



REPUBLIC OF THE MARSHALL ISLANDS

National Invasive Species Strategy and Action Plan

2021—2029





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SPREP
Secretariat of the Pacific Regional
Environment Programme



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Acknowledgements	iv
Foreword	v
Key concepts	vi
Acronyms	viii
1 Introduction	1
1.1 Introduction to the Republic of the Marshall Islands	2
1.2 The significant threat of invasive species for the RMI	3
1.3 Invasive species – everyone's responsibility	8
1.4 Biodiversity at risk in the Republic of the Marshall Islands	9
1.5 Why is a NISSAP needed?	10
1.6 Process of NISSAP development	13
2 Linkages of the NISSAP to other strategies	15
2.1 National strategies	15
2.2 Regional strategies	16
2.3 Community plans	17
3 Guiding principles	18
4 Goal, themes, and outcomes	19
4.1 Goal	19
4.2 Themes	19
4.3 Outcomes	20
5 Pathway identification	21
5.1 International pathways	21
5.2 Internal pathways	23
6 Roles and responsibilities in invasive species management	24
6.1 Local community	24
6.2 National	24
6.3 Regional	25
7 Past and current programmes	26
8 Legislation and international conventions	27
8.1 National legislation	27
8.2 International conventions and agreements	29
9 Action plan	33
9.1 THEME A Foundations	33
9.2 THEME B Problem Definition, Prioritisation, and Decision-Making	39
9.3 THEME C Management Action	41
10 Monitoring and evaluation	48
11 Bibliography	51
12 Annexes	53
12.1 ANNEX 1 Priority invasive species for management in the RMI	53
12.2 ANNEX 2 Priority invasive species for prevention from the RMI	55
12.3 ANNEX 3 Priority sites	56
12.4 ANNEX 4 Consultations for the NISSAP review	57
12.5 ANNEX 5 Regional and international organisations and databases related to invasive species management	65

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This plan was based on the National Invasive Species Strategy and Action Plan guiding principles developed by the Secretariat of the Pacific Regional Environment Programme (SPREP) Pacific Regional Invasive Species Management Support Service (PRISMSS). The revised RMI NISSAP was drafted by Monica Gruber of Pacific Biosecurity, Ray Pierce of Eco-Oceania, and the RMI Government. Assistance was kindly provided by RMI Ministry of Natural Resources of Commerce, Ministry of Environment, SPREP Invasive Species Team, and PRISMSS partners.

The development of the National Invasive Species Strategy Action Plan for Republic of the Marshall Islands is an activity under the GEF 6 Regional Invasives Project (GEF 6 RIP) – Strengthening national and regional capacities to reduce the impact of Invasive Alien Species on globally significant biodiversity in the Pacific. The GEF 6 RIP is funded by the Global Environment Facility, implemented by the United Nations Environment Programme, and executed by the Secretariat of the Pacific Regional Environment Programme.



A wandering tattler with ruddy turnstones on Nadikdik.

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FOREWORD

It gives me great pleasure to introduce the National Invasive Species Strategy and Action Plan of the Marshall Islands – the NISSAP. The Ministry, in particular the Division of Quarantine, must attach considerable importance to this action plan, as it will now serve as the principal guide to their planning and operations surrounding invasive species.

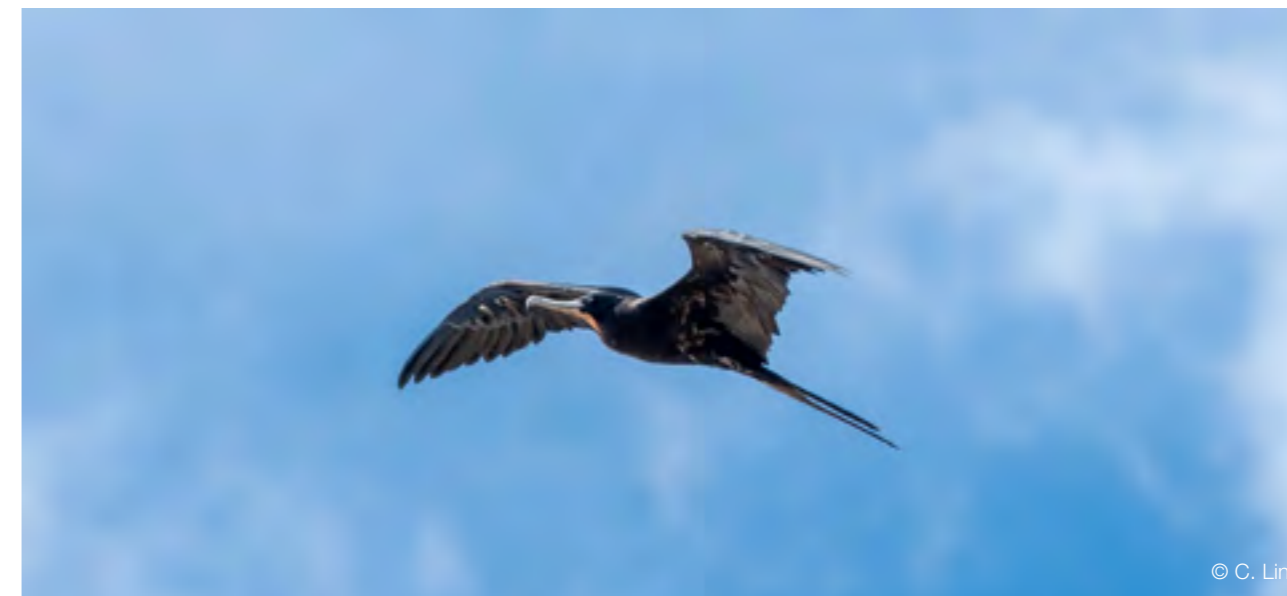
The NISSAP aims to protect the RMI's natural resources, environment, and communities from the impact of invasive species. Further, it seeks to enhance and strengthen cooperation and coordination to combat invasive species by improving public awareness, enhancing capacity for managing and preventing the introduction and spread of invasive species.

The NISSAP includes an overview of the current situation of invasive species in the RMI and identifies the process for their management. The Ministry of Natural Resources and Commerce will implement the NISSAP in cooperation with key stakeholders and partners.

I wish to give my sincere gratitude and a special tribute to the community leaders, youth, government and non-government organizations, women representatives, farmers, and fishers who contributed and provided guidance throughout the consultations. Last, but not least, I acknowledge the effort and sacrifice rendered by the hard-working team from the Division of Quarantine who, through their hard work and dedication, have enabled the timely completion of this action plan.

Hon. Anthony M. Muller

Minister of Natural Resources and Commerce



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KEY CONCEPTS

Biocontrol or biological control	Controlling an invasive species by introducing a natural enemy, such as an insect or fungus, that specifically attacks the target species and does not attack other native or economically important species.
Biodiversity	The variety of living organisms on Earth, including the variability within and between species and within and between ecosystems.
Biosecurity	Preventing the spread of invasive species across international or internal borders.
Containment	Keeping an invasive or pest species within a defined area.
Control	Reducing the population of an invasive species (numbers and distribution).
Ecosystem	Plants, animals, and other organisms and the physical environment in which they live and interact with each other. Types of ecosystems with distinct characteristics include lagoons, forests, and grasslands.
Ecosystem services	All the benefits to people provided by the natural environment and from healthy ecosystems. Some of the benefits of healthy ecosystem function include natural pollination of crops, clean air and water, nutrient cycling, and food productivity. Ecosystem services are usually referred to within four categories: regulating, provisioning, cultural, and supporting services.
Effective management	Achieving operational success (such as reducing the pest to defined levels) and desired outcomes (such as reduced impact and recovery of impacted values) of invasive species management.
Emergency response	The differences between the terms emergency response, incursion response and EDRR might not be obvious: <ul style="list-style-type: none"> Emergency response <ul style="list-style-type: none"> Emergency response is a general term that describes an event that requires some immediate action to decrease the impact of the event. Ideally, that event has been planned for, but it is not exactly predictable, such as where a cyclone might make landfall. Incursion response <ul style="list-style-type: none"> Incursion response is an emergency response where the event is the arrival of a harmful pest or invasive species. Early Detection and Rapid Response (EDRR) <ul style="list-style-type: none"> Early detection and rapid response plans also target invasive species or pests. EDRR requires similar actions as for emergency or incursion response but also includes prioritisation, surveillance (for early detection), and being actively prepared. Active preparedness is crucially important to acknowledge in the Pacific islands because remote locations and lack of locally available treatment products slow the ability to respond rapidly.
Emergency response plan	When targeting pests and diseases, usually referred to as an incursion response plan. An incursion response plan is an emergency response plan to deal with a newly detected invasive species, plant or animal disease, or pest.
Endemic species	A native species that naturally occurs confined to a single specific country or area. Indigenous (native) species occur naturally in one or more places.
Environmental Impact Assessment	Evaluates the impact of development and other activities on the environment and puts in place actions to mitigate these environmental impacts.
Environmental and social impact assessment	In addition to assessing environmental impact, an ESIA evaluates potential impacts to people and puts in place mitigation actions.
Eradication	The removal of every individual of an invasive species from a specific place. Eradication is only successful if every individual is removed.

Introduced species	Plants, animals, and other organisms taken beyond their natural range by people, deliberately or unintentionally.
Invasive species	Introduced species that become destructive to the environment or human interests; can also include some native species that proliferate and become destructive following environmental changes caused by human activities.
Kaupule	Established on each island of Republic of the Marshall Islands, the function of the council is to support and guide the work of the islands and enforce conservation legislations and by-laws.
Monitoring	Programmes to detect change, such as change in the distribution of invasive species, the success of management projects, and so on.
Movement control	Placing restrictions on the movement of people, animals, plants, and goods to restrict the spread of an invasive species. See also containment.
Native species	Plants, animals, and other organisms that occur naturally on an island or in a specified area, having either evolved there or arrived without human intervention.
Neonative species	Neonative species are those that have expanded geographically beyond their native range and that now have established populations whose presence is due to human-induced changes of the biophysical environment, but not because of direct movement by human agency, intentional or unintentional, or due to the creation of dispersal corridors such as canals, roads, pipelines, or tunnels.
Non-native species	Non-native species are those species that have been introduced by people. Non-native species include both harmful (that is, invasive) and beneficial species.
Pacific Regional Invasive Species Support Service	Pacific Regional Invasive Species Support Service (PRISMSS) is a collaboration of leading organisations supporting invasive species management for biodiversity protection in the Pacific. PRISMSS currently provides technical support across five regional programmes for the Pacific region: Natural Enemies–Natural Solutions (NENS), Predator Free Pacific (PFP), Protect our Islands (POI), Resilient Ecosystems, Resilient Communities (RERC), and War on Weeds (WOW).
Pathway	The means by which an invasive species can be transported.
Pest	A pest is an animal or plant that harms the environment directly or harms human interests in an environment (agriculture, people’s health, and so on) — whether it is native or introduced. Any animal that is harmful, unwanted, or annoying.
Precautionary principle	As applied to invasive species, the precautionary principle holds that where there is not enough information to predict whether a species will become invasive or not, it should be assumed that it will have a damaging impact and action should be taken to stop it establishing or spreading. It should also be assumed based on international experience that any species imported with the intention of being kept in ponds, pens, or cages will eventually escape into the wild.
Region	When not otherwise qualified, means the Pacific Ocean, with specific reference to the island states and territories members of SPC and SPREP.
Risk assessment	Evaluation of the risk that a new introduced species will become invasive with damaging consequences; this evaluation is conducted prior to its introduction.
Surveillance	Monitoring to detect the arrival of new invasive species.
Threatened species	General term for species ranked by <u>IUCN</u> as Critically Endangered (CR), Endangered (EN), or Vulnerable (VU).

ACRONYMS

ABS	Access and Benefit Sharing (with reference to the Nagoya Protocol)
CABI	Commonwealth Agricultural Bureaux International
CBD	Convention on Biological diversity
CCD	Climate Change Directorate
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMAC	Coastal Management Advisory Council
CMI	College of the Marshall Islands
EBA	Endemic Bird Area
EDRR	Early Detection and Rapid Response
EIA	Environmental Impact Assessment
EPA	Environmental Protection Authority
ERP	Emergency Response Plan
ESIA	Environmental and Social Impact Assessment
FSM	Federated States of Micronesia
GBIF	Global Biodiversity Information Framework
GEF	The Global Environment Facility
GEF 6 RIP	Global Environment Facility Regional Invasives Project: Strengthening national and regional capacities to reduce the impact of Invasive Alien Species on globally significant biodiversity in the Pacific. See: https://www.thegef.org/projects-operations/projects/9410
GISD	Global Invasive Species Database (maintained by ISSG)
GISIN	Global Invasive Species Information Network
GMO	Genetically Modified Organism
HPWRA	Hawai'i-Pacific Ecosystems at Risk
IAS	Invasive Alien Species
IBA	Important Bird Area of BirdLife International, recognising key sites for bird conservation
IAS	Invasive Alien Species
IBA	Important Bird Area
IPM	Integrated Pest Management
IS	Invasive Species
ISSG	Invasive Species Specialist Group of the Species Survival Commission of the IUCN
IUCN	International Union for Conservation of Nature
KADA	Kwajalein Atoll Development Authority
KALGOV	Kwajalein Atoll Local Government
KBA	Key Biodiversity Area, a key area for biodiversity survival, part of a global partnership
MAWC	Majuro Atoll Waste Company
MIF	Micronesian Island Forum
MICS	Marshall Islands Conservation Society
MICNGOs	Marshall Islands Council of Non-Governmental Organisations
MIIST	Marshall Islands Invasive Species Taskforce

MIMRA	Marshall Islands Marine Resource Authority
MOEST	Ministry of Education, Sports and Training
MOF	Ministry of Finance
MOHHS	Ministry of Health and Human Services
MoNRC	Ministry of Natural Resources and Commerce
NBSAP	National Biodiversity Strategy and Action Plan
NDMO	National Disaster Management Office
NENS	Natural Enemies–Natural Solutions
NISSAP	National Invasive Species Strategy and Action Plan
OAG	Office of the Attorney General, RMI
OEPPC	Office of Environmental Planning and Policy
PAN	Protected Areas Network (Marshall Islands)
PBIF	Pacific Biodiversity Information Framework
PestList (PLD)	Pacific islands PestList Database
PFP	Predator Free Pacific
PIAT	Pacific Invasive Ant Toolkit
PIER	Pacific Island Ecosystems at Risk – for plant risk assessment information
PIF	Pacific Islands Forum
PILN	Pacific Invasives Learning Network
PIP	Pacific Invasives Partnership
PIRT	Pacific Islands Roundtable for Nature Conservation
Plant Pono	Hawai'i-Pacific Ecosystems at Risk website for plant risk assessment information
PMBT	Pacific Marine Biosecurity Toolkit
POI	Protect our Islands
PoWPA	Programme of Work on Protected Areas
PRISMSS	Pacific Regional Invasive Species Support Service
RBP	Regional Biosecurity Plan for Micronesia and Hawai'i
RERC	Resilient Ecosystems, Resilient Communities
RISC	Micronesia Regional Invasive Species Council
RMI	Republic of the Marshall Islands
RMIEPA	Environmental Protection Authority
SOPs	Standard Operating Procedures
SPC	(Secretariat of the) Pacific Community
SPREP	Secretariat of the Pacific Regional Environmental Programme
SSC	Species Survival Commission of IUCN
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USDOD	United States Department of Defense
WDPA	World Database on Protected Areas
WOW	War on Weeds

SPECIES REFERRED TO IN THE DOCUMENT

Species are present in RMI unless otherwise indicated. Presence was initially derived from the ISSG list for RMI (ISSG 2015) and reviewed during the NISSAP creation. The following list is a subset of the ISSG list.

ENGLISH NAME	COMMON NAME RMI	SCIENTIFIC NAME	STATUS
MICRO-ORGANISMS			
Banana bunchy top virus		Banana bunchy top virus (BBTV)	invasive (absent)
Taro leaf blight		<i>Phytophthora colocasiae</i>	invasive (absent)
Breadfruit Fungus		Unidentified fungus	invasive
PLANTS			
Chain of Love/Coral Vine		<i>Antigonon leptopus</i>	invasive
Beggar's Tick		<i>Bidens alba</i>	invasive
Spanish Needle		<i>Bidens pilosa</i>	invasive
Ironwood		<i>Casuarina equisetifolia</i>	invasive
Chromoleana		<i>Chromoleana odorata</i>	invasive
Ivy Gourd	Kiuri awia	<i>Coccinia grandis</i>	invasive
Coconut	Ni	<i>Cocos nucifera</i>	introduced
Taro	Taro	<i>Colocasia esculenta</i>	native
Egyptian Finger Grass		<i>Dactyloctenium aegyptium</i>	invasive
Merremia		<i>Decalobanthus peltatus</i> ¹	invasive
Money Plant		<i>Epipremnum pinnatum</i> cv. 'Aureum' (<i>Scindapsus</i>)	invasive
Lantana		<i>Lantana camara</i>	invasive
Native grass		<i>Lepturopetium marshallense</i>	native
Native grass		<i>Lepturus gassparicensis</i>	native
Mile-a-minute Weed		<i>Mikania micrantha</i>	invasive
Sensitive Plant		<i>Mimosa pudica</i>	invasive
Noni	Nen	<i>Morinda citrifolia</i>	native
African Tulip Tree		<i>Spathodea campanulata</i>	invasive
Heliotrope Tree		<i>Tournefortia argentea</i>	native
Yellow Alder	Nor in jibon	<i>Turnera umbifolia</i>	invasive
Singapore Daisy (Wedelia)		<i>Sphagneticola trilobata</i>	invasive
ANTS			
Yellow Crazy Ant		<i>Anoplolepis gracilipes</i>	invasive
Bicoloured Trailing Ant		<i>Monomorium floricola</i>	invasive
Black Crazy Ant		<i>Paratrechina longicornis</i>	invasive
African Big-headed Ant		<i>Pheidole megacephala</i>	invasive

¹ Formerly *Merremia peltata*

ENGLISH NAME	COMMON NAME RMI	SCIENTIFIC NAME	STATUS
ANTS			
Tropical Fire Ant		<i>Solenopsis geminata</i>	invasive
Red Imported Fire Ant		<i>Solenopsis invicta</i>	invasive (absent)
Ghost Ant		<i>Tapinoma melanocephalum</i>	invasive
White-footed house Ant		<i>Technomyrmex albipes</i>	invasive
Bicoloured Pennant Ant		<i>Tetramorium bicarinatum</i>	invasive
Similar Groove-headed Ant		<i>Tetramorium simillimum</i>	invasive
Singapore Ant		<i>Trichomyrmex destructor</i> (<i>Monomorium destructor</i>)	invasive
Little Fire Ant		<i>Wasmannia auropunctata</i>	invasive (absent)
OTHER INSECTS/INVERTEBRATES			
Giant African Snail		<i>Achatina fulica</i>	invasive ²
Mosquitos		<i>Aedes aegypti</i> and other <i>Aedes</i> spp.	invasive ³
Spiralling Whitefly		<i>Aleurodiscus dispersus</i>	invasive
Citrus Blackfly		<i>Aleurodicus woglumi</i>	invasive
Coconut Scale Insect		<i>Aspidiotus destructor</i>	invasive
Mango Fruit Fly		<i>Bactrocera frauenfeldi</i>	invasive
Coconut Crab		<i>Birgus latro</i>	native
Breadfruit Mealybug		<i>Icerya aegyptiaca</i>	invasive
Coconut Rhinoceros Beetle		<i>Oryctes rhinoceros</i>	invasive (absent)
Papaya Mealybug		<i>Paracoccus marginatus</i>	invasive
Paper wasp species		<i>Polistes</i> spp.	invasive (absent)
Citrus Black Scale		<i>Saissetia oleae</i>	invasive
Wasps		<i>Vespula</i> spp.	invasive (absent)
REPTILES/AMPHIBIANS			
Brown Tree Snake		<i>Boiga irregularis</i>	invasive ⁴
Loggerhead Turtle		<i>Caretta caretta</i>	native
Green Turtle		<i>Chelonia mydas</i>	native
Leatherback Turtle		<i>Dermochelys coriacea</i>	native
Micronesia Forest Skink		<i>Emoia boettgeri</i>	native
Hawksbill Turtle		<i>Eretmochelys imbricata</i>	native
Asian House Gecko		<i>Hemidactylus frenatus</i>	introduced
Pacific Ridley Turtle		<i>Lepidochelys olivacea</i>	native
Cane Toad		<i>Rhinella marina</i>	invasive
Micronesia Saw-tailed Gecko		<i>Perochirus ateles</i>	native
Monitor Lizard		<i>Varanus</i> sp.	introduced

² Present in Kwajalein (Ebeye) and Majuro

³ *Aedes albopictus* is present according to the ISSG list, but *Aedes aegypti* is not

⁴ Present in Kwajalein according to the ISSG list

ENGLISH NAME	COMMON NAME RMI	SCIENTIFIC NAME	STATUS
MAMMALS			
Feral House Cat		<i>Felis catus</i>	invasive
Indian Grey Mongoose		<i>Herpestes javanicus</i>	invasive (absent)
House Mouse		<i>Mus musculus</i>	invasive
Pacific Rat		<i>Rattus exulans</i>	invasive
Brown Rat/ Norway Rat		<i>Rattus norvegicus</i>	invasive
Black Rat/Ship Rat		<i>Rattus rattus</i>	invasive
Asian Black Rat		<i>Rattus tanezumi</i>	invasive (absent ⁵)
BIRDS			
Jungle Myna		<i>Acridotheres fuscus</i>	invasive (absent)
Common Myna		<i>Acridotheres tristis</i>	invasive (absent)
Feral Pigeon		<i>Columba livia</i>	introduced
Ratak Micronesian Imperial Pigeon		<i>Ducula oceanica ratakensis</i>	native
Common Hill Myna		<i>Gracula religiosa</i>	invasive (absent)
White Tern		<i>Gygis alba</i>	native
House Finch		<i>Haemorhous mexicanus</i>	invasive (absent)
Bristle-thighed Curlew		<i>Numenius tahitiensis</i>	native migrant
Sooty Tern		<i>Onychoprion fuscata</i>	native
Eurasian Tree Sparrow		<i>Passer montanus</i>	invasive
House Sparrow		<i>Passer domesticus</i>	invasive (absent)
Red-vented Bulbul		<i>Pycnonotus cafer</i>	invasive
MARINE SPECIES			
Crown-of-thorns Starfish		<i>Acanthaster planci</i>	native
Humphead Wrasse		<i>Cheilinus undulatus</i>	native
Girdled Wrasse		<i>Cirrhilabrus balteatus</i>	endemic
Dinoflagellates associated with Ciguatera disease		<i>Gambierdiscus toxicus</i>	unknown
Red Alga		<i>Hypnea spp.</i>	unknown

⁵ To be confirmed with genetic analysis as the species is widespread in the North Pacific region and physical characteristics are impossible to differentiate from *R. rattus*

1 INTRODUCTION

Biodiversity is a term that describes the number and diversity of the different plants, animals, and other living things within our environment. Biodiversity is a key factor in natural resilience to the impacts of environmental change. All species contribute to environmental resilience, including those that are naturally common and those that are rare.

Natural biological communities have evolved over thousands or millions of years and have resulted in adaptations to local conditions that make these species resilient to natural environmental change. This community of native species contributes to ecosystem functioning and together provides the ecosystem services that we rely on. These services include provisioning (such as food, fuel, raw materials, or medicines), regulating (such as providing clean water and air, climate regulation and flood protection, waste decomposition, and biological pest and disease control), supporting (such as nutrient cycling), and cultural services (such as spiritual and heritage value, recreation, and science).

When ecosystems are disturbed or disrupted, due to habitat modification, overharvesting, or invasive species, their function is affected, the benefits they offer decline, and resilience to further change is reduced.

In this time of unprecedented global environmental change, protecting biodiversity is more important than ever to ensure we can retain the benefits of the natural world on which all our lives depend.



FIGURE 1 Map of the Republic of Marshall Islands showing Ratak (Rotok) and Ralik Island chains. Map: Worldometers.info

1.1 Introduction to the Republic of the Marshall Islands

The Republic of the Marshall Islands (RMI) of western Micronesia is made up of 29 coral atolls and five low-lying isolated islands contained in two island chains: Ratak and Ralik (Figure 1). Although the land area of RMI covers only 180 square kilometres, its oceanic territory is nearly two million square kilometres. The ocean, therefore, plays a dominant role in the history, culture, economy, and many environmental issues of the RMI.

The RMI is bordered by other small island states, including the Federated States of Micronesia (FSM) to the east and Kiribati and Nauru to the south. The entire country lies within the tropics extending from 4 to 14 degrees north of the equator. Annual temperatures average around 80°F (27°C) with little seasonal fluctuation. Large tropical storms are infrequent with minor storms mainly in March–April and October–November. Rainfall varies throughout the country with the south being much wetter than the north.

1.1.1 History and population

The RMI was settled by Micronesian people about the second millennium BC. Little is known of the islands' early history, but the Marshallese are among the many great oceanic voyagers and designed stick charts to map ocean swells and navigate between the islands.

Europeans first visited RMI in the early sixteenth century, but it was not until the nineteenth century that increased western influence arrived in the form of whalers and missionaries. Japan occupied the islands during and after World War I and briefly during World War II. From 1947 until independence, RMI was administered by the United States as part of the Trust Territory of the Pacific islands during which time Bikini Atoll was used as a nuclear test site.

The RMI became a republic in 1979, but it maintains close links with the US which coordinates ongoing decontamination at Bikini Atoll and provides local employment on these and missile projects.

The population of the RMI was approximately 68,000 in 2009 (UN estimate). Majuro is the capital, legislative centre, and economic hub of the RMI with that atoll supporting approximately 25,000 people. People of the outer islands live a more traditional lifestyle.

1.1.2 Environment

The islands and atolls of RMI are typically oceanic in nature, with plant life dominated by salt-tolerant species such as the coastal trees *Pandanus*, *Guetarda*, *Scaevola*, *Cocos*, and others, some of which were introduced by early seafarers, and many salt-tolerant grasses and herbs. The native forests of the Marshall Islands have largely been replaced by agroforest, especially coconut plantations. Native vegetation remains in some undisturbed atolls, made up of a mixed-broadleaf forest, *Neisosperma* (kish par) forest, *Pisonia grandis* (kanae) forest, *Tournefortia argentea* (kiden) forest, and *Pemphis acidula* (kone) forest (Donnegan et al. 2008, Mueller-Dombois and Fosberg 1998).

Native animals include turtles, coconut crabs, terns, frigatebirds, tropicbirds, and boobies, all of which are dependent on both land and sea and some of which are threatened.

Important marine environments include lagoons, tidal flats, and reefs that support migratory waders, such as the threatened Bristle-thighed Curlew (*Numenius tahitiensis*), and important fish feeding and spawning areas, including mangroves.

1.1.3 Economy

The Gross Domestic Product (GDP) of RMI is derived mainly from payments made by the United States' "Compact of Free Association". Direct US development assistance accounts for about 60 per cent of the RMI's USD 90 million budget.

The remainder of the GDP is made up of exploited natural resources including phosphate, marine resources, and seabed minerals. The subsistence economy includes fishing and breadfruit, banana, taro, and pandanus cultivation, while production of copra and handicrafts provides a cash income throughout the Republic.⁶

1.2 The significant threat of invasive species for the Republic of the Marshall Islands

Invasive species cause harm across a wide range of human activities in Pacific island environments including:

- Food security
 - reduced crop yields (both quantity and quality);
 - food loss or damage in storage;
 - suppression or removal of natural resources, such as land crabs and seabirds;
 - impacts to reef health and productivity; and
 - suppression of natural plant growth and regeneration.
- Health
 - increased incidence of specific diseases;
 - contamination of water supplies;
 - greater dependence on imported processed food, with an associated risk of non-communicable diseases; and
 - injuries and deaths through bites, stings, and allergic reactions.
- Biodiversity
 - impacts to ecosystem processes, such as pollination, seed dispersal, forest regeneration, nutrient cycles, and so on; and
 - suppression and removal of native species.
- Culture
 - lost resources leading to lost cultural practices; and
 - changing societal roles.
- Geomorphological
 - soil erosion; and
 - suppressed reef building and land accretion.
- Infrastructure
 - burrowing animals and roots of plants undermining roads and buildings; and
 - animals nesting in electrical systems causing outages and fires.

⁶ Statistics in this section from Wikipedia (2021)

Invasive species are a major global threat to biodiversity, and Pacific islands are particularly vulnerable due to their isolation and relatively recent human occupation. Native species often cannot cope with predation or competition from new arrivals. The RMI already suffers from the impact of invasive species that have arrived in the country. However, there are many more devastating species that are not present in the Republic but are found in other countries of the region, and every effort needs to be made to prevent their arrival.

In 2004, the IUCN published a selection of ‘100 of the World’s Worst Invasive Species’ (Lowe et al. 2004). Only about nine of the species on this list are established in the RMI, namely invasive plants (five species), Black Rat (*Rattus rattus*), Feral Cat (*Felis catus*), Red-vented Bulbul (*Pycnonotus cafer*), and Yellow Crazy Ant (*Anoplolepis gracilipes*). However, there are a vast number more that could be introduced if the RMI does not maintain strong border control, and there have been recent incursions of Brown Tree Snake (*Boiga irregularis*), Cane Toad (*Rhinella marinus*), and Common Myna (*Acridotheres tristis*).

1.2.1 Threats already within the Republic of the Marshall Islands

The RMI has approximately 523 introduced species that are considered invasive or potentially invasive with the majority being terrestrial plant species (ISSG 2015). Given the relatively limited terrestrial habitat available in the RMI, land for biodiversity protection or agricultural and forestry related activities is scarce, and land set aside for such resources is highly valuable. Invasive species, especially those which do or might impact natural resources, including marine systems and/or crops and forest products, are of significant concern and potential detriment to both local and national wellbeing and economies.

PLANTS

At least 41 plants in the RMI are considered invasive (ISSG 2015), with Chromolaena (*Chromolaena odorata*), Merremia (*Merremia peltata*), Mikania (*Mikania micrantha*), and Ivy Gourd (*Coccinia grandis*) being destructive to the environment. While some of these plants are already having major impacts, others have severe impacts elsewhere that are under-appreciated, such as the Money Plant (*Epipremnum pinnatum* cv. ‘Aureum’ [*Scindapsus*]), which is widespread and damaging on Niue.

MAMMALS AND BIRDS

Rats (*Rattus* spp.) and Red-vented Bulbuls can harm animals and damage crops. The Pacific Rat (*Rattus exulans*) is widespread in RMI, and its introduction around the Pacific has caused many species extinctions. Black Rats are even more damaging to animals and crops and need to be prevented from invading the outer islands.

Rodents—two species of rats (*Rattus exulans* and *R. rattus*) and mice (*Mus musculus*)—and Puusi/feral cats (*Felis catus*) may reduce forest growth and harm human health as well as threaten the survival of native birds that are traditional food sources, such as Brown Noddy (*Anous stolidus*), Black Noddy (*Anous tenuirostris*), Pacific Pigeon (*Ducula pacifica*), and Brown Booby (*Sula leucogaster*).

The reduction or removal of seabird populations by rats and cats has widespread effects on terrestrial and marine ecosystems because these species supply much-needed nutrients to forests and nearshore reefs (Graham et al. 2018).

Useful domestic animals can also cause harm if they are not controlled. Feral pigs (*Sus scrofa*) damage forests and plantations and feed on native invertebrates. Other domestic animals such as feral dogs (*Canis lupus familiaris*) are found in the RMI and can all cause harm to the environment and to people if they are out of control.

ANTS AND OTHER INSECTS AND INVERTEBRATES

The RMI has 51 ant species, none of which are locally endemic (Gruber et al. 2017). Twenty are Indo-Pacific (regional) natives, 20 are introduced but not considered harmful, and 11 species are considered invasive in the Pacific. The invasive species include Yellow Crazy Ant (*Anoplolepis gracilipes*), Black Crazy Ant (*Paratrechina longicornis*), African Big-headed Ant (*Pheidole megacephala*), Ghost Ant (*Tapinoma melanocephalum*), Tropical Fire Ant (*Solenopsis geminata*), Bicoloured Pennant Ant (*Tetramorium bicarinatum*), Similar Groove-headed Ant (*Tetramorium simillimum*), and Singapore Ant (*Trichomyrmex destructor*).

Yellow Crazy Ant is well known for its population explosions and impact on Christmas Island (Australia), where it has changed the entire forest community (O’Dowd et al. 2003) and has been implicated in extinctions of native species. In Tokelau, it caused declines in Coconut Crab (*Birgus latro*) numbers and reduced the reproductive success of the White Tern (*Gygis alba*) (Gruber et al. 2018).

Other introduced insects of concern include Southern House Mosquito (*Culex quinquefasciatus* – a known carrier of Avian influenza), one *Aedes* mosquito, as well as a fruit fly (*Bactrocera* sp.). Other crop pests are also present.

MARINE SPECIES

The native Crown-of-thorns starfish sometimes experience outbreaks that cause harm to reef health. While reefs in general in the RMI are relatively healthy, localised outbreaks of Crown-of-thorns and coral disease were observed around Majuro in 2005 (Beger et al. 2008).

Section 7 outlines current and past management programmes, and Annex 1 describes the priority invasive species within the RMI and their management.

1.2.2 Impacts of invasive species in the Republic of the Marshall Islands

Many invasive plants are listed as destructive in the RMI “State”-wide Assessment and Resource Strategy 2010–2015+, and include Ironwood (*Casuarina equisetifolia*), Yellow Alder or Nor In jibon (*Turnera umbifolia*), Beggar’s Tick (*Bidens alba*), and various grasses including Egyptian Finger Grass (*Dactyloctenium aegyptium*) (Ministry of Resources and Development 2010). The RMI forest inventory of the Forest Action Plan noted that 37 per cent of trees had some form of damage from invasive species, most often by insects and secondarily by other vegetation, including vines (Donnegan et al. 2008).

During NISSAP consultations, participants voiced concern that brown tree sparrows are spreading rapidly through RMI and are causing damage to crops. Rats were also a common concern of participants.

The Ministry of Resources and Development Strategic Plan indicates that fruit flies, mealybugs, and coconut scale (*Aspidiotus destructor*) should be regularly monitored and that control and eradication activities be carried out (Ministry of Resources and Development 2004).

Giant African Snail (*Achatina fulica*) is present in Kwajalein and Majuro and subject to control measures. As well as ecological impacts through herbivory on plants and competition with native snails, it is a vector of a parasitic nematode that can cause meningitis, a sometimes-fatal infection of the brain, in people.

Other impacts not reported but likely to occur include:

- disease transmission by rats via contaminated water and food sources;
- damage to ecosystems via disruption to ecosystem processes (such as invasive ants reducing flowering and carrying plant disease, rats reducing fruiting levels, rats killing seed dispersers, and pigs [*Sus scrofa*] and goats [*Capra hircus*] disrupting plant germination and growth);
- predation on birds, their nests and young by rats and cats (*Felis catus*); and
- potential harm to threatened species such as turtles and seabirds by domestic animals (such as pigs, goats, and cats) through habitat degradation and predation.

1.2.3 Potential threats to the Republic of the Marshall Islands

Key invasion pathways into RMI are through trade. Yachts and fishing vessels arrive from multiple sources, each of which brings its own set of risks.

Examples of invasive species not currently known to be established within the RMI but which are of significant concern of establishing include Brown Treesnake, Cane Toad, Common Myna, Indian Grey Mongoose (*Herpestes javanicus*), Little Fire Ant (*Wasmannia auropunctata*), and Coconut Rhinoceros Beetle (*Oryctes rhinoceros*). These species (and many others) are already established in one or more countries which have trading or other ties with RMI; therefore, these species have a high potential for establishing in the RMI if appropriate management activities are not engaged and/or maintained.

The Brown Tree Snake is thought to have caused the extinction of 10 native landbird species in Guam, leaving only two (Rodda and Savidge 2007). Many other snakes occur around the Pacific rim.

If Red Imported Fire Ants arrive, they are predicted to potentially cost the RMI more than USD 3,959,000 per year in crop, health, and infrastructure impacts and could harm more than 11 already threatened species (Gruber et al. 2021).

The Indian Grey Mongoose (*Herpestes javanicus*) is of particular concern, with at least four recent incursions documented in the Pacific.

Asian fishing vessels often carry snakes and rats, such as the Asian rat (*Rattus tanezumi*), which devastated wildlife in the McKean Island in the Phoenix Group of Kiribati before it was eradicated (Pierce 2013).

Even if an invasive species is already present, there are varieties and strains with different levels of impact. For example, large Black Rats that have recently invaded Rennell Island in the Solomon Islands from Southeast Asia have a devastating impact on crops, including taro, coconut, and papaya (S. Cranwell and R. Pierce pers. obs.). The Coconut Rhinoceros Beetle (*Oryctes rhinoceros*) has many different strains, and one type has devastated coconut crops in Guam and is now found in the Pacific in Hawai'i, Palau, Papua New Guinea, Rota, and Solomon Islands.

Further afield, Taro Leaf Blight (*Phytophthora colocasiae*) reduced annual export returns for this crop in Samoa from around WST 10 million to approximately WST 150,000 (USD 60,000) over a couple of years (Hunter et al. 1998).

Annex 2 describes the priority invasive species to prevent their establishment in the RMI.

1.2.4 Changes in impacts due to climate change

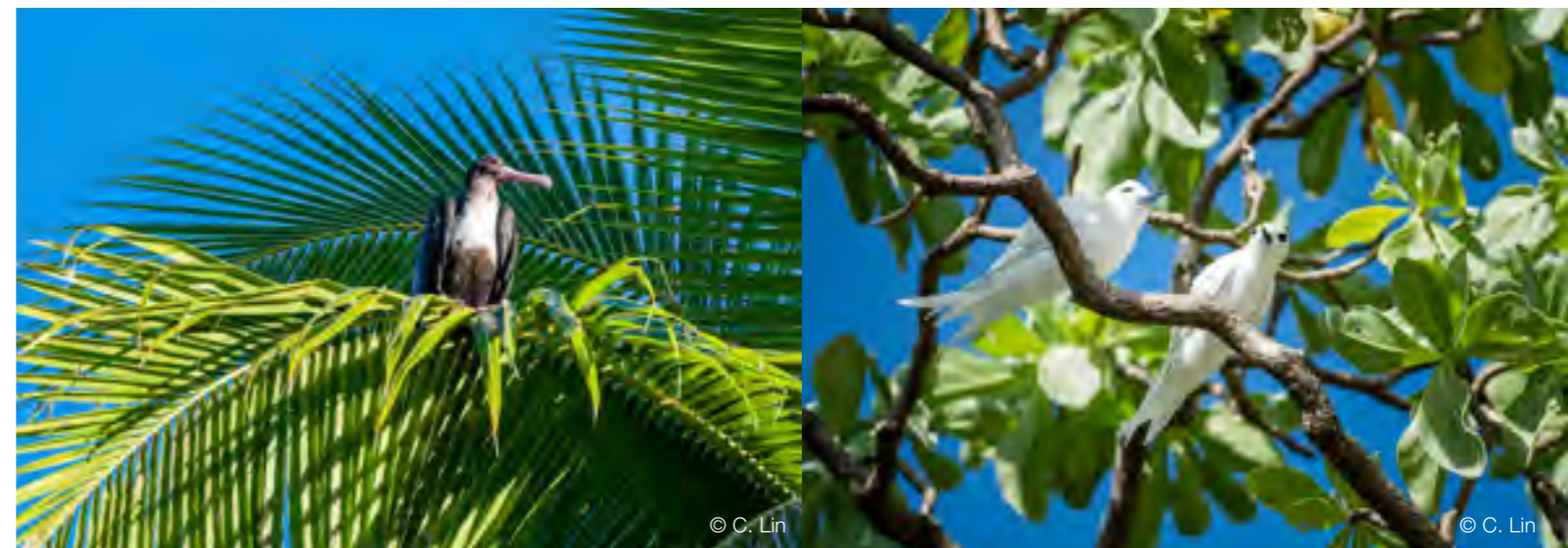
Climate change has been described as an existential problem for some Pacific island countries and territories (Connell 2016, Pasisi 2019). The direct environmental impacts of climate change include warmer average temperatures (including freshwater, ocean, and lagoon habitats), changes in weather (notable for the Pacific is an increase in frequency of high-intensity cyclones and a reduction in low-intensity cyclones), shifts in seasonal rainfall, rising sea levels, and salination. All these primary impacts have far-reaching secondary consequences that are difficult to predict.

While we are still learning about the impacts of climate change, we do know some of the effects that may occur on invasive species already present, including:

- disturbance to natural and human infrastructure provides opportunity for invasive species to spread;
- increased intensity and frequency of extreme weather events may affect society's ability to respond to invasive species threats; and
- invasive species may benefit from change.

For example, RMI currently has several species of mosquito that carry dengue fever. One predicted consequence of climate change could be that these and other mosquitoes and the diseases they carry may spread further south within the Pacific or introduced populations may experience faster growth. These changes could increase risks to human health.

The impacts of invasive species may become more severe if new climate conditions are more favourable for invasive species, the risks of others could lessen, but even currently harmless introduced or native species distributions and their interactions in the environment may change.



1.3 Invasive species – everyone’s responsibility

The movements of people, and their goods and supplies, are the main ways that invasive species reach a country. The behaviour of all people is the key to the prevention and management of invasive species. People need to avoid bringing ‘at risk’ goods into and around the country, such as fruit, plant material including seeds, soil (even on footwear), and so on. If someone sees a plant overseas that they would like to grow in RMI or move around the country, they must follow biosecurity requirements set by Quarantine.

If people receive a container of goods or deck cargo such as a vehicle or timber, they should check it very carefully when they get it home and alert Quarantine if any live animals/insects, or their eggs, are found. Ideally, people will be watchful in villages, plantations, and forests for any unusual animals or plants or for trees with leaves being eaten or dying over large areas. Villagers may be the first to spot the arrival of a new plant disease or insect pest. Detecting such arrivals early is the key to eradicating a new invasive species and potentially saving RMI millions of dollars or, worse, the loss of biodiversity.

iNaturalist is a social network of naturalists, citizen scientists, and biologists built on the concept of mapping and sharing observations of biodiversity across the globe. It enables residents and visitors to actively take part in biodiversity monitoring. The iNaturalist project created as part of the GEF 6 RIP will contribute to protecting the RMI biodiversity by acting as an ‘early warning system’ for new invasive species observed within the RMI. iNaturalist can be used freely by anyone with access to a smartphone or computer.

Invasive species are an international issue with an emphasis on preventing them moving from one country to another. Many international and regional organisations undertake coordinating roles, there are international regulations, and countries that trade with each other work in close cooperation.



1.4 Biodiversity at risk in the Republic of the Marshall Islands

All native species are at risk from the impacts of invasive species. Those most at risk are those that are already rare due to other impacts, such as overharvesting, pollution, and habitat loss. These rare species are priorities for conservation.

About 950 species are known to be native to the RMI, of which 95 are listed by IUCN as threatened (eight Endangered and 87 Vulnerable) (ISSG 2015). The RMI has 56 known species or sub-species considered to be endemic including three terrestrial plants, 24 insects, one bird, and numerous marine species (Republic of the Marshall Islands Biodiversity Clearing House Mechanism 2008, http://biormi.org/index.shtml?en/endemic_marshalls.shtml). These species occur in several important areas spanning Conservation Areas, Important Bird Areas, Key Biodiversity Areas, and Wetlands of International Importance and include pivotal areas such as Namdrik (refer to Annex 3).

Threatened species include Hawksbill Turtle (*Eretmochelys imbricata*), Leatherback Sea Turtle (*Dermochelys coriacea*), Loggerhead Sea Turtle (*Caretta caretta*), Pacific Ridley Sea Turtle (*Lepidochelys olivacea*), and Green Sea Turtle (*Chelonia mydas*), the last of which has important breeding grounds in the RMI, plus several threatened species of whales and dolphins. Girdled Wrasse (*Cirrhilabrus balteatus*) is endemic as is the Ratak Micronesian Imperial Pigeon (*Ducula oceanica ratakensis*), the one terrestrial vertebrate that is endemic to the RMI.

Plants and animals of RMI vulnerable to invasive species are:

- the Mule/Ratak Micronesian Imperial Pigeon (*Ducula oceanica ratakensis*), which is widespread but vulnerable to predation from rats (especially Black Rats), invasive ants, and Indian Grey Mongoose should they arrive;
- seabird colonies, which are vulnerable to rats, particularly Black Rats, and Feral Cats;
- the endemic Micronesia Forest Skink (*Emoia boettgeri*), which is also widespread, and the Micronesia Saw-tailed Gecko (*Perochirus ateles*), which is listed as vulnerable by the IUCN. Both are at risk from rat and invasive ant predation;
- terrestrial invertebrates, which are vulnerable to rat predation and their habitat vulnerable to escaped/feral domestic animals, such as Feral Pigs;
- endemic plant species such as the grasses *Lepturopetium marshallense* and *Lepturus gassparicensis* (ISSG 2015), which are vulnerable to browsing animals should they escape, such as Feral Pigs;
- breeding turtles, the eggs and young of which are vulnerable domestic animals, especially if they become feral, such as Feral Pigs, Feral Dogs, and Feral Cats; and
- reef environments and their fish populations, which are vulnerable to outbreaks of the native Crown-of-thorns Starfish and introduced marine invasives, which have been overlooked until recently.

1.5 Why is a NISSAP needed?

There are many reasons to develop a NISSAP, but the five key reasons are outlined below.

INVASIVE SPECIES ARE A CONSISTENT THREAT TO RESOURCES

Invasive species continue to be a costly issue for all countries and particularly to island nations, and with increasing trade and movement of people between countries, the threat of new species arriving is increasing. A NISSAP can highlight the issue and bring it to the attention of national and international decision makers.

A NISSAP PRIORITISES INVASIVE SPECIES ISSUES

The RMI (and all other countries) are faced by a wide range of invasive species causing various degrees of damage, many more than the country has the capacity to address. Management has focused on plant and animal pests of the productive sector in the past and on direct threats to human health, but there has been growing recognition of their impacts on native biodiversity and the environment.

A NISSAP can bring people in the different sectors and the wider community together to agree on the priorities.

CREATING A NISSAP IS A CROSS-SECTORAL AND INCLUSIVE EXERCISE

The management of invasive species involves many different organisations from government departments to non-governmental organisations (NGOs), farmers, fishermen and women, and island communities. This management effort has in the past been fragmented and uncoordinated.

The NISSAP seeks to address this problem by bringing all interested parties together around an agreed plan of priority actions, with clearly identified responsibilities and timeframes.

A NISSAP SUPPORTS A COORDINATED APPROACH

Managing invasive species involves many activities, including border control, awareness raising, research, monitoring, eradication, control, and risk assessment. A NISSAP allows appropriate prioritisation of the different elements and spread of resources across them.

A NISSAP IDENTIFIES RESOURCES

There is always more work to be done than any Pacific island country can afford with its own resources. An approved NISSAP identifies that a country has been through a prioritisation process involving a full range of interested parties and that the government has endorsed its findings.

A NISSAP thus gives a funder a priority list of tasks that require money and assurance that the country will commit the 'in-kind' support required to achieve successful outcomes.

1.5.1 PRISMSS supports the NISSAP implementation

The Pacific Regional Invasive Species Management Support Service (PRISMSS) is a coordinating mechanism to facilitate the scaling up of operational management of invasive species in the Pacific. PRISMSS brings together experts to provide support within the Pacific region with a focus on protection of indigenous biodiversity and ecosystem function. The goal is to reduce the ecological and socio-economic impact of invasive species on ecosystems through the management or eradication of prioritised species and the protection of valued sites.

PRISMSS supports the implementation of NISSAPs by:

- providing advice to foster on-the-ground-management actions including the development of new projects;
- helping lead the adoption and the development of best practice and innovation in the region;
- sharing technical information as far as practical for publication or training materials;
- providing training, coaching, and project-planning support for project execution; and
- providing donors with customised and successful options.

PRISMSS currently provides technical support across five regional programmes for the Pacific region:

1. PROTECT OUR ISLANDS – “PREVENT THE ARRIVAL, ESTABLISHMENT AND SPREAD OF INVASIVE SPECIES”

After an invasive species arrives in a new place, it needs to survive and reproduce, establish a population, and spread, before impacts are noticed. By the time impacts are obvious, the control or eradication of invasive species can be difficult and expensive or sometimes impossible. The purpose of this programme is to prevent or detect the arrival of invasive species and stop their establishment, spread and impacts. The clean boats, clean ports framework guides the programme. The framework defines actions needed to detect the arrival and prevent the establishment and spread of invasive species within Pacific island countries and territories.

2. PREDATOR FREE PACIFIC – “REMOVING INTRODUCED MAMMALIAN PREDATORS FROM ISLANDS”

Pacific islands connect land and sea. Invasive species such as rats alter ecosystems as they consume the seeds, plants, invertebrates, and seabirds that provide nutrients to forest systems and coastal waters. The prevention, control, and eradication of invasive predators are important strategies for supporting ecosystem-based adaptation to the effects of climate change. To date, more than sixty (60) Pacific islands have had predators removed.

3. WAR ON WEEDS – “MANAGEMENT OF HIGH-PRIORITY WEEDS”

Some invasive plants can transform (damage or destroy) ecosystem function. Weeds outcompete more desirable plant species and disrupt processes such as water flow, fire regimes, soil quality, nutrient cycling, and regeneration. Weeds can also be harmful to human and animal health. Weeds thrive on disturbance and so their harmful impacts are exacerbated by tropical cyclones, strong winds, drought, and fires, all of which are increasing in severity due to the changing climate. Although there are several existing weed management programmes across the Pacific, capacity overall is very limited. This programme is focused on the management of high-risk, low-distribution weed species, where the objective is eradication or containment.

4. NATURAL ENEMIES – NATURAL SOLUTIONS “BIOLOGICAL CONTROL OF WIDESPREAD WEEDS”

Conventional control techniques can be useful when weeds are not yet common and to protect high-value sites. However, once weeds become widespread, the only safe, cost-effective, and sustainable way of tackling them is using natural enemies, which is known as biological control. This regional programme aims to lower the impact of widespread invasive plants by reducing their vigour by introducing safe natural enemies from the area where they, and their host plant, originate. This technique has been used safely and successfully worldwide, including the Pacific, to manage weeds for more than 100 years. Natural enemies have been established on more than 25 weed species in 17 countries in the Pacific, and there are many opportunities both for spreading existing agents available in the Pacific to new countries, from introducing agents available outside the Pacific, and through developing new options for the Pacific.

5. RESILIENT ECOSYSTEMS – RESILIENT COMMUNITIES “PRIORITY AREA ECOLOGICAL RESTORATION”

Pacific threatened species and ecosystems often exist within high-value areas on larger islands where invasive animals and invasive plants will continue to be a threat. A site-led approach to manage multiple invasive species and re-introduce lost native species and ecosystem structure over a longer period is the last remaining option to restore and maintain these ecosystems. Communities directly benefit from resilient ecosystems and are an essential part of ecological restoration. Many priority area ecosystems have been restored over the past three decades, mostly in New Zealand. The Pacific has had several pilot sites which have had very successful outcomes with increases in threatened endemic birds.



1.6 Process of NISSAP development

The RMI NISSAP takes account of the regional guidelines produced by SPREP and SPC, whose goal it is “to assist Pacific island countries and territories in planning the effective management of invasive species, thereby reducing the negative impacts of invasives on their rich and fragile native heritage, communities and livelihoods” (SPREP 2009). The Action Plan is organised according to the three thematic areas of the Guidelines: Foundations, Problem Definition and Prioritisation, and Management Action.

1.6.1 History of NISSAP development in RMI

A draft NISSAP was developed for RMI in 2015 following consultation workshops (NISSAP 2015) and was funded within the GEF-PAS regional invasives project ‘Prevention, control, and management of invasive alien species in the Pacific islands’ implemented by UNEP with SPREP as the executing agency.

The development of the NISSAP began with a review of existing information conducted by the Invasive Species Specialist Group (ISSG 2015). Consultations were held in RMI, and the draft NISSAP was finalised.

This document is RMI’s second NISSAP and is supported within the GEF 6 regional invasive species project ‘Strengthening national and regional capacities to reduce the impact of Invasive Alien Species on globally significant biodiversity in the Pacific’ implemented by UNEP with SPREP as the executing agency.

The updated NISSAP incorporates the updated ISSG review and a review of RMI’s first NISSAP, updated with current information on national strategies, management programmes, and so on by the Invasive Species Coordinator (ISC), in preparation for in-country consultations. Consultations were held in RMI with interested parties from several islands in 2021–2022 during which current and planned activities were reviewed. This NISSAP was finalised in 2022 after review with the technical advisory group (TAG). Annex 4 contains summaries of the consultations.



Boettger's Emo Skink.

© P. Jacques



A bristle-thighed curlew on Nadikdik © P. Jacques

2 LINKAGES OF THE NISSAP TO OTHER STRATEGIES

This section reviews other government strategies and policies that address invasive species and the sectoral plans of the key agencies involved. The actions identified in this NISSAP should be considered when strategies and plans are next revised.

2.1 National strategies

Invasive species can have impacts on agricultural, forestry, and fisheries sectors, may spread or have increased impacts because of climate change, and have a greater likelihood of entering the country during the response to a natural disaster (such as a cyclone). It is hoped that the NISSAP will be referred to during the development of strategies and plans within these sectors.

The RMI has a framework of national strategies and policies in place covering environmental and invasive species issues to varying degrees. The considerations in the current NISSAP should be carried forward into the process of revising these policies, plans and strategies.

- The RMI National Biodiversity Strategy and Action Plan (NBSAP) 2000 provides considerable background detail on the invasive species of RMI, and the fifth national report to the CBD in 2017 mentions work being undertaken as part of the GEF PAS project.
- Climate Change Roadmap 2010 – this plan is relevant to scenarios under which potentially invading species maybe advantaged or disadvantaged by changing climate.
- National Climate Change Policy Framework, January 2011 – as above.
- Reimaanlok Framework – see Community Plans below.
- RMI Disaster Risk Management National Action Plan 2008–2018 – to be referred to for managing the increased risk of invasive species incursions during emergencies and foreign aid programmes when it might otherwise be easy to relax biosecurity protocols.
- Vision 2018 RMI Strategic Development Plan Framework 2003–2018.
- RMI EPA, Coastal Management Framework 2008 – to be referred to for managing potential invasive species incursion during importing of bulk materials for coastal infrastructure.
- Forest Action Plan 2020–2030 – includes invasive species as a threat to forests.
- National Oceans Symposium Implementation Plan 2018 – of relevance to marine invasive species.
- National Environment Management Strategy 2017–2022 – refers to the previous NISSAP actions, primarily regarding awareness-raising.
- National Strategic Plan 2020–2030 – refers to protection, management, and sustainable use of the RMI's Atoll Environment Resources.
- Agricultural Sector Plan 2021–2031 – refers to invasive species prevention and management through the Micronesia Challenge and Regional Biosecurity Plan.

2.2 Regional strategies

The RMI supports and participates in several regional initiatives.

THE MICRONESIA CHALLENGE

The Micronesia Challenge is a regional shared commitment to the conservation of terrestrial and coastal resources to effectively manage at least 50 per cent of marine resources and 30 per cent of terrestrial resources by 2030 across the region and to be a voice for sustainability and climate change. <http://www.micronesiachallenge.org/>

REGIONAL BIOSECURITY PLAN (RBP) FOR MICRONESIA AND HAWAI'I (ENDORSED 2014)

The goal of the RBP is to provide recommendations that, if appropriately implemented, will minimise the harmful ecological, social, cultural, and economic impacts of invasive species through the prevention of their introduction, their management, and control of expansion and dispersal into, within, and from the region. <https://dlnr.hawaii.gov/hisc/plans/rbp>

MICRONESIA REGIONAL INVASIVE SPECIES COUNCIL (RISC) STRATEGIC ACTION PLAN (SAP) 2012–2016

The RISC SAP has five goals:

1. Provide updates and recommendations to enable the RISC member Chief Executives to make informed decisions and take effective actions on invasive species policy and management;
2. Promote public awareness and education regarding invasive species and biosecurity;
3. Foster regional and international communication and cooperation on invasive species and biosecurity;
4. Support and recommend the development and implementation of coordinated efforts to enhance regional biosecurity;
5. Develop human and financial resources to implement RISC goals.

FRAMEWORK FOR NATURE CONSERVATION AND PROTECTED AREAS IN THE PACIFIC ISLANDS REGION 2021–2025

The Framework provides guidance for the region on key priorities for biodiversity conservation and ecosystem management with linkages to the global Aichi Biodiversity Targets and National Biodiversity Strategies and Action Plans (NBSAPs).

GUIDELINES FOR INVASIVE SPECIES MANAGEMENT IN THE PACIFIC (ENDORSED 2009)

The goal of the Guidelines is to assist Pacific island countries and territories in planning the effective management of invasive species, thereby reducing the negative impacts of invasives on their rich and fragile natural heritage, communities, and livelihoods. The guidelines are currently (2022) being revised.

2.3 Community plans

THE REIMAANLOK FRAMEWORK

The eight-step Reimaanlok Conservation Area Management Planning Framework is supported by CMAC and helps Marshallese communities develop strategies and to promote the conservation and sustainable use of natural resources. <https://www.atollconservation.org/reimaanlok>

In 2015, a total of 22 communities were involved in the Reimaanlok framework. In October 2021, there were 40 communities involved (see Table 1).

TABLE 1 Status of Reimaanlok Community-based Resource Management Planning by Site in 2021.
* indicates Ridge2Reef (R2R) project sites

	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6	STEP 7	STEP 8
	Initiation	Project Scoping and Setup	Building Commitment	Collecting and Managing Information	Developing the Management Plan	Sign-Off	Monitoring, Evaluation and Adaptive Management	Maintaining Commitment
Pending								
Kwajalein	Jemo			Aur*	Mejit* (TBC)	Wotho*	Ailuk Atoll	
Rongerik				Likiep*		Ailinglaplap	Namdrik Atoll	
Rongelap				Lib (Ramsar Site)		Jabat	Majuro – Bikirin	
Ailinginae				Majuro – Buruon		Namu	Majuro – Drenmeo	
Bikini				Majuro – Bokelatulik			Majuro – Woja	
Enewetak							Majuro – Bokanbotin	
Ujelang							Majuro – Ene Kalamur	
Erikub							Ujae	
Toke							Lae	
Jaluit							Utrik	
Kili							Ebon*	
							Maloelap	
							Arno	
							Bikar	
							Bokak	
							Majuro-Ajeltake	
							Mili	
							Wotje	

3 GUIDING PRINCIPLES

The CBD identified a full list of 15 principles as an annex to the report of the sixth Conference of the Parties (COP 6 2002a). Some key practical principles apply to the NISSAP.

- The 'precautionary principle' should be applied – where there is not enough information to predict whether a species will become invasive or not, it should be assumed that it will have a damaging impact and action should be taken to stop it establishing or spreading.
- Preventing the arrival of introduced species is more effective and cheaper than trying to manage them after they arrive. Emphasis should be placed on effective border control.
- Eradication is more effective and cheaper in the long term than ongoing control, so eradication should be attempted in situations in which it is likely to succeed.
- Eradication is most effective if a new arrival is detected early while in small numbers, so surveillance and early warning systems are important, as is rapid response. Emergency Response Plans, such as those in place for the possible arrival of major livestock diseases, and Emergency Response Exercises are key elements of such systems.
- Invasive species that cannot be eradicated should be considered for ongoing control, particularly biological control. This control may be aimed at reducing their impact everywhere to acceptable levels or only in important sites for native species (such as protected areas) or for agriculture.
- Invasive species must be addressed in order of priority. A rigorous system is needed to decide on priorities and stick to them.
- Any species imported into a country to only be kept in ponds, pens, or cages will eventually escape into the wild, and plans should be made accordingly.



4 GOAL, THEMES, AND OUTCOMES

4.1 Goal

To facilitate and guide the protection of the biodiversity and livelihoods of RMI from the impacts of invasive species through strong collaboration.

Within the goal, emphasis is to be placed on:

- maintaining and enhancing the status of native biodiversity;
- maintaining strong border control;
- developing an inter-island biosecurity programme;
- eradicating invasive species where this is feasible; and
- controlling those species that cannot be eradicated.

4.2 Themes

The strategy follows the Regional Guidelines (SPREP 2009) with three themes as follows:

THEME A: Foundations

Managing invasive species is a huge task that will only be effective if based on strong foundations. It requires:

- **support** – from government, village communities, and funders;
- **capacity** – including strong institutions, individuals with sound management and technical skills, and regional networks; and
- **legislative framework** – appropriate laws, regulations, policies, protocols, and procedures.

THEME B: Problem definition, prioritisation, and decision-making

There are many invasive species present in RMI and many more outside its borders, and resources to tackle them are always limited. Systems must be in place to make decisions about how to allocate resources based on the best possible information on the distribution, numbers, and likely impacts of these species.

THEME C: Management Action

Management begins with preventing the arrival of new invasive species, then tackles the eradication or control of those already present. Finally, any necessary restoration work is undertaken on sites where invasive species have been removed.

4.3 Outcomes

Outcomes are derived from the regional *Guidelines for invasive species management in the Pacific*.

THEME A: Three outcomes are identified to ensure that the impacts of invasive species are understood and actions to manage them are supported, to develop the necessary capacity, and to establish the appropriate legislative and operational framework.

THEME B: Three outcomes are identified to establish baseline information and monitor change, establish systems for risk management and prioritisation, and update knowledge and develop new techniques.

THEME C: Three outcomes are identified to prevent the arrival of new invasive species and quickly detect and respond to those that arrive, to eradicate or control existing invasive species, and to carry out restoration following invasive species removal.



Loading buckets of bait. © P. Jacques

5 PATHWAY IDENTIFICATION

ISSG has compiled a review (ISSG 2015) that identifies the ways that different invasive species can move to or around RMI. As an example, soil is a medium that can transport weed seeds, the nests of ants, the eggs of Giant African Snail (*Achatina fulica*), and larvae of pest insects. This section reviews the major pathways through which invasive species can enter the country or move between islands within it.

5.1 International pathways

5.1.1 By air

There are two main airports in the RMI serviced by several airlines. Amata Kabua International Airport is the nation's main airport on Majuro Atoll. Five commercial airlines use the airport: United Airlines, Air Marshall Islands, Asia Pacific Airlines, Japan Airlines, and Nauru Airlines.

Prior to the COVID-19 pandemic, United Airlines operated daily passenger and cargo flights from Majuro directly to both Hawai'i and Kwajalein and indirectly to other destinations. United Airlines flights originating in Hawai'i arrive in Majuro three times per week before flying onto Kwajalein and then the Federated States of Micronesia (FSM). United Airlines flights originating in Guam stop first in the FSM and arrive in Kwajalein three times per week before continuing to Majuro and Hawai'i.

Nauru Airlines transports passengers and cargo between Majuro and Fiji, Brisbane, Nauru, and Tarawa once per week. These flights depart Nauru and stop in Tarawa before arriving in Majuro. The flight then continues onto the FSM and returns to Majuro via Kosrae after two nights in Pohnpei.

Asia Pacific Airlines flies four cargo flights per week landing in Majuro, three from Guam and one from Hawai'i.

Charter flights occur on an irregular basis. Japan Airlines occasionally runs charter flights to Majuro direct from Tokyo.

The United States of America's Department of Defense (US DOD) aircraft also make occasional stops in both Majuro and Kwajalein. The United States Bucholz Army Airfield is located on Kwajalein. The airport is available to civilians through Air Marshall Islands and United Airlines. All civilian and military flights into Kwajalein require prior 24-hour approval.

5.1.2 By sea

The RMI has the second-largest ship registry in the world. A wide range and large number of vessels visit RMI annually. The two official seaports of entry are the port of Majuro (the RMI commercial hub) and Ebeye Dock at Kwajalein. The port of Majuro consists of Delap and Uliga Docks, the Calalin Channel, Port Fairway, and Vessel Anchorage Area within Majuro Atoll. The Uliga Dock is primarily used for inter-island cargo and passenger vessels, while the Delap Dock is primarily used for international cargo.

The main international port for the country is located within Majuro Lagoon. Various ports in the RMI are also regularly visited by tankers which supply diesel to the islands. Kwajalein Atoll is regularly visited by both commercial and military shipping.

Most ships visiting RMI are fishing vessels (915 out of 1081 or 85 per cent in 2018–2020). Other types of shipping vessels visiting Majuro include cargo vessels (10 per cent), tankers (4 per cent), yachts (1 per cent), and US military vessels (less than one per cent). Other vessels that are less frequent include research ships and bulk carriers.

These vessels also represent a wide range of sources (2018–2020 data):

- **Pacific islands:** American Samoa, Australia, Fiji, French Polynesia, FSM, Guam, Kiribati, Tuvalu, Palau, Papua New Guinea, Samoa, and Solomon Islands.
- **Asia:** China, Hong Kong, Japan, Korea, Philippines, Singapore, Taiwan, Thailand, and Vietnam.
- **North America:** USA.
- **South America:** Argentina, Panama, and Peru.

5.1.3 Other external pathways

DISASTER RELIEF

Humanitarian emergencies in general and damage caused by extreme events such as cyclones may directly carry new invasive species to RMI, but the major threat is an indirect one through consequent relief operations. Large shipments of supplies and relief materials may enter the country over a short period from a variety of different countries, at a time when border control may be limited or of lower priority. While humanitarian needs are the priority, disaster management planning needs to incorporate biosecurity to avoid the potential longer-term impacts of new invasive species on the economy and environment.

'NATURAL' PATHWAYS

Invasive species can also arrive as they have always done unaided by people: by flying to RMI, being carried here on the wind, swimming, or 'rafting' on floating vegetation or debris. All Marshallese need to watch for any unusual species and report them to Quarantine to assess the risk the unusual species may pose. These pathways are equally involved in the inter-island spread of invasive species. Birds can fly from one island to another, some flying insects or fungal spores can be moved by the wind, and other small pests can be carried on rafts of floating vegetation or debris.

5.2 Internal pathways

Internal pathways include movements between islands within a particular archipelago or atoll and movement between various island groups within the country.

5.2.1 By air

There are 29 outer island airstrips in the RMI. Air Marshall Islands provides links to the following locations within the country: Airok, Ailuk, Aur, Bikini, Ebon, Elenak, Enewetak, Jaluit, Jeh, Kaben, Kili, Kwajalein, Lae, Likiep, Majkin, Maloelap, Mejit, Mili, Namdrik, Rongelap, Ujae, Utirik, Wothe, and Wotje (Figure 2). Most of these locations have weekly scheduled air stops. Typical routes depart Majuro and stop at multiple locations before returning to Majuro the same day. United Airlines flights operate between Kwajalein and Majuro. US DOD aircraft may also move between islands within the country. Other aircraft may also at times be chartered to move between various islands or island groups within the country. Passengers and goods are being moved around the country through air transportation; therefore, internal biosecurity to prevent the spread of invasive species within the country is warranted.



FIGURE 2 Air Marshall Islands domestic transport routes around the republic

5.2.2 By sea

Various RMI-flagged sea vessels move between islands including yachts, fishing vessels, canoes, and supply ships. Supply ships ferry people and their belongings potentially including fish, fruit, vegetables, livestock, and pets.

Natural pathways can also transport species around RMI.

6 ROLES AND RESPONSIBILITIES IN INVASIVE SPECIES MANAGEMENT

This section identifies the different government agencies and NGOs that have roles in invasive species management.

6.1 Local community

Local community roles and responsibilities are apportioned as below:

- Marshall Islands Mayors Association (MIMA) represents the 24 political divisions of the RMI which include: Ailinglaplap, Ailuk, Arno, Aur, Ebon, Enewetok/Ujalang, Jabat, Jaluit, Kili/Bikini/Ejit, Kwajalein, Lae, Lib, Likiep, Majuro, Maloelap, Mejit, Mili, Namorik, Namu, Rongelap, Ujae, Utirik, Wotho, and Wotje. The Mayors are responsible for communicating with the traditional leaders
- Council of the Chiefs: traditional leaders of local communities
- Majuro Atoll Local Government (MALGOV) is part of MIMA. MALGOV jurisdiction includes the main international sea and airport for the country
- KALGOV: Kwajalein Atoll Local Government (KALGOV) is part of MIMA. KALGOV jurisdiction includes the international seaport at Ebeye
- Various local communities through establishment of protected areas within their communities

6.2 National

Many agencies have roles and responsibilities in RMI invasive species management.

- Climate Change Directorate (CCD)
- Office of Environmental Planning and Policy (OEPPC)
- Ministry of Natural Resources and Commerce – Division of Quarantine
- Marshall Islands Marine Resources Authority (MIMRA)
- Ministry of Transportation, Communications and Information Technology (MTCIT)
- Ministry of Health and Human Services (MOHHS)
- Ministry of Education, Sports and Training (MOEST)
- Ministry of Foreign Affairs and Trade (MOFAT)
- Ministry of Justice, Immigration and Labor
- Environmental Protection Authority (EPA)

- College of the Marshall Islands (CMI)
- Marshall Islands Conservation Society (MICS): data collection and development to support line agencies
- Marshall Islands Invasive Species Taskforce (MIIST): A planning, coordination, and support group which includes staff from various line agencies
- Ministry of Culture and Internal Affairs (MOCIA): Land use planning
- Office of the Attorney General
- Coastal Management Advisory Council (CMAC)

6.3 Regional

MICRONESIA REGIONAL INVASIVE SPECIES COUNCIL

The Regional Invasive Species Council (RISC) advises the Micronesian Island Forum (MIF) leaders and provides leadership with updates and recommendations on invasive species issues, supporting the Micronesian leaders' ability to make informed decisions and take effective action.

SPREP AND SPC

SPREP and SPC are the two key agencies providing regional coordination and support for the management of invasive species with impacts on native biodiversity and impacts on the agricultural and fisheries sectors, respectively. SPC also supports border control programmes. Annex 4 provides further details of their roles and identifies other agencies and initiatives that support invasive species work in the region.

The PRISMSS partners represent the regional support mechanisms for invasive species management support:

PRISMSS PROGRAMME	SCOPE	LEADING TECHNICAL PARTNER(S)
Protect our islands	National and Inter-Island Biosecurity and Early Detection/Rapid Response	Pacific Biosecurity (Wellington UniVentures) and SPC
Predator free Pacific	Removing Introduced Mammalian Predators from Islands	Island Conservation and Birdlife International
War on weeds	Management of High Priority Weeds	SPREP
Natural enemies – natural solutions	Biological Control of Widespread Weeds	Manaaki Whenua – Landcare Research
Resilient ecosystems – resilient communities	Priority Area Ecological Restoration	SPREP

7 PAST AND CURRENT PROGRAMMES

CONTROL OF INVASIVE PLANTS

Infestations of *Chromolaena* on Majuro were treated with pesticides in the past, as were infestations of *Mikania* and Sensitive Plant at Majuro Airport.

CONTROL OF INVASIVE INSECTS

Papaya Mealybug (*Paracoccus marginatus*) was detected on Majuro in 2012 during a Plant Health and Weed Survey of Majuro and Arno atolls surveys with a team from SPC.

An unidentified non-native caterpillar was found on Delap Dock and eradicated with no reoccurrences reported as at 2016.

HABITAT RESTORATION

Mangrove replanting projects have been undertaken on Jaluit and Namdrik atolls. The Ailinginae Atoll management plan included rat eradication.

BIOSECURITY TRAINING

Several Quarantine staff have participated in EDRR training provided by US Department of Interior on Guam, and an Emergency Response Plan for Brown Tree Snake has been drafted. Seminars on invasive species and EDRR for line agencies and port workers were conducted over several years (2005, 2007, 2009, 2012, and 2013).

EDUCATION AND AWARENESS

Invasive species awareness presentations for school and community groups were provided in 2005, 2007, 2009, 2012, and 2013.

GEF 6 REGIONAL INVASIVE SPECIES PROJECT (GEF 6 RIP)

As part of the GEF 6 Regional Invasive Species Project ‘Strengthening national and regional capacities to reduce the impact of Invasive Alien Species on globally significant biodiversity in the Pacific’ (GEF 6 RIP), several activities are being undertaken and planned, including:

- NISSAP development
- Risk assessment protocols
- Reviews of legislation, policy, and regulations
- Economic assessments
- Early Detection and Rapid Response Planning
- Eradication projects
- Interisland biosecurity protocols
- Extension officer capacity-building
- Ballast Water Convention compliance
- Assessments of the economic impacts of invasive species
- Weed and other high-risk species surveillance programmes
- Awareness and outreach programmes
- Biodiversity baseline surveys, include pest distributions

8 LEGISLATION AND INTERNATIONAL CONVENTIONS

The following Acts, Regulations, and Conventions and Protocols include provisions that relate to invasive species prevention and management.

8.1 National legislation

ENDANGERED SPECIES ACT (1975)

This Act provides for the protection of endangered species of plants and animals, with exemptions for scientific purposes, aquaculture, mariculture, and traditional uses provided there is no commercial or export activity.

NATIONAL ENVIRONMENT PROTECTION ACT (1984)

The Act creates the Environmental Protection Authority, which has a wide remit to protect all aspects of the environment, including pesticides and pollutants via the Pesticides and Persistent Organic Pollutants Regulations (2004).

FISHERIES ACT (1997)

Includes protection for turtles, sponges, oysters, and trochus and prohibitions on introductions of fishes.

MARINE RESOURCES ACT (1997)

The Act has provisions for protection for turtles.

OFFICE OF ENVIRONMENTAL PLANNING AND POLICY COORDINATION ACT (2003)

The Act establishes the Office of Environmental Planning and Policy Coordination (OEPPC) and provides for matters associated with it. The Office manages all international environmental projects, providing a pivotal role as a coordinator and liaison among government ministries/agencies, the private sector, and civil society. The Act was later repealed and succeeded by the Ministry of Environment Act (2018) with similar provisions.

ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS (1994)

The regulations implement Part IV of the National Environmental Protection Act 1984 (NEPA) and Section 11 of the Coast Conservation Act 1988 (CCA) by establishing standard procedures for environmental impact assessment (EIA) for proposed development activities that may affect the quality of the environment and is relevant when developing EDRR plans.

MARINE WATER QUALITY REGULATIONS (1992)

The regulations concern preservation of the water quality within the marine environment (including brackish nearshore environments and lagoons). These regulations are relevant when developing EDRR plans to ensure pesticides/herbicides do not enter the marine environment.

ANIMAL AND PLANT INSPECTION ACT (1966)

The Animal and Plant Inspection Act provides for the regulation of imports of agricultural and animal products. Provision is made in the Act for emergency response, inspections, seizures, treatment, and penalties. Detailed requirements are outlined in the Plant and Animal Quarantine Regulations. Unlike the harmonised legislation that has been adopted by a number of other countries in the Pacific, the Act and regulations do not specify duties of the ship's Masters to minimise the risk of transfer of invasive species from the ship to shore.

PLANT AND ANIMAL QUARANTINE REGULATIONS

The regulations operationalise the mandate of the Animal and Plant Inspection Act (1966) and include procedural requirements for biosecurity and quarantine and a register of prohibited plants and animals. While several invasive animals are prohibited, only crop plants are prohibited imports.

PROTECTED AREAS NETWORK (PAN) ACT 2015

Creates a national Protected Areas Network for the purposes of conservation and management of natural resources in the Marshall Islands. The Act mandates the role of the PAN Office to assist with management plans for protected areas, which should include invasive species as needed.

Under development

BIOSECURITY BILL

A Biosecurity Bill was drafted in 2007, with the intent of harmonising with regional legislation, but has not yet been presented to the Nitijela. It is currently unclear what activities need to be completed to pass the Bill.

8.2 International conventions and agreements

The RMI is party to several international agreements (in order of relevance).

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

The CBD, ratified in 1993, is the key convention relating to the conservation of flora, fauna, and ecosystems. It requires countries to develop a NBSAP and specifically to “prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.”

The Convention's Aichi Target 9 states: “By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled, and measures are in place to manage pathways to prevent their introduction and establishment.”

The Kunming-Montreal Global Biodiversity Framework (GBF) has established new targets to 2030 for invasive species that focus strongly on biosecurity (Target 6):

“Eliminate, minimize, reduce and/or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent, by 2030, eradicating or controlling invasive alien species especially in priority sites, such as islands.”

CARTAGENA PROTOCOL ON BIOSAFETY

The Cartagena Protocol to the Convention on Biological Diversity aims to ensure the safe handling, transport, and use of living modified organisms (LMOs) resulting from modern biotechnology. The Parties undertake to ensure that the development, handling, transport, use, transfer, and release of any LMOs are undertaken in a manner that prevents or reduces the risks to biological diversity, also considering risks to human health. While LMOs are different from invasive species, similar processes of risk management, border control, and quarantine apply.

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

The ultimate objective of the UNFCCC is to stabilise greenhouse gas concentrations “at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system.” It states that “such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner.” The UNFCCC entered into force on 21 March 1994. Today, it has near-universal membership.

THE KYOTO PROTOCOL

Adopted on in 1997 and ratified in 2005, the Kyoto Protocol operationalises the UNFCCC by committing developed countries and economies in transition to limit and reduce greenhouse gas emissions in accordance with agreed individual targets. The Convention itself requires those countries to adopt policies and measures on mitigation and to report periodically.



THE PARIS AGREEMENT

The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects. Adopted by 196 Parties at the UNFCCC Conference of the Parties (COP) 21 in Paris in 2015, it entered into force on 4 November 2016. Its goal is to limit global warming to well below 2 degrees Celsius, and preferably to 1.5 degrees Celsius, compared to pre-industrial levels to achieve a climate-neutral world by mid-century.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are a call for action by all countries—developed and developing—in a global partnership. They recognise that ending poverty and other deprivations must go together with strategies that improve health and education, reduce inequality, and spur economic growth, all while tackling climate change and working to protect the environment.

FRAMEWORK FOR RESILIENT DEVELOPMENT IN THE PACIFIC (FRDP)

The FRDP (2016) is the current regional policy that guides action to ensure that future development is more resilient to the adverse effects of climate change and disasters. The Pacific Resilience Partnership (PRP) is the umbrella implementation mechanism for the FRDP.

INTERNATIONAL PLANT PROTECTION CONVENTION (IPPC)

The IPPC is an international agreement on plant health developed in 1951 and overseen by the United Nations Food and Agriculture Organisation (FAO). Its objectives include:

- protecting sustainable agriculture and enhancing global food security through the prevention of pest spread;
- protecting the environment, forests, and biodiversity from plant pests;
- facilitating economic and trade development through the promotion of harmonized scientifically based phytosanitary measures; and
- developing phytosanitary capacity for members to accomplish the preceding three objectives.

AGREEMENT ON THE APPLICATION OF SANITARY AND PHYTOSANITARY MEASURES (SPS AGREEMENT)

The SPS Agreement was adopted in 1994 and came into force in 1995. The agreement applies to the importation of pests, diseases, disease-carrying organisms, or disease-causing organisms and:

- provides a uniform interpretation of the measures governing safety and plant and animal health regulations;
- applies to all sanitary and phytosanitary measures, directly or indirectly affecting international trade; and
- defines sanitary and phytosanitary measures as any measure applied to protect animal or plant life or health within a Members' Territory from entry, establishment, or spread of pests, diseases, and disease-carrying organisms, and to prevent or limit other damage within the Members Territory from the entry, establishment, or spread of pests.

UNITED NATIONS CONVENTION ON THE LAW OF THE SEA (UNCLOS)

UNCLOS includes (Part V) prescription of exclusive economic zones (EEZs) stretching to 200 nautical miles from its coast over which a country has sovereign rights over the exploration and use of marine resources. Part XII contains provisions for protection and preservation of the marine environment including minimising pollution and preventing the introduction of invasive species.

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

In 2004, the IMO adopted this Convention which entered into force in 2017, after it was ratified by 30 states representing 35 per cent of the world's merchant shipping tonnage. It will ensure the safe management of ballast water through requiring ships to have ballast management plans and detailed record keeping.

INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS (MARPOL)

MARPOL is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. The Convention includes regulations aimed at preventing and minimising pollution from ships—both accidental pollution and that from routine operations—and currently includes six technical Annexes. Special Areas with strict controls on operational discharges are included in most Annexes.

WORLD HERITAGE CONVENTION

The Convention sets out the duties of the parties in identifying potential sites and their role in protecting and preserving them. The convention links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognises the way in which people interact with nature and the fundamental need to preserve the balance between the two.

RAMSAR CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE ESPECIALLY AS WATERFOWL HABITAT (RAMSAR)

The Convention on Wetlands is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. The Convention was adopted in 1971 and came into force in 1975. Since then, almost 90 per cent of UN member states have become contracting Parties. Two Ramsar sites in the RMI are at Namdrik and Jaluit Atolls.

9 ACTION PLAN

The Action Plan is based on the nine outcomes in the regional Guidelines for Invasive Species Management in the Pacific.

9.1 THEME A FOUNDATIONS

9.1.1 A1 Generating support

A1 OUTCOME

The impacts of priority invasive species on biodiversity, economies, livelihoods, and health are widely understood, and actions to manage and reduce them are supported

A1 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A1.1 Awareness and outreach programmes are designed and implemented					
A1.1.1 Promote and, as needed, develop targeted communications and outreach initiatives to raise awareness of the urgent need and unique opportunity to protect RMI from the adverse impacts of invasive species (GEF 6 RIP 3.2.3) Promote existing policies, regulations, protocols, and laws concerning the management of island resources and invasive species	Ongoing activities include an EPA Radio program started in 2019 on invasive species awareness Past activities have included awareness-raising in schools, workshops for farmers on IPM and poster development, but no coordinated programme	Awareness programme enhanced by the end of the GEF 6 RIP Outreach materials should be in Marshallese, with technical terms appropriately translated	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS Communications (development) MoNRC ISC	GEF 6 RIP then as department funds allow
A1.1.2 Develop awareness programme for target audiences (GEF 6 RIP 3.2.3) such as tourism industry, shipping, and fishing vessels	No awareness programmes in place	Outreach plan developed for target audiences (including case studies)	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS Communications (development) ISC	GEF 6 RIP
A1.1.3 Implement awareness programme for target audiences (GEF 6 RIP 3.2.3) Outreach events are held (depending on how programme is designed)	No awareness programmes in place	Awareness materials sourced and tailored for RMI's use by end of 2023	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS Communications (development) MoNRC ISC	GEF 6 RIP then as department funds allow

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A1.2 Government support for invasive species management is enhanced					
A1.2.1 Continue to support mechanisms that mainstream invasive species management into national decision-making processes Encourage the inclusion of invasive species in high-level discussions with aid donors	As outlined in the NBSAP (2020), invasive species are a national priority for RMI	Invasive species provisions in further strategic plans and actions, using the targets in this NISSAP as a guide by 2023	NISSAP annual reporting	ISC MoNRC	As department funds allow
A1.3 Invasive species are incorporated into primary and secondary education					
A1.3.1 Develop a plan for incorporating invasive species content into the school curriculum (science syllabus primary and secondary level). The plan should consider practical experience through internships with CMAC organisations	No plan for invasive species learning in the primary or secondary curricula	High-level plan developed by end of 2023	Curriculum Plan NISSAP annual reporting	MoNRC MIMRA Education (Public School System)	Department funding as time and funds allow
A1.3.2 Develop curriculum materials from existing sources and tailor to RMI's needs such as information from other countries, such as Kiribati Year 6 invasive species curriculum (also on the Pacific Invasive Ant Toolkit), SPREP Little Fire Ant resources, and PFP resources	No curriculum content	Source curriculum content from partners such as PRISMSS, regional Education departments, other ISCs, PILN, and so on by end of 2025	NISSAP annual reporting	MoNRC MIMRA Education (Public School System) Potentially PRISMSS for provision of generic materials that can be adapted to RMI's needs	Departmental budgets/staff time External funding may be required
A1.3.3 Customise content for RMI for invasive species topics to be taught to first classes	No curriculum content	Train teachers to deliver content by end of 2026	School curriculum NISSAP annual reporting	ISC MoNRC Education (Public School System)	Departmental budgets/staff time External funding may be required
A1.4 Awareness of marine invasive species is promoted					
A1.4.1 Derive information from the SPREP Marine Biosecurity Toolkit and make this available to those able to detect marine invasives (such as dive companies, tourists snorkelling, and those harvesting on reefs)	The National Oceans Symposium Implementation Plan 2018 includes awareness-raising (item 4.1.2). This activity aligns with that plan	MIMRA provided with information from the Marine Biosecurity Toolkit by end of 2022	NISSAP annual reporting	ISC MIMRA SPREP (for Marine Biosecurity Toolkit)	Department funding as time and funds allow

9.1.2 A2 Building capacity

A2 OUTCOME

The institutions, skills, infrastructure, technical support, information management, networks, and exchanges required to manage invasive species effectively are developed.

A2 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A2.1 Invasive Species Coordinator (ISC) is appointed					
A2.1.1 Establish a position to coordinate activities under RMI's GEF 6 RIP invasive species project. Alternatively, it could be coordinated through the chair of the MIIST	No coordinator prior to GEF 6 RIP project	Maintain at least one ISC position	NISSAP annual reporting	MoNRC	GEF 6 RIP and then department funding
A2.1.2 Provide ongoing support of the ISC activities as a core position	Coordinator is project-funded	Maintain at least one ISC position	NISSAP annual reporting	MoNRC	Department funding
A2.2 A multi-sectoral invasive species committee is formed (TAG)/MIIST on invasive species issues					
A2.2.1 Hold regular TAG meetings to discuss cross-sectoral invasive species issues and enhance cross-sectoral support (GEF 6 RIP RMI 1.1.1) The MIIST could be formalised to take on the role of a TAG, with a Cabinet Minute approving the terms of reference of the MIIST, or perhaps MIIST should be integrated into CMAC. MIIST should include representatives from Ebeye and other islands	RMI has an active cross-sectoral invasive species committee (TAG)/MIIST	TAG meetings held every six months and minuted	GEF 6 RIP reporting Minutes of TAG meetings NISSAP annual reporting	ISC TAG members	GEF 6 RIP until 2024
A2.2.2 Continue support of the TAG (or MIIST) after completion of GEF 6 RIP	TAG established	TAG meetings held every six months and minuted Maintain this multi-sectoral invasives species team and encourage activities	GEF 6 RIP reporting Minutes of TAG meetings NISSAP annual reporting	ISC TAG members	Cost-shared by TAG member departments as funds allow

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A2.3 Identification of marine invasive species, leading to improved management and monitoring					
A2.3.1 Strengthen knowledge of marine invasives, with a focus on training Harbourmasters and others working in the coastal and marine environment	Current knowledge of marine invasives is limited	Share information from the Marine Biosecurity Toolkit with Harbourmasters by mid-2023	GEF 6 RIP reporting NISSAP annual reporting	MoNRC MIMRA	GEF 6 for Marine Biosecurity Toolkit Department as staff time and funds allow
A2.4 Participation in knowledge-sharing through regional meetings and communications					
A2.4.1 Continue membership of and participation in PILN	RMI are established members of PILN	Representatives to attend PILN Meetings and share knowledge from activities in RMI	GEF 6 RIP reporting NISSAP annual reporting	ISC	GEF 6 RIP to fund PILN meeting attendance
A2.4.2 Continue membership of and participation in RISC	RMI are established members of RISC	Representatives to attend RISC Meetings and share knowledge from activities in RMI	NISSAP annual reporting	MoNRC	Existing funding mechanism
A2.5 National invasive species teams include extension officers					
A2.5.1 Determine whether extension officers will be employed or National Disaster Office (NDO) staff will be trained	Currently no extension officers are employed. National Disaster Office staff could be co-opted to undertake this role	Identify way forward for extension officers by mid-2023	GEF 6 RIP reporting NISSAP annual reporting	ISC MoNRC	GEF 6 RIP
A2.5.2 Assess extension officer training needs (GEF 6 RIP 1.1.5)	Limited understanding of invasive species issues	Needs assessed for 12 extension officers by mid-2023	GEF 6 RIP reporting NISSAP annual reporting	ISC MoNRC	GEF 6 RIP
A2.5.3 Design training programme for extension officers (GEF 6 RIP 1.1.5)	Depending on A2 5.2	Depending on A2 5.2	GEF 6 RIP reporting NISSAP annual reporting	ISC MoNRC PRISMSS POI and PFP (information and support)	GEF 6 RIP
A2.5.4 Deliver extension officer training on-island by project staff (GEF 6 RIP 1.1.5)	Depending on A2 5.3	Training delivered by end of GEF 6 RIP in 2024 (depending on the COVID-19 pandemic)	GEF 6 RIP reporting NISSAP annual reporting	ISC MoNRC	GEF 6 RIP then ongoing as part of department budget

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A2.6 Structured national invasive species/biosecurity annual work programmes implemented					
A2.6.1 Define annual work programmes including monitoring and reporting	Structured international and some domestic biosecurity work programmes are in place Invasive species work programmes are in place but are either unstructured, not resourced, or not financed	Structured domestic biosecurity and invasive species work programmes are in place by the end of 2023	GEF 6 RIP reporting NISSAP annual reporting	ISC MoNRC PRISMSS support	GEF 6 RIP for defining work programmes
A2.6.2 Support nvasive species work programmes after the end of GEF 6 RIP	Invasive species work is conducted reactively rather than proactively	Structured invasive species work programmes are in place after GEF 6 RIP project ends	GEF 6 RIP reporting NISSAP annual reporting	MoNRC MIMRA PRISMSS support	Ongoing department budgets and staff time
A2.7 Biosecurity facilities at main ports of entry					
A2.7.1 Identify requirements and costings and investigate funding options	Inadequate biosecurity facilities at ports (Majuro)	Compete requirements definition by end of 2023	NISSAP annual reporting	MoNRC PRISMSS support	Department budget (for identifying requirements) Donor funding to implement
A2.8 Funding is available to carry out the NISSAP activities					
A2.8.1 Implement long-term funding mechanisms to ensure the implementation of this strategy using the guidance from GEF 6 RIP Sustainable Funding activity (GEF 6 RIP 4.1.2)	RMI is reliant on outside funding for invasive species work	Long-term funding plan is designed using the GEF 6 RIP Sustainable Funding guidelines by 2023	GEF 6 RIP reporting NISSAP annual reporting	MoNRC SPREP MoNRC MIMRA	GEF 6 RIP (for Sustainable Funding guidelines) Other donors



9.1.3 A3 Legislation, policy, and protocols

A3 OUTCOME

Appropriate legislation, policies, protocols, and procedures are in place and operating, to underpin the effective management of invasive species.

A3 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
A3.1 Review and revise NISSAP for RMI					
A3.1.1 Review NISSAP for RMI (GEF 6 RIP RMI 1.1.3)	RMI's first NISSAP expired 2021	NISSAP reviewed in 2021	GEF 6 RIP reporting NISSAP annual reporting	Consultants ISC SPREP	GEF 6 RIP
A3.1.2 Develop revised NISSAP	RMI's first NISSAP expired 2021	NISSAP revised in 2023	GEF 6 RIP reporting NISSAP annual reporting	Consultants MoNRC ISC SPREP PRISMSS Partners	GEF 6 RIP
A3.1.3 Monitor NISSAP progress	No monitoring process or records	Completion of NISSAP annual reporting	GEF 6 RIP reporting NISSAP annual reporting	MoNRC ISC SPREP	GEF 6 RIP MIISC after completion of GEF 6 RIP
A3.1.4 Review NISSAP and revise	This NISSAP	Mid-term review and initiation of revised NISSAP by 2025	NISSAP annual reporting	MoNRC SPREP support	GEF 6 RIP MIISC after completion of GEF 6 RIP
A3.2 Biosecurity legislation is fit-for-purpose					
A3.2.1 Enact a Biosecurity Bill to ensure RMI's legislation is harmonised with the rest of the region and fit-for-purpose for RMI (GEF 6 RIP)	Biosecurity Bill was first proposed in 2007 and reviewed through GEF 6 RIP Marine biosecurity is the mandate of MIMRA Consideration of harmonisation of all invasive species-related legislation	Determine what is needed to ensure the Biosecurity Bill is fit for purpose for RMI and have new Biosecurity Bill passed by the end of 2024	Revised legislation NISSAP annual reporting	MoNRC (terrestrial) MIMRA (marine)	GEF 6 RIP (for biosecurity legislation review and support) Departmental budgets
A3.3 Domestic biosecurity regulations					
A3.3.1 Review and implement domestic biosecurity regulations	Regulations have provision for domestic biosecurity but are not enforced	Review domestic biosecurity regulation requirements by end of 2023 (see also C1)	NISSAP annual reporting	MoNRC	Departmental budgets

9.2 THEME B PROBLEM DEFINITION, PRIORITISATION, AND DECISION-MAKING

9.2.1 B1 Baseline and monitoring

B2 OUTCOME

Systems are in place to generate baseline information on the status and distribution of invasive species, detect changes, including range changes and emerging impacts.

B2 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
B1.1 Biodiversity baseline surveys (marine and terrestrial) established and repeated as required					
B1.1.1 Conduct regular biodiversity surveys Establish a programme for detecting change in the status and distribution of invasive species (using iNaturalist and GBIF) Incorporate traditional knowledge for Access and Benefit Sharing (ABS) considerations	Previous surveys not recorded Aligns with National Oceans Symposium Implementation Plan 2018 (item 4.22) implemented by MIMRA	Repeat surveys by first quarter of 2023 and at least every five years thereafter Record results in iNaturalist POI project (new invasive species) and GBIF Use species identification tools from the Marine Biosecurity Toolkit by end of 2022	NISSAP reporting	MoNRC MIMRA PRISMSS partners (for advice on monitoring)	Department budgets as funds allow Other projects (such as Ridge to Reef) Additional funding to be determined
B1.2 Collection and sharing of biodiversity information					
B1.2.1 Promote the use of iNaturalist and PBIF/GBIF as tools for use by communities and schools to improve collection of occurrence information and identification of invasive species	At 30 November 2022, there were 151,071 records for RMI in GBIF and 2,669 occurrences originated from within RMI	Actively promote use of PBIF/GBIF and the iNaturalist app through networks (schools, government departments and so on)	NISSAP annual reporting	MoNRC MIMRA ISC	MoNRC department funding
Make biodiversity information publicly available via PBIF	At 30 November 2022, there were 151,071 records for RMI in GBIF	Publish any data that arise from the activities MoNRC	NISSAP annual reporting	MoNRC MIMRA	GBIF DOE department funding

9.2.2 B2 Prioritisation

B2 OUTCOME

Effective systems are established and implemented to assess risk and prioritise invasive species for management.

B2 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
B2.1 Risk profiles for the most important invasive species threats completed					
B2.1.1 Complete risk profiles (pathways, mitigation plans, and rank order of species) for the most important threats (GEF 6 RIP 2.1.2): terrestrial species	Pathways identified and eight terrestrial species prioritised (See Annex 2)	Complete EDRR Plan for eight threat species by end of 2022 (see C1.3)	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS POI (Pacific Biosecurity) PRISMSS Partners (support) MoNRC	GEF 6 RIP
B2.1.2 Complete marine invasive species risk profiles, particularly focussed on protected areas (GEF 6 RIP 2.1.2)	No profiles for marine invasives (see also B1.1) for surveys	Profiles in the Pacific Marine Biosecurity Toolkit are used by RMI by mid 2024	GEF 6 RIP reporting NISSAP annual reporting	MIMRA	GEF 6 RIP

9.2.3 B3 Research on priorities

B3 OUTCOME

Knowledge is updated for priority invasives, including species biology and impacts, and development of effective management techniques.

B3 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
B3.2 Use available research to guide prevention and management of priority species					
B3.2.1 Keep up to date with knowledge through subscribing to email lists (such as PestNet and Aliens-List), taking part in PILN meetings, and seeking information through PRISMSS partners, including SPC	Available research is used as needed. Not all applicable lists are subscribed to	Continue using research and subscribe to all lists by early 2023	NISSAP annual reporting	MoNRC PRISMSS partners (for support)	Departmental budgets

9.3 THEME C MANAGEMENT ACTION

9.3.1 C1 Biosecurity

C1 OUTCOME

Mechanisms are established to prevent the spread of invasive species across international or internal borders and quickly detect and respond to those that arrive.

C1 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
C1.1 Domestic and International invasive species pathways secured					
C1.1.1 Pathways (across national boundaries and inter-island) identified, assessed, and reported and protocols for their mitigation written (GEF 6 RIP 3.1.1)	International pathways have been identified by ISSG Eight priority international species/taxa have been identified by SPREP and PRISMSS POI (C1.2)	Identify domestic pathways by end of 2023	NISSAP annual reporting GEF 6 RIP reporting	MoNRC PRISMSS partners (support for risk assessment)	GEF 6 RIP
C1.1.2 Biosecurity gap analysis (GEF 6 RIP 3.2.2) Ensure that inter-island biosecurity links to the regulations of Ports and RMI quarantine regulations, Animal and Plant Inspection Act, and other regulations	Biosecurity gaps not documented (such as domestic pathways not secured generally or for specific species). Currently, the team responsible for biosecurity (Quarantine) is not staffed at a level sufficient to manage domestic spread	Biosecurity gaps identified by mid-2023 Timeframe depending on COVID-19 response	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS PFP (Island Conservation) MoNRC ISC	GEF 6 RIP
C1.1.3 Depending on gap analysis, develop protocols and implement biosecurity enhancements (GEF 6 RIP 3.1.1)	Depending on gap analysis	Protocols prepared and biosecurity enhancements initiated 2023–2024	GEF 6 RIP reporting NISSAP annual reporting	MoNRC PRISMSS POI (Pacific Biosecurity) PRISMSS Partners (support)	GEF 6 RIP

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
C1.2 EDRR implemented for priority invasive species not yet in RMI					
C1.2.1 Write EDRR plans and protocols for three priority high-risk species in priority sites (GEF 6 RIP 3.1.2)	RMI does not have a general ERP for plant pests An ERP for Brown Tree Snake incursions was drafted in 2006 and updated in 2008 Staff members from line agencies as well as shipping and airline companies have participated in IAS early detection seminars held in 2005, 2007, 2009, 2012, and 2013	Develop endorsed EDRR plan for three highest-priority invasive species by mid-2023	GEF 6 RIP reporting NISSAP annual reporting	MoNRC PRISMSS POI (Pacific Biosecurity – plan development)	GEF 6 RIP
C1.2.2 Develop a list of pesticides that may be required for invasive species incursions (GEF 6 RIP 3.1.2), with reference to the Pesticides and Persistent Organic Pollutants Regulations (2004)	Pesticide requirements for EDRR are not yet known	By mid-2023, cross-check all pesticides that may need to be imported for EDRR with registered pesticide list Undertake EIA for any new requirements so that these pesticides by end of 2023	GEF 6 RIP reporting NISSAP annual reporting	MoNRC PRISMSS partners (to provide lists of pesticides and assist with EIA)	Departmental budgets GEF 6 RIP for EDRR
C1.2.3 Purchase EDRR specialist equipment (GEF 6 RIP 3.1.2)	RMI does not have specialist equipment for priority species	Specialist equipment delivered to RMI by the end of 2023	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS POI (Pacific Biosecurity)	GEF 6 RIP
C1.2.4 Complete EDRR training for the three priority species (GEF 6 RIP 3.1.2)	No training undertaken	Training undertaken by the end of 2023 or sooner, COVID-19 response permitting	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS POI (Pacific Biosecurity) ISC MoNRC	GEF 6 RIP
C1.2.5 Run initial simulation exercises for the three priority species and complete assessments (GEF 6 RIP 3.1.2)	No simulation exercises completed	Exercise completed as part of training in C1.2.3	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS POI (Pacific Biosecurity) ISC MoNRC	GEF 6 RIP

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
C1.2 EDRR implemented for priority invasive species not yet in RMI					
C1.2.6 On-going surveillance for the three priority species, and others if possible (GEF 6 RIP 2.1.2)	Surveillance not currently undertaken for the priority invasive species. Currently RMI has insufficient staff to undertake regular surveillance	Some surveillance undertaken in 2023 and 2024	GEF 6 RIP reporting NISSAP annual reporting	MoNRC	GEF 6 RIP MoNRC funding after GEF 6 RIP as funds allow
C1.2.7 Tailor SPC general ERP for crop pests (GEF 6 3.1.2)	No general ERP is in place for RMI Surveillance is undertaken for Fruit Flies, Coconut Rhinoceros Beetle (CRB), Coconut Scale, and mealybugs Surveillance of Little Fire Ant was conducted in the past	Adopt ERP by end of 2023	GEF 6 RIP NISSAP annual reporting	MoNRC (Quarantine) PRISMSS POI (Pacific Biosecurity)	GEF 6 RIP Department funding after GEF 6 RIP as funds allow
C1.3 Marine and terrestrial (including weeds) invasive species surveillance programmes designed and operational					
C1.3.1 Identify priority marine species for surveillance (GEF 6 RIP 2.1.1 and GEF 6 RIP 2.1.2) Marine Biosecurity Toolkit identifies 25 highest priority species	Terrestrial priority species have been identified for surveillance (see C1.2) but marine species not yet prioritised	Identify marine priority species by end of 2022 from the Marine Biosecurity Toolkit	GEF 6 RIP reporting NISSAP annual reporting	MIMRA (to tailor from Marine Biosecurity Toolkit)	GEF 6 RIP (Marine Biosecurity Toolkit) MIMRA funding after GEF 6 RIP as funds allow
C1.3.2 Design and test surveillance programmes for marine species (GEF 6 RIP 2.1.2)	No ongoing surveillance for marine species	Once marine species prioritised, design and test surveillance programme by end of 2023	GEF 6 RIP reporting NISSAP annual reporting	MIMRA	GEF 6 RIP (Marine Biosecurity Toolkit) Departmental funding after GEF 6 RIP as funds allow
C1.3.3 Surveillance programmes operational for marine species (GEF 6 RIP 2.1.2)	No ongoing surveillance for marine species	Marine surveillance programme operational from beginning of 2024	GEF 6 RIP reporting NISSAP annual reporting	MIMRA	GEF 6 RIP (Marine Biosecurity Toolkit) Departmental funding after GEF 6 RIP as funds allow

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
C1.4 Ensure Masters are undertaking steps to prevent invasive species leaving ships					
C1.4.1 If the Biosecurity Bill is not going to be passed, Plant and Animal Quarantine Regulations should be updated to include steps to prevent animals leaving ships, using best-practice guidelines from PRISMSS partners	Current Animal and Plant Inspection Act and Plant and Animal Quarantine Regulations do not specify the obligations of Masters and captains to take “all necessary steps” to prevent animals from leaving the ship (or equivalent). These steps include: Rope guards for rats Prohibition of night offloading (this is a risk for CRB) Deratting	Best-practice guidelines to be identified by mid-2023 MoNRC to implement best practice guidelines by end of 2023 (if needed)	NISSAP annual reporting	MoNRC PRISMSS POI Other PRISMSS partners (such as PFP, for best practice advice)	GEF 6 RIP for best practice MoNRC operational budget
C1.4.2 If the Biosecurity Bill is not going to be passed, Plant and Animal Quarantine Regulations should have provision for deratting. Deratting can be considered a “necessary step” as described above	As above	Implement deratting by the end of 2023	NISSAP annual reporting	MoNRC	Ship’s Masters

9.3.2 C2 Management of established invasives

C2 OUTCOME

The impacts of priority established invasive species are eliminated or reduced by eradicating or controlling the target species.

C2 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
C2.1 Marine invasive species mitigation plan					
C2.1.1 Write marine invasive species mitigation plan (GEF 6 RIP 3.1.1)	No marine invasive species mitigation plan	Marine invasive species mitigation plan written by end of 2023 (using Marine Biosecurity Toolkit)	NISSAP annual reporting	MIMRA ISC	GEF 6 RIP
C2.1.2 ISC and CMAC to work with communities to identify additional invasive species management actions	As determined above	Start working with communities on planning additional activities by end of 2023 Start funding applications by end of 2023	NISSAP annual reporting	ISC MoNRC CMAC/MIMRA PRISMSS partners (to support creation of plans and funding applications)	Departmental budgets as funds allow Seek additional funding as needed
C2.2 Rodent eradication plan implemented for RMI					
C2.2.1 Write feasibility and operational plans for at least eight rodent eradications in RMI (GEF 6 RIP 3.2.2) The focal sites will be those that are a priority for Ratak Imperial Pigeon	No rodent eradication plans in place Lib, Mejit, Majuro, and Mili atoll have been identified as priority sites	Feasibility and operational plans complete by end of 2022 Operational plans dependent on feasibility	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS PFP (Island Conservation) MoNRC	GEF 6 RIP 3.2.2
C2.2.2 Conduct and assess rodent eradications (at least four), and post-operational monitoring regimes written and established (GEF 6 RIP 3.2.2)	No eradications have been undertaken	Eradications carried out by end of 2023 depending on feasibility	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS PFP (Island Conservation) MoNRC	GEF 6 RIP
C2.2.3 Conduct ongoing monitoring after rodent eradications (GEF 6 RIP 3.2.2)	No eradications have been undertaken	Ongoing monitoring finds no evidence of rodents	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS PFP (Island Conservation) MoNRC	GEF 6 RIP and department funds after GEF 6 RIP ends



C2.3 Eradications of other key invasive species (Eurasian Tree Sparrow, Giant African Snail, and Green Anolis Lizard)

C2.3.1 Write and carry out feasibility and operational plan for identified key species	No species-led eradication plans in place	Feasibility and operational plans complete by end of 2023	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS PFP (Island Conservation) MoNRC	GEF 6 RIP
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C2.4 Species-led biological control for invasive plants

C2.4.1 Research and establish weed biological control programmes (GEF 6 RIP 3.1.2)	No plants of concern assessed as likely to be suitable for NENS	Complete assessment and implementation of at least two programmes by end of GEF 6 RIP/MISCCAP (timing subject to COVID-19 pandemic)	GEF 6 reporting NISSAP annual reporting MISCCAP reporting	PRISMSS NENS ISC MoNRC	GEF 6 RIP MISCCAP
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C2.5 Species-led weed control programmes

C2.5.1 Develop species-led weed control plans for at least three weed species in RMI (GEF 6 RIP 2.1.2)	No weed control plans in place	Prioritise species for weed control programmes by end of 2022 (travel permitting) Implement three weed control programmes by conclusion of GEF 6 RIP (timing dependent on COVID-19 pandemic response)	GEF 6 RIP reporting NISSAP annual reporting	PRISMSS WOW MoNRC Communities	GEF 6 RIP
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C2.6 Integrated Pest Management for priority crop and infrastructure pests

C2.6.1 Continue to support farmers with Integrated Pest Management for priority crop pests, particularly Citrus Black Fly, mealybugs, and termites	IPM is being used in RMI	Encourage more widespread use of Integrated Pest Management	NISSAP annual reporting	MoNRC (Agriculture) Farmers	None identified
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C2.7 Management of impacts of lowland tropical forest root disease

C2.7.1 Obtain technical assistance to better understand the root disease issues (lowland tropical forest)	Root disease issues in lowland tropical forest are not well understood	Identify possible sources of technical assistance by end of 2023	NISSAP annual reporting	MoNRC (Forestry)	None identified
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C2.8 Control, and prevention of spread, of Monitor Lizard (Varanus sp.)

C2.8.1 Write and carry out control plan for monitor lizards in Wotje and Mejit	No species-led control plans in place	Control plan written by end of 2023	NISSAP annual reporting	MoNRC PRISMSS partners (for advice)	None identified
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9.3.3 C3 Restoration

C3 OUTCOME

Following invasive species management, the best methods are determined and implemented to facilitate effective restoration of native biodiversity or recovery of other values

C3 ACTIONS

ACTIVITIES	BASELINE	TARGET	VERIFICATION	RESPONSIBILITY	FINANCING
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C3.1 Assess opportunities to support management of invasive species within the Reimaanlok framework

C2.3.1 Review current Reimaanlok plans for invasive species status and actions (including identifying potential restoration targets)	Ailinginae Atoll Conservation Management Plan (Draft) includes invasive species activities Bikini Atoll Conservation Management Plan 2010 mentions invasive species but does not include management plans See also GEF 6 RIP activities in C2	Review other plans and identify invasive species opportunities by mid-2023	NISSAP annual reporting	MIMRA/CMAC MoNRC ISC PRISMSS partners (for support)	GEF 6 RIP (ISC staff time) Departmental budgets
C2.3.2 Ensure invasive species awareness, biosecurity and management aspects are considered in the Reimaanlok process in the future	Invasive species are not specifically considered in the Reimaanlok process	Consideration of invasive species issues is incorporated into Reimaanlok process by the end of 2023	GEF 6 RIP reporting (awareness) NISSAP annual reporting	MIMRA/CMAC MoNRC ISC PRISMSS partners (for support)	GEF 6 RIP (ISC staff time and awareness) Departmental budgets Additional funding (new projects)



10 MONITORING AND EVALUATION

The Invasive Species Coordinator has the role of coordinating the monitoring and evaluation of the implementation of this strategy.

Monitoring – NISSAP annual reporting

An annual review of activities in the Action Plan is required, with the involvement of the Technical Action Group. The NISSAP annual reporting requires only completion of the monitoring template as shown on the following page and is prompted by SPREP at the same time as the Guidelines reporting updates. Ideally, any reports that have been produced should also be sent out with the completed monitoring template.

Once the annual review is complete, it is shared with SPREP and SPC. Monitoring assesses progress using the baselines, targets, and verification (indicators) identified in the Action Plan tables. Monitoring identifies issues that might affect the success of the activities and provides an opportunity to adapt to changing conditions.

Any additional work that contributes to the NISSAP goals but was not identified in the Action Plan should also be recorded.

Evaluation

Halfway through the NISSAP timeframe, a mid-term review should be undertaken, and a final review should occur at the end of the NISSAP timeframe. The final review may be undertaken as part of the preparation for the updated NISSAP. The purpose of the reviews is to compare the expected progress with actual outcomes. The reviews are undertaken by the agency responsible for the implementation of the NISSAP as well as the Technical Action Group, with contributions and guidance from SPREP and SPC.

The evaluation should include a review of the monitoring reports to date. The mid-term review should identify areas that will likely be carried forward to the next NISSAP, for which funding should be sought, so that the work to secure funding can commence.

Monitoring template

This template should be completed every year for NISSAP annual reporting. All the applicable columns from the Action Tables are included in the left-hand columns. Each year, status information is added to the right-hand columns.

ACTIONS	2021	2022	2023	2024	2025	2026	2027
A1.1 Awareness and outreach programmes are designed and implemented							
A1.2 Government support for invasive species management is enhanced							
A2.1 A National Invasive Species Coordinator (NISC) is appointed							
A2.2 A multi-sectoral national invasive species committee is formed (TAG) on invasive species issues							
A2.3 Identification of marine invasive species, leading to improved management and monitoring,							
A2.4 Participate in knowledge-sharing through regional meetings and communications							
A2.5 National invasive species teams include extension officers							
A2.6 Structured national invasive species/biosecurity annual work programmes implemented							
A2.7 Biosecurity facilities at main ports of entry							
A2.8 Funding is available to carry out the NISSAP activities							
A3.1 Review and revise NISSAP for RMI	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
A3.2 Biosecurity legislation is fit-for-purpose							
A3.3 Domestic biosecurity regulations							
B1.1 Biodiversity baseline surveys (marine and terrestrial) established and repeated as required							

ACTIONS	2021	2022	2023	2024	2025	2026	2027
B1.2 Collection and sharing of biodiversity information							
B2.1 Risk profiles for the most important invasive species threats completed							
B3.2 Use available research to guide prevention and management of priority species							
C1.1 Domestic and International invasive species pathways secured							
C1.2 EDRR implemented for priority invasive species not yet in RMI							
C1.3 Marine and terrestrial (including weeds) invasive species surveillance programmes designed and operational							
C1.4 Ensure Masters are undertaking steps to prevent invasive species leaving ships							
C2.1 Marine invasive species mitigation plan							
C2.2 Rodent eradication plan implemented for RMI							
C2.3 Eradications of other key invasive species (Eurasian Tree Sparrow and Giant African Snail and Green Anolis Lizard)							
C2.4 Species led biological control for invasive plants							
C2.5 Species-led weed control programmes							
C2.6 Integrated Pest Management for priority crop and infrastructure pests							
C2.7 Manage impacts of lowland tropical forest root disease							
C3.1 Assess opportunities to support management of invasive species within the Reimaanlok framework							

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12 ANNEXES

12.1 ANNEX 1 Priority invasive species for management in the Republic of the Marshall Islands

PLANTS

African Tulip Tree <i>Spathodea companionata</i>	Crowd out native species and are extremely difficult to remove as they can grow back from fragments and wind-dispersed seeds. Potential biocontrol target using African Tulip Tree Mite (<i>Colomerus spathodae</i>).
Chain of Love <i>Antigonon leptopus</i>	Smothering vine that invades clearings and forest edge. Reported from Kwajalein and Majuro.
Chromoleana <i>Chromoleana odorata</i>	Eradication from Majuro, Bikini, and Kili islands was identified by the RMI government for the GEF funded project “prevention, control, and management of invasive alien species in the Pacific islands”. The population on Majuro Atoll has been treated.
Ivy Gourd – kiuri awia <i>Coccinia grandis</i>	Smothering vine and host for melon fly and other pest species. Reported from Majuro.
Lantana <i>Lantana camara</i>	Crowds out grazing lands, native forests, and agricultural areas. Lantana is toxic to most grazing livestock.
Merremia <i>Decalobathus peltatus</i>	Eradication from Majuro, Bikini, and Kili islands was identified by the RMI government for the GEF funded project “prevention, control, and management of invasive alien species in the Pacific islands”.
Mile a Minute <i>Mikania micrantha</i>	Mikania is an extremely fast-growing vine that smothers other plants, outcompeting them for sunlight and other resources. Eradication from Majuro, Bikini, and Kili islands was identified by the government of the RMI as an activity for the GEF funded project “prevention, control, and management of invasive alien species in the Pacific islands”.
Sensitive Plant <i>Mimosa pudica</i>	Can form dense stands, preventing other species from establishing. Known weed of agricultural fields. Reported from Kwajalein and Majuro. Population in Majuro was treated in the past.
Spanish Needle <i>Bidens pilosa</i>	Erect annual herb. Known crop weed which reduces yield. Widespread throughout the RMI.

MAMMALS

Brown Rat <i>Rattus norvegicus</i>	Established throughout the country. Known crop pest and disease vector; causes direct impacts on biodiversity via seed and egg consumption.
Pacific Rat <i>Rattus exulans</i>	Established throughout the country. Known crop pest; potential disease vector and may directly impact biodiversity via seed and egg consumption.
Black/Ship Rat <i>Rattus rattus</i>	Established throughout the country. Known crop pest and disease vector; causes direct impacts on biodiversity via seed and egg consumption.
Feral Cat <i>Felis catus</i>	Preys on native wildlife. Carries human disease (toxoplasmosis) that can cause miscarriage.

BIRDS

Red-vented Bulbul <i>Pycnonotus cafer</i>	Recently arrived and established on Majuro Atoll. Majuro communities report crop damage from this species. Tentative report from Arno but at 2015 this was not confirmed.
Eurasian Tree Sparrow <i>Passer montanus</i>	Rapidly spreading throughout the country and causing damage to crops. Also a vector for several avian diseases as well as diseases that can affect humans, including the H5N1 virus and Salmonella.

INSECTS/INVERTEBRATES

Breadfruit Mealybug <i>Icerya aegyptiaca</i>	Both papaya and breadfruit crops are currently being damaged by mealybugs. Multiple mealybug species are established.
Coconut Scale Insect <i>Aspidiotus destructor</i>	Attacks coconuts, bananas, and other fruit trees and shrubs. Biocontrol is available.
Mango Fruit Fly <i>Bactrocera frauenfeldi</i>	Well established; affects crops and restricts export of produce internationally.
Citrus Blackfly <i>Aleurodiscus dispersus</i>	Well established; affects crops and native plants.
Mosquitos <i>Aedes aegypti</i> and other <i>Aedes</i> spp.	Well established vector of human and animal disease.
Spiraling Whitefly <i>Aleurodiscus woglumi</i>	Well established; affects citrus crops.
Giant African Snail <i>Achatina fulica</i>	Environmental impacts through herbivory on plants and competition with native snails. Vector of a parasitic nematode that can cause meningitis, a sometimes-fatal infection of the brain, in people. Undergoing control in Kwajalein and Majuro.
Yellow Crazy Ant <i>Anoplolepis gracilipes</i>	Widespread in RMI. Impacts not known but see below regarding other tramp ants.
Other Tramp Ants	Concern was raised in the past regarding red ants and reports suggested they were affecting crab populations in places like Jaluit. Tramp ants such as Tropical Fire Ant (<i>Solenopsis geminata</i>), Black Crazy Ant (<i>Paratrechina longicornis</i>), and Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>) have all been reported.

REPTILES AND AMPHIBIANS

Monitor Lizard <i>Varanus</i> sp.	Reported concerns in Wotje and Mejit.
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MICRO-ORGANISMS

Breadfruit Fungus	A variety of fungi attack breadfruit and these may infect various parts of the tree including roots, trunk, leaves, and fruit.
Chikungunya virus	Generally spread by <i>Aedes</i> spp. mosquitoes, which can also transmit dengue. These mosquitoes typically feed during the day.

MARINE

Ciguatera vectors	Workshop participants at the previous NISSAP consultation commented that ciguatera was on the rise throughout the country. Ciguatera is a toxin that is produced by some dinoflagellates and can accumulate in the flesh of fish species (generally reef and lagoon fish). The primary dinoflagellate associated with ciguatera is <i>Gambierdiscus toxicus</i> . Typically, outbreaks are related to environmental degradation.
Crown-of-thorns Starfish <i>Acanthaster planci</i>	Considered native to the RMI but is reported to be expanding population numbers and damaging reef ecosystems. Typically, outbreaks are related to environmental degradation.
Red Alga <i>Hypnea</i> spp.	On-going algal bloom on Majuro reef which is expected to be reducing biodiversity and overall reef vitality. Probably related to environmental degradation.

12.2 ANNEX 2 Priority invasive species for prevention from the Republic of the Marshall Islands

PLANTS

All invasive plants	See species list for key species for prevention in the Pacific region.
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MAMMALS

Indian Grey Mongoose <i>Herpestes indica</i>	Present in Fiji and Hawai'i with recent incursions occurring in several other Pacific countries.
Asian Black Rat <i>Rattus tanzenumi</i>	Eastern Asia with several incursions on Pacific islands via fishing boats and wrecks. Similar impacts as <i>R. rattus</i> .

BIRDS

Myna Birds (Family Sturnidae)	Several species established throughout the Pacific, including in Hawai'i Common Myna (<i>Acridotheres tristis</i>) and Hill Myna (<i>Gracula religiosa</i>) and in Fiji Common Myna and Jungle Myna (<i>Acridotheres fuscus</i>).
Passerine Birds such as Sparrows and Finches	Several species established on Pacific islands, including Java Sparrow (established in Fiji, Guam, and Hawai'i), House Sparrow (established in Fiji and Hawai'i) and House Finch (established in Hawai'i).

INSECTS/INVERTEBRATES

Coconut Rhinoceros Beetle <i>Oryctes rhinoceros</i>	Established throughout much of the Pacific. Has a damaging genetic form that is found in Guam, Papua New Guinea, Solomon Islands, and Vanuatu.
Little Fire Ant <i>Wasmannia auropunctata</i>	Established on Guam and Hawai'i as well as elsewhere in the Pacific. Has the potential to reduce biodiversity and impact agricultural activities. Tramp ants in general are a concern.
Wasps	<i>Vespula</i> spp. wasps found in Kiribati and Hawai'i. Paper wasps (<i>Polistes</i> spp.) found in the Cook Islands, Easter Island, Hawai'i, Marquesas Islands, and Samoa.

REPTILES/AMPHIBIANS

Brown Treesnake <i>Boiga irregularis</i>	Established on Guam where it has caused extensive damage, impacting biodiversity, economies, and human health. Several arrivals have been reported in RMI but were dead or killed on detection (Stanford 2007). Other reptiles are also undesirable.
Cane Toad <i>Rhinella marina</i>	Individuals have been reported from Ebeye but may not be established (Stanford 2011). There are other accounts of frogs being seen on Majuro but authorities are not aware of any established to date. Several frogs are established in both Guam and Hawai'i, and Cane Toads are established in most of the FSM including Kosrae.

MICRO-ORGANISMS

Taro Leaf Blight <i>Phytophthora colocasiae</i>	Has caused significant impact to crops and the economy in Samoa.
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12.3 ANNEX 3 Priority sites

RMI has a range of globally and regionally important protected areas. Areas indicated by a variety of sources as having conservation value within the Republic of the Marshall Islands:

BIRDLIFE ENDEMIC BIRD AREA (EBA): REPUBLIC OF THE MARSHALL ISLANDS

Ramsar internationally important wetlands	World Database of Protected Areas	BirdLife Important Bird Areas (IBA)	Community Based Conservation Efforts	Conservation International Key Biodiversity Areas (KBA)	World Heritage Sites
	Ailinginae		Ailinginae Atoll conservation management plan draft 2.0	Kabin Meto northwestern atolls	Northern atolls (Ailinginae, Bokak, Bikar, Erikub, Jemo, Rongerik, and Toke) (tentative)
	Rongerik				
	Bokak Atoll	Bokak Atoll		Bokak Atoll	
		Bokak Atoll Marine			
	Bikar Atoll	Bikar Atoll		Northern Ratak (eastern chain)	
		Bikar Atoll Marine			
		Toke Atoll			
		Toke Atoll Marine			
	Arno			Southern Ratak (eastern chain)	
	Majuro	Majuro Atoll	Eneko Island Conservation Area		
	Mili Atoll	Mili Atoll	Mili Atoll Nature Conservancy (established 2002)	Mili Atoll Nature Conservancy	Mili Atoll Nature Conservancy and Nadrikdrik (tentative)
Namdrik	Namdrik (Ramsar)			Southern Railik (western chain)	
	Namdrik (conservation area)				
Jaluit	Jaluit (Ramsar)		Jaluit Atoll environmental resource management plan (2002)	Jaluit conservation area (est. 1999)	
	Jaluit (conservation area)				
	Ailuk				
	Bikini		Bikini Atoll conservation management plan (2010)		Bikini Atoll
		Enewetak Atoll			
		Enewetak Atoll Marine			
	Kwajalein				
	Likiep Atoll				Likiep Village Historic District (tentative)
	Rongelap				

12.4 ANNEX 4 Consultations for the NISSAP review

Consultations were held from November 2021 to November 2022. In Majuro and Ebeye, the workshops first outlined the rationale for a NISSAP (for the benefit of those who had not attended the consultations for the previous NISSAP), then described the priorities identified for management and prevention, and sought feedback and contributions.

12.4.1 Majuro consultation

The workshop was held on 25 November 2021. The consultant and SPREP representatives participated remotely using Zoom and Mentimeter technology. The workshop was facilitated locally by Kennedy Kaneko (ISC) and Austen Jurelang (MoNRC) and remotely by Monica Gruber (consultant). David Moverley, Bradley Myer, and Isabell Rasch represented SPREP remotely from Apia.

COMMENTS FROM PARTICIPANTS INCLUDED:

- Developing school curricula would take a significant amount of time. Practical experience through internships with CMAC organisations was suggested.
- Access to funding is critical to implement invasive species management.
- The ISC does not have to be a new role and could be coordinated through the chair of the MIIST. The MIIST should be formalised; a Cabinet Minute approving the terms of reference of the MIIST was suggested. Perhaps the MIIST should be integrated into CMAC.
- It was noted that the USFS Forest Action Plan deals with invasive species and the NISSAP should not duplicate that work.
- Communication and coordination at the local level should be strengthened.
- Rats were a major concern, as were tree sparrows, which were spreading rapidly and impacting crops.
- Breadfruit mealybug has been a problem, but citrus canker and white fly are more serious in Majuro.
- Concerns were also raised about other birds, GAS (present in Majuro and Kwajalein), invasive corals, a marine catfish, mosquitos, invasive plants, invasive birds, invasive sea weeds, CRB, and other crop pests (a new caterpillar and pests on breadfruit).
- The 2018 National Ocean Policy on Marine Invasives should be included in the NISSAP.
- There are no MoNRC extension officers. The National Disaster Office has officers on each island who are used to share information for outreach, so could assist with biosecurity. Funding would be needed to hire extension officers who would need attachment training.
- There was interest in the outcomes of the biofouling pilot project for Tonga, and a request was made for presentation of this. It was suggested that biofouling provisions could be included in the biosecurity regulations.
- The domestic shipping fleet owners do not have the same policy and protocols as international ship owners.
- Baseline information and associated traditional knowledge for access and benefit sharing under the Nagoya protocol would be useful.

- SPC support risk assessment for biosecurity. Consultation with farmers was recommended.
- A citizen science program could be used to collect data (CMI science students, yacht club and dive club members, and so on).
- Inter-island biosecurity needs to be implemented. Standard operating procedures exist but are not enforced.
- Cartagena Protocol provisions (for LMOs and GMOs) could be incorporated into biosecurity.
- A biosecurity facility is required at port of entry.
- A government position is needed to monitor inter-island air and sea transport.
- Investigate the medicinal use of invasive plants.
- More community-based management is needed.
- Reintroduction of the Mule (Ratak Imperial Pigeon).
- Technical assistance to better understand the root disease issues (lowland tropical forest).
- Definition of protected turtle nesting areas.
- Restoration of Giant Clams.

All draft actions were supported, and the applicable and potentially achievable above actions incorporated.

PARTICIPANTS AT THE MAJURO NISSAP WORKSHOP

NAME OF PARTICIPANT	ORGANISATION	GENDER	YOUTH?
Byrelsen Jacklick	MoNRC	M	Y
Helon Zedkaia	Immigration	M	N
Carlton Marshall	MICNGOS	M	Y
Melvin Kilma	RMLEPA	M	Y
Stacy Peralta	MALGOV	F	N
Neilani Ackley	MALGOV	F	N
Boaz Lamdrik	MALGOV	M	N
Leroy Leban	CMI-students	M	Y
Jacqueline Lakmis	MAWC	F	N
Kilom Ishiguro	SPREP	M	N
Lajikit Rufus	MoNRC	M	Y
Max Sudnovsky	SEAGRANT/CMI	M	N
Kennedy Kaneko	SPREP	M	Y
Benedict Yamamura	MIMRA	M	Y
Warwick Harris	CCD, Ministry of Environment	M	N
Austen Jurelang	MoNRC	M	N

Also recorded on Mentimeter: George Muller, Helwuit Kaneko, Amelia Neamon, Teliphen Neamon, Delap, and Rita.

12.4.2 Ebeye consultation

The workshop was held on 17 December 2021. The workshop was facilitated locally by Kennedy Kaneko (ISC), Austen Jurelang (MoNRC), and Warwick Harris (CCD) and remotely by Monica Gruber (consultant). The consultant participated remotely using Zoom and Mentimeter technology.

The workshop first outlined the rationale for a NISSAP (for the benefit of those who had not attended the consultations for the previous NISSAP), then described the priorities identified for management and prevention, and sought feedback and contributions.

COMMENTS FROM PARTICIPANTS INCLUDED:

- Concerns were noted about white fly, rodents, invasive weeds, sparrows (causing damage to crops, nesting in roofs, and affecting water quality), mosquitos, Crown-of-thorns, wasps, flies, and Giant African Snail.
- Lack of capacity to manage invasive species.
- Coordination among and through local government and traditional leaders.
- A need for outreach, awareness-raising, and response plans.
- Need for facilities – a waste incinerator.
- Formalisation of the MIIST and inclusion of Ebeye in the MIIST (including the USAG-KA military base).
- Need for biosecurity training.
- Inclusion of Cartagena and Nagoya Protocols (and others as applicable) in biosecurity legislation.
- MIMRA laws to be considered regarding invasive species movement.
- Formalise the MIIST within biosecurity legislation.
- Local government management of biosecurity (including local level legislation and protocols).
- All invasive species legislation needs to be harmonised (such as MIMRA and EPA Acts and regulations).
- MIMRA database system on Reimaanlok needs to be enhanced (before any decision to move to a regional tool like PIPAP).
- Communities should be provided with equipment for monitoring.
- MIMRA, Customs, EPA, and Immigration all need training on invasive species awareness, identification, prevention, and monitoring.
- Stronger biosecurity protocols – like a boat-cleaning program.
- Screening machines at ports and airports.
- Fumigation on imported and exported materials – with appropriate equipment.
- Biosecurity pamphlets and videos for incoming passengers.
- Access to shipping databases to see previous ports of call.
- Produce a “what we need to eradicate” booklet.

- Funding for invasive species management is inadequate.
- School-led eradication or control programs.
- Eradicate tree sparrows.

All draft actions were also supported by the participants, and actions identified in Majuro were all considered to be applicable to Ebeye. Applicable and potentially achievable above actions were incorporated.

PARTICIPANTS AT THE EBEEYE NISSAP WORKSHOP

NAME OF PARTICIPANT	ORGANISATION	GENDER	YOUTH?
Calvin Juda	MOHHS/Environmental Health	M	N
Abacca Maddison	Office of the Chief Secretary	F	N
Malolo Malolo	RMIEPA	M	N
Warwick Harris	CCD, Ministry of Environment	M	N
Wesley Lemari	OCS/NDMO	M	N
Amon Arelong	KALGOV	M	N
Emmanuel Smith	MOF	M	N
Anjo Kabua	KADA	M	N
Ted Michael	MOF Customs and Revenue Division	M	N
Lee Tima	Immigration	M	N
Joseph Lajkan	MOF Customs and Revenue Division	M	N
Jefferson Mea	MOF Customs and Revenue Division	M	Y
Carl Jacklick	MOF Postal Services	M	Y
Randy Lucky	Quarantine	M	Y

Training in survey techniques. © P. Jacques



12.4.3 Other on-island consultations

In 2022, on-island consultations were led by Kennedy Kaneko, Kilom Ishiguro, Austen Jurelang, Byrelson Jacklick, and Warwick Harris.

Jaluit 28 May 2022

PARTICIPANTS AT THE JALUIT NISSAP WORKSHOP

NAME OF PARTICIPANT	ORGANISATION/VILLAGE	GENDER	YOUTH?
Kalani Loeak	Jabor Community	M	Y
Alfonso Bungitak	Jaluit High School	M	N
Wonmi Jacklick	Marshall Islands Police Department	M	N
Poe Mataiwai	Jaluit High School	M	N
Ateca Dakau	Jaluit High School	F	N
Jolane Tuwe	Jaluit High School	M	Y
Alustasi Matiaiwaio	Jaluit High School	F	N
Tiben Jaki	Jaluit High School	M	Y
Randon Laikidik	Jaluit High School	M	N
Mill MILne	Jaluit High School	M	Y
Junior Morris	Jaluit Local Council	M	N
Waini Tokelu	Jabor Community	M	Y
Newij Leviticus	Imej Jaluit community	F	N
Melinta Langmoir	Jaluit High School	F	N
Bradley Jacob	Jaluit College of the Marshall Islands	M	Y
Nimata Zedekiah	Vice Principal Jaluit High School	M	N
Paulwin Robert	Principal Jaluit High School	M	N
Yolanda Matauto	Jaluit Elementary School	F	N
John Robert	Jaluit Elementary School	M	N
Junior Titus	Jaluit Elementary School	M	N

COMMENTS FROM PARTICIPANTS INCLUDED:

- A participant was concerned about mealybug infestation in papaya and asked when action would be taken to control the mealybug.
- The JHS principal stated the need of the community to understand more about invasive species, types, and so on. Rats are currently a very big concern of coconut farmers.
- A participant asked why invasive species existed and how do they affect the environment.
- Participants asked about the Cane Toad and sparrows.
- The JHS vice principal asked if control measures could be introduced as soon as possible to control the sparrows.
- Jaluit Health Center Director raised concerns about termites and rats. He said these two invasive species must be the highest priority to eradicate.

- Participants noted that to enable better prevention of invasive species, local jurisdiction should put local ordinance or biosecurity measures in place.
- One participant suggested that it might be a good idea to eat more invasive species often (such as invasive birds).
- A participant suggested that Jaluit Local Government create a committee on the invasive species issue.
- The acting mayor asked if there are any tools available to eradicate these invasive species, which could be used by the local government to tackle invasive species.
- Imiej council women noted a need from the community of Imiej to control pests in the community.
- Imiej council women asked if SPREP could reduce rat numbers at Imiej by providing cover for the coconut (a strap around the coconut to prevent rats from climbing).

Arno 7 June 2022

PARTICIPANTS AT THE ARNO NISSAP WORKSHOP

NAME OF PARTICIPANT	ORGANISATION	GENDER	YOUTH?
Talley Mewa	Arno Atoll Police Department	M	N
Meyochi Kamram	Tinak Arno Elementary School	M	N
Ando Jibae	Assembly of God Church	M	N
Christy Jiwirak	Principal Tinak Arno Elementary school	F	N
Melan Atalaia	Protestant Church	M	N
Hemsa Jitkelong	Arno Atoll Local Government	M	N
Abila William	Tinak Arno Elementary School	M	N
Jibi Betwel	Arno Atoll Police Department	M	N
Jason Jason	Full Gospel Church	M	Y
Mina Jormanit	Arno Longar	F	N
Jonita Lat	Kilange community	F	N
Jennifer Jason	Longar community	F	Y
Witay Latdik	Longar Community	M	N
Nathaniel Lojan	Tinak Community	M	N
Jerbit Jetton	Landowner Kilange community	F	N
Neko Kattil	Malel village	F	N
Johniton Jim	Kilange village	M	N
Ratho Lojan	Tinak Elementary School	M	N
Liana Jiwirak	Tinak Elementary School	F	N
Swart Kawe	Kilange Elementary School	F	N
Botta Jormanit	Longar Village	M	N
Helenton Leon	Tinak Village	M	N
Lucky Mewa	Kilange village	M	N
Hanna William	Tinak Village	F	Y
Alton Kauwe	Kilange Elementary School	M	Y

COMMENTS FROM PARTICIPANTS INCLUDED:

- The group agreed that it is very important to work with border control officers and agencies to control pathways. Boat inspection should be done on all atolls to prevent invasive species moving from one place to another.
- The group agreed to all the actions in the presentation; however, they had some problems understanding the environmental terms and requested that the country have standard definitions in Marshallese.
- The group raised concerns about pests such as mealybugs that were destroying lime trees, Pandanus, and Breadfruit leaves.
- People asked if there could be a representative from each local government on any task force or at least if the Ministry in charge could bring back the extension agents for each atoll. Kennedy said he would follow up with the Ministry on extension agent status.
- Invasive Mosquitos should be added to the list of priority species.
- People asked about community training for invasive species management and tools to help control pathways and eradicate invasive species if possible. Kennedy said he would invite one person from Arno atoll to participate in any training that will take place in the future.
- The participants requested a copy of the final draft of the NISSAP to the local government and asked if the local government could be part of the Marshall Islands invasive species network.

12.4.4 EDRR consultations

Consultations were held on 5 March 2021 with a focus group to determine priorities for prevention. A list of eight invasive species groups was presented to the focus group, which they were asked to rank in priority order. The focus group was also asked to suggest other species. No other species were identified as priorities by the focus group.

A letter outlining EDRR priorities was presented to the responsible authorities for endorsement.

EDRR FOCUS GROUP PARTICIPANTS

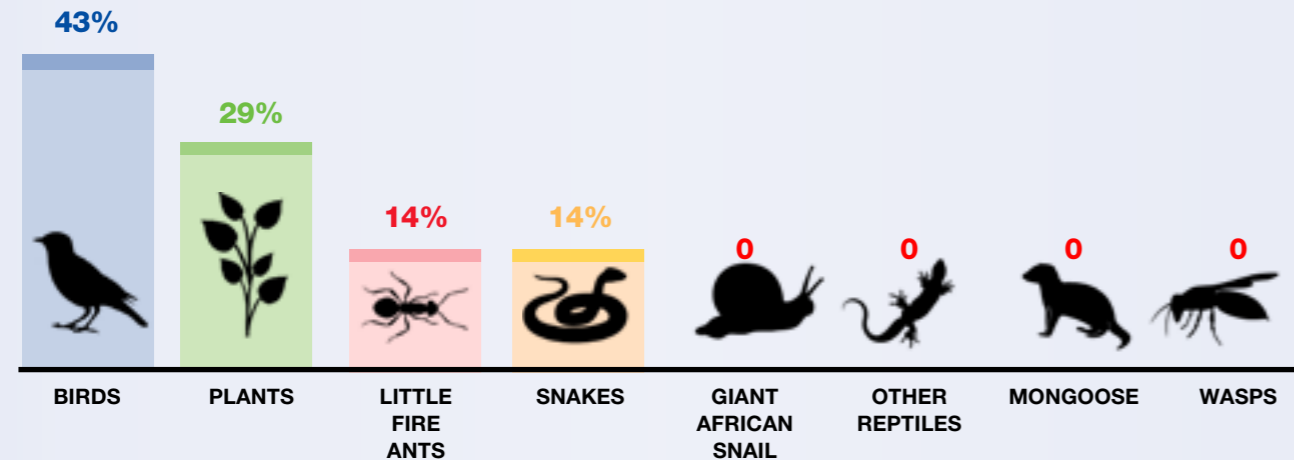
NAME OF PARTICIPANT	ORGANISATION	GENDER	YOUTH?
Melvin Kilma	Conservation Officer	M	N
Kai Samuel	Custom Intelligence Officer	M	N
Byrelson Jacklick	Quarantine Officer	M	Y
Austen Jurelang	Chief of Quarantine	M	N
Marmar Lejjena	Airport Manager	M	N
Kilom Ishiguro	Technical Expert	M	N
Kennedy Kaneko	ISC RMI	M	Y

FOCUS GROUP EDRR PRIORITIES

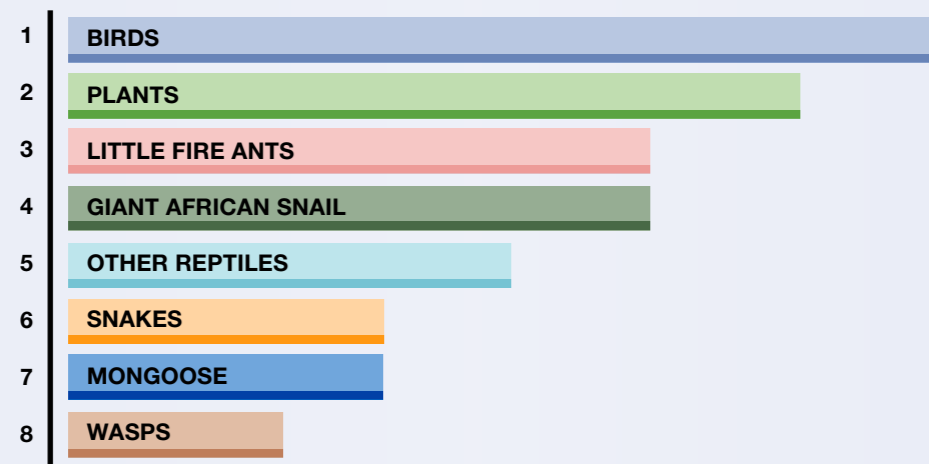
The data columns for priority taxonomic groups are equivalent to the proportion of responses to an in-session survey, listing the given group, among the seven participants.

WHICH OF THE FOLLOWING TAXONOMIC GROUPS IS THE HIGHEST PRIORITY FOR EDRR IN RMI?

Share of respondents listing the priority group (%)



PLEASE RANK THE FOLLOWING TAXONOMIC GROUPS FROM HIGH TO LOW PRIORITY FOR EDRR IN RMI.



12.5 ANNEX 5 Regional and international organisations and databases related to invasive species management

12.5.1 Organisations

THE PACIFIC COMMUNITY (SPC)

SPC helps Pacific island people respond effectively to the challenges they face and make informed decisions about their future and the future they wish to leave for the generations that follow. Go to the website for a description of the core business of each of SPC's Divisions and more detailed information about how they can help. SPC is a leading partner in the PRISMSS Protect our Islands programme.

Secretariat of the Pacific Regional Environment Programme (SPREP)

SPREP works for its member countries towards the ongoing goal of improved sustainable management of island and ocean ecosystems and biodiversity, in support of communities, livelihoods, and national sustainable development objectives, through an improved understanding of ecosystem-based management and implementation of National Biodiversity Strategy and Action Plans.

The SPREP Island and Ocean Ecosystem Services Strategy is delivered through four main priorities:

1. Biodiversity;
2. Invasive Species
3. Coastal and Marine
4. Threatened species

SPREP is a leading partner in the PRISMSS programmes War on weeds and Resilient ecosystems – resilient communities.

PACIFIC REGIONAL INVASIVE SPECIES SUPPORT SERVICE (PRISMSS)

Made up of five programmes, PRISMSS is a coordinating mechanism to facilitate the scaling up of operational management of invasive species in the Pacific. PRISMSS brings together experts to provide support within the Pacific region with a focus on protection of indigenous biodiversity and ecosystem function. The goal is to reduce the ecological and socio-economic impact of invasive species on ecosystems through the management or eradication of prioritised species and the protection of valued sites. PRISMSS currently provides technical support across five programmes for the Pacific region:

1. **Protect our islands** “Prevent the arrival, establishment and spread of invasive species”
2. **Predator free Pacific** “Removing introduced mammalian predators from islands”
3. **War on weeds** “Management of high priority weeds”
4. **Natural enemies – natural solutions** “Biological control of widespread weeds”
5. **Resilient ecosystems – resilient communities** “Priority area ecological restoration”



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