the transfer of expertise and knowledge, as well as peer learning between countries. They will guide the ongoing development of a Regional Invasive Species Strategy and Action Plan (RISSAP) for the SADC region. Project resources will be committed to ensure the ongoing involvement in, and information sharing with, regional counterpart countries on IAS management and control, through the SADC Directorate: Food, Agriculture and Natural Resources. Special care will be taken to avoid duplicating past and present efforts, and to enhance existing methods of managing knowledge, using for example existing Clearing House Mechanisms such as the Global Invasive Species Database.

9. Monitoring and Evaluation

Describe the budgeted M and E plan

9. Monitoring and Evaluation.

The project will follow UNEP standard monitoring, reporting and evaluation processes and procedures. Reporting requirements and templates are an integral part of the UNEP legal instrument to be signed by the DFFE and UNEP. In addition, the project M&E plan will be consistent with the GEF Monitoring and Evaluation policy. The Project Results Framework presented in Appendix 4 of the project document includes SMART indicators for each expected outcome as well as mid-term and end-of-project targets. These indicators are designed according to the GEF indicator guidelines. These indicators along with the key deliverables and benchmarks included in Appendix 7 of the project document will be the main tools for assessing project implementation progress and whether project results are being achieved. The means of verification and the costs associated with obtaining the information to track the indicators are summarized in Table 8 below and Appendix 6 of the project document. Other M&E related costs are also presented in the Costed M&E Plan and are fully integrated in the overall project budget.

Table 8. Monitoring and Evaluation Budget and Plan

M&E activity	Budget from GEF	Budget co-finance	Time Frame
Inception Meeting	10,000	50,000	Within 2 months of project start-up
Measurement of project indicators (outcome, progress and performance indicators) at national and global level	55,582	300,000	Outcome indicators: start, mid and end of project Progress/perform. Indicators: annually by M&E officer and project partners through co-financing
Project Steering/Technical Working group meetings	20,000	306,997	Once a year minimum.
Annual Review and Planning meetings	20,000	225,000	Annually
Mid Term Review/Evaluation	30,000	35,000	At mid-point of project implementation
Terminal Evaluation	35,000	40,000	Within 6 months of end of project implementation
Total M&E Plan Budget	**170,582**	**956,997**	

The M&E plan will be reviewed and revised as necessary during the project inception workshop to ensure project stakeholders understand their roles and responsibilities vis-?-vis project monitoring and evaluation. Indicators and their means of verification may also be fine-tuned at the inception workshop. Day-to-day project monitoring will be the responsibility of the project management team but other project partners will have responsibilities to collect specific information to track the indicators. It will be the responsibility of the Project Manager to inform DFFE and UNEP of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely fashion.

The Project Steering Committee will receive periodic reports on progress and will make recommendations to the PMU, DFFE and UNEP concerning the need to revise any aspects of the Results Framework or the M&E plan. Project oversight to ensure that the project meets UNEP and GEF policies and procedures will be the responsibility of the Task Manager in UNEP-GEF. The Task Manager will also review the quality of draft project outputs, provide feedback to the project partners, and establish peer review procedures to ensure adequate quality of scientific and technical outputs and publications.

Project supervision will take an adaptive management approach. The Task Manager will develop a project supervision plan at the inception of the project which will be communicated to the project partners during the inception workshop. The emphasis of the Task Manager supervision will be on outcome monitoring but without neglecting project financial management and implementation monitoring. Progress vis-?-vis delivering the agreed project global environmental benefits will be assessed with the Project Steering Committee at agreed intervals. The quality of project monitoring and evaluation will also be reviewed and rated as part of the Project Implementation Review (PIR). Key financial parameters will be monitored quarterly to ensure cost-effective use of financial resources.

The Risk assessment and rating (Table 5) as well as the Risk Information Form (Appendix 11 of the project document), will be an integral part of the PIR. Perhaps the most infamous risk will be that posed by COVID-19. South Africa has swiftly adapted to this new environment and remains very dedicated to support implementation of this GEF project despite the challenges faced from this pandemic. The project will take the following actions to mitigate negative results arising from COVID-19 or any other health related risk: a) Identify critical stakeholders the absence of whom can lead to unplanned delays, b)

Consider legal and financial implications of COVID-19 and develop a mitigation plan at the inception stage, c) Communicate any disruptions due to COVID-19 to all stakeholders, including staff, UNEP and GEF, d) Conduct scenario analysis and consider alternative delivery methods, such as virtual or online meetings, radio programmes, recorded messages and guidelines, personal protective equipment or any other steps that will allow the project to be completed on time and on budget, even if it is delayed at some stages by COVID-19.

A mid-term management review or evaluation will take place after 2.5 years of project implementation as indicated in the project milestones. The review will include all parameters recommended by the GEF Evaluation Office for terminal evaluations and will verify information gathered through the GEF core indicator worksheet, as relevant. The review will be carried out using a participatory approach whereby parties that may benefit or be affected by the project will be consulted. Such parties were identified during the stakeholder analysis (see section 2 of the project document). The project Steering Committee will participate in the mid-term review and develop a management response to the evaluation recommendations along with an implementation plan. It will be the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented.

In line with the GEF Evaluation requirements and UNEP?s Evaluation Policy, the project will be subject to an independent Mid-Term Evaluation or management-led Mid-Term Review at mid-point. All GEF funded projects are subject to a performance assessment when they reach operational completion. This performance assessment will be either an independent Terminal Evaluation or a management-led Terminal Review.

The UNEP Evaluation Office will provide tools, templates, and guidelines to support the Review consultant. For the Terminal Review, the UNEP Evaluation Office will perform a quality assessment of the Terminal Review report and validate the Review?s performance ratings. This quality assessment will be attached as an Annex to the Terminal Review report, validated performance ratings will be captured in the main report.

However, if an independent Terminal Evaluation (TE) of the project is required, the Evaluation Office will be responsible for the entire evaluation process and will liaise with the Task Manager and the project implementing partners at key points during the evaluation. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP staff and implementing partners. The direct costs of the evaluation (or the management-led review) will be charged against the project evaluation budget. The TE will typically be initiated after the project?s operational completion if a follow-on phase of the project is envisaged; the timing of the evaluation will be discussed with the Evaluation Office in relation to the submission of the follow-on proposal.

The Evaluation Office will monitor compliance with this plan every six months for a total period of 12 months from the finalisation of the Recommendations Implementation Plan. The compliance performance against the recommendations is then reported to senior management on a six-monthly basis and to member States in the Biennial Evaluation Synthesis Report

10. Benefits

Describe the socioeconomic benefits to be delivered by the project at the national and local levels, as appropriate. How do these benefits translate in supporting the achievement of global environment benefits (GEF Trust Fund) or adaptation benefits (LDCF/SCCF)?

The project will provide benefits globally, nationally and locally. This project will enhance the capacity for implementation of a robust framework to manage IAS in South Africa. By strengthening South Africa?s strategies, mechanisms, and institutions for IAS prevention and management at the national level, globally significant biodiversity will be protected. The strengthening of IAS management will contribute to the development of social inclusion and gender equality, foster clear and transparent provisions and strengthen the capacity for local communities to benefit from their biodiversity, thereby generating opportunities for themselves. This will also have benefits to the local communities immediately impacted by invasives including those deriving livelihoods from forest, fresh water and agricultural ecosystems, directly through production, or indirectly such as through tourism and ecosystem services. Additional domestic benefits generated over the baseline case will be as a result of reduced impact of invasives on economic activity. Further benefits will accrue through replication of the approaches used at the pilot sites to other sites in the four countries. The approach used in the project as a whole will also provide lessons and opportunities for replication in other countries in Africa.

11. Environmental and Social Safeguard (ESS) Risks

Provide information on the identified environmental and social risks and potential impacts associated with the project/program based on your organization's ESS systems and procedures

Overall Project/Program Risk Classification*

PIF	CEO Endorsement/Approval	MTR	TE
	Medium/Moderate		

Measures to address identified risks and impacts

Elaborate on the types and risk classifications/ratings of any identified environmental and social risks and impacts (considering the GEF ESS Minimum Standards) and any measures undertaken as well as planned management measures to address these risks during implementation.

The project strategy, described in detail within this project document, identifies the following key risks (Table 5). These risks and the mitigation measures will be continuously monitored and updated throughout the project implementation period.

Table 5: Risks and risk management measures

Risks	**Significance of Risk**		**Mitigation Measures**
	Impact	**Probability**	
1) The government shifts its priorities from financing IAS control, biosecurity monitoring and enforcement which is critical for long-term sustainability of project interventions (Category = Financial)	4	1	**ESS Risk Level = Medium Risk** The project has beed designed so that the country?s capacity to control and manage IAS will be strengthened in parallel with relevant regulations, capacity, inter-government and inter-agency cooperation, and strong connections and engagement with local communities. In this way the sustainability of project interventions will not be reliant solely on government, but a diversity of stakeholders. This puts less pressure on government and allows for finances to be allocated to these key parts of an effective IAS control and management response.
2) Lack of cooperation and coordination between different public institutions in the management of IAS leads to inefficiencies in project implementation *Category = Operational*	4	3	**ESS Risk Level = Medium Risk** It is envisaged that these project-supported interventions would collectively provide sufficient incentive for the public institutions to cooperate with, and actively collaborate in, the project implementation. All affected public institutions have been actively consulted in the project design and development phase, and opportunities for their involvement in project implementation will be optimised wherever practicable. These public institutions will also be co-opted to be represented on, and participate in, the Project Steering Committee.

3) Conflicts between stakeholders over the regulation and management of IAS with perceived benefits undermines the efficacy of IAS control measures *Category = Strategic*	2	2	***ESS Risk Level = Low.*** The project will seek to promote an approach in which parties with different value systems agree on a win-win solution where invasive species can still deliver benefits, but adverse impacts are reduced. This will require open dialogue among stakeholders, trade-offs and compromises, taking into consideration the differences in use and management of natural resources by men and women. Where the impacts outweigh perceived benefits, the project will negotiate trade-offs and compromises that minimise the impact of the invasive species but retain a large proportion of their amenity values. In some cases, such as the use of biological agents to control invasive plants species (see Output 3.2), the project will employ strategies to try and effectively communicate the risks through open dialogue among stakeholders (see Output 2.1). Conflicts will, wherever possible, be resolved by avoiding biocontrol agents that have the ability of causing damage to the useful part of the plant, and instead using only seed-reducing agents (these reduce the reproductive potential of the plants, curb their dispersal and reduce the follow-up work needed after clearing, while still allowing for the continued utilization of the plant).

4) Project interventions will focus on control and management of priority IAS in order to reduce threats to native biodiversity and ecosystem functioning. As such there may be an incidental risk of the project causing damage or introducing/spreading IAS. *(Safeguard Standard 1: Biodiversity, Ecosystems and Sustainable Natural Resource Management; Qs 1.1-1.12)*	2	1	***ESS Risk Level = Low.*** South Africa has practiced biological control for nearly a hundred years, has an exemplary safety and success record, and is a leader in this field internationally. The control of IAS will enhance natural habitats, not contribute to degradation. IAS activities proposed in the project will be undertaken in compliance with policy and legal frameworks. The project will utilize biocontrol agents but this will not involve the introduction of genetically modified organisms. Once biocontrol agents have been collected in the country of origin, they are imported directly into quarantine. Host specificity testing will be carried out ensure that the proposed biological control agent is specific to the target species (a host specificity test list is a list of plants/insects closely related to the target weed or insect pest that is developed by a biological control researcher. The species on the list are exposed to the proposed biological control agent in a quarantine containment facility). Once the agent is considered to be host specific, and safe for release, only then is permission sought from the DEFF for its release.. All newly introduced potential biocontrol agents will be subjected to risk management frameworks such as host-specificity testing under quarantine conditions. Host-specificity testing protocols over the last 30 years have been refined and interpretation of the results is benefiting from an improved understanding of agent behavior. These protocols provide assurances that the agent cannot and will not attack plants other than the target species, and if populations of the host should become extinct locally, that the agent populations will not survive.

5) Climate change may adversely influence the potential outcomes of IAS interventions. *(Safeguard Standard 2: Climate Change and Disaster Risks; Qs 2.1 and 2.6)*	2	2	***ESS Risk Level = Low.*** *These impacts are more likely to arise over the longer-term than the duration of the project. The risk is assessed as low and no specific management responses are needed at this time. The status of the risk will be reassessed during implementation as needed.* The control of IAS is recognized as improving resilience against potential climate change and the impacts of the project will persist beyond the intervention project. IAS control will contribute to enhancing ecosystem resilience and reduce risks of fire, which will increase carbon sequestration potential.The project will strengthen biosecurity measures to prevent the introduction of new IAS (or strains of IAS) as a result of climate change and develop rapid response capacities to monitor and eradicate alien species that may become more invasive due to climate change. These improved biosecurity measures and rapid response capacities will include: implementing a more coordinated approach to biosecurity monitoring, prevention, early detection and emergency responses (Outputs 1.1 and 3.1.2); strengthening the biosecurity capacities (e.g. risk management system, inspection staff, sniffer dogs, cleaning equipment, quarantine facilities) to manage priority pathways of introduction (harbours and airports) to the country (Outputs 1.2 and 1.3); establishing and maintaining a central access point for improved biosecurity-related information and risk analysis (Output 2.2); and broadening the active involvement of the wider community in biosecurity activities along high risk introduction and post-introduction pathways, incorporating gender sensitive approaches(Output 2.1).

6) Management and control of IAS could involve occupational health and safety risks through inappropriate use of chemicals (herbicides, fungicides, pesticides). *(Safeguard Standard 3. Pollution Prevention and Resource Efficiency; Qs. 3.3 and Safeguard Standard 4: Community Health, Safety and Security; Qs 4.2 and 4.5)*	3	2	***ESS Risk Level = Medium.*** The project includes the use of hazardous chemicals for the control of IAS at Marion Island, Durban Harbour, and the local pilot demonstration sites at Winterveld and Elundini. In mitigation the project will include the compliance with protocols for the safe use of the chemicals, and training of people who will use these chemicals in compliance with national policy and legal frameworks, including supply and use of all necessary PPE. The disposal of the chemical containers will also be undertaken in compliance with policy and law. It will be undertaken on a relatively small scale and mitigated by preventative actions such as training and provision of PPE. An Occupational Health and Safety Plan will be prepared during the Inception Phase of the project. Project activities at Durban Harbour for the high pressure washing and fumigation of bulk and/or sea containers could result in water run-off. The safety protocols for these activities will be adhered to in compliance with national law, and the check and monitoring of compliance of these operations will be developed during the inception phase of the project when the chemical list to be used has been confirmed. Project activities will involve transport, storage use of chemicals for IAS control at Marion Island, Durban Harbour and the local pilot demonstration sites at Winterveld and Elundini. However this will be undertaken in compliance with law and the nature of the chemicals used will not create a risk of an emergency event. It will be undertaken on a relatively small scale and mitigated by preventative actions such as training and provision of PPE.

7) Emerging issues, such as COVID-19, particularly the emergence of variants that are resistant to vaccines, may hold up, delay or even jeopardise the implementation of the project altogether. In the **short term,** there is risk of increased COVID transmission due to people movements across project sites, while in the **long term,** there is a possible risk of other climate change-mediated diseases (and pandemics). *(Safeguard Standard 4: Community Health, Safety and Security; Q4.3)*.	3	3	**ESS Risk Level = Medium Risk** The project will take the following actions to mitigate negative results arising from COVID-19 or any other health related risk: a) Identify critical stakeholders the absence of whom can lead to unplanned delays, b) Consider legal and financial implications of COVID-19 and develop a mitigation plan at the inception stage, c) Communicate any disruptions due to COVID-19 or any other disease outbreak to all stakeholders, including staff, UNEP and GEF, d) Conduct scenario analysis and consider alternative delivery methods, such as virtual or online meetings, radio programmes, recorded messages and guidelines, personal protective equipment or any other steps that will allow the project to be completed on time and on budget, even if it is delayed at some stages by COVID-19 or any other widespread health related issue. A gender sensitive approach will be applied in the planning of these mitigating actions, and recognising that the impacts of COVID-19 have reshaped power relations between men and women as well as how they use and manage the environment. In the short term, the project will take preventive measures including protection of staff, partners and people in need by using protective equipment, physical distancing, minimizing physical meetings and use of virtual meetings. The project will also actively encourage staff and communities to take out vaccinations in full. The project will keep in close touch with the COVID-19 task forces established by government as well as health facilities in the project implementation sites to promptly report any incidence of the disease. For long term mitigation, the COVID 19 pandemic provides an opportunity for the local communities, CSOs, NGOs, and government agencies to come together for effective planning to mitigate the impacts associated with such pandemics. The project will take care of this during the implementation phase, by prioritizing it in M&E, as well as project planning activities.

8) Project interventions (e.g. regulations, protocols, IAS control activities e.g. at ports of entry/exit and Adopt-a-River within river catchments) may result in changed access / restrictions on use / temporary loss of access to land and natural resources for local communities. *(Safeguard Standard 6: Displacement and Involuntary Resettlement; Q 6.2)*	3	1	***ESS Risk Level = Low*** Project activities do not involve temporary or permanent displacement or relocation of people. Project activities do not involve economic displacement or relocation of people. Where the control of IAS involves species that are potentially used for economic purposes by local stakeholders the project inception phase will include consultation with the stakeholders to inform decision making and planning, and the necessary mitigation identified.

Supporting Documents

Upload available ESS supporting documents.

Title	Module	Submitted
Safeguard Risk Identification Form - 1_Dec_2021	**CEO Endorsement ESS**	

ANNEX A: PROJECT RESULTS FRAMEWORK (either copy and paste here the framework from the Agency document, or provide reference to the page in the project document where the framework could be found).

Annex A: Project Results Framework

Project Objective *Lasting and significant changes to which the project is expected to contribute*	**Objective level Indicators** *How contributions to the objective will be measured including quantity, quality, time*	**Baseline** *Initial Baseline for Objective indicator(s)*	**Targets and Monitoring Milestones**		**Means of Verification** *How the information required to measure the indicator will be collected, when, and by whom*	**Assumptions & Risks** *Assumptions and Risks that affect objective level*	**UNEP MTS reference** * *The Subprogramme under which the project objective can be fitted*
			Mid-Term *Mid-Point Target*	**End of Project** *End of project Target*			
The efficient and effective management of high-risk invasive alien species (IAS) directly mitigates their negative impacts on South Africa?s	New tools and methods of high-risk IAS surveillance are adopted by South African authorities at key national ports	There are numerous new and emerging invasive species that are currently not under management due to the absence of specific biosecurity risk management and surveillance systems.	South Africa?s biosecurity systems are able to mitigate the negative impacts of IAS on biodiversity	Effective management of IAS is able to contribute to improved biodiversity and rural food security as well as livelihoods	Bioscurity systems standard operating procedures Livelihood reports Growth and development indices	**Assumptions:** - State border agencies have the capacity to facilitate increased participation in management of IAS - Stakeholders are	

biodiversity assets, and indirectly contributes to the improvement of rural food security and livelihoods	Stakeholders partner with and support state biosecurity agencies in pre-border and post border risk analysis, surveillance, detection, reporting and control of high-risk IAS	Biosecurity management and systems (including data collection, storage, and sharing) are currently fragmented across several government departments and their agencies. The level of success in managing invasions is only 5.5%. In addition, there are very low levels of awareness on biological invasions and its legislation are low key stakeholder groups.	A centralised biosecurity information and risk analysis system is in place. A biosecurity awareness campaign targeting all key stakeholder groups is in place Bioblitz projects in key areas developed and implemented.	Key stakeholders are actively engaged with state biosecurity agencies to conduct risk analysis, surveillance, reporting and control of IAS using a functional centralised biosecurity information and risk analysis system	Operational centralised biosecurity information and risk analysis system Biosecurity awareness campaign plans and documents Report of awareness raising activities	willing and able to participate in biosecurity actions - IAS management and control re-mains one of the priority government programmes - **Risks:** - Covid-19 pandemic travel and meeting restrictions may jeopardize the management and control of IAS - Laxity of responsible agency officers may lead to IAS re-introductions - Lack of cooperation and coordination between different	
	Marion Island and Prince Edward Islands native biodiversity and ecosystem function are restored due to the absence of the invasive House Mouse	The House Mouse has re-configured species relationships on Marion Island through predation and competition.	Improved biosecurity and incursion response systems are in place to minimize future pest invasions	There is adequate research capacity and implementation of enhanced biosecurity measures leads to restoration of Marion Island ecosystems	- Project reports - Survey data - Research studies (dissertations, published articles, popular articles, policy briefs) - Biosecurity reports - Incursion response reports		

	High risk plant species in South Africa are managed and controlled	Only 24.3% of the 556 listed invasive alien taxa in South Africa are subjected to regular management. The remaining proportion are under scanty or no management at all.	Biocontrol agents, mass rearing and release protocols, as well as research capacity for IAS is developed.	Research capacity and biocontrol agents are available and actively being used for control of IAS	Project reports, Survey reports, Research studies (publications, workshop proceedings, etc.)	public agencies in the management of IAS leads to inefficiencies, incursions and re-introductions - Climate change creates new opportunities for the introduction of new, and further spread of existing, IAS	
Project Outcome *Capacity or behavioral changes to which the project is expected to contribute*	**Outcome Indicators** *How the outcome will be measured including quantity, quality, time*	**Baseline** *Initial Baseline for Outcome Indicator(s)*	**Targets and Monitoring Milestones**		**Means of Verification** *How the information required to measure the indicator will be collected, when, and by whom*	**Assumptions & Risks** *Assumptions and Risks that affect processes by which outcomes contribute to objectives*	**UNEP MTS reference *** *The Expected Accomplishment under which the project outcome can be fitted*
			Mid-Term *Mid-Point Target*	**End of Project** *End of project Target*			

1. South African authorities adopt new tools and methods of high-risk IAS surveillance at key national ports	There is enhanced capacity at key national ports of entry to conduct integrated and coordinated surveillance of high risk IAS	Biosecurity risk information is currently processed at separate centres depending on the nature of the IAS involved. There is no Biosecurity Risk Assessment/ Targeting Centre (BRA/TC)	South Africa is operating under a regulatory regime that facilitates exchange of biosecurity risk data from between and within government entities and/or the private sector	South Africa is operating integrated and coordinated surveillance of IAS at key ports of entry through an operational Biosecurity Risk Assessment/ Targeting Centre (BRA/TC)	BRA/TC Operator reports, IAS surveillance reports, Inter-agency working documents, Training reports, project reports, Inspection profiles of high risk travellers, goods or conveyances through the three pilot ports of entry	**Assumptions:** - Stakeholders are willing to take part in awareness-raising projects - Biosecurity detection dogs are able to detect a wide enough range of products arriving at ports of entry. - **Risks:** - Failure to reach	

	Durban harbour is able to mitigate the unintentional risks of introductions of the priority invasive species from container ships and break bulk cargo.	Durban harbour handles approx. 2.8 million containers per year (about 60% of the total number of containers handled at South African ports). It is estimated that three new alien taxa arrive in South Africa accidentally or illegally every year through ports of entry.	Watch lists of priority IAS, risk profiles of sea containers and break-bulk cargo and protocols for visual inspection of medium and high risk sea containers and break-bulk cargo are developed and under implementation at Durban harbor as part of a biosecurity risk management system	A biosecurity risk management system based on a national biosecurity risk policy and involving high-pressure container cleaning and washing, automated inspections and implementing a cost recovery module is operational and in use at Durban harbor	- Designs of the sea container and break-bulk cargo biosecurity risk management system at Durban harbor - Report detailing the operations of the sea container and break-bulk cargo biosecurity risk management at Durban harbour.	agreement on coordination mechanisms and information sharing by state border agencies and all relevant stakeholders. - Injury or sickness due to unsafe use of chemicals and equipment. - Lack of capacity to facilitate the timeous development of risk analyses. - Relatively short lifespan and working span of biosecurity detection dogs. - Contrasting perceptions or interpreta	
	Affected ports of entry are utilizing biosecurity detection dogs for detection of high risk invasive species	There are no dedicated units where dogs are used by the Department of Forestry and Fisheries and the Environment for the detection of potentially harmful agricultural pests in South Africa.	12 skilled and dedicated biosecurity detection dogs and 12 handlers are available and deployed for biosecurity detection at the 3 ports of entry i.e. ORTIA, Durban and Beit Bridge	ORTIA, Durban and Beit Bridge ports of entry are utilizing a team of four (4) biosecurity detection dogs and four (4) handlers to enhance their IAS surveillance	- Certification reports for biosecurity dogs and their handlers. - Report detailing the operations of biosecurity dogs and their handlers at each key port of entry		

	New and emerging invasive species are under effective monitoring and control	A Species Under Surveillance ? Possible Eradication or Containment Targets (SUSPECT) list and a watch list for South Africa are currently available. There is inadequate investigation and management of the species contained in these lists.	Profiles of 29 prospective IAS by distribution, ecology, population density, reproductive strategy, patterns of distribution, impacts and feasibility of eradication are available	South Africa is actively controlling the new and emerging invasive species through five-year species-specific management plans	- Management plans for all priority new and emerging invasive species. - Risk analysis reports.	tions among stakeholders of the value and impacts of alien species	
Outputs: 1.1. An inter-agency ?Biosecurity Risk Assessment/ Targeting Centre (BRA/TC) is established and operational 1.2. A sea container and break-bulk cargo biosecurity risk management system is piloted. 1.3. A small team of biosecurity detection dogs and their handlers are operational at key ports of entry. 1.4. New and emerging invasive species identified monitored and controlled.							

2. Stakeholders partner with and support state biosecurity agencies in pre-border and post border risk analysis, surveillance, detection, reporting and control of high-risk IAS	Key stakeholders are aware and supporting state biosecurity agencies in surveillance, detection, reporting and control of high risk IAS	Many stakeholders are not aware of their role in the biosecurity and the problem of biological invasions in the country.	A communication plan is in place and under implementation to disseminate specific targeted messages on biosecurity to key stakeholders	12 stakeholder groups, including nursery owners; Green Industries Council; Landscapers Institute; fruit and nuts import and export companies; forestry and fishing industry; farmers urban and rural communities; environment clubs; conservancies; and pet trade industry are of aware and actively involved in biosecurity.	Awareness reports, stakeholder reports	**Assumptions:** - Stakeholders are willing to take part in awareness-raising projects **Risks:** - Failure to reach agreement on coordination mechanisms and information sharing by state border agencies and all relevant stakeholders. - Lack of capacity	

	A centralized Biosecurity Information and Risk Analysis System is actively being utilized to engage communities about the importance of pre- and post-border biosecurity and influence public perception about biosecurity	There is no centralized biosecurity risk information system. Inter-agency coordination for biosecurity is currently fragmented/not clear across several government departments and their agencies (including data collection, storage, and sharing).	Appropriate plans are in place and being utilized to develop a centralized Biosecurity Information and Risk Analysis System	Communities and responsible biosecurity agencies are actively coordinating biosecurity responses through a centralized information and risk analysis system.	Collaboration agreements and detailed plans for the development of a centralized biosecurity information and risk analysis system Report detailing the operations of the centralized biosecurity information and risk analysis system,	to facilitate the timeous development of risk analyses. - Contrasting perceptions or interpretations among stakeholders of the value and impacts of alien species	
	Tsitsa and Tolwane rivers in the Eastern Cape and Gauteng provinces of South Africa are clear of invasive alien species	The Tsitsa and Tolwane river vegetation are composed of between 10 ? 60% invasive alien species. Adopt-a-River approach has been utilized to clear IAS elsewhere but has not been tried in the Tsitsa and Tolwane river systems	Communities along the Tsitsa and Tolwane river systems are aware of the Adopt-a-River approach and are involved in the clearing of the two river systems of invasive alien species	The abundance of IAS is cleared from the two river systems through community awareness and participation	Monitoring and Survey reports		

	GHG emissions avoided/sequestered in the Tsitsa and Tolwane river systems	Emissions of 1,985,457 metric tonnes of carbon dioxide equivalent (tCO2e) are being avoided/sequestered in the Tsitsa and Tolwane river systems	At least 3,600,000 metric tonnes of carbon dioxide equivalent (tCO2e) avoided/sequestered in the Tsitsa and Tolwane river systems	5,253,575 metric tonnes of carbon dioxide equivalent (tCO2e) avoided/sequestered through reforestation in the Tsitsa and Tolwane river systems	PIR report, Annual progress reports, monitoring reports, Mid-term evaluation reports, Terminal evaluation report, Impact evaluation report		
	Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment in management, risk analysis, surveillance, detection, reporting and control of high-risk IAS	Only a few stakeholders (women and men) have been directly capacitated and involved in management, risk analysis, surveillance, detection, reporting and control of high-risk IAS	At least 310 stakeholders (100 men & 210 women) participate as direct co-beneficiaries of GEF investment in management, risk analysis, surveillance, detection, reporting and control of high-risk IAS	At least 620 stakeholders (200 men & 420 women) participate as direct co-beneficiaries of GEF investment in management, risk analysis, surveillance, detection, reporting and control of high-risk IAS	PIR report, Annual progress reports, monitoring reports		
Outputs: 2.1. A ?biosecurity awareness and involvement campaign? is developed and implemented 2.2. A centralized Biosecurity Information and Risk Analysis System is operational and freely accessible to all responsible public biosecurity institutions. 2.3. Invasive alien plants are cleared at selected sites with the involvement of rural communities through the Adopt-a-River approach							

3.1 Marion Island is free of the House Mouse and the reintroduction of the mouse is controlled	Area of Marion Island under improved management through eradication of the invasive House Mouse	33,400 ha of Marion Island is infested with around 800 000 individuals of the invasive House Mouse at an average of 28 mice per hectare across the island, and higher in some areas	House Mouse is down to 50% of baseline in 15,000 hectares of Marion Island	33,400 ha of Marion Island is under improved management and free of the invasive House Mouse	- Project reports from team; monthly - Student reports, six-monthly - Confirmation monitoring reports - Environmental Conservation Officer reports	**Assumption:** - Project staff are willing to work in remote locations - There is ongoing agency commitment to keeping the islands pest-free. - Stakeholders are able and willing to cooperate in the management and control of IAS **Risk:** - Lack of political support may delay or hamper the permits / authorizations necessary for the eradication operation and	
	Relevant agencies have adequate capacity to manage and maintain rodent-free status at the Prince Edward Islands	There are limited guidelines and protocols to prevent the introduction and control of rodents at the Prince Edward Islands. There is no Incursion Response Plan for the islands.	Appropriate guidelines, protocols and approaches (in the form of a biosecurity handbook, incursion response plan and trained staff) are available and being utilized to maintain a mouse free Marion Island	All relevant agencies have built the necessary capacity through skilled manpower and are actively using appropriate guidelines, protocols and approaches to maintain and control a rodent-free Marion and Prince Edward Islands	- Biosecurity Handbook - Incursion Response Plan - Training reports - Project reports - Biosecurity logs - Incursion surveillance reports - Job performance reports		

3.2 South Africa contains the spread of five high-risk invasive plant species (*Tecoma, Biancea, Anredera*, *Xanthium* and *Schinus*).	- Area of landscapes under improved management through control of the spread of 5 high risk invasive plant species (*Tecoma, Biancea, Anredera, Xanthium* and *Schinus*) - Greenhouse gas emissions sequestered through improved biodiversity as a result of controlled spread of invasive alien species	- Only 0.36% (108,000 ha) of invaded land is subjected to active management/ control of IAS. Only 6.4% of IAS populations have either been eradicated or brought under complete biological control. - Emissions of 3,000,000 metric tonnes of carbon dioxide equivalent (tCO2e) are being avoided/sequestered in the landscapes with IAS	- -Biocontrol agents for 5 IAS (Biancea, Xanthium and Schinus) screened and application to release them submitted to regulatory authorities. - -100,000 ha of landscapes under improved management though biological control of 2 IAS (Tecoma and Anredera) spread throughout distribution range - At least 3,200,000 metric tonnes of carbon dioxide equivalent (tCO2e) avoided/sequestered in the landscapes under IAS management	- 300,000 ha of landscapes under improved management through biological control of 5 IAS (Tecoma, Biancea, Anredera, Xanthium and Schinus) throughout their distribution range - . - 3,450,117 metric tonnes of carbon dioxide equivalent (tCO2e) avoided/sequestered through reforestation in the landscapes under IAS management	Project reports, Survey reports, Research studies (publications, workshop proceedings, etc.), Permission of release agents	associated GEF-funded activities - Failure of biosecurity procedures leads to the re-introduction of rodents to the island during the baiting operation and subsequent monitoring period -	
	Local scientists are able to develop and implement biocontrol measures against the 5 IAS	The level of knowledge required to fast-track the management and control of some species e.g. *Cestrum, Shinus* and *Arundo,* and also sustain practice is limited	3 researchers at the ARC have the requisite capacity to develop biocontrol management practices and techniques for management of IAS	3 researchers at the ARC have the requisite capacity to develop biocontrol management practices and techniques for management of IAS	Research reports, Human resource reports, publications		

Outputs
3.1.1 The House Mouse on Marion Island is eradicated
3.1.2 Protocols to control and prevent future introductions of the House Mouse to Marion and Prince Edward Islands developed
3.2.1 Biocontrol agents for 5 high risk invasive plant species (*Tecoma*, *Biancea*, *Anredera*, *Xanthium* and *Schinus*) developed and released
3.2.2 Existing biocontrol agents for *Tecoma,* and *Anredera* mass-reared and released.
3.2.3 Capacity of *Cestrum*, *Shinus* and *Arundo* researchers in the development of biocontrol agents built.

ANNEX B: RESPONSES TO PROJECT REVIEWS (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF).

Annex B: Response to Project Reviews (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion, and responses to comments from the Convention Secretariat and STAP at PIF).

GEF Council Comments (June 2020)	Responses
??***Germany Comments:*** Germany requests that the following requirements are taken into account during the design of the final project proposal:	
? Germany would like to request that the overall project approach and feasibility are re-evaluated during the further design of the project, in particular activities, outcomes and outputs under the components 1 and 2. The proposal combines many tasks at different levels, including setting up an inter-agency Risk Assessment Centre as well as a biosecurity risk management system, controlling ports of entry and involving a vast number of stakeholders, including private sector, local communities and environmental groups. While we welcome the overall project goals as an effective means to conserve biodiversity, we would recommend that the project focuses on aspects that are feasible within the given timeframe and budget.	The project design took this into consideration and project activities in component 1 and 2 were developed bearing feasibility in mind.

? With regard to invasive alien vegetation, its competition with indigenous vegetation and the overall water balance (e.g. the ?adopt a river? approach by the communities), a connection could be made with the GIZ Regional Project NATURES, as they have activities which tackle invasive alien species to preserve water.	The Department of Water and Sanitation has implemented the GIZ Natural Resources Stewardship Programme in areas of South Africa e.g. uMhlathuze with much success. In this GEF project, the DFFE has partnered with the DWS to implement the Adopt-a-River approach by local communities for the eradication of IAS in two river systems. The DWS will lead the activity and will bring its experience and linkage with the NATUREs project to achieve the cleaning of the river system for ease of access to the water resources by the local communities.

Response to SATP comments - 18 Nov 2021

10524 : Project Title: Capacity strengthening for management of invasive alien species in South Africa to enhance sustainable biodiversity conservation and livelihoods improvement		
What STAP looks for	**STAP comments**	**Agency response**
A simple narrative explaining the project?s logic, i.e. a theory of change.	There is no explicit TOC, and project design and development would benefit from this. The TOC of this project is quite simple and is implicit in the project description, but an explicit TOC would be a valuable tool for participatory project planning and help articulate key assumptions underlying project implementation and success.	The detailed TOC has been done
are the lessons learned from similar or related past GEF and non-GEF interventions described; and	No, no specific lessons are described, and further project development would be enhanced by careful examination of lessons learned from similar/related projects.	Lessons learnt from The USA, Canada, UK, Australia, and New Zealand (the Border Five countries which are global leaders in risk-based compliance management at the border) have been included and were used to inform the design of the project
how did these lessons inform the design of this project?	See above	See above
What is the theory of change?	There is no explicit TOC, but as indicated above, the internal logic of this project is quite straightforward and is clearly explained in the narrative project description.	The detailed TOC has been done
Are the mechanisms of change plausible, and is there a well-informed identification of the underlying assumptions?	The mechanisms of change are plausible, but underlying assumptions are not articulated. A good TOC would assist in doing this.	The detailed TOC has been done
Is there a recognition of what adaptations may be required during project implementation to respond to changing conditions in pursuit of the targeted outcomes?	No, not explicitly, although some responses are identified at section 5 in consideration of risks. More thinking on this front would strengthen the project.	A detailed risk analysis has been done and is well articulated in the prodoc and the CEO ER
Are indicators, or methodologies, provided to demonstrate how the global environmental benefits/adaptation benefits will be measured and monitored during project implementation?	Yes (to some extent ? some cannot be but are nevertheless important).	The logframe has been developed

What activities will be implemented to increase the project?s resilience to climate change?	None are explicitly considered. However, it is hard to see that climate change would directly affect the project and its outcomes. Climate change may make the threat addressed by this project worse (a risk addressed at 5.), but is unlikely to affect the measures established by the project.	A detailed climate screening has been done
Will incremental adaptation be required, or more fundamental transformational change to achieve long term sustainability?	This project could be described as modestly transformative ? it is not trying to transform a whole system, but is trying to transform (rather than adapt) the way IAS are managed in order to shift from reactive battling against invaders toward averting future introductions or addressing them more effectively at early stages. The chance for sustainability (durability) of project outcomes appears high ? the project is largely piloting new ways of doing things for established institutions, in order to ramp up their ability to counter IAS, to put them at project?s end in a much better to pursue these goals more effectively.	The section on sustainability give this in detail
Are the identified risks valid and comprehensive? Are the risks specifically for things outside the project?s control? Are there social and environmental risks which could affect the project?	This appears to be a robust set of risks and response measures are particularly well thought-through and detailed. On climate risk, climate risk screening has not been undertaken in any clear way, although some general consideration of climate risk is included here.	There is a robust set of risks and response measures. The climate risk and climate risk screening has been undertaken and attached as an appendix to the prodoc
Are the project proponents tapping into relevant knowledge and learning generated by other projects, including GEF projects?	There is little evidence of this presented.	The CEO ER and the prodoc gives detailed explanation of how the project will tap into relevant knowledge and learning generated by other projects, including GEF projects
Is there adequate recognition of previous projects and the learning derived from them?	See above.	See above.
Have specific lessons learned from previous projects been cited?	See above.	See above.
How have these lessons informed the project?s formulation?	See above.	See above.

Is there an adequate mechanism to feed the lessons learned from earlier projects into this project, and to share lessons learned from it into future projects?	This is not clear and should be strengthened.	Yes, there an adequate mechanism to feed the lessons learned from earlier projects into this project, and to share lessons learned from it into future projects

ANNEX C: Status of Utilization of Project Preparation Grant (PPG). (Provide detailed funding amount of the PPG activities financing status in the table below:

Annex C: Status of Utilization of Project Preparation Grant (PPG) (Provide detailed funding amount of the PPG activities financing status in the table below

PPG Grant Approved at PIF:

Project Preparation Activities Implemented	***GETF/LDCF/SCCF Amount ($)***		
	Budgeted Amount	***Amount Spent To date***	***Amount Committed***
Project Design Expert / international consultants	45,450	30,000	15,450
Consultancy on detection and surveillance capacities at key national ports of entry	18,000	18,000	0
Consultancy on Marion Island and Prince Edward Island	15,000	15,000	
Consultancy for coordinating PPG activities/processes at National level	15,000	15,000	
consultancy on biocontrol for plant spp.	15,000	15,000	
Consultancy on biosecurity communications and information flows	15,000	15,000	
Baseline information Consultancy	15,000	15,000	
Social safeguards and gender consultant	10,000	10,000	
Travel	1,550	0	1,550
Total	***150,000***	***133,000***	***17,000***

If at CEO Endorsement, the PPG activities have not been completed and there is a balance of unspent fund, Agencies can continue to undertake exclusively preparation activities up to one year of CEO Endorsement/approval date. No later than one year from CEO endorsement/approval date. Agencies should report closing of PPG to Trustee in its Quarterly Report.

ANNEX D: Project Map(s) and Coordinates

Please attach the geographical location of the project area, if possible.

The project addresses IAS Management at national and municipal/district sites with a specific focus on:

a) Improving the operational management of high-risk introduction pathways for priority alien invasive species at the following port of entries:

i). OR International Airport (26? 08? 00? S, 028? 15? 00? E)

ii). Beitbridge (22? 13? 51.6?? S, 29? 59? 13.2?? E)

iii). Durban Habour (29? 52? 24? S, 31? 01? 28? E)

b) Increasing the capacity to secure and manage a rodent-free status on Marion Island (46? 53? 19? S, 37? 44? 08? E), one of the two Prince Edward Islands in the southern Indian Ocean, about 1190 miles (1920 km) southeast of Cape Town.

c) Controlling Invasive Alien Species at key sites with the involvement of rural communities using the Adopt-a-River approach at two river systems:

i). Tsitsa river of the Uzimvumbu catchment in the Eastern Cape at the following sites: Mpetsheni 31? 5' 17" S, 28? 40' 8" E; Sibomvaneni 31? 5' 1" S, 28? 37' 51" E; PG Bison Plantations 31? 9' 35" S, 28? 12' 31" E and Nontlangatshe 30? 45' 49" S, 28? 3' 23" E), and

ii). Tolwane river catchment (25? 28' 53" S, 28? 1' 56" E) in Winterveldt in Gauteng province.

d) Containing the spread of high-risk invasive plant species at thirteen sites across the provinces of:

i). Gauteng (Gerotek: 25? 45' 40? S; 28? 1' 27? E),

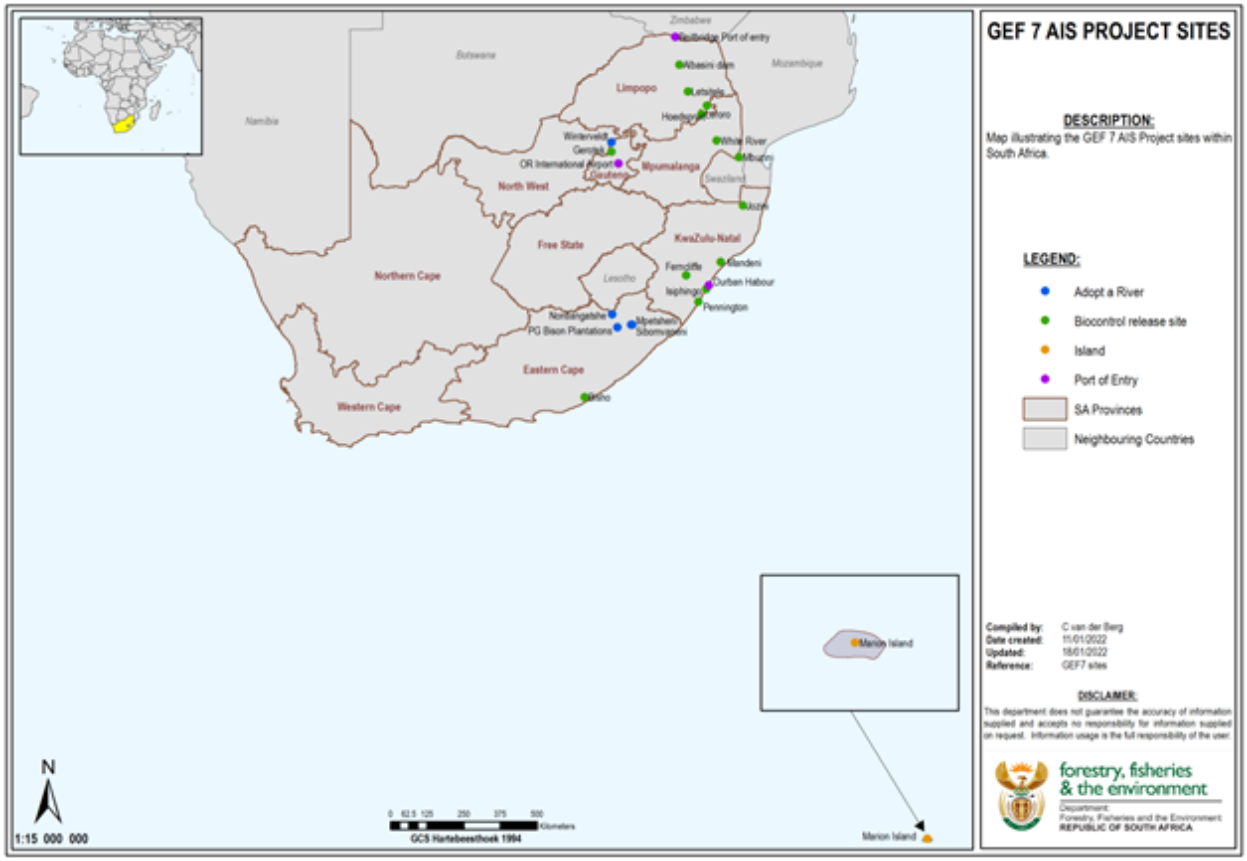
ii). Limpopo (Letsitele: 23? 54' 32? S, 30?22'34.1? E; Hoedspruit: 24? 21' 0" S, 30? 58' 0? E; Leroro: 24? 36? 33? S, 30? 47? 19? E; Albasini dam: 23? 05? 16.5? S, 30? 06? 45.8? E),

iii). Mpumalanga (Mbuzini: 25? 55' 48" S, 31? 57' 0" E; White River: 25? 25? 21? S; 31? 15? 54? E),

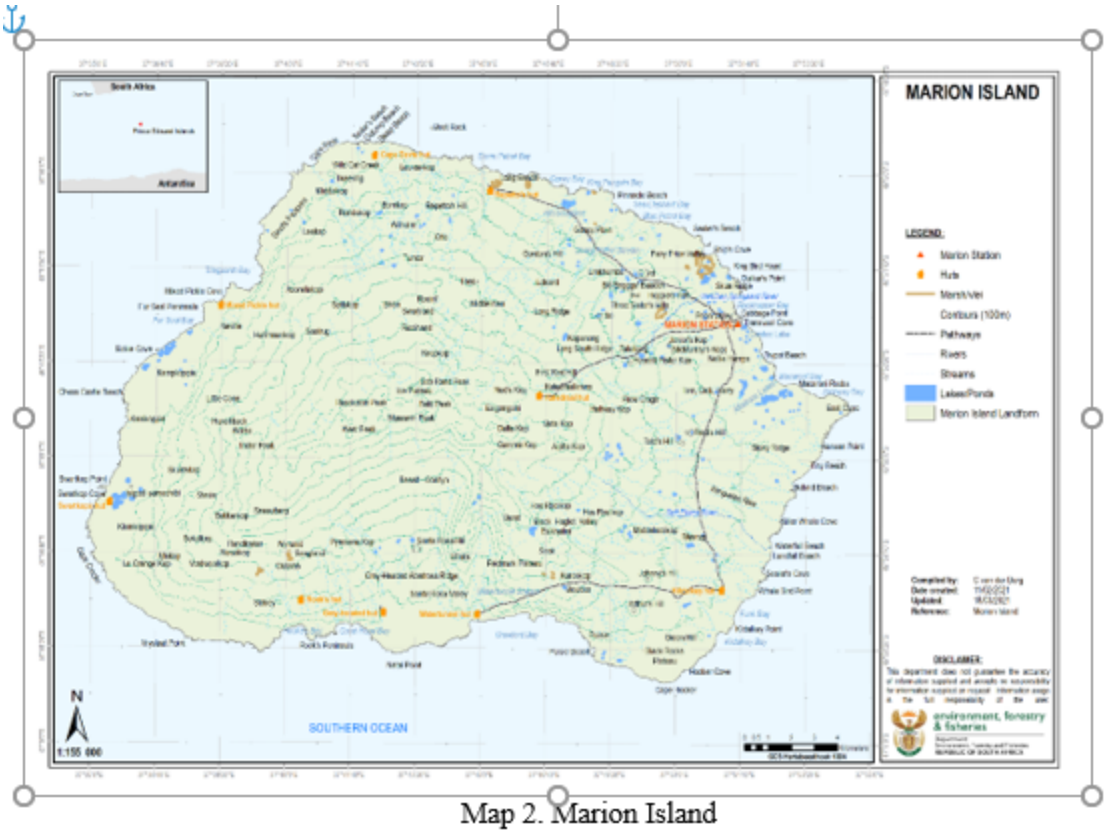
iv). KwaZulu Natal (Mandeni, 29? 9' 8? S, 31? 23' 15.9? E; Jozini: 27? 15' 7" S, 32? 23' 23" E; Pennington: 30? 22? 41? S, 30? 42? 1? E; Ferncliffe: 29? 33? 33.7? S, 30? 19? 31.4? E; Isiphingo: 29? 59? 16.9?? S, 30? 56? 15.87?? E), and

v). Eastern Cape (Near Bisho: 33? 30? 83?? S; 27? 20? 89?? E).

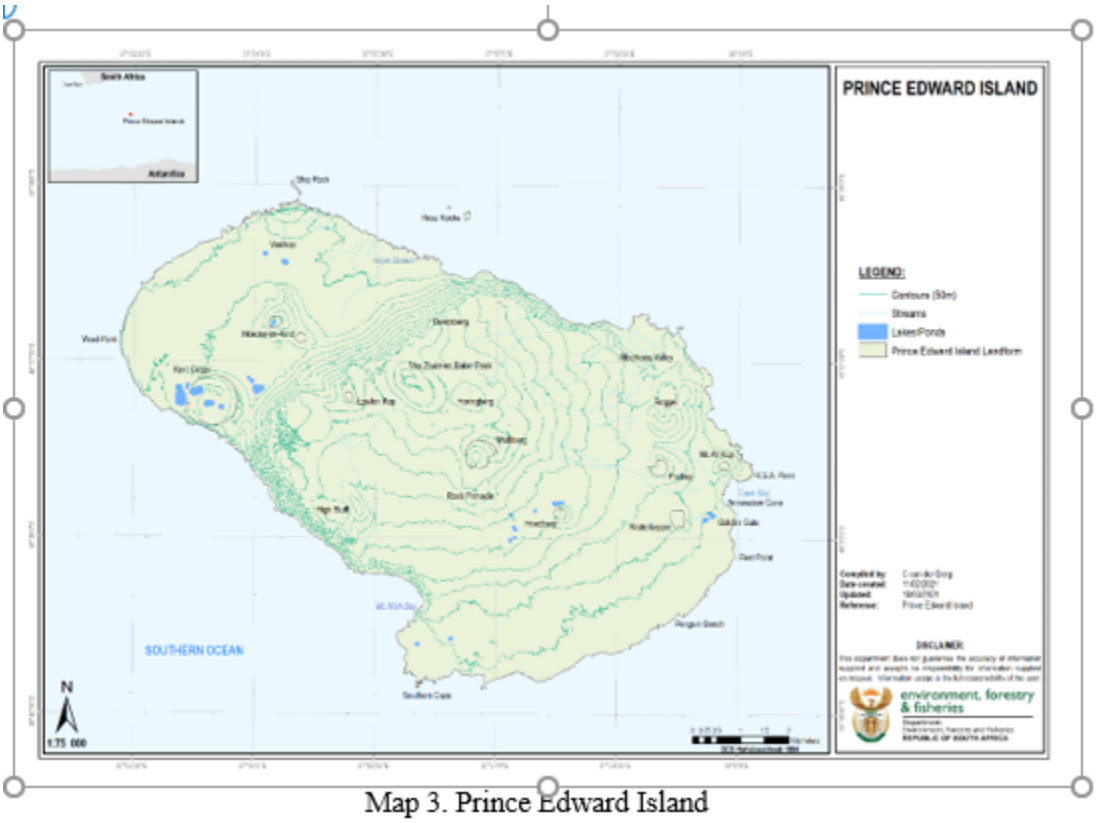
A synoptic map of the locations of the above mentioned project sites is presented as Map 1 below.



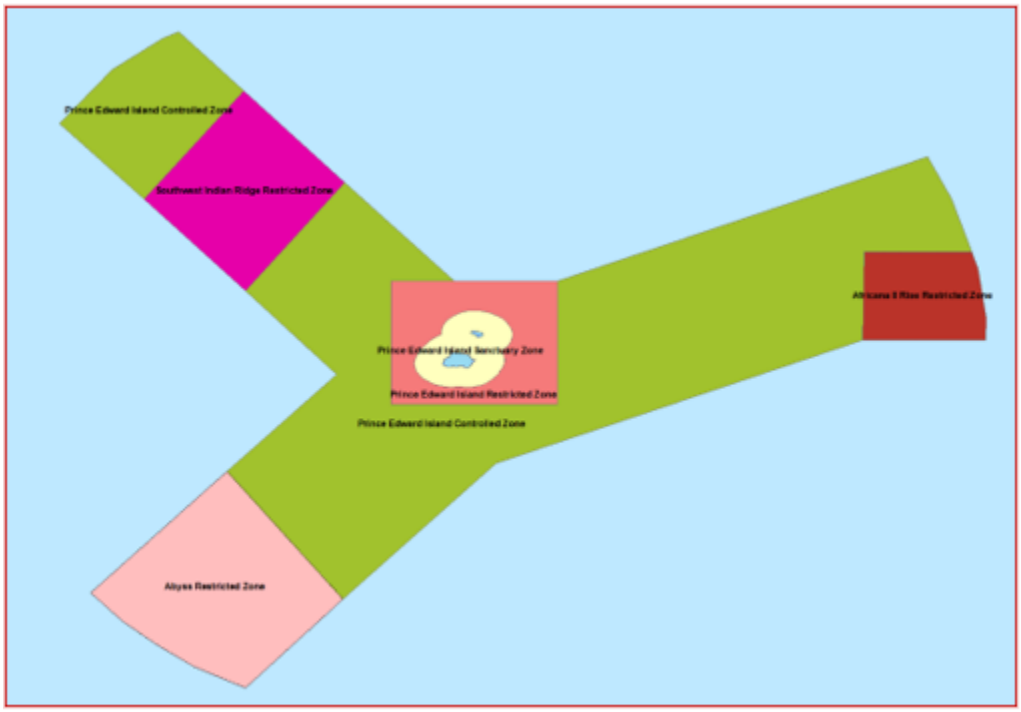
Map 1. Location of project sites across South Africa



Map 2. Marion Island



Map 3. Prince Edward Island



Map 4. Prince Edward Islands Marine Protected Area

ANNEX E: Project Budget Table

Please attach a project budget table.

Overall project budget - see the detailed budget attached as appendix 1

The project will be financed by a full size GEF grant of USD 3,411,644, with a total co-financing of USD 22,844,660. A summary of the project costs is given in Table 9 and Table 10 below. The detailed project budget is provided in Appendix 1 and 2. The project budget may be subject to revision during implementation

From:	**2023**	

To:	2027		Expenditure by project component/activity					
UNEP Budget Line			**1**	**2**	**3**	**M&E**	**PMC**	**Total**
10	**PERSONNEL COMPONENT**							
	1100	**Project personnel**						
	1101	National Project Coordinator (co-financed position)					-	-
	1102	Project Manager	43,500	43,500	42,441		50,559	180,000
	1103	Project M&E Officer	22,150	22,138	32,130	55,582		132,000
	1104	Finance and Administrative Assistant	-	-	-		75,000	75,000
	1199	**Sub-total**	**65,650**	**65,638**	**74,571**	**55,582**	**125,559**	**3 87,000**
	1200	**Consultants**						**-**
	1201	Biosecurity Risk Indicator Consultant (Component 1)	20,000					20,000
	1202	Operating Model Consultant (Component 1)	20,000					20,000
	1203	Inter-agency ?Biosecurity Risk Assessment/ Targeting Centre System Consultant (Component 1, Output 1.1)	20,000					20,000
	1204	Legal Consultant Regulations (Component 1)	20,000					20,000
	1205	Biosecurity trainer/consultant (Component 3)			20,000			20,000
	1206	Development of Incursion Plan (Component 3)			20,000			20,000
	1299	**Sub-total**	**80,000**	**-**	**40,000**	**-**	**-**	**1 20,000**
	1600	**Travel on official business**						**-**
	1601	International travel	10,000	10,000	10,000			30,000
	1602	National travel	30,000	40,000	30,000			100,000

	1699	**Sub-total**	**40,000**	**50,000**	**40,000**	**-**	**-**	**1 30,000**
1999	**Component total**		**1 85,650**	**115,638**	**154,571**	**55,582**	**125,559**	**6 37,000**
20	**SUB-CONTRACT COMPONENT**							
	2100	**Sub-contracts (MOUs/LOAs for cooperating agencies)**						**-**
	2101	ARC - Develop and release biocontrol agents for priority IAS (outcome 3.2)			300,000			300,000
	2102	DWS - Clear IAS from Toloane and Tsitsa rivers (Adopt-a-River approach)		400,000				400,000
	2103	SANBI - Biosecurity awareness and involvement campaign		200,000				200,000
	2104	DALRRD - Recruitment & training of biosecurity detection dogs & their handlers	100,000					100,000
	2105	DFFE - Establish & pilot a sea container & break-bulk cargo biosecurity risk management system at Durban & Beit Bridge	291,000					291,000
	2106	SANBI - Monitor and control new and emerging invasive species	200,000					200,000
	2107	DFFE - Establish & deploy a centralized Biosecurity Information & Risk Analysis System		200,000				200,000
	2108	DFFE - Establish and deploy a Biosecurity Risk Assessment/ Targeting Centre	500,000					500,000
	2199	**Sub-total**	**1,091,000**	**800,000**	**300,000**	**-**	**-**	**2,191,000**
	2200	**Sub-contracts (MOUs/LOAs for supporting organizations)**						**-**

	2201	BirdLife South Africa - Eradication of house mouse on Marion Island (outcome 3.1)			300,000			300,000
	2299	**Sub-total**	**-**	**-**	**300,000**	**-**	**-**	**300,000**
2999	**Component total**		**1,091,000**	**800,000**	**600,000**	**-**	**-**	**2,491,000**
30	**TRAINING COMPONENT**							
	3200	**Group training**						**-**
	3201	Incursion response training			1,500			1,500
	3202	Biosecurity training			1,500			1,500
	3203	Gender & social safeguard: Awareness campaign (ALSA)			4,844			4,844
	3204	Awareness and safety training for overwintering team			1,300			1,300
	3299	**Sub-total**	**-**	**-**	**9,144**	**-**	**-**	**9,144**
	3300	**Meetings/Conferences**						**-**
	3301	Project Inception Workshop				10,000		10,000
	3302	Project Steering/Technical Working group meetings	30,000	30,000	10,000	20,000		90,000
	3303	Annual Review and Planning meetings	13,000	10,418	16,582	20,000		60,000
	3399	**Sub-total**	**43,000**	**40,418**	**26,582**	**50,000**	**-**	**160,000**
3999	**Component total**		**43,000**	**40,418**	**35,726**	**50,000**	**-**	**169,144**
40	**EQUIPMENT AND PREMISES COMPONENT**							
	4200	**Non-expendable equipment**						**-**
	4201	Office equipment (computers, printers, photocopiers, etc)		-			20,000	20,000
	4202	Field equipment (cell phones, tablets, etc)					10,000	10,000

	4203	Communication and stationery					10,000	10,000
	4299	**Sub-total**	**-**	**-**	**-**	**-**	**40,000**	**40,000**
4999	**Component total**		**-**	**-**	**-**	**-**	**40,000**	**40,000**
50	**MISCELLANEOUS COMPONENT**			-				
	5100	**Operation and maintenance of equipment**						**-**
	5101	Repair and service of office equipment (printers, photocopiers, etc)					5,000	5,000
	5199	**Sub-total**	**-**	**-**	**-**	**-**	**5,000**	**5,000**
	5200	**Reporting costs**						**-**
	5201	Biosecurity Handbook production			4,500			4,500
	5299	**Sub-total**	**-**	**-**	**4,500**	**-**	**-**	**4,500**
	5500	**Evaluation**						**-**
	5501	Mid-term evaluation				30,000		30,000
	5502	Terminal evaluation				35,000		35,000
	5599	**Sub-total**	**-**	**-**	**-**	**65,000**	**-**	**65,000**
5999	**Component total**		**-**	**-**	**4,500**	**65,000**	**5,000**	**74,500**
99	**GRAND TOTAL**		**1,319,650**	**956,056**	**794,797**	**170,582**	**170,559**	**3,411,644**

ANNEX F: (For NGI only) Termsheet

Instructions. Please submit an finalized termsheet in this section. The NGI Program Call for Proposals provided a template in Annex A of the Call for Proposals that can be used by the Agency. Agencies can use their own termsheets but must add sections on

Currency Risk, Co-financing Ratio and Financial Additionality as defined in the template provided in Annex A of the Call for proposals. Termsheets submitted at CEO endorsement stage should include final terms and conditions of the financing.

N/A

ANNEX G: (For NGI only) Reflows

Instructions. Please submit a reflows table as provided in Annex B of the NGI Program Call for Proposals and the Trustee excel sheet for reflows (as provided by the Secretariat or the Trustee) in the Document Section of the CEO endorsement. The Agencys is required to quantify any expected financial return/gains/interests earned on non-grant instruments that will be transferred to the GEF Trust Fund as noted in the Guidelines on the Project and Program Cycle Policy. Partner Agencies will be required to comply with the reflows procedures established in their respective Financial Procedures Agreement with the GEF Trustee. Agencies are welcomed to provide assumptions that explain expected financial reflow schedules.

N/A

ANNEX H: (For NGI only) Agency Capacity to generate reflows

Instructions. The GEF Agency submitting the CEO endorsement request is required to respond to any questions raised as part of the PIF review process that required clarifications on the Agency Capacity to manage reflows. This Annex seeks to demonstrate Agencies? capacity and eligibility to administer NGI resources as established in the Guidelines on the Project and Program Cycle Policy, GEF/C.52/Inf.06/Rev.01, June 9, 2017 (Annex 5).

N/A