The background of the cover is a photograph of a sailboat on the ocean. The sailboat has a blue and green sail and is positioned in the lower-left quadrant. The ocean is a deep blue, and the sky is filled with soft, white and grey clouds, suggesting a late afternoon or early morning setting. The text is centered and overlaid on the upper half of the image.

**Republic of the Marshall Islands
National Invasive Species Strategy and
Action Plan
2016-2021**

**Republic of the Marshall Islands Office of Environmental
Planning and Policy Coordination**

PUBLICATION DATA

Republic of the Marshall Islands National Invasive Species Strategy and Action Plan compiled by James Stanford - Apia, Samoa Secretariat of the Pacific Regional Environmental Programme (SPREP) 2015- for the Republic of the Marshall Islands Office of Environmental Planning and Policy Coordination.

This document is a product of the GEF-PAS regional invasive species project '*Prevention, control and management of invasive alien species in the Pacific Islands*' implemented by United Nations Environmental Programme (UNEP) and executed by SPREP.



Cover photo: Sailing canoe Majuro Lagoon by J Stanford

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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 the earth, including the variability within and between species and within and between ecosystems.

Biosafety: Minimizing the risks from both the international and accidental introduction and spread of organisms with potential to have adverse economic, environmental and socio-economic impacts, including genetically modified organisms (GMO's). (Biosafety is effectively the same as biosecurity except that it also includes GMO's).

Biosecurity: Preventing the spread of invasive species across international or internal borders.

Control: Reducing the population of an invasive species.

Endemic species: Unique to a geographical area such as an island or group of islands.

Eradication: removal of the entire population of an invasive species.

Genetically modified organism: An organism whose genetic composition has been altered by the application of biotechnology techniques

Introduced species: Plants, animals and other organisms taken beyond their natural range by people, deliberately or unintentionally.

Invasive species: Species that become destructive to the environment or human interests may include native species that increase in number and become destructive.

Invasive alien species: Introduced species that become destructive to the environment or human interests.

IUCN Red List: Global inventory of the conservation status of biological species

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.

Pathway: The route by which an invasive species may be moved from one location to another.

Pest: A destructive organism. The term pest is often used as an equivalent of the term invasive species.

Risk assessment: Evaluation of the risk that a new introduced species will become invasive with damaging consequences, prior to its introduction.

Surveillance: Monitoring to detect the arrival of new invasive species.

Vector: conveyance that could move an invasive species from one location to another. In biological science, a vector is also the term for an organism that transfers a disease or parasite from one organism to another.

ACRONYMS

BTS	Brown Treesnake
CI	Conservation International
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CRB	Coconut Rhinoceros Beetle
EBA	Endemic Bird Area
ERP	Emergency Response Plan
GISMP	Guidelines for Invasive Species Management in the Pacific
GMO	Genetically Modified Organism
IAS	Invasive Alien Species
IBA	Important Bird Area
IS	Invasive Species
ISSG	Invasive Species Specialist Group
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
LFA	Little Fire Ant
LMO	Living Modified Organism
MIIST	Marshall Islands Invasive Species Taskforce
NGO	Non-government Organization
NISSAP	National Invasive Species Strategy and Action Plan
RBP	Regional Biosecurity Plan for Micronesia and Hawaii
RISC	Micronesia Regional Invasive Species Council
RMI	Republic of the Marshall Islands
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environmental Programme

UNEP United Nations Environmental Programme

WDPA World Database on Protected Areas

1.0 INTRODUCTION

1.1 Introduction to the Republic of the Marshall Islands

The Republic of the Marshall Islands (RMI), located in western Micronesia, is composed of 1225 islands spread out within 29 coral atolls and five isolated islands. The islands are divided into two chains, Ratak and Ralik.

These chains run approximately parallel to each other and extend from the northwest to the southeast (Figure 1). The Marshall Islands are bordered to the east by the Federated States of Micronesia (FSM) and to the south Kiribati and Nauru. The entire country lies within the tropics extending from 4 to 14 degrees north of the equator. The Marshall Islands cover a large area of more than 750,000 square miles composed mostly of ocean, with a total land area of about 70 square miles (RMI



Figure 1: Map of the Marshall Islands (extracted from the Republic of the Marshall Islands Embassy website: <http://www.rmiembassyus.org/Geography.htm>)

Embassy website: <http://www.rmiembassyus.org/Geography.htm>). Temperature averages around 80 degrees Fahrenheit year round with little fluctuation. Large tropical storms are infrequent with minor storms occurring more frequently, especially between March and April and October and November. Rainfall varies throughout the country with the south being much wetter than the north.

In 2009 the United Nations estimated that the population of the Marshall Islands to be approximately 68,000. Majuro is the capital, legislative center and economic hub of the Marshall Islands. Majuro Atoll is the most populated island group within the country with approximately 25,000 inhabitants.

Natural resources include phosphate, marine resources and seabed minerals. Native flora and fauna are mostly marine organisms simply based on the high ratio of marine to terrestrial systems within the country. There are a more limited number of native terrestrial species, but endemic species are known from both the marine and terrestrial ecosystems. Likely there are still discoveries to be made regarding some habitats within the Marshalls, especially given the extent of its marine systems and relative isolation of some islands and atolls. Examples of native species that are considered imperiled include: Hawksbill Sea Turtle (*Eretmochelys imbricata*), Leatherback Sea Turtle (*Dermochelys coriacea*), Green Sea Turtle (*Chelonia mydas*), Loggerhead Sea Turtle (*Caretta caretta*), Pacific Ridley Sea Turtle (*Lepidochelys olivacea*), Ratak Micronesian Imperial Pigeon (*Ducula oceanica ratakensis*), various cetaceans (IUCN listed species, CITES and/or RMI listed species).

1.2 The Significant Threat of Invasive Species for the Republic of the Marshall Islands

IUCN ISSG has completed a desktop survey of invasive species recorded for the Marshall Islands, which includes extensive supplemental tables with details on native species, invasive species, protected areas, and existing invasive species management activities (ISSG 2015).

The Marshall Islands have approximately 523 documented alien species that are considered invasive or potentially invasive (as per the ISSG database) with the majority being terrestrial plant species (ISSG 2015). Given the relatively limited terrestrial habitat available in the Marshall Islands, land for biodiversity protection or agricultural and forestry related activities is scarce and land set aside for such resources 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 potentially detrimental to both local and national well-being and economics.

Several invasive plant species listed as destructive in the Marshall Islands Statewide Assessment and Resource Strategy, including 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 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 should be carried out (presumably for these species and possibly others as needed) (Ministry of Resources and Development 2004). Some additional established invasive species of concern include Chromolaena (*Chromolaena odorata*), Merremia (*Merremia peltata*), Mikania (*Mikania micrantha*), Ivy Gourd (*Coccinia grandis*), Rats (*Rattus* spp.), Feral Pigeon (*Columba livia*) and Red-vented Bulbul (*Pycnonotus cafer*).

As part of the project “Prevention, Control and Management of Invasive Alien Species in the Pacific Islands” the Marshalls has identified the eradication of *Chromolaena*, *Merremia* and *Mikania* from Majuro, Kili and Bikini as implementable actions (UNEP 2011). Control of ants near Coconut Crab (*Birgus latro*) populations on Jaluit and attending biannual Regional Invasive Species Council (RISC) meetings and Micronesia Chief Executive summits were other invasive species related elements identified for implementation (UNEP 2011).



Figure 2: *Chromolaena odorata* thicket

Chromolaena (Figure 2) was detected in Majuro in 2001 (Vander Velde 2003) and in Bikini in 2005 (Muniappan et al. 2006). The Majuro Atoll population has been reported as being only known from a small area near a former garment factory on Laura Island (Vander Velde 2003). Local officials have attempted eradication with a combination of chemical and mechanical methods (Muniappan et al. 2006). *Chromolaena* if left uncontrolled has the potential to form dense thickets in open areas, competing with other plants and reducing biodiversity and usable agricultural lands. Known *Chromolaena* populations were

chemically treated on Majuro Atoll and likely have been eradicated there (K. Kusto pers. comm. 2015).

Merremia was reported as present in three locations and likely a recent arrival on Laura Island, Majuro Atoll in 1999 and 2000 (Vander Velde 2003). *Merremia* is an aggressive vine with the ability to cover over trees and bushes blocking sunlight from reaching other plants and eventually if left untreated will reduce the ability of covered plants to sustain themselves resulting in die offs (Figure 3).



Figure 3: Example of uncontrolled *Merremia* growth from the Fijian Islands

Mikania has been reported from Kili Island (Vander Velde and Vander Velde 2006). An excerpt from this document found on the PIER website

(http://www.hear.org/pier/species/mikania_micrantha.htm) 5 July 2015 reads “Locally



Figure 4: *Mikania micrantha* thicket

common; a smothering vine covering bananas and other plants behind Bikini Projects complex; probable new record for country; the most threatening species found, one which could potentially cause great agriculturally and environmentally damage; residents around camp said they had not known it to flower but if it does, its windborne seeds could potentially spread over the entire island”. Mikania is an extremely fast growing vine which has the tendency to smother other plants, outcompeting them for sunlight and

competing for other resources (Figure 4).

Examples of invasive alien species not currently known to be established within the Marshalls but

which are of significant concern of establishing include

Brown Treesnake (*Boiga irregularis*) (Figure 5a),

Little Fire Ant (*Wasmannia auropunctata*)

(Figure 5b), and Coconut Rhinoceros

Beetle (*Oryctes rhinoceros*) (Figure 6a,b).

These species (and many others) are already established in one or more

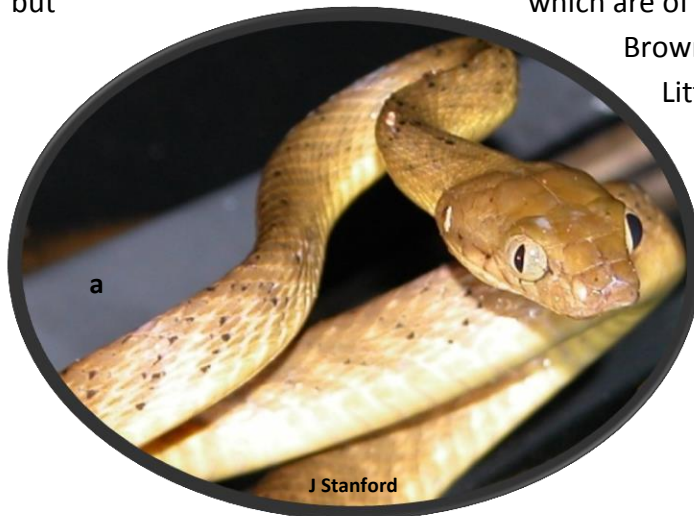
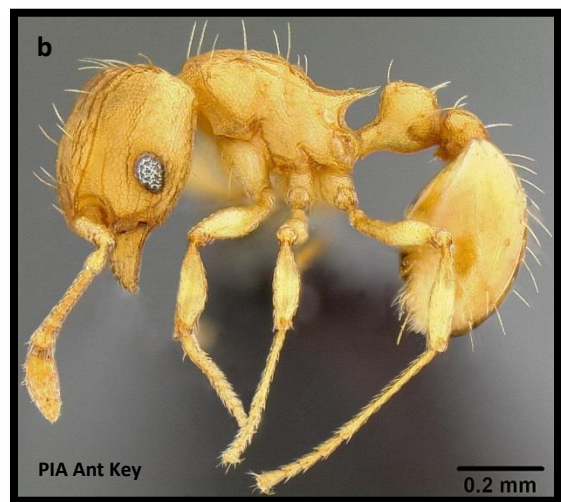


Figure 5: a) Brown Treesnake (*Boiga irregularis*), b) Little Fire Ant (*Wasmannia auropunctata*)



countries with trade with and/or have other ties to the Marshall Islands and therefore these species have an elevated potential for establishing in the Marshalls if appropriate management activities are not engaged and/or maintained.

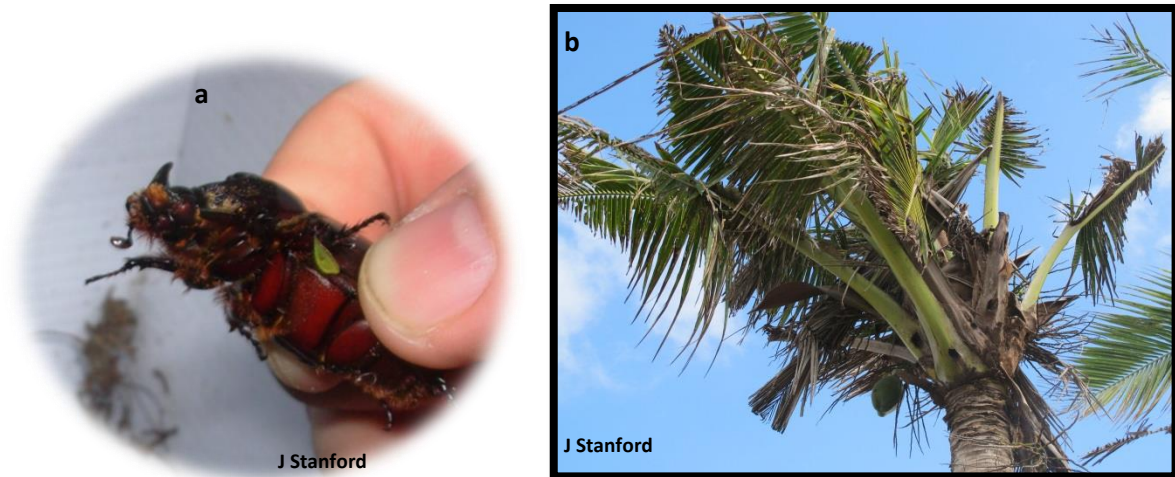


Figure 6: a) Coconut Rhinoceros Beetle or CRB (*Oryctes rhinoceros*), b) Damage to Coconut Tree caused by CRB

During the August 2015 NISSAP development workshop, participants (Annex 1) discussed priority invasive species for the Marshall Islands. Out of this discussion two lists were developed and are included in the NISSAP. These lists are not meant to be comprehensive but instead are an attempt by workshop participants to develop priority lists of species which could be the focus of species specific efforts, which in turn should provide better protection and management within the Marshalls from these species as well as from a vast array of other species. The list of priority invasive species are:

- Priority Established Invasive Species for Management in the Republic of the Marshall Islands (Annex 2)
- Priority Invasive Alien Species that Threaten the Republic of the Marshall Islands (Annex 3)

1.3 Invasive Alien Species- Everyone's Responsibility

The movements of people, and their goods and supplies, are the key ways that invasive species reach a country or move from island to island within it. So the behavior of individual people, both residents and visitors is the key to invasive species management. People need to avoid bringing risky goods into the country (fruit, plant material including seeds, soil (even on boots), etc.). If anyone sees a plant overseas that they would like to grow in the Marshall Islands they need to identify it, then request and receive an import permit from Quarantine. Quarantine will conduct a 'risk assessment' to decide if the organism is safe to bring to the country. If people are importing a container of goods, or deck cargo such as a vehicle or timber, it needs to be checked very carefully when it reaches its destination and Quarantine needs to be alerted if any live animals/insects, or their eggs, are found. Individuals need to keep an eye out in villages, plantations and forest for any unusual animals or plants, for trees with leaves being

eaten or dying over large areas. Residents may well be the first to spot the arrival of a new plant disease or insect pest. Early detection and rapid response are key factors supporting eradication/management efforts and ultimately could save the RMI millions of dollars.

A key part of this strategy will be to try to prevent invasive species moving between different islands within the country. It is perhaps too late to eradicate some invasive species already established in the Marshall Islands, but with appropriate actions, we can keep some islands within the nation free from them.

Invasive species are clearly also an international issue with an emphasis on preventing them moving from one country to another. So there are a number of international and regional organizations undertaking coordinating roles, a number of international regulations in force, and countries that trade with each other should be coordinating efforts to reduce and prevent the spread of invasive species.

1.4 The Republic of the Marshall Islands' Biodiversity at Risk

A query of "Marshall Islands" on the IUCN Red List results in an annotated inventory of 948 species (actually 949 species if *Homo sapiens* is included) that are known to be native to the country (ISSG 2015). 95 of the 948 species listed are classified into an IUCN threatened category (8- Endangered and 87- Vulnerable) (ISSG 2015).

The Marshall Islands have 56 known species or sub-species considered to be endemic (Republic of the Marshall Islands Biodiversity Clearing House Mechanism 2008). A list of these species can be found at the RMI Office of Environmental Planning and Policy Coordination website: http://biormi.org/index.shtml?en/endemic_marshalls.shtml. These endemic organisms include 3 terrestrial plants, 24 insects, 2 birds (one extinct) and numerous marine species.

Protected species of the Marshall Islands are listed at the Republic of the Marshall Islands Biodiversity Clearing House Mechanism: http://biormi.org/index.shtml?en/protected_species.shtml. Most protected species are marine organisms. The single terrestrial national level protection is the Ratak Imperial Pigeon (Figure 7), a sub-Micronesian Imperial Pigeon which is found throughout much of Micronesia. Reasoning for protection varies by species includes endangered mammal protection act, commercial and no commercial activities.



B Menke
Figure 7: Ratak Micronesian Imperial Pigeon (*Ducula oceanica ratakensis*)

organism with Micronesian species of the found throughout protected status status, marine closed season and

Native, endemic and useful alien species may be threatened by a variety of factors such as invasive species. For example, black rats (*Rattus rattus*) and feral cats (*Felis catus*) are known to prey on the eggs and chicks of many bird species and to consume small lizards and may directly impact population levels of these faunal groups. Rats and mice (*Mus musculus*) eat the fruits and seeds of plants altering the composition of native forest and destroying crops. Sometimes species which are thought to be native are also considered invasive. One such species in the Pacific is the Crown of Thorns Starfish (*Acanthaster planci*). NOAA has reported that while reefs in general in the Marshall Islands are relatively healthy that localized outbreaks of Crown of Thorns Starfish and coral disease were observed around Majuro in 2005 (<http://www.coris.noaa.gov/>).

Important ecosystems or sites occupied by a range of species can also be threatened by invasive species. A search of the World Database on Protected Areas (WDPA) for “Marshall Islands” provided feedback on 16 protected areas (<http://www.protectedplanet.net/>). The WDPA sites include: Namdrik (Ramsar site), Namdrik (conservation area), Rongerik, Ailinginae, Ailuk, Arno, Jaluit (Ramsar site), Jaluit (conservation area), Likiep Atoll, Mili Atoll, Rongelap, Majuro, Kwajalein, Bikini, Bokak Atoll and Bikar Atoll. The two Namdrik sites in this list are both listed on the site with the same attributes, suggesting they may well cover the same area. The same situation occurs with the two Jaluit sites listed. If we therefore combine the two Namdrik sites and similarly the two Jaluit sites, then the total list of protected areas for the Marshall Islands would be 14 individual protected areas.

BirdLife International has designated one Endemic Bird Area (EBA) and 10 Important Bird Areas (IBA) within the Marshall Islands (ISSG 2015). The single EBA is actually the entire nation. The trigger species for this designation is the near threatened (IUCN) Micronesian Imperial Pigeon (*Ducula oceanica*). The EBA includes the 10 designated IBAs sites. The IBA sites include the following atolls and their extended marine areas: Bokak Atoll, Bokak Atoll Marine, Bikar Atoll, Bikar Atoll Marine, Enewetak Atoll, Enewetak Marine, Take Atoll, Take Atoll Marine, Majuro Atoll and Mili Atoll inclusive of the Northeast islets (ISSG 2015). The IBA’s provide habitat for numerous nesting and breeding seabirds such as the least concern Sooty Tern (*Onychoprion fuscatus*), the near threatened Micronesian Imperial Pigeon (sub-species *ratakensis*) and are home to endemic plant species such as the grasses *Lepturopetium marshallense* and *Lepturus gassparicensis* (ISSG 2015). The IBAs also provide nesting sites for marine turtles, including the endangered Green Sea Turtle (ISSG 2015).

Conservation International (CI) has recognized seven Key Biodiversity Areas (KBA) in the Marshall Islands: Bokak Atoll, Jaluit Atoll Conservation Area, Kabin Meto (North-western atolls), Mili Atoll Nature Conservancy, Northern Ratak (Eastern chain), Southern Railik (Western chain) and Southern Ratak (Eastern chain) (ISSG 2015).

Bikini Atoll Nuclear Test Site is inscribed as a World Heritage Site. Several additional sites in the Marshall Islands have also been proposed as World Heritage sites based at least in part on natural resources, including Mili Atoll Nature Conservancy and Nadrikdrik and the northern atolls including Ailinginae, Bokak, Bikar, Erikub, Jemo, Rongerik and Taka (<http://whc.unesco.org/en/statesparties/MH/>). Likiep Village Historic District has also been proposed as a World Heritage Site.

There is clearly overlap between some locations listed as protected areas, IBAs, KBAs and World Heritage sites, as well there should be (Table 1). Detailed information regarding many of these specific areas is lacking and/or difficult to obtain. Information pertaining to management plans for Bikini and Ailinginae Atolls can be found in the Linkages section of this document. Some additional information on specific areas follows.

Jaluit Atoll has a downloadable background report (2003) for its environmental resource management plan (2002) which can be accessed at: (<https://drive.google.com/file/d/0B8ceiJclLPBeR0s5ZFM1a0pGNWc/view>). While this background report does not specifically mention invasive species, it does document threat levels to the natural resources of Jaluit Atoll including some resources which may very well be being impacted negatively by invasive species or which could be if additional invasive species were to arrive and establish. Some of these natural resources which are under threat include mangroves which could be threatened by both pest and competition from non-native species, reduced bird populations through mortality and the destruction of nests, nesting grounds and eggs. Bird populations may be impacted directly by a variety of non-native organisms, some of which are likely already present on the atoll, including rodents, monitor lizards, various tramp ants, feral cats and feral dogs (*Canis familiaris*).

The Jaluit Atoll Conservation Area (JACA) was established in 1999 as a local community managed marine and terrestrial conservation area. Details on JACA from the Ramsar website indicate that it is a large coral atoll comprised of 91 islets with a land area of 700 ha that encloses a large lagoon with diverse and relatively pristine marine and terrestrial habitats, such as reefs, sand flats, seagrass beds, mangroves, and sand cays. There is a considerable range of relatively healthy marine species populations including reef fish and invertebrates, and though terrestrial species are more limited there are turtle nesting beaches and seabird roosting islands in relative stable conditions. Fewer than 2000 people practice a subsistence lifestyle in this area. Traditional land ownership and resource management has been effective, but as resource uses fall increasingly under local government councils there has been a decline in sustainable management awareness and practices. Potential threats include over-harvesting, especially of marine species for off-island markets, and the prospect of rising sea levels associated with global warming. A management plan is in effect.

Namdrik Atoll (Ralik Chain) is also documented on the Ramsar website (<http://www.ramsar.org>). Details include that the atoll is 119 ha in size and lies 390 km southwest of Majuro. The atoll consists of two wooded islands with an extensive reef flat lying between them. A subterranean water lens lies underneath the islands, replenished by rainfall, supplying freshwater. The site is unique due to its large size and unlike many other coral atolls in the region, there are no navigable passes into the lagoon. The atoll is unusual as it supports a rich mangrove forest that is home to some 150 species of fish, including the endangered Humphead Wrasse (*Cheilinus undulates*). It also supports breeding populations of the critically endangered Hawksbill Turtle and endangered Green Sea Turtle. The wetland provides many resources for local people, including canoe building supplies, ornaments, beauty aids, medicines, ceremonial supplies and material for maintaining attractive homesteads. The intertidal ponds are used for curing wood and other plant material to make traditional handicrafts and clothing. Being relatively isolated, the atoll is in nearly pristine condition and has supported traditional sustainable human development for the past 3000 years. However, current unsustainable harvesting practices are placing considerable pressure on the atolls unique biodiversity. An integrated conservation management plan has been developed with the community. Information regarding the utilization of the plan and an update on current conditions are needed.

According to the Marine Conservation Institution (July 2015) website (<http://www.mpatlas.org>) Bokak Atoll was established as a traditionally-managed protected area prior to the Marshall Islands independence in 1986, but since independence has not been re-established and therefore is not currently recognized as a marine protected area.

A planning document (Reimaanlok an approach for community based management) is available to assist Marshallese communities with developing conservation strategies and to promote the conservation and sustainable use of natural resources.

Concepts for developing a protected areas network for the country are currently under consideration (M. Stege pers. Comm. 2015). According to the Marshall Islands Marine Resource Authority (MIMRA) website (<http://mimra.com/index.php/2013-12-30-04-14-13/2013-12-30-06-43-45>) a major next step will be the development of a Protected Areas Network (PAN) for the Marshall Islands, which will integrate existing and future protected areas into a single system in order to facilitate effective management, enforcement, monitoring, and disbursal of sustainable financing to the sites. Protected Areas Network (PAN) legislation for the Marshall Islands has recently been drafted.

1.5 Why is a National Invasive Species Strategy and Action Plan Needed?

Invasive species are an ever-present and growing threat and their management involves many different organizations from government departments, NGO's, farmers, foresters, fishermen and women, and local communities. This management effort has in the past been fragmented and under-resourced and the National Invasive Species Strategy and Action Plan (NISSAP) seeks to address this by bringing all stakeholders together around an agreed plan of priority actions.

Invasive species management has concentrated on plant and animal pests of the productive sector in the past, but there has been a growing recognition of their impacts on native biodiversity and the environment as a whole. This recognition has led to increasing efforts from environmental agencies, taking more of a coordination role addressing all invasive species, and to increased regional efforts, such as the development of a regional biosecurity plan (United States Department of the Navy 2015). Production of the RMI NISSAP is part of the regional effort: the GEF-PAS regional invasive species project '*Prevention, control and management of invasive alien species in the Pacific Islands*' being implemented by UNEP with SPREP as the executing agency.

The NISSAP takes account of the Guidelines for Invasive Species Management in the Pacific or GISMP produced by SPREP and Secretariat of the Pacific Community (SPC) in 2009. GISMP's goal is "To assist Pacific Island countries and territories in planning the effective management of invasive species, thereby reducing the negative impacts of invasive species on their rich and fragile native heritage, communities and livelihoods" (SPREP 2009). The Action Plan is organized in part in accordance with the thematic areas presented in the GISMP which include: Foundations, Problem Definition, Prioritization, and Management Action.

Implementation of the NISSAP should ensure that the RMI meets the Aichi target 9, established under the Convention of Biological Diversity: **that 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.**

1.6 Process of National Invasive Species Strategy and Action Plan Development

An initial draft document was distributed on 15 May 2015. Comments, edits and additional input were used to update the initial draft document and a second draft was circulated to stakeholders on 10 July 2015. Workshops were then held in each of the four states as well as a separate workshop for national input during the month of August 2015. After updating the

draft document with input and comments received on the second draft and from the workshops, a third draft was distributed on 8 September 2015. An agreed on fourth draft was then provided to the RMI National Government enabling the government to add final touches to the document and prepare for endorsement on 30 September 2015.

During the month of October efforts were undertaken to ensure provision of a completed NISSAP, which was then submitted for government review and consideration for endorsement on 31 October 2015.

1.7 Linkages of the National Invasive Species Strategy and Action Plan to Other Strategies, Plans, Frameworks and Guidelines

This section reviews other Government strategies and policies that address invasive species and the sectorial plans of the key agencies involved. The actions identified in this NISSAP should be fed into these strategies and plans when they are next revised.

1.7.1 Regional/Sub-regional Plans, Frameworks and Guidelines

Regional Biosecurity Plan for Micronesia and Hawaii (endorsed 2014)

The RBP is a tool to assist jurisdictions and the region with improved coordination of current management efforts, identification of remaining problem areas and gaps, and recommending additional actions that are needed to effectively address invasive alien species (IAS) issues within jurisdictions as well as regionally. The focus of this plan is the identification of feasible, cost-effective management practices to be implemented by appropriate authorities for the environmentally sound prevention and control of IAS in a coordinated fashion. The goal of the RBP is to provide recommendations that, if appropriately implemented, will minimize the harmful ecological, social, cultural, and economic impacts of IAS through the prevention and management of their introduction, expansion, and dispersal into, within, and from the region and the jurisdictions of the region. Objectives that need to be addressed in order to advance towards the goal include: securing funding, coordination and collaboration, prevention, monitoring, early detection and rapid response, management and eradication as feasible, education and outreach, research, policy development and restoration. The plan is available for download at: https://www.navfac.navy.mil/navfac_worldwide/pacific/about_us/regional-biosecurity-plan-for-micronesia-and-hawaii-.html.

Micronesia Regional Invasive Species Council Strategic Action Plan 2012-2016

The RISC SAP identifies the following 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 2014-2020

The framework provides guidance for the region on key priorities for biodiversity conservation and ecosystem management with clear linkages to the global Aichi Biodiversity Targets and National Biodiversity Strategies and Action Plans (NBSAPs). It is broad in scope to fit in with local, national, regional and international priorities and to allow for successful implementation of actions at country level, through the provision of adequate and sufficient resources. The framework reinforces the role governments, local communities and traditional knowledge, development partners and all key stakeholders play in improving the status of conservation and ecosystem management which are also critical for livelihood and heritage. It also underscores the key role biodiversity and ecosystem services provide in building resilience to the impacts of climate change and other pressing environmental challenges.

Guidelines for Invasive Species Management in the Pacific (GISMP) (endorsed 2009)

These guidelines were developed to aid in planning invasive species programs, at a local, national and regional levels, to better ensure that key aspects relevant to any given situation or program are included in the design of such programs.

1.7.2 National Plans, Strategies and Frameworks

The Marshall Islands has a strong framework of national strategies and policies in place and all show that environmental issues are mainstreamed across different sectors. The detailed provisions in the NISSAP should be carried forward into the process of revising these different documents.

- The Republic of the Marshall Islands National Biodiversity Strategy and Action Plan (NBSAP) 2000
- National Strategic Plan (NSP)
- State Wide Assessment and Resource Strategy (SWARS) 2010-2015+
- Climate Change Roadmap 2010
- National Climate Change Policy Framework, January 2011

- Reimaanlok National Planning Team, *Reimaanlok: National Conservation Area Plan for the Marshall Islands 2007-2012* (N Baker: Melbourne, 2008) – see “Community Plans” below for more details
- RMI National Energy Policy and Energy Action Plan 2009
- RMI Disaster Risk Management National Action Plan 2008-2018
- Vision 2018 RMI Strategic Development Plan Framework 2003-2018.
- RMI EPA, Coastal Management Framework 2008

1.7.3 Community Plans

- Ailuk Atoll Fisheries Management Plan 2012
Ailuk's management plan is entirely marine system based at present, but they want to add on a terrestrial component.
- Namdrik Atoll Resource Management Plan 2011
- Bikini Atoll Conservation Management Plan 2010
This plan indicates that Bikini Atoll has extensive existing populations of invasive species but that currently there is no established guidance for their management nor for protecting the atoll from new incursions (biosecurity). The Bikini Atoll Conservation Management Plan can be accessed at:
<https://drive.google.com/file/d/0B8ceiJclLPBec0pwemtzMz11T3c/view>
- Ailinginae Atoll Conservation Management Plan (Draft)
Various elements are covered in the action planning section of this document including invasive species. Under the sub-heading of invasive species, the following activities are listed:
 - Establish monitoring program for invasive species
 - Carry out rat eradication program
 - Develop quarantine procedures for marine and terrestrial contact
 - Selective cutting of Coconut trees (*Cocos nucifera*) except at picnic and camping island (Enebuk)

There is an annex to the plan which lists a few proposed quarantine procedures. The report indicates that rats are threatening the extensive bird nesting populations of the atoll. Additionally, the report states that non-native plants (including Coconut and Ironwood trees) are a potential threat to native forests. The draft plan can be accessed at: <https://drive.google.com/file/d/0B8ceiJclLPBeanRvaWpLRktOUIE/view>.

Other Conservation Management Plans are in development, by atoll/island, with Step 5 being the key step where plans are formalized and adopted by the local jurisdiction’s legislative body (Table 2).

2.0 GUIDING PRINCIPLES

In regards to the arrival of non-native species, the ‘precautionary principle’ should be applied. Simply put, this principle is that when 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 from establishing or spreading. It should also be assumed based on international experience that any species imported under the pretext of being kept in captivity such as in ponds, pens or cages will eventually escape into the wild and therefore must be considered a potential risk to the nation.

Implementing appropriate levels of biosecurity to reduce the arrival of new species is more effective and less expensive than trying to manage populations and mitigate impacts after IAS are established. Therefore, an emphasis should be placed on effective border and pre-border preventative mechanisms. But, it must be clearly understood that while pre-border and border biosecurity efforts are the most effective mechanisms to stopping the incursion of unwanted species, even the best biosecurity will not stop all invasions and therefore detection and eradication mechanisms need to be in place.

Eradication of established IAS is more effective and less expensive than permanent control and should be implemented where feasible. Eradication efforts are also more effective, less costly and have a higher likelihood of success if conducted before newly established species can become wide spread. Therefore, early detection and rapid response elements are an essential part of IAS prevention and management (Stanford and Rodda 2007). Emergency Response Plans or ERPs, and emergency response training should be key elements of the biosecurity system (US Department of the Navy 2015).

Species that cannot feasibly be eradicated should be considered for on-going control, particularly biological control. This control may be aimed at keeping established IAS out of important sites such as protected areas, or keeping them from expanding their range to new islands within the nation.

3.0 GOALS, THEMES AND OUTCOMES

3.1 Goal

To conserve and protect biodiversity, food security, livelihoods, health, sustainable development, economics and resilience to climate change by preventing the introduction of new alien invasive species to the country, limiting further spread of invasive species within the country and managing existing invasive species including eradication when feasible.

3.2 Themes

The strategy follows GISMP 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
- Legislative framework – appropriate laws, regulations, policies, protocols and procedures.

Theme B: Problem Definition, Prioritization and Decision-making

There are a large number of invasive species present in the Marshall Islands and many more outside its borders, and resources to tackle them are always limited. There needs to be systems in place to make decisions on 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 and early detection and rapid response to new incursions; then tackles the eradication or control of those already established, and finally restoration work needed at sites where IAS have been effectively removed.

3.3 Outcomes

Outcomes are derived from GISMP.

Theme A: Three outcomes are identified to ensure that the impacts of invasive species are understood and actions to manage them 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 prioritization, 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; to carry out restoration following invasive species removal.

4.0 PATHWAY IDENTIFICATION

4.1 International

4.1.1 By Air

There are 2 main airports and several airlines provide flights into the Marshall Islands. United Airlines flights originating in Hawaii arrive in Majuro three times a week before flying onto Kwajalein and then the FSM. United Airlines flights originating in Guam and stopping first in the FSM arrive in Kwajalein three times a week before continuing on to Majuro and Hawaii. Nauru Airlines flies from the south Pacific to Majuro once weekly. These flights depart Nauru and stop in Tarawa before arriving in Majuro. The flight then continues onto the FSM (Kosrae and Pohnpei States) and returns to Majuro via Kosrae after overnights (two nights) in Pohnpei. Asia Pacific Airlines flies four cargo flights a week landing in Majuro, three from Guam and one from Hawaii. Charter flights occur on an irregular basis. United States (US) Department of Defense (DOD) aircraft also make occasional stops in both Majuro and Kwajalein.

Amata Kabua International Airport is the nation's main airport located on Majuro Atoll. The airport is capable of handling all propeller driven aircrafts, turbo props, business jets and small to medium size jet aircraft (e.g. Boeing 737, Boeing 727) and Boeing 767s. Three commercial airlines utilize this airport: United Airlines, Air Marshall Islands, and Our Airline. Japan Airlines also occasionally runs charter flights to Majuro direct from Tokyo.

With the opening of Nauru Airlines, Micronesia again has direct air linkages with several South Pacific locations via flights which arrive at and depart from Majuro. Destinations with Nauru Airlines from Majuro include: Fiji, Brisbane, Nauru, and Tarawa. Both passengers and air cargo are moved between Majuro and these destinations. United Airlines connects Majuro directly to both Hawaii and Kwajalein and indirectly to other destinations beyond these 2 locations. There are daily United Airline flights which transport both passengers and air cargo.

The Bucholz Army Airfield is a US Army airfield located on Kwajalein Island. 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. Kwajalein Island is the southernmost and largest island in Kwajalein Atoll. The Kwajalein airfield is 267 miles (430 kilometers) west of Majuro. The atoll lies in the Ralik Chain and is 2,100 nautical miles (3900 kilometers) south west of Honolulu, Hawaii.

4.1.2 By Sea

Two official ports of entry exist in the Marshall Islands, the port of Majuro and Ebeye Dock. 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 Port of Majuro is the hub of the Marshall Islands economy (Republic of the Marshall Islands Port Authority website: <http://rmipa.com/>).

Commercial Shipping

The main international port for the country is located within the 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.

Fishing Vessels

Various ports in the Marshall Islands are regularly visited by foreign flagged fishing vessels.

Visiting Yachts

Visiting yachts stop over at various locations throughout the nation and pose biosecurity concerns.

Cruise Ships

Cruise ships visiting the Marshall Islands pose biosecurity concerns.

Coast Guard and Military Vessels

Coast Guard and military vessels also pose biosecurity concerns.

4.1.3 Other External Pathways

Natural Disasters

Natural disasters such as typhoons and tsunamis may directly carry new invasive species to the Marshall Islands, but their main threat in terms of IAS is indirectly through consequent relief operations. In the advent of a significant natural disaster, large amounts of supplies and relief materials are likely to enter the country over a short time frame from a variety of different countries. Following such a large scale disaster, border control operations and facilities may well be compromised. While humanitarian needs are obviously the priority, disaster management planning should also incorporate appropriate biosecurity elements. With such a disaster scenario, there may be a need to bring in overseas biosecurity personal to assist local staff with managing the increased traffic, which potentially would include high risk items such as construction materials and equipment, while at the same time local residents may well be dealing with personal/family/village impacts caused by the natural disaster.

'Natural' Pathways

New organisms can also arrive unaided by people or disasters; by flying to the RMI, being carried there on the wind, swimming there or 'rafting' there on floating vegetation.

4.2 Internal

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

4.2.1 By Air

There are 29 outer island airstrips in the Marshall Islands. Photos and more details regarding specific airstrips can be found at: <http://rmipa.com/airports/>. Air Marshall Islands provides



Figure 8: Map of Air Marshall Islands flight routes

links to the following locations within the country: Airok, Aluk, Aur, Bikini, Ebon, Elenak, Enewetak, Jaluit, Jeh, Kaben, Kili, Kwajalein, Lae, Likiep, Majkin, Maloelap, Mejit, Mili, Namdrik, Rongelap, Ujae, Ulirik, Wothe, and Wotje (based on their 2013 schedule) (Figure 8). 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 and internal biosecurity to prevent the spread of invasive species within the country is warranted.

4.2.2 By Sea

In addition to those sea vectors mentioned in the international section, there are also various RMI flagged sea vessels that move between islands including yachts, fishing vessels, canoes and supply ships (which also ferry individuals and their belongings potentially including fish, fruit, vegetables, livestock and pets) (Figure 9).

4.2.3 “Natural” Pathways

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 carried on rafts of floating vegetation.



Figure 9: Watercraft Majuro Lagoon

4.3 Detection and Reporting of New Species

Regardless of the pathway, all residents and visitors need to keep an eye out for any unusual organisms and inform appropriate authorities if they feel a new species may have been detected. This may be a new species to the country or new to an individual island or group of islands. Any new species which has arrived in the country or to a new island should be safely captured and contained when feasible. Newly arriving species need to be assessed to determine what, if any, risk they may pose. An early detection and rapid response capacity which includes a national reporting system, such as a 24/7 hotline, would greatly improve the ability of authorities to react quickly in the case of a new species detection.

Several Quarantine staff members have attended 1-week IAS early detection and rapid response training on the island of Guam. 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. An ERP for Brown Treesnake incursions was drafted in 2006 and updated in 2008. Developing generic ERPs for terrestrial and marine concerns should be considered. All ERPs should be updated and disseminated regularly.

5.0 Roles and Responsibilities

This section identifies the roles of the different agencies and organizations which have specified roles and responsibilities in regards to invasive species management within the Marshall Islands. Examples of additional regional and international stakeholders that can provide support with invasive species management are provided in Annex 4.

5.1 National

- Office of Environmental Planning and Policy (OEPPC)
- Ministry of Resources and Development
 - Division of Quarantine
 - Marshall Islands Marine Resource Authority (MIMRA)
- Ministry of Transportation and Communication
- Ministry of Health
- Ministry of Education
- Customs
- Immigration
- Ministry of Justice
 - Sea Patrol
- 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 Interior and Outer Islands (MI): Land use planning
- Office of the Attorney General
- Coastal Management Advisory Council (CMAC)

5.2 Community

- Marshall Islands Mayors Association (MIMA), representing the 24 political divisions of the Marshall Islands which include: Ailinglaplap Atoll, Ailuk Atoll, Arno Atoll, Aur Atoll, Ebon Atoll, Enewetok/Ujalang, Jabat, Jaluit Atoll, Kili/Bikini/Ejit, Kwajalein Atoll, Lae Atoll, Lib, Likiep Atoll, Majuro Atoll, Maloelap Atoll, Mejit, Mili Atoll, Namorik Atoll, Namu Atoll, Rongelap Atoll, Ujae Atoll, Utirik Atoll, Wotho Atoll, Wotje Atoll. Mayors usually communicate with the traditional leaders.

- Council of the Chiefs: traditional leaders of local communities.
- Majuro local government (MALGOV) is part of MIMA. MALGOV jurisdiction includes the main international sea and airport for the country.
- KALGOV: Kwajalein 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

5.3 Regional/Sub-regional

- **Micronesia Regional Invasive Species Council**
RISC is a council to the Micronesia Chief Executives or MCEs and is to provide leadership with updates and recommendations regarding invasive species, supporting the MCEs' ability to make informed decisions and take effective actions in regards to invasive species.
- SPREP and SPC are the two regional partners that provide technical support for the management of invasive species. Annex 4 provides further details of their roles and identifies other agencies and initiatives that support invasive species work in the region.

6.0 Past and Current Programs

6.1 Quarantine Program

Quarantine is a sector of the Ministry of Resources and Development

- Border control at official international ports of entry
- Risk assessments for proposed new species for importation
- Early detection and rapid response for terrestrial concerns
- Weed and agricultural pest management

6.2 Invasive Plant Management

- Chemical treatment of *Chromolaena* on Majuro Atoll conducted. Follow-up surveillance and treatment(s) are needed to ensure no new growth.
- Treatment of *Mikania* initiated with follow-up required.
- Sensitive Plant (*Mimosa pudica*) infestation near the Majuro airport was chemically treated with follow-up required.

6.3 Invasive Insect Management

- Papaya Mealybug (*Paracoccus marginatus*) detected and species confirmed in 2012 (Figure 10a)
- Chemical treatment of area at Delap Dock infested with non-native caterpillar; follow up treatment with mechanical removal and destruction of infested vegetation has been completed (Figure 10b). No reoccurrences to date.

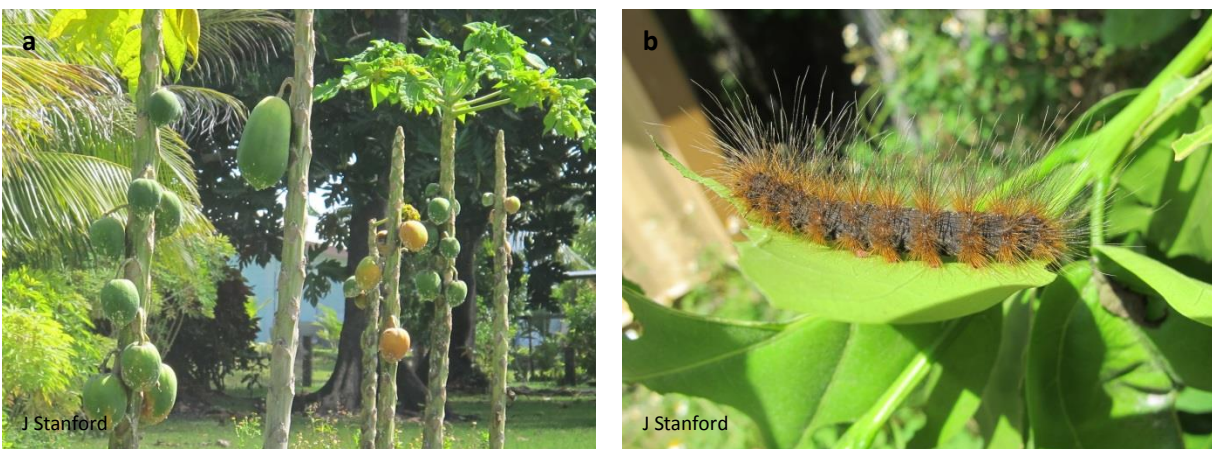


Figure 10: a) Papaya crop damaged by mealybug 2012, b) Non-native caterpillar Delap Dock 2012

6.4 Planning, Development and Capacity Building

- A national biosecurity bill was drafted and is currently under review
- Protected areas network development is underway. Currently reviewing legislation to support this development
- Community conservation planning guide developed
- Supported the development of the Regional Biosecurity Plan for Micronesia and Hawaii
- A team from SPC assisted in conducting a Plant Health Survey and Weed Survey on Majuro and Arno atolls (2012)
- RMI has established Pacific Invasives Learning Network team
- RMI has an invasive species taskforce, MIIST, with existing strategic plan that is in the process of being updated
- Several quarantine staff have participated in early detection and rapid response training provided by US Department of Interior on Guam (Figure 11)
- Emergency Response Plan for Brown Treesnake has been drafted
- IAS early detection and rapid response seminars for line agencies and port workers conducted in 2005, 2007, 2009, 2012 and 2013



Figure 11: Quarantine staff developing snake capture skills, Early Detection and Rapid Response Training Program

6.5 Habitat Restoration

- Mangrove replanting projects exist for Jaluit and Namdrik atolls

6.6 Education and Awareness

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

7.0 Legislation, Conventions and Agreements

The following sub-sections include provisions relating to invasive species management or can support biosecurity and invasive species management within the Marshall Islands.

7.1 National Legislation, Regulations, Acts and Policies

- Earth Moving Regulations (1989)
- Environmental Impact Assessment Regulations (1994)
- Marine Water Quality Regulations (1992)
- Pesticides and Persistent Organic Pollutants Regulations (2004)
- Public Water Supply Regulations (1994)
- Quarantine Regulations
- Coast Conservation Act (1988)
- Customs Act
- Endangered Species Act (1975)
- Fisheries Act (1997): Provides protection for turtles, sponges, oysters and trochus
 - Shark Law Amendment (2011): band trade in shark products and commercial shark fishing
- Food Safety Act (2010)
- Marine Mammal Protection Act (1990)
- Marine Resources Act (1997)
- National Environment Protection Act (1984)
 - Conservation of marine and terrestrial resources
 - Protection of specific species such as sea turtles
- Office of Environmental Planning and Policy Coordination Act (2003)
- Food and Nutrition Security Policy
- Draft Biosecurity Bill
- Draft Protected Areas Network Legislation

7.2 International Conventions and Agreements

Convention on Biological Diversity (CBD)

RMI is party to this convention. This is a 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 alien species and control or eradicate those alien species which threaten ecosystems, habitats or native diversity.

Nagoya Protocol on Access and Benefits-sharing

The objective of the protocol is the fair and equitable sharing of the benefits arising from the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding, thereby contributing to the conservation of biological diversity and the sustainable use of its components.

International Plant Protection Convention (IPPC)

The IPPC is an international agreement on plant health developed in 1951 and overseen by the Food and Agriculture Organization (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
- Developing phytosanitary capacity for members to accomplish the preceding three objectives.

United Nations Convention on the Law of the Sea (UNCLOS)

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

Cartagena Protocol on Biosafety

RMI is party to the CPB. This 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, taking also into account risks to human health. While LMOs are different from invasive species similar processes of risk management, border control and quarantine apply.

Stockholm Convention

The objective of the convention is to protect human health and the environment from persistent organic pollutants.

Rotterdam Convention

The objective of the convention is to promote shared responsibility and cooperative efforts among parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm and to contribute to their environmentally sound use, by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to parties.

International Treaty on Plant Genetic Resources for Food and Agriculture

The RMI is party to this treaty. The objectives of this treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the Convention on Biological Diversity, for sustainable agriculture and food security.

Noumea Convention

The Convention for the Protection of the Natural Resources and Environment of the Pacific Region along with its two protocols entered into force in 1990. In order to protect the environment in the Pacific region, through the Noumea Convention the Parties agree to take all appropriate measures in conformity with international law to prevent, reduce and control pollution in the Convention Area from any source, and to ensure sound environmental management and development of natural resources. The adoption of appropriate measures includes: the establishment of laws and regulations for the effective discharge of the obligations of the Convention, and the co-operation between countries in order to undertake activities that prevent, reduce and control pollution.

Nauru Agreement

The RMI is party to this agreement which covers conservation and management of the world's largest sustainable tuna fishery. Management efforts include high seas closures to fishing, controls on Fish Aggregating Devices (FADs), protection for whale sharks and the 100% coverage of purse seine fishing vessels with observers. No dolphins are caught in PNA waters and the PNA is actively involved in limiting bycatch of other species.

World Heritage Convention

The RMI has accepted this convention (2002). 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 recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two.

Convention on Wetlands or Ramsar

The convention entered into force in 2004. The Convention's mission is the conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. There are two sites currently in the Marshall Islands, Namdrik and Jaluit Atolls.

United Nations Framework Convention on Climate Change

The RMI is a signatory to this convention. The convention entered into force in 1994. The objective of the convention is to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. 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.

8.0 Action Plan

Thematic Area A: Foundations

A1. Generating Support

Outcome 1:1 The impacts of priority invasive species on biodiversity, economies, livelihoods and health, are widely understood and actions to manage and reduce them are supported

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Determine level of invasive species (IS) awareness for all sectors	Conduct preliminary surveys to determine current IS awareness levels	2016	Survey results	MIIST, MICS, CMI	
	Conduct periodic surveys to gauge IS awareness profile for all sectors of society	Every 1 to 2 years	Survey results	MIIST, MICS, CMI	
Raise awareness and carry out outreach on the impacts of IS on biodiversity, economy, health and cultural values	Visit high school to raise awareness of IS and their impacts	Visit high school – 2nd quarter 2015, 1st ¼ 2016 & 2017 – and by request	Annual records of school visits, including classes visited and number of students in attendance	MIIST, MICS, CMI, MOE	
	Visit primary schools to raise awareness of IS and their impacts	Visit primary schools – 2nd quarter 2015, 1st ¼ 2016 & 2017 – and by request	Annual records of school visits, including classes visited and number of students in attendance	MIIST, MICS, CMI, MOE	
	Develop IS presentations	schools and communities	Minimally 3 IS presentations tailored for: primary schools, high school and general community groups	MIIST, MICS, CMI, MOE	
	Start IS club at high school	Young people	Find and train club facilitator, establish club, records of club meetings, attendance and activities	MIIST, MICS, CMI, MOE	
	Training IS club members to give IS presentations	Young people	records of student lead presentations to schools and community groups	MIIST, MICS, CMI, MOE	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Raise awareness and carry out outreach on the impacts of IS on biodiversity, economy, health and cultural values (continued)	IS club field activities	Young people and general community	records of students involved in field activities, types of activities undertaken and results of field effort	MIIST, MICS, CMI, MOE	
	Organize media campaign	Campaign in last ¼ each year including 1 talkback radio program, 1 provincial radio program, and newspaper articles	Annual report on campaign activities and copies of information produced.	MIIST, MICS, CMI	
	Produce short biosecurity video for showing at airport terminal	Video produced and playing in 2016	Video and a report on its use in 2016	MIIST, Quarantine, MT&C	
Design and implement community workshops to counter IS threats	Conduct workshops for farmers and general public on Integrated Pest Management (IPM)	2018	Stakeholder IPM workshops	MIIST, Quarantine, CMI	
Development of community-focused education and awareness resources	Produce Farmer's Pocket Guide on IS	Production in 2nd half of 2016	Pocket Guide and record of its distribution	MIIST, CMI	
	Produce Media Guide	Production in 2nd half of 2016	Media Guide and record of its distribution	MIIST, CMI	
	Conduct awareness through radio programs	2-3 programs a year	Annual record of programs delivered	Quarantine, MIMRA, EPA, MOH, MOE	
	Assistance RISC with development of regional transportation IS awareness video	2016	Video developed and utilized	MIIST, RMI RISC reps	
	Produce documentary DVD regarding IS and the RMI	Produce in 2019	DVD, record of its distribution and play time on local TV	MIIST	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Development of community-focused education and awareness resources (continued)	Develop a national marine awareness program which includes IS	2018	Established national marine awareness program	CMAC, MIMRA	
Development of education materials	Identify priority messages for outreach materials	develop in 2016	draft messages developed for outreach materials	MIIST, OEPPC	
Development of awareness materials for wider public	Develop poster on economic impact of IS – aimed at raising community awareness so individuals prioritize the issue.	Produce in 2017	Poster & record of distribution	MIIST, CMI, OEPPC	
	Develop poster: ‘Watch out for these pests’ to cover priority invasive alien species (IAS) threatening the RMI	Produce in 2017	Poster & record of distribution	Quarantine, MIIST	
Demonstrate the economic cost of existing invasive species	Present progress report to proper sectors and outside partners & experts	2017	Annual report on status of existing IS and their associated impacts and management costs	OEPPC, MIIST, SPREP IS Advisor	
Demonstrate the potential economic costs of specific non-established IAS	Present analysis and results to state and national leadership	2017	Annual report on status of priority IAS that threaten the state	Quarantine, OEPPC, MIIST, CMI	
Seek strategic funding for priority IS actions	solicit and secure grants from donors (local, regional, international)	2017	Annual secure at least 1 grant to support IAS efforts	OEPPC	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Develop material on marine IS (how they might arrive and how to identify them)	Prepare awareness material on priority species	Awareness material produced and distributed in 2016	Awareness material produced	CMAC, MIMRA	SPC
	Distribute material to all involved in marine activities (tourism operators, Marine Protected Area committees, coastal communities)	2017	Records of awareness material distribution	CMAC, MIMRA	
A2. Building Capacity					
Outcome 1:2 The institutions, skills, infrastructure, technical support, information management, networks and exchanges required to management invasive species effectively are developed					
Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Facilitate IS coordination within the country, regional and internationally	Establish a National IS coordination office	2017	Office funded, established and maintained by dedicated staff	RMI Government	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Training/capacity needs are identified and training programs for priority IS management issues are developed and implemented	Agencies conduct training needs assessments regarding IS efforts. Training needs will likely include species identification, control and monitoring techniques, and risk assessment.	2016	Training needs identified, records of training provided	RMI Government, SPC, SPREP	SPC, SPREP, Others
	Promote training programs and develop new ones to cover important aspects of invasive species management process, from planning and fundraising to demonstration of advance skills	2016-on-going	Appropriate training programs identified to support addressing gaps identified in the training needs assessments	RMI Government, SPC, SPREP	
	Conduct targetted IS training events	Training provided for new staff and existing staff at appropriate intervals	Records of training provided	RMI Government, SPC, SPREP	
Provide training for Harbormasters and other Ports and Harbor staff on identifying invasive species issues associated with incoming air and water vectors	Develop a brief training program with the assistance of experts	2017	Training program developed	Quarantine, OEPPC	
	Provide training to appropriate staffs	(previously this type of training has been provided on an irregular schedule, approximately every other year)	Reports on training provided, including details on staff who received training	Quarantine, OEPPC	
Maintain good ties with local & regional partners	Ensure regular meetings between local partners	Schedule and hold at least 2 meetings annually	Meeting minutes	MIIST	
	Provide progress reports on IS to RISC	Annually prior to winter MCES	Progress reports	RISC RMI reps	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Maintain a system of technical advice and support	Ensure that MIIST is meeting regularly	Quarterly meetings are scheduled, stakeholders are notified, and meetings are held; meeting minutes are recorded	summary reports for all meetings are produced and shared with stakeholders	MIIST	
	Involve partners in training events and meetings	2016	Meeting minutes and training reports		
Develop national database for IS activities and results	disseminate report on database progress and IS issues to stakeholders possibly via an appropriate website	September annually	Reports made available to stakeholders	MIIST, CMI, MICS, OEPPC	
	Establish who will update the database and ensure that it is updated regularly	2016	Database management strategy established	RMI National IS Coordinator	
	Provide stakeholder access to database once established	2019	Stakeholder access to database provided	RMI National IS Coordinator	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Improve regional/national engagement and information sharing regarding IAS	Ensure that the RMI is represented by 2 RISC council members	2016	2 government endorsed council members attending RISC functions	RMI Government	
	Improve communication between RISC and MIIST	2016	Debriefing of MIIST by RISC members following RISC meetings	RISC RMI reps, MIIST	
		2016	MIIST coordination with RMI RISC members prior to RISC meetings	MIIST, RISC RMI reps	

A3. Legislation, Policy and Protocols

Outcome 1:3 Appropriate legislation, policy, protocols and procedures are in place and operating, to underpin the effective management of invasive species

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Support the establishment of the RMI Biosecurity Act	Review of the draft RMI Biosecurity Bill	Biosecurity legislation passed in 2016	Biosecurity legislation in place	RMI Government	
	Provide technical input and background details on the draft Biosecurity Bill to RMI leadership	on-going	Ruling on the draft biosecurity bill	OEPPC, MRD, EPA	
Promote existing policies, regulations, protocols, and laws concerning the management of island resources and IS issues	Develop and distribute a regulation booklet based on existing IS related laws and regulations	2016	Booklet developed and distributed	OAG, OEPPC, MRD, EPA, MOH	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Support the establishment of national biosafety framework	Develop draft framework	2020	Biosafety framework in place	RMI Government	
Carry out mid-term review of NISSAP and develop the next strategy	review of the NISSAP in 2018	Review completed in 2018	Review report received and recommendations acted on	OEPPC	GEF 6
	Final evaluation of NISSAP	2020	Reporting on Achi Targets	OEPPC	GEF 6
	Develop a revised NISSAP for 2022-2027	Process to develop new NISSAP undertaken in 2021	Updated endorsed NISSAP for next 5 years	MIIST	

Thematic Area B: Problem Definition, Prioritization and Decision Making

B1. Baseline and Monitoring

Outcome 2.1: Systems are in place to generate baseline information on the status and distribution of invasive species and to detect changes and emerging impacts

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Improve techniques for monitoring the spread of invasive species within the country	Conduct monitoring of and collect field data on priority IS species	Annually	Document monitoring with reports	MRD, CMI	GEF 6 for additional work outside of day to day; SPC; SPREP
	Develop IS range maps	2016	Range maps produced and made available	MRD, CMI, RMI National IS Coordinator	GEF 6 for additional work outside of day to day; SPC; SPREP
	Update IS range maps	Annually	Updated range maps	MRD, CMI, RMI National IS Coordinator	GEF 6 for additional work outside of day to day; SPC; SPREP

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Improve techniques for monitoring the spread of invasive species within the country (continued)	Provide annual report on priority species to working partners and local leaders	Annually in October	Annual reports	MRD, CMI, RMI National IS Coordinator	GEF 6 for additional work outside of day to day; SPC; SPREP
B2. Prioritization					
Outcome 2.2: Effect systems are established to assess risk and prioritize invasive species for management					
Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Determination of priority species for the country to address	Identify priority established invasive species	2016	Established list of priority species with justification	MIIST	
	Identify priority non-established invasive alien species	2016	Established list of priority species with justification	MIIST, Quarantine, MIMRA, CMAC	
Determine priority IS actions	Identify priority actions to address in regards to IS	2016	Prioritization of IS activities	MIIST, OEPPC	
Risk assessments in place for each species proposed for import or which is determined to be established	Utilize existing information where possible; conduct RA if needed	Completed risk assessment for any new species for input or which are identified within the country	Information provide to Quarantine for determination	Quarantine	GEF 6 for additional work outside of day to day; SPC; SPREP

B3. Research on Priorities					
Outcome 2.3: Improve understand of priority Invasive species taxa, including species biology and associated impacts, and develop effective management techniques for these priority taxa					
Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Design and adopt decision making tools for invasive management planning	Introduce IPM concept to local managers and support its use across sectors	Annual workshop to support IPM understand, use and coordination	Workshop report	MRD	
Develop and implement national IS research strategy (to support the investigation of biology and impacts of IS)	Develop strategy	Completed 3-5 year strategy by December 2016		MIIST, CMI, external partners	
	Contact and request support from existing and potential external partners	2016		National IAS Coordinator	
	Conduct informal interviews regarding IS in each community	annually		MIIST, MICS, CMI	
	Conduct field research on priority IS species	annual report per project		CMI, MICS, external project partners	
	Update research strategy	every 3-5 years as determined by strategy		MIIST, MICS, CMI	
Improve knowledge regarding current status of non-native marine species within the RMI	Coordinate with groups conducting (or that have completed) marine system surveys within the RMI	2016	Report of know non-native marine species established in the RMI, including existing ranges within the RMI	MIMRA, CMAC, UOG, SPC, NOAA	

Thematic Area C: Management Action

C1. Biosecurity

Outcome 3.1: Mechanisms are established to prevent the spread of invasive species across international borders, between states and within states

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Design and promote model risk assessment systems for existing IS	develop (5) billboards concerning IS risks in each community	2 workshops per year (2016-2021)		MIIST, MICS, CMI	
Develop and implement improved inspection, treatment, packing and transportation procedures and methods, for goods and transport vectors	Review permits (import/export) as required	on-going	Records of permit reviews and final disposition (should be entered into IS database)	Quarantine	
	Develop cross training program for line agencies in regards to quarantine activities	2016	Development of training program	Quarantine, external partner	
	Provide cross training to line agencies to support the mission of Quarantine	implement in 2016	Records of training provided	Quarantine	
	create inspection manual for line agencies to assist Quarantine office as needed	2016	Inspection manual produced and distributed	Quarantine	
	Promote the development and implementation of stronger international export standards regarding IAS	on-going	Strengthening of existing international export standards	National IAS Coordinator, MFA	
	Review and modify as needed existing border controls, transport controls and quarantine systems	2016	Strengthening of existing biosecurity systems	Quarantine, MT&C, OEPPC, OAG	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Develop and implement improved inspection, treatment, packing and transportation procedures and methods, for goods and transport vectors (continued)	Conduct risk assessments for proposed national and/or internal movements of species and for the movement of goods that may harbor IS	As warranted by national regulations	Risk assessments completed (as needed) and documented (information regarding completed assessments should be available in the National IS database)	MRD	
	Hold, reject, or confiscate items/permit applications without proper certificates or documents	On-going as warranted by national regulations	Line agency activity reports with critical IS information input into the National IS database	Quarantine, Customs, EPA, MOH	
Improved cross sectoral planning and sharing for marine system activities	Establish a marine systems working group that meets (or otherwise communicates as a body) on a regular basis and supports cross sectoral marine systems activities	2016	Quarterly meetings of marine systems working group, including representatives from government and non-government offices within the RMI	MIMRA, CMAC, CMI	
Finalize draft protocols regarding the importation of marine species	Conduct final review of existing draft, update as needed, finalize and endorse	2016	Endorsed marine species importation protocols in place	MRD	
Establish, maintain and utilize risk assessment procedures for the proposed importation of new species, varieties, etc. and for the internal movement of organisms from one island group/atoll to another	risk assessments are completed for all proposed aquaculture and mariculture introductions	2017	100% compliance for all new proposed introductions	MRD	SPC, importers

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Improved functionality of MIIST	Invite additional office/groups to join such as the RMI Port Authority, EPA, AG's office, etc.	2016	Increased number of offices/groups participating in MIIST	MIIST	
	Quarterly meetings	2016	MIIST meeting quarterly including meeting minutes and improved functionality (demonstrable forward action with NISSAP activities)	MIIST	
	Endorsement of MIIST by national government	2017	Taskforce endorsed and supported by national government	MIIST, OEPPC	
Improve ability to prevent the incursion of non-native species	Work with the RMI Port Authority to establish protocol regarding the sharing of pathway and vector information in the advent of a detection	2016	Finalized and endorsed protocol	Quarantine	
	Address ballast water concerns	2019	Establish national legislation on ballast water treatment	MIMRA	
	Address hull fouling concerns	2019	Develop timeline and strategy to address hull fouling throughout the nation	MIMRA	
	Identify certified dive operations and resources throughout the nation	2017	Operations and resources identified and updated annually	MIMRA, CMAC	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Improve ability to prevent the incursion of non-native species (continued)	Ensure that Protected Area Networks (PAN) planning documents are inclusive of IS	on-going	PAN documents appropriate address IS concerns	OEPPC, MICS, MIMRA, MIIST	
	Ensure that climate change initiatives are inclusive of IS	on-going	Climate change planning documents take into account IS	OEPPC, MIIST	
Review existing detection and response mechanisms	Complete an overview report with suggestions for improvement	2016	Report on existing early detection and rapid response capacity	MIIST, Quarantine	
Establish and maintain an effective IAS incursion detection and response system	Implement adequate surveillance systems at island entry points	monthly surveillance review at all official ports of entry	Monthly surveillance reports	Quarantine	
	Secure funding to support response actions	2017	Funding available for response actions (revolving fund)	MIIST, Quarantine	
	Develop generic emergency response plan for IAS incursions	Draft plan in place by September 2016; Endorsed by leadership by December 2016	ERPs developed and disseminated	MIIST	
	Develop rapid response training workshop	2016	Workshop developed	MIIST, external partner	
	Technical workshop to train core response team members in aspects of a response action	Initiated 2017 (hold subsequent trainings every 2-3 years)	Report on workshops provided	MIIST, external partner	
	Workshop(s) for response action community support	annually	Workshops developed and provided	MIIST	
	Awareness campaign to develop public support for early detection and rapid and appropriate reporting of potential IAS incursions	Campaign underway by January 2017	Yearly review of campaign (and adjustment as needed)	MIIST	

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Establish and maintain an effective IAS incursion detection and response system (continued)	Coordinate with national, regional, and international response support mechanisms	on-going	Annual report on activities shared with stakeholders	National IS Coordinator	
Improve ability to react to potential marine systems invasions	Coordinate with partners to establish a marine systems ERP that identifies available resources within the RMI and the region which could be utilized during a response situation	2017	Marine systems ERP in place and updated regularly	MIMRA, CMAC, National IS Coordinator	

C2. Management of established invasive species

Outcome 3.2: the impacts of priority established invasive species are eliminated or reduced

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Create biosecurity protocols and response capacity for non-established priority species	Develop appropriate biosecurity and response capacity for each non-established priority species	2017	Documentation of biosecurity elements for each species including ERPs	Quarantine	
Create management plans for priority established invasive species	Develop appropriate management actions for each established priority species	2018	Management plans established	MIIST	
Reduced Algal impacts to Majuro reefs	Reduce and/or remove algae from reef flats	2017	Management action underway		

Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Design and apply best practice standards based on latest information	Apply IPM concept to control priority species	2016	Improved control and management of priority species	RMD	
	Assist farmers with IPM techniques to control other invasive species found in their respective farm sites	2016	Activity reports	RMD	
C3. Restoration					
Outcome 3.3: Following invasive species management best methods are implemented to facilitate effective restoration of native biodiversity or recovery of other values					
Outcomes and Actions	Activities	Target	Means of Verification and Monitoring Frequency	Responsibility	Resources/ Funding
Ensure that all invasive species management projects are accompanied and followed by long term monitoring and evaluation of outcomes	Develop and carry out (3) restoration projects within local communities	Development planning underway in 2016; On the ground action by 2018	Project planning documents; Update reports once ground actions begin	MICS, local community, National Government	
Improve sustainability of islands and communities	Mangrove replanting	Projects underway in Jaluit and Namdrik Atolls (add additional locations once these initial efforts have been completed)	Documentation of efforts and increase in size of existing mangrove stands	Communities with support from national government and MICS	

9.0 Monitoring and Evaluation

The Office of Environmental Planning and Policy has the role of coordinating the monitoring and evaluation of the implementation of this strategy with support from other key offices such as Quarantine and MIMRA as well as the MIIST. A national invasive species coordinator could facilitate these activities. It is proposed to conduct a mid-term and final review of activities in the Action Plan with the involvement of MIIST, SPREP and SPC using the 'targets' and 'means of verification'. Those activities that are part of donor-funded projects will also be monitored as part of those projects' reporting systems.

Table 1: Established conservation areas and areas indicated by a variety of sources as having conservation value within the Marshall Islands

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

Table 2: Status of Reimaanlok Community Based Resource Management Planning by Site

Pending	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Status of Reimaanlok Community-Based Resource Management Planning by Site -- September 2015								
Jaluit	Maloelap	Rongerik	Ailuk	Wotje	Likiep	Namdrik	Bikini	
Enewetak	Mili	Wotho	Rongelap			Ailuk (marine)		
Jabat	Ujae	Arno	Ailinginae					
	Lae	Mejit	Ebon					
			Majuro					
			Lib					

Table supplied by MICS September 2015

Appendices

Annex 1: Attendees National Invasive Species Strategy and Action Plan Development Workshop

Dates: 7 and 10 August 2015





Location: RRE conference room, Majuro




Facilitators: James Stanford and David Moverley

Name	Organization
Rebecca Lorennij	MRD
Rica Kabua Myazoe	MRD
Rufus Lajket	UHH
Buina Samson	CMI Land Grant
Adelina John	RMI Customs
Limman Takiah	RMI Customs
Jena Mejbon	RMI Customs
Isaac Marty	Marshall Islands Journal
James Reimers	OEPPC
Lowell Alik	OEPPC
Karness Kusto	MRD
Don Hess	CMI
Mariana Phillip	SPREP/OEPPC
Carlos Latkom	MRD
Jumkar Jumkar	CMI Land Grant
Foster Lanwe	CMI Land Grant
Mabel Peter	HPO MOLA
Judy Reng	CMI Land Grant
Roger Muller	CMI Land Grant
Paulphen Clanry	CMI Land Grant
Mark Stege	MICS
Warwick Harris	OEPPC
Byrelson Jacklick	MRD
Henry Capelle	MRD
Stephen Lepton	MRD
Barry Rilanj	EPA


Annex 2: Priority Established Invasive Species for Management in the Republic of the Marshall Islands



Plants

Taxa	Comments
<p>Chain of Love (<i>Antigonon leptopus</i>)</p> 	<p>Smothering vine that invades clearings and forest edge. Reported from Kwajalein and Majuro.</p>
<p>Chromoleana (<i>Chromoleana odorata</i>)</p>  <p>N Vander Velde</p>	<p>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". Population on Majuro Atoll has been treated.</p>
<p>Ivy Gourd - kiuri awia (<i>Coccinia grandis</i>)</p> 	<p>Smothering vine and host for melon fly and other pest species. Reported from Majuro.</p>
<p>Merremia (<i>Merremia peltata</i>)</p>  <p>J Stanford</p>	<p>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"</p>


<p>Mile a Minute (<i>Mikania micranthra</i>)</p>  <p>K Englberger</p>	<p>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"</p>
<p>Sensitive Plant (<i>Mimosa pudica</i>)</p>  <p>J Space USFS</p>	<p>Can form dense stands, preventing other species from establishing. Known weed of agricultural fields. Reported from Kwajalein and Majuro. Population in Majuro was treated.</p>
<p>Spanish Needle (<i>Bidens pilosa</i>)</p>  <p>F & K Starr</p>	<p>Erect annual herb. Known crop weed which reduces yield. Widespread throughout the Marshall Islands.</p>

Mammals



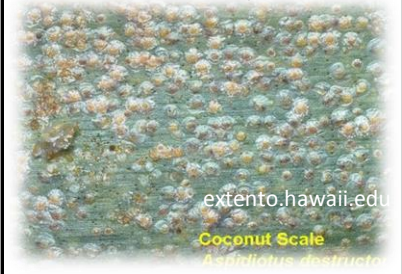

Taxa	Comments
<p>Pacific Rat (<i>Rattus exulans</i>)</p>  <p>J Stanford</p>	<p>Established throughout the country. Known crop pest, potential disease vector and may have direct impacts to biodiversity via seed and egg consumption.</p>



<p>Ship Rat (<i>Rattus rattus</i>)</p>  <p>CSIRO</p>	<p>Established throughout the country. Known crop pest, disease vector and direct impacts to biodiversity via seed and egg consumption.</p>
<p>Brown Rat (<i>Rattus norvegicus</i>)</p>  <p>AnemoneProjectors</p>	<p>Established throughout the country. Known crop pest, disease vector and direct impacts to biodiversity via seed and egg consumption.</p>

Birds

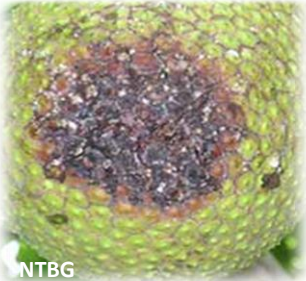
Taxa	Comments
<p>Red-vented Bulbul (<i>Pycnonotus cafer</i>)</p>  <p>J Stanford</p>	<p>Recently arrived and established on Majuro Atoll. Majuro communities reporting crop damage from this species. Tentative report of individuals seen on Arno but as of 2015 this has not been confirmed.</p>

Invertebrates




Taxa	Comments
<p>Spiraling Whitefly (<i>Aleurodicus dispersus</i>)</p>  <p>Spiraling Pattern Spiraling Whitefly <i>Aleurodicus dispersus</i> extento.hawaii.edu</p>	<p>Well established, affects crops and native plant species.</p>
<p>Breadfruit Mealybug (<i>Icerya aegyptiaca</i>)</p>  <p>CSIRO</p>	<p>Both papaya and breadfruit crops are currently being impacted by mealybugs. Multiple mealbug species are established and responsible for these impacts.</p>
<p>Coconut Scale Insect (<i>Aspidiotus destructor</i>)</p>  <p>extento.hawaii.edu Coconut Scale <i>Aspidiotus destructor</i></p>	<p>Attacks coconuts, bananas and other fruit trees and shrubs. Biocontrol is available.</p>
<p>Mango Fruit Fly (<i>Bactrocera frauenfeldi</i>)</p>  <p>Photo by: S. Wilson</p>	<p>Well established, affects crops and ability to ship produce internationally.</p>

<p>Tramp Ants</p>  <p>J Stanford</p>	<p>Clarification is needed on what atolls/islands have established exotic ant species and what species are present. Concern has been raised regarding red ants and some reports suggested that they may be affecting crab populations in places like Jaluit. Red or reddish ants species such as Tropical Fire Ant (<i>Solenopsis geminata</i>), Slender Crazy Ant (<i>Paratrechina longicornis</i>) and Yellow Crazy Ant (<i>Anoplolepis gracilipes</i>) have all been reported from the Marshalls.</p>
<p>Giant African Snail (<i>Achatina fulica</i>)</p>  <p>J Stanford</p>	<p>Reported from Kwajalein. Has ability to affect crops and native plant species. Potential vector for disease.</p>


Fungi

Taxa	Comments
<p>Breadfruit Fungi</p>  <p>NTBG</p>	<p>There are a variety of fungi that attack breadfruit and these may infect various parts of the tree including roots, trunk, leaves and fruit.</p>





Aquatic Organisms

Taxa	Comments
<p>Vector Fish of Ciguatera Toxins in the Pacific</p> 	<p>Workshop participants commented that ciguatera is on the rise throughout the country. Ciguatera is a toxin which is produced by some dinoflagellates and may accumulate in the flesh of fish species (generally reef fish). The primary dinoflagellate associated with ciguatera is <i>Gambierdiscus toxicus</i>.</p>
<p>Crown of Thorns Starfish (<i>Acanthaster planci</i>)</p> 	<p>Considered native to the Marshall Islands but appears to be expanding population numbers and impacting reef ecosystems.</p>
<p>Red Algae (<i>Hypnea spp.</i>)</p> 	<p>On-going algal bloom Majuro reef which is expected to be reducing biodiversity and overall reef vitality.</p>



Viruses

Taxa	Comments
<p>Chikungunya virus</p>  <p>VectorBase.org</p>	<p>Generally spread by <i>Aedes spp.</i> mosquitos. These are the same mosquitoes which can transmit dengue and they typically feed during the day.</p>

Annex 3: Priority Invasive Alien Species that Threaten the Republic of the Marshall Islands

Herpetiles	
Taxa	Comments
<p>Brown Treesnake (<i>Boiga irregularis</i>)</p>  <p>J Stanford</p>	<p>Established on Guam where it has caused extensive damage, impacting biodiversity, economics and human health. Several individual BTS arrivals have been reported, all reported arrivals were dead or dispatched on detection (Stanford 2007).</p>
<p>Cane Toad (<i>Rhinella marina</i>)</p>  <p>J Stanford</p>	<p>Individuals have been documented from Ebeye but it may not be established (Stanford 2011). There are other accounts of frogs and/or toad being seen on Majuro but authorities are not aware of any established anuran species to date. Various anurans are established in both Guam and Hawaii and Cane Toads are established in most of the FSM including Kosrae.</p>
Birds	
Taxa	Comments
<p>Myna Birds (Family Sturnidae)</p>  <p>J Stanford - Common Myna</p>	<p>There are several species established on various islands throughout the Pacific, including in Hawaii 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>). There is an unconfirmed report of Myna birds being seen on Majuro Atoll in recent years.</p>
<p>Passerine Birds e.g. Sparrows and Finches</p>  <p>Laitche - Eurasian Tree Sparrow</p>	<p>There are various sparrow species established on Pacific islands, any of which could arrive within the country and potentially establish. These include the Eurasian Sparrow (established in Guam), Java Sparrow (established in Guam, Hawaii and Fiji), Tree Sparrow (established in Pohnpei), House Sparrow (established in Hawaii and Fiji) and House Finch (established in Hawaii).</p>

Invertebrates

Taxa	Comments
<p data-bbox="185 254 483 310">Coconut Rhinoceros Beetle (<i>Oryctes rhinoceros</i>)</p>  <p data-bbox="147 548 250 569">J Stanford</p>	<p data-bbox="561 401 1458 428">Established on Guam, Fiji and in Palau; Established else where in the Pacific.</p>
<p data-bbox="185 598 477 655">Little Fire Ant (<i>Wasmannia auropunctata</i>)</p>  <p data-bbox="147 894 269 915">PIA Ant Key</p>	<p data-bbox="553 705 1468 810">Established on Guam and Hawaii as well as else where in the Pacific. Has the potential to reduce biodiversity and impact agricultural activities. Tramp ants in general are a concern.</p>

Annex 4: Organizations and Databases Related to Invasive Species Management

Secretariat of the Pacific Commission (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. Web link: <http://www.spc.int/>

Secretariat of the Pacific Regional Environment Programme (SPREP)

SPREP has been charged by the governments and administrations of the Pacific region with the protection and sustainable development of the region's environment. SPREP's vision is the Pacific environment, sustaining our livelihoods and natural heritage in harmony with our cultures. SPREP's activities are guided by its Strategic Action Plan 2011-2015. Develop through extensive consultation with Members, Secretariat staff and partner organizations; the Plan establishes four strategic priorities: climate change, biodiversity and ecosystem management, waste management and pollution control, and environmental monitoring and governance. Web link: <https://www.sprep.org/>

Pacific Islands Roundtable for Nature Conservation (PIRNC)

Formed in 1997 at the request of Pacific Island Countries and Territories, PIRNC serves as a forum whereby organizations working on nature conservation in the Pacific can improve their collaboration and coordination to increase effective conservation action. In particular it is the coordination mechanism for the implementation of the Action Strategy for Nature Conservation in the Pacific Island Region 2008-2012. The Action Strategy was endorsed by SPREP members, and highlights the priority concerns for conservation in the Pacific region as well as outlining a roadmap for achieving the key goals. It is to be reviewed in December, 2013. Web link:

<http://www.iucn.org/about/union/secretariat/offices/oceania/roundtable/>

PIRNC has a number of Working Groups, one of which addresses invasive species; the **Pacific Invasives Partnership (PIP)**. PIP is the umbrella regional coordinating body for agencies working on invasive species in more than one country of the Pacific and promotes coordinated planning and assistance from regional and international agencies to meet the invasive species management needs of the countries and territories of the Pacific. Web link:

<http://sprep.org/Pacific-Invasives-Partnership/invasive-partnerships>

Pacific Invasives Learning Network (PILN)

PILN is a professional network for invasive species workers in the Pacific and organizes skills and learning exchanges, workshops and meetings, and facilitates multi-sector invasive species teams in countries. Web link: <http://www.sprep.org/piln>

United Nations (UN)

Various offices of the UN support invasive species efforts, including the Food and Agricultural Organization (FAO), UN Environmental Program (UNEP), UN Development Program (UNDP) and International Maritime Organization (IMO)

World Health Organization (WHO)

WHO can provide expertise in human disease and support efforts to address vector control in regards to invasive species management.

US Government

A number of US Government agencies operate programs or render assistance to the Marshall Islands. These include the Federal Aviation Administration, the US Postal Service, the Small Business Administration, the US Agency for International Development, the Department of Energy, the Department of Agriculture, the Department of Health and Human Services, the Department of Education, the Department of State, and the Department of Interior. Some of these agencies are directly linked to invasive species efforts in the Marshalls or elsewhere, while others are not typically involved in these efforts but all potential could be as invasive species could impact each of these offices' focal areas.

International Union for the Conservation of Nature (IUCN) - Oceania Regional Office

IUCN Oceania is working with like-minded organizations to contribute to the conservation of species and ecosystems in the Oceania region. Increasing awareness about the importance of species and the threats they are facing is crucial. The concept of "Investing in Nature" is central to this approach: too often, humans take other species and their day-to-day uses for granted. It is vital that investments in natural resources promote sustainable long-term use, management and conservation of the species we utilize in our everyday lives. Web link:

<http://www.iucn.org/about/union/secretariat/offices/oceania/priorities/>

Non-Governmental Organizations and Consultancies

Pacific Invasives Initiative (PII), RARE, The Natural Conservancy (TNC), BirdLife, Island Conservation, Conservation International and a host of other NGOs and contractors can provide support for building invasive species management capacity by providing technical support, training, assistance with proposal and project design, and links to expertise.

Hawaii Pacific Weed Risk Assessment

Hawai'i-Pacific Weed Risk Assessment (HPWRA) provides a free service. Professional botanists use published information to predict whether plants have a low-risk or high-risk of becoming invasive in Hawai'i or similar Pacific islands. Web link:

<https://sites.google.com/site/weedriskassessment/home>

IUCN, Species Survival Commission (SSC), Invasive Species Specialist Group (ISSG)

ISSG aims to reduce threats to natural ecosystems and the native species they contain by increasing awareness of invasive alien species, and of ways to prevent, control or eradicate them. ISSG is a major source of information on invasive species either through the Global Invasive Species Database (GISD) or by direct contact. Web link: <http://www.issg.org/about.htm>

Global Invasive Species Database (GISD)

The GISD focuses on alien species known to have negative impacts on native biodiversity and ecosystems. It features over 850 species profiles of some of the most harmful species. While there are taxon and geographical biases on selection of species (due to funding sources and priority themes) that are featured on the GISD, the Oceania region is well represented with a large number of harmful species listed. Other information extracted from the GISD included information on taxonomy, species organism type, common names, habitat type, biome, biostatus information and information on pathways of introduction and spread of these species. Web link: <http://www.issg.org/database/welcome/>

Pacific Island Ecosystems at Risk (PIER)

The PIER database is focused on plant species that are known to have been introduced to the Pacific region including the Pacific Rim. Information extracted from PIER included biostatus of alien species at island level, common names in Pacific languages, habitat information and most importantly links to risk assessments conducted for the Pacific region. Web link: <http://www.hear.org/pier/>

CABI Invasive Species Compendium (ISC)

CABI ISC is an encyclopedic type of database on invasive alien species that impact biodiversity and livelihoods. CABI maintain compendia on Crop Protection, Forestry, Aquaculture and Animal Health and Production. The CABI ISC lists invasive species that impact biodiversity as well as pests of crops and pathogens. The focus for this project was on species that are known to impact biodiversity and ecosystems. Web link: <http://www.cabi.org/isc/>

FishBase & SeaLifeBase

FishBase and SeaLifeBase are databases focused on all fish species known to science. Data and information included in FishBase (<http://www.fishbase.org/>) includes ecological information, information on traits and distribution at country and ecosystem level including in the introduced range of fish species in the aquatic system (both marine and freshwater). SeaLifeBase (<http://www.sealifebase.org/>) consists of similar information on marine species.

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