Regional Biosecurity Plan for Micronesia and Hawaii

Volume I

Prepared by:

University of Guam and the Secretariat of the Pacific Community 2014

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1. Forward

This document, the Regional Biosecurity Plan for Micronesia and Hawaii or RBP, is the work of many, in fact hundreds of individuals. Various government agencies, organizations, and individuals have contributed either through preparing texts that have become elements of this overall document and/or by supplying detailed comments and suggestions which have been used to build the implementation strategy. The concept of building this plan with such extensive input was felt to be the appropriate mechanism to insure that biosecurity needs for the region were comprehensively documented and it is to be hoped that any errors which do exist in this document are minimal and that any existing errors can over time be identified and corrected for future editions of this living document.

The RBP was originally termed the Micronesia Biosecurity Plan or MBP. Since the inception of the plan the term MBP has been used for a variety of subcomponents as well as to reference the overall project and the term can be found in earlier documents and components including the risk assessments which are part of the RBP. The risk assessment sections of this document are by far the largest components. These assessments contain a vast array of useful information and details and end users are encouraged to explore them in order to benefit fully from these assessments.

Given the extensive size of the risk assessments, an attempt was made to keep the strategic implementation component of the plan as streamlined as feasible to assist end users. The implementation section hinges on the recommendation tables, one table for each jurisdiction, plus additional tables for the U.S. (covering its three jurisdictions within the region) and for the U.S. Department of Defense (DoD). In this regard, the U.S. regional and DoD are treated as jurisdictions, although strictly speaking they are not. The three jurisdictions which fall under U.S. federal oversight and are part of this plan are only a part of the area covered by the U.S. federal jurisdiction. DoD is a department of the U.S. federal government with facilities, personnel, and materials in many areas around the globe. This plan only covers those DoD elements which are within the region or which are either entering or departing the region.

The preparers of the RBP have agreed that the task at hand was not to write a biosecurity plan for the region per se, but rather to serve as compilers, editors, and synthesizers working to produce a regional biosecurity strategy from the input of experts and stakeholders from throughout the region as well as supplementing this core input with additional material from experts from beyond the region as appropriate. Ultimately, what the reader of this document will find is what local, regional, and global experts and stakeholders have suggested should be included in this document. Some jurisdictions provided much more input than others. It is hoped that the information provided in this plan will assist each and every jurisdiction as well as the region in moving forward with improving biosecurity across the board (within jurisdictions, between jurisdictions, and for the region, as well as for linkages outside the region).

This plan was drafted and developed with the intention that it should remain a living document and that once the final product has been delivered to the jurisdictions, the jurisdictions themselves would

determine how best to move forward with recommendations, implementation, and updating their elements of the plan as needed in order to insure that it remains current and ultimately functional. It is hoped that updates both in regards to advancements towards meeting specific recommendations as well as to the plan itself will be shared between jurisdictions and supported by the region, ultimately ensuring that the plan remains a regional concept with a regional focus but driven by the individual jurisdictions via regional agreements and continued planning, development, and implementation.

2. Mission Statement

The concept of the RBP is visionary in its scope. The transfer of invasive species or invasive alien species (IAS) to the region and within the region is real, ongoing, and an increasing problem that must be addressed. The spatial scale for this plan is extremely broad, encompassing most of Micronesia and the archipelago of Hawaii. The plan attempts to cover the broadest possible extent of habitats and taxonomic groups including terrestrial, freshwater, and marine systems. This overall approach is unprecedented due to the broad geographic and taxonomic scope, as well as inclusion of multiple countries and cultures.

The primary entities covered by the RBP are listed below. These entities are often referred to as jurisdictions within the RBP, as most of them are government jurisdictions.

- The U.S. Federal Government, as it relates to its jurisdictions within the region
- The U.S. Territory of Guam, commonly referred to as Guam
- The U.S. Commonwealth of the Northern Mariana Islands or CNMI
- The U.S. state of Hawaii, commonly referred to as Hawaii
- The Federated States of Micronesia or FSM
- The FSM state of Chuuk
- The FSM state of Kosrae
- The FSM state of Pohnpei
- The FSM state of Yap
- The Republic of Palau, commonly referred to as Palau
- The Republic of the Marshall Islands or RMI
- The DoD

The approach used to develop the RBP explicitly considers multiple vectors and environments (marine, freshwater, and terrestrial systems) together, using an appropriate spatial scale at which invasions operate. The implementation of this large-scale, integrative, and cross-cutting strategy should result in improved biosecurity protection, efficiency, and consistency, compared to advancing many individual activities in isolation. By cross-cutting we refer to the fact that invasive species negatively affect most major concerns within the region such as climate change adaptation, human health, green economy development, natural resources conservation, economic stability and growth, food security, etc. and that by addressing invasive species via appropriate biosecurity we are in fact positively affecting all of

these major concerns. The implementation guidance within the RBP supports establishment of a coordinated and consistent strategy internationally, across multiple countries and cultures. Most current understanding and management of invasions come from temperate latitudes and continents, but this plan aims to address invasions on tropical islands ecosystems. Even though Micronesia and Hawaii encompass a large area including multiple countries, current levels of trade and the number of points of entry are few relative to many other global regions. This suggests that understanding transfers of vessels and goods is more feasible here than it is for many other areas and should make developing appropriate and functional biosecurity mechanisms feasible. This underscores the value of Micronesia and Hawaii as a model. It is important to recognize that current capacity and resources limit present day biosecurity activities throughout the region and overcoming these deficiencies needs to be part of the implementation plan for the region. By implementing a cohesive regional plan and developing appropriate mechanisms to address IAS, Micronesia and Hawaii could become world leaders in advancing biosecurity, especially in tropical ecosystems. Coordinated biosecurity within the region could effectively become a global model.

Cooperation among nations in the western Pacific, whereby preventive measures are enacted to reduce the probability of exporting or importing invasive species, will benefit each nation by reducing the probability of such species becoming established (McNeely et al. 2001). A somewhat similar approach has been implemented for northern Australia and is known as the North Australian Quarantine Strategy (NAQS). NAQS has helped address many biosecurity concerns for northern Australia by coordinating efforts between northern ports of entry and Australia's northern neighbors including Indonesia, Papua New Guinea and Timor-Leste (Pheloung 2003). A proactive, precautionary approach is preferred for regional biosecurity development and this will require effective and coordinated efforts together with sufficient resources and networking (Henderson and Bomford 2011). Such cooperation is essential to the development of biosecurity for the western Pacific and it is encouraged between jurisdictions covered by the RBP as well as others.

Advancing a uniform and consistent approach to biosecurity throughout the region is desirable, as it would be the most likely way to reduce overall effort and costs associated with IAS control and management for the entire region and it would serve to increase clarity and possibly compliance. Thus, communication, coordination, and participation among all member countries and jurisdictions in the region are critical elements in regards to reaching the desired outcome of a better protected region.

The RBP, including both the risk assessments and implementation strategy, provides planning and in some cases execution level information. Each jurisdiction within the region will need to review the implementation guidance and in some cases may be required to further tailor the guidance to meet unique needs. Direct details such as timelines, particular costs, and specific personnel and equipment lists are in large part left out unless supplied specifically by the jurisdictions. Each jurisdiction will need to develop specific details for action items they determine are practical, warranted, and feasible to enact. The RBP does not set laws or regulations nor define the responsibilities or obligations of any jurisdictions, agencies, or offices. Again these elements are left for the appropriate authorities to determine. The RBP is a guidance document which is to be utilized to strengthen biosecurity.

3. Executive Summary

The Micronesia Chief Executives (MCEs) and their council on invasive species, known as the Regional Invasive Species Council or RISC, have been in the forefront of regional IAS work for almost a decade. The current effort to develop a regional biosecurity plan originated with the RISC and the MCEs as early as 2005. In 2007, DoD formally announced its intentions to prepare an Environmental Impact Statement (EIS) to address environmental impacts associated with the relocation of military forces from their current location in Okinawa to Guam, as well as the expansion of training in the Mariana Islands (Federal Register Volume 72 No 44, March 7, 2007). The announcement elicited concerns about the unintentional movement of invasive species associated with the relocation effort. In response to regional concerns, the U.S. Department of the Navy (DON) contracted the U.S. Geological Survey (USGS), the Smithsonian Environmental Research Center (SERC), and the U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS) to produce three risk assessments, one each for freshwater systems (Volume II), marine systems (Volume III), and terrestrial systems (Volume IV). These risk assessments were to address invasive species whose introduction to, or spread within, the region might compromise human health and safety, animal and plant health, economic viability and/or biodiversity values in the region. These DON funded risk assessments were the first concrete steps in developing this regional biosecurity plan. While DON funded the development of the regional biosecurity plan, the plan itself is not restricted to DON or even only DoD related activities but rather encompasses (or attempts to encompass) biosecurity concerns throughout the region for all levels of society.

Guam is the main transport hub for the rest of Micronesia and Hawaii is a major hub for much of the Pacific Region, including Micronesia. Entry of any pest or disease into either hub could lead to a rapid movement of the same pests into the surrounding region. For this reason, biosecurity within these jurisdictions is of immense regional importance.

Some species' risks are well known but many are unknown and unpredictable. Therefore a comprehensive strategy needs to have both specificity to manage the known high-risk present threats (e.g. brown treesnake (BTS) (*Boiga irregularis*) and coconut rhinoceros beetle (CRB) (*Oryctes rhinoceros*)) and generality or precautionary processes for the unknown or infrequent threats.

The means by which the threats arrive or leave a jurisdiction or region can be classified according to their physical vector and/or pathway (ships, aircraft, or people), as diseases brought with incursions of risk species or of non-risk species allowed into each island, and/or in relation to some human derived process (legal, illegal, or accidental introduction). Ultimately how each jurisdiction will handle planning and developing their biosecurity capacity will in part depend on current and future anticipated vectors and pathways and it is essential that a well formed pathways analysis be part of any biosecurity planning efforts.

Mitigation or intervention to manage these high risk species can be done pre-border at a source, along the pathways and/or on the vectors, at the border, or post-border – with generally increasing costs and

potential adverse outcomes as the intervention point is delayed. Identifying the costs of intervention at different points along the risk chain, and also the resulting costs to environment, economy, and health if sub-optimal interventions are used, is essential to managing a biosecurity system and allocating responsibilities.

There is a common belief that intervention all along the risk chain is optimal (e.g. Russell et al. 2008). This is true across the whole biosecurity process, and probably true for high, medium and low risk species when funds are not constrained, but as funds are usually constrained it is not true for each invasive species or class of species generally speaking. Therefore, most biosecurity systems allocate resources to the most effective points in the risk chain. This point varies with the nature of the risk species, the predicted frequency of the event, the cost to detect it, the cost of dealing with an event at the most effective point in the chain, and the consequence and cost of failure to detect and manage the event at that point in the chain. This complexity makes biosecurity planning difficult by requiring a combination of precautionary and reactive management commensurate with the likelihoods of events, and the costs and feasibility of action, and costs of failure. Plans need to focus more on processes than on the specifics of risky species.

A question faced by all agencies developing biosecurity plans is whether to focus activities around particular species or around generic processes designed to cover all eventualities or perhaps more likely, how to determine the optimal mixture of the two. Clear and present hazards (e.g. BTS) tend to focus effort at the species level, but uncertain or rare events need to be managed by more systematic biosecurity approaches. The compromise approach is to ask, “What collateral reduction of risks might be covered by a focus on high-risk species?”

Each of the risk assessments, presented in volumes II, III, and IV, has addressed these considerations in various degrees of detail, especially for those with Guam as an endpoint. However, sources, pathways, and vectors have only been identified and linked to the assessments for some risks. The focus of the assessments on sources and endpoints (the freshwater component), pathways and endpoints (the terrestrial component), pathways alone (the marine component), or vectors (the phytosanitary and disease parts of the terrestrial component) appears to have been determined by the assumed best points of intervention along the risk chains.

Terrestrial, marine and freshwater risk species are all transported from a source (within or outside Micronesia) to an island (or its littoral zone) in Micronesia or Hawaii but, of course, the nature of this transportation differs with the risk species. Terrestrial species can be transported by anything that floats or flies, marine species can float but are transported mostly on ships via biofouling or in ballast or waste water, and freshwater species are mostly deliberately moved in ‘fish tanks’. The terrestrial and marine components concentrate on inbound pathways for Guam and have less detail of intra-Micronesia risks. Future updates of the plan will need to refine and enhance the definitions of intra-Micronesia risks for the terrestrial and marine environments.

A focus on pathways is critical (since it is not possible to focus on each and every species), but along with a focus on pathways, it is equally important to also focus on a few key species, as appropriate management of these key species will also reduce the risk of invasion by other species.

The three risk assessments and the implementation strategy are a plan or framework and no matter how well developed and comprehensive they are, until there is effective action taken within the jurisdictions, by the jurisdictions, biosecurity will remain sub-standard for the region. Implementation of this plan by the jurisdictions is the anticipated next step in this process. This is the critical step and it is anticipated that implementation will be a multi-tiered effort, or efforts, undertaken by the leadership and agencies of the individual jurisdictions, in partnership with other jurisdictions as well as external partners. It should be recognized, however, that the RBP does not create any right, obligation, or legal responsibility on the part of any of the jurisdictions discussed herein to fund or execute the recommendations set forth in the plan.

The purpose of this regional biosecurity plan is to act as a tool with which to help enhance the coordination of current management efforts, identify remaining problem areas and gaps, and recommend additional actions that are needed to effectively address 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 plan 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 (where feasible), education and outreach, research, policy, and restoration.

4. Introduction

4-1. Background

Invasive species pose a constant and costly threat to Pacific islands' native ecosystems, ecosystem functions, biodiversity, watersheds, economies (including tourism, agriculture, aquaculture, importation, exportation, and transportation), public health, cultures, and the quality of life of residents and visitors.

Oceanic islands throughout the world are notoriously vulnerable to biological invasions. Islands experience long periods of evolution in isolation from those forces faced routinely by plants and animals on continents. This isolation also contributes to the vulnerability of islands to biological invasion (Loope and Mueller-Dombois 1989). The relatively small, restricted populations of native species on isolated islands and the intensity of human impacts on the small land areas of islands have clearly made the situation worse by increasing most islands' susceptibility to invasion.

The MCEs and their council on invasive species for years have advocated a regional approach to biosecurity in Micronesia. DON agreed to fund the development of this regional biosecurity plan in part to assist with minimizing the risk of introduction and spread of invasive species to and within the region in response to the proposed U.S. military relocation from Okinawa to Guam and the CNMI (hereafter referred to simply as "the build-up"). This regional plan has been termed the RBP. A critical component of the RBP is its proposed framework for regional biosecurity found within the RBP's implementation strategy (Section 11).

Biosecurity strategies or plans have been formulated for many countries, including island states such as New Zealand (Anon 2003) and the Bahamas (www.best.bs/Documents/Bahamas_Biosecurity_Strategy.pdf, July 2014). There have also been efforts to develop biosecurity strategies that involve multiple countries or regions of countries such as the NAQS. The RBP differs in its scope and ambition in several respects. First, the geographic area being considered is enormous (covering up to 5000 miles east-west and up to 1700 miles north-south), and it includes multiple countries, unique cultures, and diverse activities and institutional structures. Second, the approach adopted here includes all human-mediated mechanisms (vectors) of alien species introductions, attempting to evaluate their operational characteristics and the status of current management practices in the region. Third, the RBP attempts to address biosecurity in a holistic sense considering pre-border, border, and post-border elements for each jurisdiction. Although addressing these dimensions presents obvious challenges, it also represents an important opportunity and step forward in integrating information across vectors at a regional scale. This integration is vital to advance coordinated and effective action for invasion management across countries as well as the military, government, and public and private sectors.

An appropriate definition for biosecurity would be a strategic and integrated approach that encompasses policy and regulatory framework for analyzing and managing relevant risks to human, animal and plant life and health, and associated risks to the environment. Therefore, a regional

biosecurity plan may be considered a set of proposed actions that a group of end users with common goals implement to prevent the incursion and establishment of potential IAS into a region. A strategic implementation plan is a proactive management tool that should be used as a guide that illustrates critical steps in the capacity building process and addresses existing challenges and gaps.

While biosecurity can include post-border responses to new incursions and management of established invasive species, such as eradication, containment, and control, extra emphasis is usually placed on pre-border efforts that aim to prevent invasions from occurring in the first place. Prevention, or minimizing the probability and number of new invasions, is usually viewed as the most cost-effective and desirable strategy to pursue, because it can be extremely difficult to eradicate or control species once they have established (Wittenberg and Cock 2001). Even though prevention may be the best approach to minimizing impacts from potential IAS, other elements should not be neglected, such as early detection and rapid response for post-border situations. No border security can be 100% effective all of the time and, therefore, a good biosecurity plan will incorporate pre-border, border, and post-border elements to insure the best possible protection from potential IAS.

Efforts to prevent the transport or import of potentially harmful species are usually directed at specific vectors and aim to reduce the magnitude (concentration or abundance) and frequency of species transfers to a target area. Such measures may be aimed at entire communities (e.g., ballast water of ships, as discussed in the marine risk assessment) or particular species of concern, and vectors are an explicit focal point for evaluation and management action(s) in most cases. Thus, vector management is a central aspect of most efforts to prevent invasions, whether on land or in water.

4-2. Overview of Invasive Alien Species

In order for an organism to be considered an IAS, it must meet all of the following criteria:

- Non-native
- Able to establish in a new location (start an incipient population or at least seems likely to be able to do this based on life history traits and/or examples of establishment in similar locations)
- Cause harm (to environment and/or directly or indirectly to humans and/or their endeavors or at least seems likely that it would cause harm if permitted to establish based on life history traits and/or examples from other locations)

Non-native species refer to plants, animals, and micro-organisms transported or established outside of their natural range due to the activities of humans, regardless of whether these actions are intentional or not. Non-native species are sometimes referred to as non-indigenous, alien or exotic species. Not all non-native species will become invasive, and not all non-native species cause unacceptable harm. Some intentional introductions are considered beneficial (at least to humans), such as some crops (e.g. rice) and livestock (e.g. cattle and poultry). In fact, many of the species used for agricultural purposes within Micronesia are non-native plants. Introduced species form the basis of the more than $800-billion food

system in the United States (Pimentel et al. 2000). Some species, either purposely or accidentally introduced, fail to become established or remain restricted in numbers or geographical range, and may be of negligible economic or ecological significance. As an example, many of the bird species currently established on the island of Guam (e.g. blue quail (*Coturnix chinensis*), black francolin (*Francolinus francolinus*)) were introduced during the 1800s and early 1900s as sources of food and while these non-native species have established, they do not currently appear to have extensive negative impacts, although it should be pointed out that their potential impacts to native systems of Guam have not been closely examined and their populations are most likely kept in check by the presence of the BTS. While not all species have the potential to become invasive if introduced to a new location, some do and when they do become established these species have the potential to cause serious harm. There are numerous examples of non-native species having become invasive and causing major disruptions in agriculture, other economic sectors, to people and the natural environment. Examples of such species are numerous and would include organisms such as miconia (*Miconia calvescens*), strawberry guava (*Psidium guajava*), and little fire ant (LFA) (*Wasmannia auropunctata*).

Invasive species are sometimes referred to simply as pest or nuisance species. These terms are misleading as both can also be applied to native species where they cause conflicts with human activities. Therefore it should be clear that not all pest or nuisance species are necessarily non-native and it is better to use the term invasive when discussing IAS.

While the specific biology of invasive species varies enormously, some or all of the following general characteristics apply to many invasive species (both terrestrial and aquatic) worldwide:

- Adaptable to, and capable of thriving in different habitats and a wide range of conditions;
- Have rapid growth rates of individuals, thereby able to displace other plants or animals;
- Are easily dispersible to new localities; and
- Have reproductive characteristics that allow for rapid population growth.

Invasive species often tend to relatively easily surmount geographical and environmental barriers, establish themselves quickly, and then expand their numbers and ranges, often rapidly, in the new habitat (Ehrlich 1986; Mack et al. 2000; Richardson et al. 2000), frequently displacing or extirpating populations of native species in the process (Vitousek et al. 1997). Most of the highly successful invaders have been those introduced into new regions, either inadvertently or deliberately, by human agency (e.g., Baker 1986; Mack et al. 2000; Ruiz et al. 2000; Mack and Lonsdale 2001; Naylor et al. 2001; Reichard and White 2001; Fuller 2003; Kraus 2003).

The establishment and spread of species introduced to regions where they are not native is commonly cited as second only to habitat loss as a cause of global biodiversity decline (Wilson 1992; Wilcove et al. 1998). There is evidence that invasive species are a leading cause of animal extinctions (Clavero and García-Berthou 2005). Reduced diversity and abundance of native species resulting from the widespread

establishment of non-native invasive species has also led to biotic homogenization, a human-mediated phenomenon whereby the species composition of different ecosystems become more similar (McKinney and Lockwood 1999; Lockwood and McKinney 2001; Rahel 2002; Olden and Poff 2004; Olden et al. 2004; Helfman 2007; Rooney et al. 2007). Some scientists have referred to the present as the "Homogocene" era to highlight the unprecedented global redistribution of species and associated alterations to ecosystems (Rosenzweig 2001; Didham et al. 2005). Invasion success depends on the characteristics of introduced organisms and the physical and biological makeup of the environment to which they are introduced. The mechanisms and results of invasions vary widely. Highly invasive species may exploit native species directly, such as through predation or hybridization, may be superior competitors, or may have ecological or economic effects of a more subtle nature.

Although the biological fragility of islands has been debated, evidence suggests that many introduced species are more likely to establish on islands than in mainland areas, and are more likely to have major ecological effects (Simberloff 1995). The vulnerability of islands to invasion has been attributed to a variety of factors. In general, biological communities on islands have evolved and diversified in relative isolation (with limited gene exchange) over many millennia. As a result, islands typically exhibit high species endemism, low numbers of top predators, and species and communities that are highly specialized. These characteristics, combined with other factors, make island floras and faunas especially vulnerable to impacts from the introduction of non-indigenous species (Vermeij 1991; Paulay 1994).

Islands in the Pacific Ocean are among the most biologically diverse in the world, yet also face some of the highest extinction rates and threats to endemic species (CI-MCBC 2007). On Pacific islands the estimated minimum numbers of native species for different biotic groups (percent endemic in parentheses) are: vascular plants 5,330 (57%); birds 242 (68%); reptiles 61 (49%); mammals (all bats) 15 (73%); and amphibians 3 (100%). Data for fish are not as well documented, but at least 100 species, many endemic, occur as adults in freshwater habitats of western and central Pacific islands. The invertebrate fauna is even less well known, but diversity is high; for example, land snails may number over 750 species in Hawaii alone, possibly with as many as 4,000 species throughout the insular tropical Pacific (CI-MCBC 2007).

Although habitat loss may be the primary threat to many insular ecosystems, introduced species on tropical islands of the Pacific play a major role due in part to the vulnerability of a native biota that evolved with less or no exposure to terrestrial predators, grazing herbivores, and pathogens that are typical of larger land masses. For some islands, IAS may currently be the single greatest threat to native wildlife. In Hawaii alone, the large number and diversity of introduced species has resulted in a myriad of impacts to the native flora and fauna. For example, the impacts on the native bird fauna of the Hawaiian Islands by invasive species such as the Indian mongoose (*Herpestes edwardsii*) and mosquitos (and associated pathogens) has been extensive.

There are also cases of widespread harm resulting from the introduction of one or only a few invasive species. One of the most infamous examples in the western Pacific is that of the BTS. The introduction of this snake to Guam has resulted in the extinction or dramatic decline of a variety of native birds, bats

and reptiles (Rodda et al. 1997; Fritts and Rodda 1998). In addition to the ecological threats posed to native species and ecosystems, the economic impact of invasive species can be enormous (NRC 2000; Pimentel et al. 2000; Finnoff et al. 2005; Lovell and Stone 2005; Pimentel et al. 2005; Shogren and Tschirhart 2005). Such impacts can be especially burdensome to island economies.

Biological invasions by non-native species have the potential to cause significant environmental, genetic, economic, social, and cultural impacts as well as effects on human health (Mack et al. 2000; Carlton 2001; Millennium Ecosystem Assessment 2005; Charles and Dukes 2007). Invasions and associated effects are known to occur across diverse global regions and habitats, representing a major force of change. It appears that no area is immune from invasions, which are occurring from the poles to the tropics in terrestrial, freshwater, and marine environments.

Range expansions occur when species establish self-sustaining populations beyond their historical range. While range expansions may result from natural dispersal, in recent times human-aided dispersal has resulted in introductions of harmful non-native species. This includes the unintentional transfer of organisms associated with trade and transportation, as well as intentional introductions for aquaculture and related activities. Human activities have substantively altered invasion dynamics in two major ways. First, the observed rate of new invasions has increased dramatically in recent time, driven primarily by human introductions (Ruiz et al. 2000; Ruiz and Carlton 2003). Second, the geographic scale of invasions has changed, because global commerce moves biota across historical dispersal barriers such as continents and ocean basins, creating connectivity among geographic regions that would not otherwise exist. In addition to the key role of transportation, invasion dynamics are also responding to climate change, which affects the probability of establishment as well as the possible consequences (Stachowicz et al. 2002; Harley et al. 2006; Hellmann et al. 2008). As Hulme (2012) suggests, climate change “may lead to an increase or decrease in susceptibility of ecosystems to invasion such that past patterns of establishment may not hold in the future.”

As a result of the rapid expansion in international travel and trade over recent decades, more people and goods are moving throughout the world than ever before. This increased traffic has been undeniably of great benefit, fostering greater contact and communication and raising living standards. However, the pace and extent of modern global travel also have engendered significant risks, one of the most serious of which is the increased chance of introduction of non-native species that may become invasive (Bright 1998; McNeely 2006).

In their impact on human society, invasive species impose economic, social, cultural and medical costs in a variety of ways. They feed on or infect valued plants (food and fiber crops, ornamentals, timber) or, in the case of weeds, compete with them for nutrients and sunlight, thus reducing yields or causing post-harvest losses; increase crop production costs through increases in mechanical and chemical controls; increase crop protection costs directly or by harboring other pests (arthropods, nematodes, plant pathogens); reduce the quality of farm products (e.g., through contamination of crop seed with weed seed, reduction in the area of useful forage for livestock in pastures and rangelands); damage fisheries and aquaculture; reduce the quality of livestock or game through infection, parasitization, or toxicity,

leading to death or failure to thrive, lowered quality of animal products (milk, fleece, or hides), or reproductive failure; increase processing costs incurred in cleaning contaminated products; interfere with water management in agriculture by infesting irrigation ditches and other waterways; increase utility costs; damage commercial and residential structures; increase costs to maintain rights-of-way for railroads, highways, and power and telephone transmission lines; endanger human health and decrease labor productivity through allergies and poisonings, and the transmission of pathogens; reduce revenues from recreational hunting and fishing, and from tourism; restrict access to foreign markets; and decrease land values (OTA 1993; Westbrooks 1998; Mullin et al. 2000; Huber et al. 2002; Monaco et al. 2002).

Biotic invasions have enormous economic consequences. Worldwide, the annual economic impact of invasive species (losses or damages combined with control costs) is estimated to exceed $1 trillion, nearly 5% of the global economy (Pimentel et al. 2001). Costs to the U.S. economy alone total approximately $137 billion annually (Pimentel et al. 2000).

Economic losses due to introduced plants surpass those caused by any other class of invasive species. For example, the annual economic impact of invasive weeds is estimated to be approximately $39 billion in India, $34 billion in the United States, $17 billion in Brazil, $1.4 billion in the United Kingdom (Pimentel et al. 2001), $12 billion in South Africa (van Wilgen et al. 2001), $3 billion in Australia (Sinden et al. 2004), and $1 billion in New Zealand (Williams and Timmins 2002). Losses to the Canadian economy resulting from invasion by four weeds, Canada thistle (*Cirsium arvense* (L.) Scopoli (Asteraceae)), leafy spurge (*Euphorbia esula* L. (Euphorbiaceae)), diffuse knapweed (*Centaurea diffusa* Lam.), and spotted knapweed (*C. maculosa* Lam. (Asteraceae)), exceed $250 million annually (Claudi 2002). Rockwell (2003) estimated that the total costs imposed solely by invasive aquatic weeds in the United States ranged from $900 million to $14 billion annually. In the United States, invasive plants currently infest an estimated 40 million hectares, and continue to spread into an additional 1.2 million hectares every year (NISC 2001). They have badly degraded more than 15 million hectares of grazing lands and natural ecosystems in Australia (Glanznig 2003). Noxious weeds have invaded an estimated 10 million hectares in South Africa (van Wilgen et al. 2001), where they are appropriating as many as 3.3 billion cubic meters (7%) of mean annual surface water runoff from catchments, riparian zones, and wetlands (Olckers 1999).

Invasive species, in their capacity to modify community structure and ecosystem processes, also impose a heavy toll on natural environments. They impact ecosystems by reducing biodiversity through predation, grazing, competition, or hybridization; simplifying food webs; initiating epizootics or epiphytotics; altering fire regimes and hydrological cycles; changing soil chemistry and biology through, for example, changes in pH and nutrient cycling, salt accumulation, nitrogen fixation, or altering the composition of the soil fauna and flora; affecting normal geomorphologic processes by promoting siltation or erosion; altering the activity of pollinators; and modifying evolutionary trajectories in native species (Mooney and Drake 1989; OTA 1993; Cronk and Fuller 1995; Woods 1997; Mack and D'Antonio 1998; Westbrooks 1998; Mooney and Cleland 2001; Huber et al. 2002; Levine et al. 2003; Zedler and Kercher 2004; Mooney 2005). So large has been the negative impact of some invasive species that they

have been described as “ecosystem engineers” (Crooks 2002). Biotic invasions have been implicated as major actors driving global environmental change (Vitousek et al. 1996; Sala et al. 2000), rivaling habitat loss as a contributor to species extinctions (Vitousek et al. 1997; Wilcove et al. 1998). In turn, the causes and consequences of global change (e.g., increased atmospheric pollution, shifting climatic zones, and habitat disruption) may provide new opportunities for invasions, increasing their frequency and severity (e.g., Huenneke 1997).

4-3. Pathways and Vectors Definitions

Pathways describe the processes or means by which a nonindigenous or alien species is introduced from one location to another (Hulme et al. 2008). According to Ruiz and Carlton (2003), a vector is how a species is transported—the physical means or agent. In this sense, an individual pathway may consist of multiple vectors, with each vector composed of: (1) a carrier (either in the form of a living organism, such as a plant or animal, or a nonliving inorganic or organic item, such as a shipping crate, soil, or volume of water, such as ballast), and; (2) one or more introduced organisms that are transported (or “vectored”) by the carrier. The two authors also identify other terms closely associated with pathways, including “routes” (the geographic path over which a species is transported), and “corridors” (the physical conduit over or through which the vector moves within the route, such as roads and railroad beds) (Ruiz and Carlton 2003).

Non-human mediated colonization of remote oceanic islands by life is a rare event. The modes of long-distance dispersal available to potential colonizers include: 1) direct dispersal, for which flying animals such as birds, bats, and large insects are best equipped for reaching isolated areas under their own power, and are usually well represented in island biotas; 2) windborne dispersal, via which tiny seeds and invertebrates are carried passively on air currents; 3) waterborne dispersal, a mechanism responsible for transporting propagules, such as large seeds capable of floating in seawater for extended periods, or small animals, as well as seeds rafting on trees or mats of vegetation washed into the ocean; and 4) dispersal by birds, who may serve as inadvertent carriers of plant and animal “hitchhikers” adhering to feathers or feet, or, in the case of some seeds, passing through the digestive system to be deposited with feces in a suitable site for germination (Juvik 1998).

5. Limitations to the Scope of the Regional Biosecurity Plan

Though this plan is meant to be comprehensive, there are limitations to its scope that were realized at various stages in its development. Significant aspects that are not fully addressed in the RBP include biosecurity considerations and IAS within the following groups: micro-organisms, terrestrial plants, algae, and arthropods. Micro-organisms (bacteria, viruses, diseases, protists) are certainly part of the invasive species problem, and though they are alluded to in various parts of this plan, the scope of the issues potentially associated with micro-organisms was deemed overly extensive to readily facilitate detailed inclusion within this document. Each of the existing risk assessments does cover some aspects

of the taxon groups mentioned above, but this information should not be considered comprehensive. To properly address each of these taxon groups, an extensive amount of additional work will need to be completed. While the amount of effort needed to complete risk assessments for the region in all taxon groups is extensive, it is hoped that as part of the efforts, which evolve from the recommendations of this plan, work can begin to address these current short comings. All of these taxon groups are known to contribute to biosecurity concerns; in fact, terrestrial plants and arthropods are probably the two IAS taxon groups that currently receive the highest level of funding and management both globally as well as within the region. The lack of detailed coverage of these taxon groups within the RBP was necessitated in part in order to be realistic in where efforts could be initially focused, and in no way is meant to indicate that these groups are not just as important in terms of their threats. Some of the major recommendations coming from this document will be for the region to complete risk assessments and recommendations for each of these groups in order to insure that biosecurity concerns receive full coverage for the region as soon as feasible.

6. Overview of the region

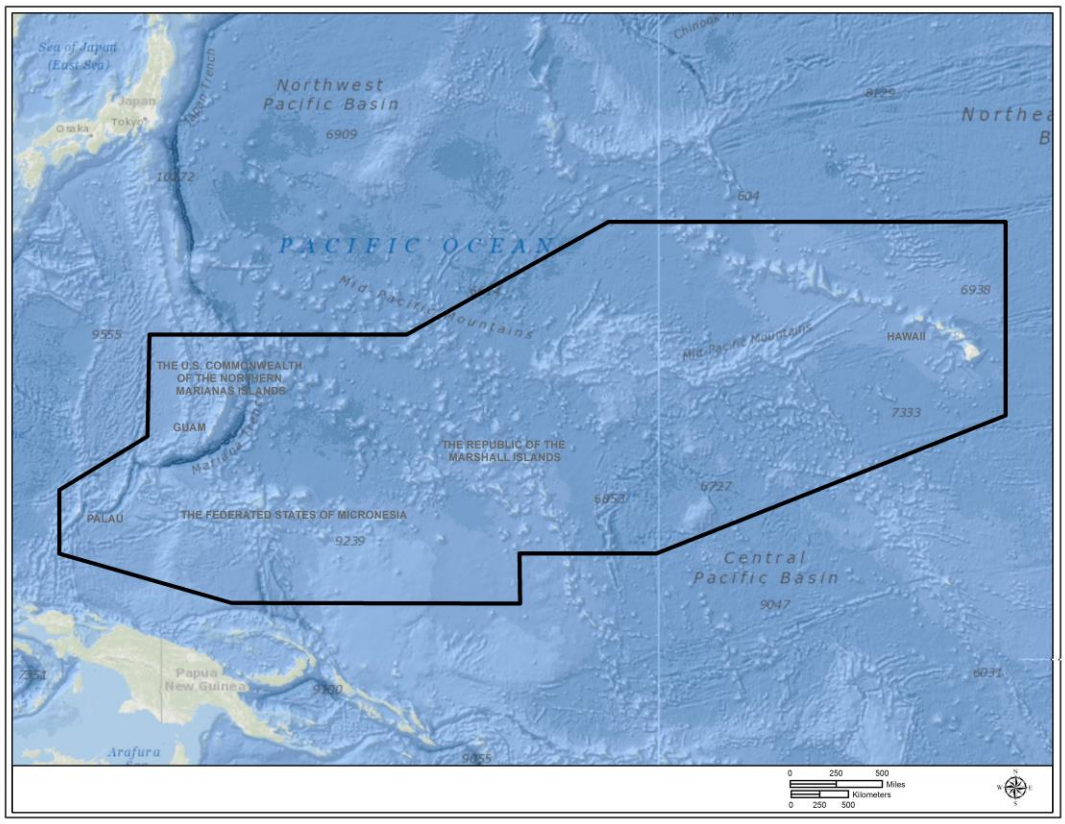
The region of focus for this biosecurity plan includes most of the islands of the global region known as Micronesia and the archipelago of Hawaii (Figure 1). Overviews of the individual jurisdictions can be found in Attachment A of this document. The islands of this region are all located in the tropical or sub-tropical north Pacific.

Micronesia is a sub region of Oceania that is comprised of four main island groups or archipelagos (three of which are covered by this plan: Marianas, Carolines, and Marshalls) as well as numerous outer islands. Overall, Micronesia encompasses thousands of individual islands and is approximately 7,400,000 square kilometers (2,900,000 square mi) in size, with both high islands and atolls. The region has a tropical maritime climate with little annual variation in temperature and a slightly more variable rainfall within parts of the region. Most islands experience wet and dry seasonality, although the dry season may not be very pronounced depending on location.

Guam and the Hawaiian island of Oahu serve as the two main hubs of human activity and shipping for the region, with most goods transshipped through Oahu to Guam with some goods then going from Guam to other islands within the region. Various countries within Southeast Asia are also important trade partners with both the Micronesian jurisdictions and Hawaii.

The Mariana islands are situated about 1,700 km (1,060 mi) south of Japan, 2,100 km (1,300 mi) east of the Philippines, and 1,800 km (1,100 mi) north of New Guinea. There are 15 islands, all of volcanic origin. The archipelago runs more or less north-south. The Mariana archipelago is composed of two jurisdictions, the CNMI and Guam. The CNMI is composed of the 14 northern islands. Guam consists of the single southernmost island.

Figure 1: Republic of the Marshall Islands, Republic of Palau, Federated States of Micronesia, Territory of Guam, Commonwealth of the Northern Mariana Islands, and the State of Hawaii



The Caroline Islands are a widely scattered archipelago north of New Guinea, east of the Philippines, and south of the Mariana archipelago. This archipelago runs more or less east-west. Politically the islands of the archipelago are divided between the Federated States of Micronesia and the Republic of Palau. Palau encompasses the westernmost section of the archipelago and the FSM the central and eastern sections. The archipelago is composed of approximately 500 islands, which include several large high islands and many low atolls.

The Marshall Islands are divided into two island chains, Ratak and Ralik. There are a total of 29 atolls and five isolated islands. The Marshall Islands lie to the east of the Caroline Islands and north of the equator.

7. Pertinent Regulatory Drivers

The regulatory drivers for the region provide requirements and justification for planning, compliance, and development in regards to biosecurity. Regulatory guidance is essential for developing appropriate biosecurity standards for the region. All jurisdictions have existing regulations that support some level of biosecurity. In large part the existing regulations are based on the U.S. system. The U.S. has a quarantine system, which continues to evolve, but which was mainly established to address agricultural concerns on the U.S. mainland. To a large extent these regulations do not adequately address freshwater and marine concerns, nor do they always take the best approach for relatively small tropical islands or island groups. While some regulatory improvements have occurred in most jurisdictions within the past 10 to 20 years, all of the jurisdictions still have gaps in their existing regulations that should be addressed. An overview of the existing regulations for each jurisdiction can be found in Attachment B of this document.

8. Overview of the Proposed U.S. Department of Defense Build-up

The U.S. military has various resources in the Micronesia-Hawaii region and utilizes these and others areas within the region for training purposes. The current DoD facilities and training locations within the region include: Guam Bases (Andersen Air Force Base- AAFB, Naval Base Guam, and the various naval annexes and properties), Tinian training facilities, Palau Civic Action Teams (CAT) Camp Katuu, U.S. Army Kwajalein Atoll (USAKA), Wake Island, and Hawaii based facilities.

The concept of the RBP, or more precisely, the interest in regional biosecurity, existed well before planning for the military build-up in the Marianas was announced, but the actual development of such a framework went unfunded and the concept therefore remained only a concept. Funding to develop the RBP was initiated to assist with planning and environmental impact analysis related to the potential for IAS introduction in the region due in part to the military build-up. Linkages between Micronesia and the State of Hawaii were also added to the overall coverage of the RBP only once the military build-up had been proposed.

The proposed military build-up on Guam has been reduced in size from its original scope. The draft risk assessments relied upon the definition of the build-up as depicted within the 2010 FEIS for the Guam and CNMI Military Relocation (DON 2010). Some of the figures and statistics used in the risk assessments, specifically in regards to the amount of military traffic entering and leaving via military ports may reflect the original larger build-up concept and not reflect build-up planning as of 2014. Similarly, the military build-up statistics considered in the risk assessments date from 2006 and do not reflect current DoD planning.

As of 2014, the number of personnel to be relocated to the region has been reduced from the originally planned 8,600 Marines and 9,000 family members, to a force of approximately 5,000 Marines and 1,300 family members on Guam. Approximately two-thirds of the Marines relocated to Guam will be rotational with the remaining one-third permanent. In addition, the timeline to complete the build-up was extended from 5 to 12 years. As a result of the reduced and more gradual scope of the build-up, peak and steady-state population numbers on Guam will be much less than previously anticipated (see Figure 2.2-1 in Chapter 2 of the Draft Supplemental Environmental Impact Statement (Joint Guam Program Office 2014): http://guammarines.s3.amazonaws.com/static/draftSEIS/Chapter2.pdf). Associated with this, the number of off-island workers and amount of commercial port throughput will be substantially less than under the 2010 ROD. More information regarding the proposed military build-up can be found at http://www.guambuildupeis.us/.

9. Risk Assessments

9-1. Overview of the risk assessment process

Risk analysis is commonly used for management of IAS because pragmatic decisions can be made that provide a balance between competing environmental and socio-economic interests, despite limited availability of information (e.g., Hayes and Hewitt 1998; Hewitt et al. 2006; Barry et al. 2008; Campbell and Hewitt 2008, 2011).

In a biosecurity context, conventional risk assessment methodology consists of five steps:

1. Identifying endpoints (within biosecurity common endpoints are a breach in quarantine or a subsequent impact)
2. Identifying hazards
3. Determining likelihood
4. Determining consequences; and
5. Calculating risk

This process is similar (following the five step process) to the risk management standard used in Australia and New Zealand and the risk framework agreed on by the U.S. Aquatic Nuisance Species Task Force and U.S. National Invasive Species Council (2007). Biosecurity risk endpoints are typically (a) inoculation (breaking the quarantine barrier), (b) establishment, and (c) spread. Additionally, some would also consider mitigating impacts as an endpoint.

The terms of reference for the development of the RBP risk assessments were set by DoD and are as follows:

The deliverables will cover/discuss three periods; 1) current steady state, 2) during the military build-up, and 3) post military build-up steady state.

1. List of priority species and potential pathways that are not established in the Micronesian region and Hawaii that could pose a high risk to the local economies, environments, and human health.

2. Map of ports of origin for the Micronesian region:

- Rank high/medium/low risk for each port based on priority species previously identified.
- Rank high/medium/low risk for each pathway based on priority species previously identified.

3. Rank high/medium/low risk for the top import and export commodities for each island group based on priority species previously identified.

4. List of priority species established in the region that require pre-departure mitigation measures to reduce the risk of their movement within and outside the Micronesian region:

- Prioritized list of pathways associated with the previously identified locally established species that will be targeted for pre-departure quarantine measures.

5. Ranked list of highest risk regional and trade partner ports based on lists of both locally established priority species and species not yet established within the Micronesian Region:

- Prioritized list of pre-departure mitigation measures for immediate implementation.
- Development of regional monitoring strategy.

9-2. Caveats to the Risk Assessments

1. A major weakness of the risk assessments is that all threat analyses (or attempts at analyses) are measured by intercept data or basically the frequency that organisms are detected at the border. This approach fails to measure slippage (failure to detect an organism during an inspection), and varies in respect of the speed with which actual entry and establishment of new organisms are detected. For example, a dozen or so very serious pests of agriculture and the environment have successfully become established in Hawaii in the past 10 years alone. They include the LFA, varroa mite (*Varroa destructor*), coffee berry borer (*Hypothenemus hampei*), small hive beetle (*Aethina tumida*), coqui frog (*Eleutherodactylus coqui)*, ohia rust (*Puccinia psidii*), and several others. These organisms have rarely if ever been recorded in any intercept data prior to their detection as established pests. Another concern with this approach is that not all detections/intercepts are identified.

2. The RBP risk assessments fail to adequately consider the movement of established pests already in the region within jurisdictions and to surrounding jurisdictions. This flaw appears to arise from a notion that once a pest is established it is no longer important to target it for detection

on goods leaving one jurisdiction for another. This assumption of course is not appropriate. The Pacific Region is a complex network of independent nations, nation-states, islands, and island-states. Often the political boundaries do not reflect cultural boundaries and these may overlap considerably. This factor complicates biosecurity activities and needs to be recognized.

3. The RBP marine risk assessment authors did not utilize the term invasive species in their document but rather relied on the term non-native to denote invasive species or potentially invasive species. This is regrettable as not all non-natives should be considered invasive species e.g. many food crops are non-native. The reader should be aware of this anomaly when reading elements of the RBP marine risk assessment.

4. USAKA and the Palau CAT Camp Katuu were not covered in the RBP risk assessments. Wake Island Airfield was mentioned on several occasions in the terrestrial risk assessment but information pertaining to Wake Island was not extensive. Additional information regarding these three facilities and their current biosecurity measures could not be obtained for usage during the strategic implementation development phase, thus these specific locations are not adequately covered by this plan.

5. The RBP terrestrial risk assessment extensively covers Guam, the BTS, and the possible role of USDA-APHIS for U.S. jurisdictions. While much of the information provided is of value, by focusing on these key elements the document minimizes the regional aspect of this effort, other critical IAS or potential IAS, and the roles of other agencies and offices especially in regards to non-U.S. jurisdictions where presumably USDA-APHIS as a U.S. agency cannot provide the same support which they suggest for Guam. While the RBP terrestrial risk assessment addresses BTS issues, it seems to inadequately address the need for surveillance, detection, and rapid response to other potentially invasive species, including ants, aphids, wood-borers, spiders, and microbiological pathogens to name just a few. Invaders from these (and other) taxon groups have enormous capacity to do harm, and little is being done currently to address the imminent threat and their coverage in the RBP terrestrial risk assessment is regrettably insufficient.

6. The RBP terrestrial risk assessment does not adequately cover the concept of stowaway or hitchhiker organisms. Stowaways are a very big concern and should be addressed equally with other invasive species pathways. It was anticipated that the RBP risk assessments would provide information on what each jurisdiction had in terms of established invasive species that others in the region did not. It was also anticipated that there would be some information on potential invasive species found in areas outside of the region (such as southeast Asia) that are linked to the region through shipping and other transportation routes. This information is essential for each jurisdiction in developing adequate and appropriate biosecurity measures. Much of this basic information was regrettably not identified within the RBP risk assessments and, therefore, should be developed in the near future to support and fine tune regional biosecurity efforts.

7. In 2012 the National Oceanic and Atmospheric Administration (NOAA) nominated 66 species of coral for listing under the Endangered Species Act. The proposed action of listing these species as endangered in the U.S. occurred after the RBP risk assessments were drafted and therefore is not covered by the risk assessments. Some coral species are potentially biofoulers. It is unclear if there is evidence of biofouling by any of the 66 nominated species, but presumably the possibility exists. It is unclear what if any impact the potential listing of these marine organisms could have in regards to biosecurity. Would a biofouled vessel arriving at a U.S. port need to be sampled to determine the species composition of the attached biofouling community? Or would it simply fall under recommended regulations which support zero biofouling and immediate remedial action could be taken, potentially including hull cleaning, if biofouling is detected. If sampling of the community would be required prior to treatment, determinations on how and where this would be accomplished are needed. Additionally, if an endangered species or even proposed species were detected, how would treatment of the hull proceed? Regular sampling of biofouling communities to determine species composition is currently not a feasible action within the region covered by this plan. Do any of these 66 nominated species have ranges that overlap with the region? If not, then presumably if they did arrive they could be treated as non-native organism and potentially an invasive species and, therefore, would most likely not be afforded ESA protection. But if the native range of one or more of these species does or is thought might overlap with any portion of the region, then again this situation should be further explored.

8. The original authors of the three sets of risk assessments also proposed recommendations regarding how to improve biosecurity within the region. Many of the recommendations listed within the risk assessments refer directly to Guam but could equally be applied to the other jurisdictions covered by the RBP. Most of the recommendations within the risk assessments are also covered in the implementation strategy recommendation tables, a single section within the implementation strategy that lists all recommendations so that the end user can readily locate them.

9. The assessment of invasive terrestrial plants is limited in scope while invasive plants are a major concern for the region. It would be helpful to have this work completed for the region. Minimally the region should work towards establishing a weeds risk assessment.

10. Arthropods are generally poorly covered in the risk assessments; even though arthropods are one of the largest groups of organisms know to have potential as IAS. This gap should be addressed.

11. The emergency response plans, actions, and capacities listed throughout the terrestrial risk assessment are very USDA-specific. It is doubtful USDA could or should be the lead entity responding in all cases. Additionally, many Micronesian nations may not have capacity or desire to be led under the auspices of USDA. This section of the plan is overly "mono-agency" specific and does not adequately address leadership and capacity beyond USDA programs.

12. No risk assessment was completed for marine algae. This should be addressed for the region.

13. Risk assessments placed disproportionate focus on Guam. For example, air transport is only considered in detail for aircraft arrivals to Guam. The remainder of the region is poorly addressed and follow up work should be conducted including keeping updated details on changes to plane arrivals and locations with direct linkages to the region.

14. Micro-organisms are not adequately covered in the risk assessments. This should be addressed for the region.

To fully explore the risk assessments, refer to Volume II (Executive Summary to the Risk Assessments and the Freshwater Systems Risk Assessment); Volume III (Marine Systems Risk Assessment); and Volume IV (Terrestrial Systems Risk Assessment)

10. Example Species of Concern

Lists of IAS of concern are interesting but can be counterproductive if they are perceived as complete – which in the RBP risk assessments they are not. Within the region it is recognized that one island's natives or established species might be another island's invasive species. All islands within the region have at least some species (exotic and native) not found on any other particular island or at least not all islands, and are therefore a proximal source for those species if a pathway or vector exists to move them. Species present on all islands are not necessarily a priority biosecurity issue, unless they pose a disease or health risk that is not present on all islands or if overall impacts from these species are extensively high.

The most devastating invasive ant species to establish to date in both Hawaii and Guam is the LFA. This species is established on the Big Island of Hawaii and several smaller populations are known to exist elsewhere within the state. Surveys for this species have not been completed on Guam but it seems likely that it is wide spread and well established. The LFA if unchecked has the potential to cause significant impacts native ecosystems as well as agricultural production.

The CRB is established in Palau and Guam. Eradication efforts on Guam have not been successful. In December 2013, this same species was detected at on Oahu with numerous individuals being found, including multiple life stages (suggesting it has been there for some time). .

The BTS has been established on Guam since at least the early 1950s. To date, no other populations of this species have been confirmed outside of its native range. However, the snake continues to be a major pest on Guam and it threatens the rest of the region.

Dengue virus, zika virus, chikungunya virus, and melioidosis (caused by a bacterium) have all been reported for Yap State in the last few years. These organisms are all non-native to the region and cause or may cause serious human health issues. Some of these organisms are found elsewhere within the region.

Kosrae has been battling a white fly (*Aleurocanthus spiniferus*) outbreak for more than a year now. The larvae of these flies are feeding on the food crops and forestry biomass of the state. In 2013 Kosrae also learned that coconut termites (*Neotermes rainbowi*) have established. These termites have infested coconut trees, which in turn will likely need to be destroyed if there is any hope of containing this pest species.

Attempts to list species of concern have met with limited success, the reason being that there are so many known species of concern. Perhaps, even more important is the understanding that what we don't know is likely or should likely be an even bigger concern. The potential for harmful species to arrive within the region from outside grows every year. Asia is probably the biggest growing influence on the region and regional knowledge of established species within Asian countries that pose a serious risk to Micronesia and/or Hawaii is limited. Some jurisdictions provided a list of species that they currently consider top level concerns and these can be found in the jurisdictional overviews. Trying to determine which IAS pose the biggest threat to a given location given incomplete knowledge is an interesting exercise. When such lists of worst IAS are produced, they should be treated as working lists and not conclusive.

11. Implementation Strategy

11-1. Challenges

For the region, biosecurity risks are high for both marine and terrestrial habitats and are less well defined, but still significant, for freshwater. Many vectors moving within or entering the region transit through the marine environment. Almost all vectors eventually end up on terrestrial habitats or unloaded into terrestrial habitats. Freshwater habitats are generally well protected from IAS due mainly to their limited existence within the region. On the other hand, the limited existence of freshwater habitats also makes them extremely vulnerable, and easily impacted by IAS if and when incursions into these systems do occur. While the likelihood of additional freshwater introductions are relatively low when compared to marine and terrestrial systems, any IAS introductions that do occur within the freshwater systems of the region are likely to have broader impacts on these systems than additional marine or terrestrial introductions would have. In reality, the impacts potentially caused by IAS incursions are in large part dependent on the organism(s) themselves and how these organisms react with the systems they are invading. It is difficult to predetermine exactly what impacts any introduced organism will have, but risk analysis can provide some insight. All systems are at risk and any introduced non-native organisms have the potential to become established, create viable populations, and cause impacts, therefore fitting the definition of an invasive species.

It has been clearly established both globally and within each jurisdiction of the region that some non-native organisms, if permitted to establish, will cause harm. Numerous harmful organisms are already known to be established within parts of the region. Specific examples of non-native organisms that are established within the region, that are causing harm, and that are likely to cause further serious impacts if their current distributions are permitted to expand include some of the same organisms that have

been exemplified time and again throughout the RBP such as the BTS, CRB, and LFA. These are stand out organisms due to the impacts they have already caused, but there are many non-native organisms already established within the region that are less well known and surely others not yet within the region that are relatively unknown but could cause serious damage if they were to become established. Appropriate biosecurity systems once in place can reduce the risk posed by established high risk threats within the region as well as relatively unknown threats from elsewhere.

Within the non-U.S. jurisdictions of the region, inspections are typically carried out by local agricultural quarantine officers. Inspections of cargo are made following reviews of bills of lading and of baggage, based on customs declarations or when there is reason to suspect smuggling (usually based on the inspector's judgment). All inspections are visual, as X-ray machines and other methods (such as trained dogs) are currently not available. As with Guam and CNMI, there is little to no capacity to do random inspections or to carry out investigations beyond entry points.

There are large gaps in the current biosecurity systems in place within the region. In some jurisdictions, these gaps go right to the core of the biosecurity system. One such gap is the almost complete lack of marine system biosecurity regulations and capacity, resulting in a minimal likelihood of intercepting marine risk organisms at ports of entry. This lack of marine system oversight is perhaps one of the most serious gaps identified since the region is composed of relatively small islands separated by large tracts of marine environment. Most materials and commodities arriving in the region arrive via ocean-going vectors. Resolving the current lack of attention to marine system biosecurity across the region should be a high priority for the region and each of the individual jurisdictions. Other gaps are further addressed below.

Another clear example of a major biosecurity gap for some jurisdictions is the lack of biosecurity legislation formulated specifically to address IAS. Where such legislation does exist, it is generally not comprehensive. The inability to collect sufficient revenue and to utilize this revenue to support biosecurity regulations needs to be addressed and in fact should be a high priority for all jurisdictions. Laws are needed to support regulations, regulations need to be improved across the board, and revenue streams to support biosecurity efforts need to be better developed.

Other major gaps that need to be addressed for most if not all jurisdictions include: improved outreach and education improvements enabling citizens and visitors to actively participate in supporting biosecurity efforts; enhanced regulations based on established biosecurity legislation (several of the jurisdictions currently have pending bills); better development, implementation, and enforcement of border quarantine/biosecurity elements; increased pre-border sanitation; and moving beyond the conceptual stages of post-border early detection and response capacity to having solidly developed response capacity including established funding mechanisms that permit truly rapid response to new incursions by appropriately trained responders directed by an incident commander.

11-2. Needs

All jurisdictions within the region have basic infrastructure and staffing needs that should be met in order to address current levels of vector arrivals, on the ground management of established IAS, response to new incursions, and restorative efforts once appropriate management levels (or eradications) have been achieved. Future increases in both vector arrivals and additional IAS becoming established will require more resources than currently exist within the region. With or without the proposed military build-up, the numbers of pathways and vectors both within the region and arriving to the region is likely to continue to increase. Various invasive species are already well established in each and every jurisdiction of the region. Without improved biosecurity, additional invasive species will likely become established and established species will likely expand their current distributions.

11-3. Recommendations

The core of the implementation strategy is the biosecurity recommendations. The recommendations are organized into tables by jurisdiction. The jurisdictional recommendation tables can be found in the following attachments:

- Chuuk State Biosecurity Recommendations, See Attachment C
- Kosrae State Biosecurity Recommendations, See Attachment D
- Pohnpei State Biosecurity Recommendations, See Attachment E
- Yap State Biosecurity Recommendations, See Attachment F
- Federated States of Micronesia National Biosecurity Recommendations, See Attachment G
- Republic of the Marshall Islands Biosecurity Recommendations, See Attachment H
- Republic of Palau Biosecurity Recommendations, See Attachment I
- Commonwealth of the Northern Mariana Islands Biosecurity Recommendations, See Attachment J
- State of Hawaii Biosecurity Recommendations, See Attachment K
- Territory of Guam Biosecurity Recommendations, See Attachment L
- United States Department of Defense Biosecurity Recommendations, See Attachment M
- United States Regional Biosecurity Recommendations, See Attachment N

Recommendations for each jurisdiction include a variety of action items, each with its own time line, lead, resources, and prioritization. Many of the recommendations fall into what could be termed topical areas, which vary from jurisdiction to jurisdiction depending on needs, although many of the same

topical areas or recommendations occur in more than one jurisdiction. Recommendations that are common to all jurisdictions include improvements to pre-border, border, and post-border biosecurity as well as improving the coordinating of outreach efforts.

Recommendations for each jurisdiction have been categorized as one of the following: support, coordination and collaboration, prevention, early detection and rapid response, management and eradication, awareness, research, policy, and restoration. Some recommendations could easily fit into more than one of these categories and where this is the case, an attempt has been made to place the recommendation under the most fitting category with the understanding that categories should not be viewed as exclusive. Not all categories have been used for every jurisdiction.

Action items in the recommendation tables have been ranked into one of three priority levels: high, medium, and low. All listed action items are potentially important, irrespective of prioritization. While the priority ranking should be considered when determining what action items to address and in what order, other considerations should also be taken into account, including what action items, regardless of priority ranking, are readily achievable; or for which items dedicated funding or other resources may be available, or potential could be established relatively quickly.

During the development of the jurisdictional recommendations common themes were identified:

1) Current biosecurity measures throughout the region have gaps at all levels including pre-border, border and post-border.

2) Pre-border sanitation policies are minimal at best and lacking in many cases.

3) Current biosecurity efforts are inadequate largely because of a lack of funding resulting in inadequate staff numbers, inadequate or lacking equipment, and insufficient training (See Attachment P for basic training considerations). There are exceptions; for example, current biosecurity efforts by DoD or funded by DoD within the region are perhaps the most up to date in terms of capacity.

4) Other biosecurity gaps include: lack of regulatory support, lack of linkages between trade policy and biosecurity elements, insufficient communication at all levels within jurisdictions and between jurisdictions in regards to biosecurity, and in some cases the inability of offices and agencies at different levels of government to fully support each other due to restrictive policies and operational standards.

5) Education and awareness efforts in regards to IAS, while existing throughout the region, have been insufficient in most cases and often focused only on specific species and/or activities. More comprehensive planning and follow through with IAS awareness in regards to educating, changing behavior, and engaging the public are absolutely essential for improving both jurisdictional and regional biosecurity. Again, there are exceptions and various well thought out and functional awareness components do exist, such as the Joint Region Marianas education program for construction workers and military workforce. Hawaii also has a variety of well thought out awareness efforts. Overall coordination of various educational efforts and tools could still be improved, especially at the jurisdictional and regional levels.

6) Early detection and rapid response capacity development has been insufficient, resulting in the lack of capacity or in a few cases the existence of a minimal capacity, which is often focused on specific organisms and not well developed as a true response capacity to IAS in general. This is true at both the jurisdictional and regional levels.

7) The military build-up is going to place an increased strain on some these already inadequate biosecurity measures.

8) Commerce, trade, and visitation are all likely to continue to increase throughout the region (regardless of the military build-up), again resulting in increased strain on existing biosecurity measures.

None of the Micronesia jurisdictions have the capacity to carry out thorough inspections of luggage or cargo in terms of trained personnel and equipment. Many lack equipment such as X-ray machines and computers that could make biosecurity enforcement more efficient and effective. None of the jurisdictions has adequate capacity to carry out investigations or effective enforcement beyond ports of entry. In some cases, this is due to discrepancies between import regulations and other laws, as in the case of Guam, where it is not illegal to possess certain species that are prohibited for import. U.S. domestic mail is not routinely inspected, providing a potentially important (but poorly documented) pathway for trade in non-native species between the continental U.S. and Hawaii, Guam, and CNMI.

Even for declared or permitted live imports, species-level identification; labels and any certification (of disease-free status or absence of associated organisms) are often missing or inadequate, making assessment and pre-screening difficult at best. Little to no screening of outgoing cargo occurs in the region (with the exception of the USDA BTS program on Guam). Anecdotal information, as well as established records from various agencies, indicates that smuggling of live species is occurring throughout the region, including terrestrial, estuarine, and marine organisms. There is currently little capacity to address this situation.

There is clearly a need for additional capacity at most if not all ports in the region in regards to quarantine/biosecurity staff, equipment, and facilities. While numbers of potential organisms and sources that threaten each jurisdiction can never be completely known, it is certain that the amount of goods and personnel moving into and within the region will continue to increase. It appears that the short term anticipated increases will strain the available capacity to inspect and control the flow of these organisms, especially given the current limitations.

There is a regional early detection and rapid response program specifically for BTS incursions, which could be extended to support detection and removal throughout the region of alien reptiles and amphibians and might serve as a model on which to fabricate a truly regional response capacity for IAS. The program is headed by the USGS and since 2002 has provided the region with response training, networking, and limited outreach capacity in regards to alien snakes and on a more limited basis IAS in general (Stanford and Rodda 2007). The program is based around incident command structure principles and utilizes key skilled individuals to lead response actions with a mix of both trained and untrained personnel (Stanford and Rodda 2007). Ultimately, each jurisdiction would need to develop its own early

detection and rapid response capabilities, but a regional office, at least in part based on this existing model, could assist with supporting/supplementing local response capacity as requested.

By and large, the jurisdictional recommendations have been vetted by local stakeholders via extensive consultations conducted both onsite and remotely. A list of jurisdictional consultancy trips is provided in Attachment Q. Draft recommendation tables for each jurisdiction were provided to stakeholders in each jurisdiction during January 2014. In most locations stakeholders held round table workshops to facilitate stakeholder review and comment on the draft recommendations, with these comments being returned to UOG and SPC to support improvement of the draft recommendations. In early May 2014, the draft implementation strategy (including the updated recommendation tables) was provided to registered attendees of a regional workshop scheduled to be held later in the same month. The regional workshop was held on Guam from 18-21 May of 2014 and was facilitated by SPC and UOG with the purpose of reviewing these recommendations . During this workshop the jurisdictions came together to review and comment on the biosecurity implementation strategy. Representatives from all jurisdictions as well as key stakeholder organizations and offices participated in the workshop. A list of workshop participants is provided in Attachment R.

Regional implementation of the biosecurity recommendations will be challenging as the recommendations are extensive and full implementation will require significant increases in funding and other resources to be made available for biosecurity activities. In this regard, it is important to note that the RBP does not create any right, obligation or legal responsibility on the part of any of the jurisdictions discussed herein to fund or execute the recommendations set forth in the plan. In addition, for many of the recommendations to be appropriately developed and implemented, supporting legislation will need to be developed and enacted. What is more, many of the recommendations are linked and can, therefore, best be addressed by first prioritizing recommendations for each jurisdiction and then building on initial successes to achieve additional improvements ultimately resulting in a holistic approach to biosecurity both within jurisdictions but also across the region. Prioritization needs to be carried out at the jurisdictional level by internal stakeholders. Prioritization suggestions are offered for many of the recommendations (where specifics were not previously provided by the jurisdictions). These suggestions as well as suggestions on lead offices, time lines, and resources should be fully reviewed internally and adjustments made as needed.

11-4. Strategies

Finalization of the implementation strategy does not imply a commitment to implement any or all of the recommendations within the plan, but rather it represents that all jurisdictions accept the plan as written and understand it is a tool to be used by each jurisdiction as they move forward with improvement to their respective biosecurity measures. Jurisdictions, if they so choose, may decide to officially endorse the plan and/or their recommendations. It is important to remember that the RBP should remain a living document and that jurisdictions can and should update their elements as needed, checking off completed actions, providing more specific information as possible, and developing recommendations to address new circumstances as they arise.

In regards to the implementation strategy, the overarching goal for the region and each individual jurisdiction is the same, improvement of biosecurity mechanisms leading to better protection from IAS. How this goal is to be achieved within the context of the jurisdictions varies specifically but in large part the needs are similar across the various jurisdictions.

The recommendation tables document specific recommendations for the region and for each jurisdiction. These recommendations and their associated action items are important and extensive. Perhaps a practical way to begin with enhancing regional biosecurity is to outline what could be considered the highest priority recommendations. Given the size and complexity of the region, developing a consensus on what should be the top priorities may be difficult, but it is essential to focus resources and capacity, as spreading efforts over many elements will reduce overall effectiveness. A list of critical elements that need to be addressed in much if not all of the region follows. This list includes items that need to happen, that are likely achievable (at least in part), and that once achieved would greatly enhance the region's biosecurity capacity.

1. All political jurisdictions in the region should have well developed biosecurity legislation. In turn, this legislation should support appropriate and comprehensive biosecurity regulations, policies, and guidelines. Once comprehensive regulations, policies, and guidelines are established, clear standard operating procedures (SOPs) for front line agencies/staffs need to be developed and implemented. All of these items should be clearly and concisely documented and made readily available for interested parties.

2. All jurisdictions should consider developing a cost recovery biosecurity system where users via fees and penalties fund the system, if not completely, then at least in large part (see information regarding cost recovery within the New Zealand biosecurity system model in Attachment O: Models). Jurisdictions need to be realistic in estimating how much revenue such systems can ultimately provide. As an example it has been suggested that for New Zealand, the cost-recovery system which is currently in place probably provides about 30 % of the total funding needs (Pers. Comm. P. Cowan 2014). Ultimately cost-recovery systems will need to be paired with other funding streams in order to insure adequate financial support for comprehensive biosecurity.

3. All jurisdictions need to ensure that biosecurity support and invasive species awareness via outreach and education programs are raised to a level where citizens and visitors are clearly aware of IAS issues, support biosecurity efforts, and willingly contribute to IAS management, control, and prevention activities. Without the support and engagement of the citizenry, biosecurity efforts will remain only partially effective. Once the citizenry is fully engaged and has a deep awareness of invasive species concerns including how invasive species affect them directly, then they and the various governing bodies will effectively support biosecurity. The lack of effective support is currently one of the biggest gaps the region faces in regards to improving biosecurity efforts.

4. Communication and cooperation at all levels needs to be significantly improved. The basic framework for a functional biosecurity effort, including appropriate communication, is established in some jurisdictions but not all. And in no jurisdiction does this framework currently function adequately. Minimally, each jurisdiction should have each of the following:

   A. An invasive species taskforce (or the equivalent: council, committee, working group, etc.);

   B. RISC representatives who provide a direct linkage between governance and the various IAS elements within each jurisdiction.

   C. A jurisdictional invasive species coordinator (or the equivalent) with the capacity and authority to support both coordination of biosecurity and invasive species efforts within the jurisdiction and to facilitate regional (and beyond) two way communication and support of biosecurity and invasive species issues. Ideally this position would work directly with the jurisdictional leadership, play a major role in the invasive species taskforce, and work closely with the RISC.

   Each element above should be endorsed and supported by the jurisdictional leadership. The second element above should be retained and reviewed with each change in jurisdictional leadership, to ensure its continued functionality.

   In addition to the elements above, the region as a whole should support, develop, create, fund, and utilize a regional invasive species coordination office to support regional and jurisdictional biosecurity and invasive species work. The concept is similar to that of a cooperative invasive species management area or CISMA but on a regional scale and with a central coordinating office. There are various potential ways to establish and support a regional invasive species coordination office, all of which provide specific benefits but each of which also presents specific hurdles. The specifics on how such an office would be established and operate will require consultation throughout the region to ensure that if developed, the office is truly a regional office that all of the jurisdictions support and benefit from.

   The Pacific currently has various groups that at least in part are working to address invasive species concerns, including the Secretariat of the Pacific Community (SPC) and the Secretariat of the Pacific Region Environmental Program (SPREP). Both of these groups have a Pacific wide mandate, it may be feasible for one or the other to establish a specific invasive species coordination office, which could support Micronesia and Hawaii. Additionally, there are other organizations working regionally that might also be able to host such an office, including The Nature Conservancy (TNC) and The Micronesia Conservation Trust (MCT). The U.S. via various agencies and offices, both civilian and military, might also be able to support such a regional office. For all of the examples above, another level of consideration would be whether to fund such an office fully as a long term endeavor, fund fully for a few years and then anticipate that the office would begin to function largely on grant support; fund, at least minimally, with support from all of the jurisdictions; or fund and support via some combination of the above

mentioned methods. Such an office could also conceivably be linked with the Micronesia Center for a Sustainable Future and/or one of the land grant institutions within the region.

On a broad scale, the office conceptually should be able to support the region as well as the jurisdictions of the region with biosecurity and IAS issues. The office should be able to work across the region and not be restricted to focusing on U.S. jurisdictions nor non-U.S. jurisdictions, but cover both adequately.

5. All jurisdictions currently have some type of biosecurity mechanism in place for terrestrial risks, although no jurisdiction has a fully comprehensive program. The region as a whole, has little biosecurity in place for aquatic risks. Each jurisdiction needs to determine how best to improve existing biosecurity elements and to ensure that biosecurity activities are adequately covering terrestrial, freshwater, and marine systems. Marine systems are by far the most lacking in regards to current biosecurity efforts regionally. Since the region is encompassed by marine ecosystems most of the region's resources are marine system based and most vectors and pathways are marine system based. Therefore, it seems reasonable that marine systems should have a higher level of biosecurity attention than is currently the case. Each jurisdiction needs to determine how to address this anomaly where the conceivably most important system is receiving the lowest level of protection in regards to biosecurity. Initial steps that should be taken are to insure that legislation adequately covers biosecurity for marine systems, ensure that front line agencies/offices are provided with the training, infrastructure, resources, and capacity to conduct marine biosecurity inspections and management actions, and implement and enforce marine system biosecurity elements such as ballast water discharge, ballast water treatment, and hull cleanliness standards.

For each jurisdiction, it is clear that there are pressing biosecurity system gaps. Addressing these gaps should be a major focus. For example, all jurisdictions have existing regulations that address elements of biosecurity but none are fully adequate. Specific issues include:

1. Guam has a biosecurity law and, therefore, should be considered a model for the other jurisdictions, but it has yet to fully implement this law, as the funding mechanism described in that legislation is still being debated. Guam is currently exploring options regarding how to move forward with the law's implementation.

2. The Republic of Palau, the Republic of the Marshall Islands, and the Federated States of Micronesia each have pending biosecurity legislation and each country needs to review, debate, and final determination of these bills a high priority with decisions forthcoming on whether or not the pending bills can be supported or if these countries need to go back and develop new biosecurity bills.

3. Hawaii has reasonably comprehensive biosecurity regulations, but needs to increase support for aquatic biosecurity capacity.

4. The CNMI has no specific biosecurity legislation and should as a first step hold jurisdiction wide consultations to determine if such legislation is needed and if needed, begin the process of bill development with the expectation of having a biosecurity law in place within the next 2-3 years. As part of the consideration on biosecurity legislation, the CNMI should also consider establishing a government endorsed invasive species taskforce. The taskforce could be extremely helpful in the consultation process and, if warranted, with drafting the biosecurity legislation.

Looking at the bigger picture and moving forward with developing mechanisms to address the top recommendations will not only enhance the region's capacity but will also effectively support buy-in from local and regional as well as international partners. This will in turn support funding and regional cohesion, ultimately further advancing biosecurity efforts.

All jurisdictions in the region should develop and implement a mixed model approach to biosecurity, focusing on pre-arrival sanitation with high levels of inspection for all vectors from all pathways on arrival at dedicated entry locations. While the focus should be on these elements, specific policies should also be put in place to address concerns from high priority threats, such as those posed by the potential by BTS and CRB incursions. As part of the planning and development to address high level threats, policies and procedures should be established that while addressing the high level threat also improve overall biosecurity protection from all non-native taxa, i.e., focusing on specific threats should in theory assist with overall protection, not just protection from the specific threats.

Pre-border sanitation, as noted previously, is generally lacking within the region but has the potential to provide the best return per resources engaged. The fact that pre-border sanitation is minimal or lacking for the region, is due in large part to how biosecurity systems have evolved, which typically involved end users trying to reduce the impacts associated with arriving or established pests. While these efforts are worthy of attention, increasing efforts with pre-border sanitation could stop many potential pest species from entering the transportation chain, in effect stopping these species from being transported and potentially establishing. Reductions in pest arrivals and introductions would ultimately be the best way to protect end points from the impacts of invasive species as well as requiring lower levels of resources to intercept pests on arrival and to establish and support management and eradication programs. Greater focus on stopping the transport of unwanted organisms via pre-border sanitation efforts is needed throughout the region.

To improve pre-border sanitation will require expanding the traditional biosecurity role to include working with trade partners (both private and governmental) to develop appropriate sanitation mechanisms such as biosecure staging areas, pre-departure inspection and certification, awareness training for shippers, forwarders, and others working at departure ports and freight consolidation areas, and possibly focusing on specific businesses or practices when required. A developing model of potential effective pre-border sanitation that should be considered is the on-going efforts by DoD on Guam to utilize Hazard Analysis and Critical Control Point (HACCP) planning to reduce the potential of invasive species arriving on Guam with materials, equipment, and personnel. The United States Fish and

Wildlife Service (USFWS) has provided support and training for DoD, civilian agencies, and contractors in regards to utilizing HACCP as a strategic tools to reduce pest arrivals. Jurisdictions and agencies throughout the region should consider utilizing the HACCP process to improve overall biosecurity.

Some recommendations are easily recognizable as high priority items that need to be addressed early on in the biosecurity development process. A clear example of one such recommendation is improved buy-in from citizens as well as other elements of society, including the military, with supporting biosecurity and IAS work. This can best be achieved through a variety of outreach and educational activities, some of which are already either running or being planned but others still need to be developed and implemented (See Attachment O for examples of recent IAS awareness videos). Awareness and buy-in by both local communities and governance is essential to developing appropriate biosecurity for the region. Achieving sufficient levels of awareness should be considered a long term commitment as it will not be achieved overnight or even in a few years. One element that would support long term invasive species and biosecurity awareness is to formalize it as a standardized part of the educational systems throughout the region. Awareness efforts need to be highly coordinated (both within jurisdictions but also throughout the region), broad based, well supported, and improved and expanded over time. By developing such awareness efforts citizens, visitors, businesses, foreign workers, military and all elements of society can be engaged in supporting biosecurity systems through an understanding of IAS, their potential impacts, and the need for biosecurity programs to reduce the risk associated with IAS.

Improving awareness and buy-in will take time and efforts to engage the public and the military should already be underway. Other efforts to improve biosecurity need to move forward concurrently. Outreach to improve buy-in is essential and while efforts for this are being improved and expanded, jurisdictions will also need to determine what other recommendations they can move forward with.

Awareness of IAS and biosecurity within all levels of society, including the military, must be improved. Various groups are currently working within the region to improve environmental awareness. One such program is facilitated by RARE, an NGO which supports localized capacity building in various locations around the globe, including the Pacific Region. The RARE program perhaps should be considered as a model for awareness campaigns. This model utilizes social marketing techniques to change knowledge, attitudes and behaviors in specified target audiences. Building pride for the uniqueness of local natural resources is the foundation and motivation for change, adoption and maintenance of stakeholder support for conservation projects. RARE campaigns are discussed in more detail in the models attachment (Attachment O).

11-5. Costs

Funding and other resources to support biosecurity development, improvements, and maintenance should be supplied from a mixed model approach that relies on cost recovery for services provided, penalty assessment and collection for infractions to established laws, regional collaboration, and the interjection of funds and other resources from external sources. While biosecurity systems should

depend on a variety of funding streams, each jurisdiction should be looking to maximize funding self-sufficiency by engaging full participation by the citizenry and by instituting biosecurity cost-recovery systems.

Primarily all jurisdictions should be operating a cost recovery system where biosecurity fees and penalties are appropriately assessed, instituted, and enforced across the board (and ideally are harmonized as much as is feasible throughout the region to reduce the potential for competition between jurisdictions in regards to user fees). Funds collected via fees and penalties in regards to biosecurity should go directly into government sanctioned revolving funds that are explicitly set up to support biosecurity agencies and activities.

In addition to establishing cost recovery biosecurity systems in all jurisdictions, it is understood that support from external funding sources will continue to be needed and engagement of external donors to support biosecurity must be improved. Funding from external sources should be used to better develop capacities through items such as training and resource development including facilities, fleets, and workspace tools. Each jurisdiction (perhaps working together regionally) should develop long term planning for the acquisition and use of external funds. There are numerous and varied funding and support opportunities available for IAS efforts including donor country aid funds, international programs, NGOs, regional programs, agencies, offices, council, and committees. A short list of possible support sources follows:

- The U.S. Agency for International Development (US AID): http://www.usaid.gov
- The Australian Agency for International Development (AusAID): http://aid.dfat.gov.au/Pages/home.aspx
- The United Nations Development Programme - Global Environmental Facility (UNDP-GEF): http://web.undp.org/gef/
- Birdlife International: http://www.birdlife.org/
- Conservation International: http://www.conservation.org/Pages/default.aspx
- Island Conservation: http://www.islandconservation.org/
- SPC: http://www.spc.int/
- SPREP: http://www.sprep.org/
- USDA: http://www.usda.gov/. The USDA has a helpful website for managers looking for funding to support invasive species work: http://www.invasivespeciesinfo.gov/toolkit/grants.shtml
- USFWS: http://www.fws.gov/; The USFWS also has webpages to assist with granting opportunities: http://www.fws.gov/grants/

- The U.S. Department of Health and Human Services also has a helpful website listing current grants within the U.S. Federal Government: http://www.grants.gov/web/grants/home.html

Government buy-in and support will be essential to insuring long term funding. Clearly demonstrating the cost-benefits of improved biosecurity utilizing local, regional, and broader scale examples should be a basic concept that all jurisdictions promote. Improving biosecurity systems is going to require funding. Demonstrating how improved biosecurity can lead to overall cost savings and quality of life improvements utilizing real world examples should become a standard practice. Improved biosecurity versus steady-state or even reductions in current capacity is essential. Support should be sought from governance, local communities and cultural leadership.

11-6. Conclusions

For the RBP to be successfully implemented at its fullest level, each jurisdiction needs to have the capacity to track and manifest passengers and cargo and have an adequate number of professionally trained personnel capable of inspecting cargo, passengers and associated baggage, and vectors at all ports of entry (both internal and external). Legislation and regulations must be in place and enforceable to ensure pre-border, border, and post-border actions biosecurity actions are carried out and enforced. Cost recovery systems must be instituted and managed to help ensure that biosecurity programs are appropriately funding and can expand if the need for services increases. Animal & Plant Health Inspection Service/Plant Protection & Quarantine (APHIS/PPQ) and Customers & Border Protection (CBP) models offer good examples of training and organizational structure. It is highly recommended for all partners in the RBP to receive training using the Hawaii, APHIS/PPQ, CBP programs, or similar programs in New Zealand or Australia.

Suitable inspection facilities must be in place and equipped with the required technical tools and trained staff to identify suspected invasive plants, animals, diseases, and micro-organisms posing threats to terrestrial, freshwater, and marine systems. Access to taxonomic expertise and knowledge of and ability to quickly implement items such as response procedures are also essential. Equipment to look inside cargo containers, to inspect the hulls of watercraft, to identify pests, to implement treatments, etc. are needed and once obtained must be maintained and replaced as needed. Examples include fork lifts, microscopes, sniffing dogs, fumigation equipment, etc. Such facilities should be constructed in a manner that if an invasive pest is found in cargo, the cargo can be quarantined and species appropriate corrective actions implemented (e.g. fumigation) at the shipper's expense. Otherwise, the cargo should be immediately resealed and returned to the ship from which it was off-loaded and the reason for rejection noted electronically along with all pertinent container information. Suspect cargo should be quarantined until it can be properly inspected. Cargo confirmed to contain invasive species should remain quarantined and either be returned to sender or species appropriate corrective actions implemented (e.g. fumigation) with 24 hours of confirmed pest identification.

Biosecurity systems, no matter how advanced, no matter how well funded, no matter how well implemented are never going to stop 100% of all incursions. But a good system that is supported with

ample resources is likely going to prevent most incursions and hence reduce the potential damage that would have been caused if most incursions were not prevented. There are no biosecurity models that function perfectly; they all have troublesome elements, but the system utilized in New Zealand appears to work relatively well. But, what works in one location may or may not be transferrable to another location, and even if transferrable, implementation does not always equate with success. The jurisdictions of Micronesia and Hawaii should review various biosecurity models and through internal consultations determine the best pathway forward in regards to improving their own overall biosecurity strategies.

Whatever initial improvements are made and whatever systems ultimately are developed, detailed monitoring, data collection, and data analysis should become a standard part of all biosecurity systems. These and other elements (such as surveys) should be utilized as feedback mechanisms providing input and details back into the system highlighting what elements of these systems are functional and which continue to need improvement. This information will in turn permit more focused direction and better use of limited resources to address any remaining gaps.

As recommendations are fully implemented, inclusive of feedback follow through, each jurisdiction will have a fully functional biosecurity system, the region will have coordinated biosecurity, and ultimately Micronesia and Hawaii will be better protected from invasive species. The region's commitment towards developing the RBP has made the region a global leader in biosecurity and through its implementation will insure that the region is protected and continues to serve as a model for other areas within the Pacific as well as globally in regards to island biosecurity.

12. Concluding Remarks

For the islands of Micronesia and Hawaii, a stable and sustainable economy is dependent upon a healthy natural resource base. Efforts to enhance food security, develop opportunities for economic prosperity and protect cultures, natural environments and biodiversity are increasingly and fundamentally impacted by a wide range of invasive plants, animals and disease organisms. IAS threaten the way of life for many Pacific islanders. IAS degrade oceans, destroy crops, smother reefs and forests, and kill unique endemic species. IAS impact traditional practices and cultures, as well as, the health of Pacific islanders. Aside from climate change, IAS are the single greatest long-term threat to Pacific Island economies, environments, cultures, people and sustainable livelihoods. IAS undermine ecosystem resilience and the ability to adapt to climate change and develop sustainably.

At the same time, Pacific islands offer some of the greatest opportunities for the successful prevention, eradication, and control of IAS due to their relatively small size, limited number of ports of entry, and isolation from the continental sources of most known IAS. Furthermore, the region is a global leader in IAS expertise and has years of successful collaborative efforts and prevention, eradication and control experience.

It is with this knowledge in mind that the region has enthusiastically joined with partners in the United States Government, the Secretariat of the Pacific Community, Landcare Research and many other Pacific and international biosecurity experts to develop this Regional Biosecurity Plan for Micronesia and Hawaii. This comprehensive plan provides an unprecedented blueprint for effective prevention, management, and control of invasive species within and into the region.

13. Citations

Anon. 2003. The biosecurity strategy for New Zealand. Wellington, Biosecurity Council. www.maf.govt.nz/biosecurity-strategy.

Arthur, J.R., M.B. Reantaso, and M. Izumi. 2012. Pacific Island Countries and Territories (PICTs) Regional Aquatic Animal Health Capacity and Performance Survey: Summary of Survey Results and Analysis. DRAFT-03- In prep.

Baker, H.G. 1986. Patterns of plant invasion in North America. Pages 44-57 in H.A. Mooney and J.A. Drake, editors. Ecology of Biological Invasions of North America and Hawaii. Springer-Verlag. New York.

Barry, S.C., K.R. Hayes, C.L. Hewitt, H.L. Behrens, E. Dragsund, and S.M. Bakke. 2008. Ballast water risk assessment: principles, processes, and methods. ICES Journal of Marine Science, 65(2), 121.

Borror, D.J., C.A. Triplehorn, and N.F. Johnson. 1989. An Introduction to the Study of Insects, 6th ed. Fort Worth, TX: Saunders College Publ.

Bright, C. 1998. Invasive species: pathogens of globalization. Foreign Policy (116): 50-60, 62-64.

Campbell, M.L. and C.L. Hewitt. 2008. Introduced marine species risk assessment – aquaculture. In M.G. Bondad-Reantaso, J.R. Arthur and R.P. Subasinghe (eds). Understanding and applying risk analysis in aquaculture. FAO Fisheries and Aquaculture Technical Paper. No. 519. Rome, FAO. pp. 121–133.

Campbell, M.L., and C.L. Hewitt. 2011. Assessing the port to port risk of vessel movements vectoring non-indigenous marine species within and across domestic Australian borders. Biofouling 27(6): 631–644.

Carlton, J.T. 2001. Introduced species in coastal waters: Environmental impacts and management priorities. Pew Oceans Commission, Arlington VA.

Carson, H.L. 1998. Evolution, pp. 107-110. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Charles, H., and J.S. Dukes. 2007. Impacts of invasive species on ecosystem services. Pages 217-237 *in* W. Nentwig, editor. Biological Invasions. Springer, Berlin.

CI-MCBC (Conservation International--Melanesia Center for Biodiversity Conservation). 2007. Ecosystem profile: Polynesia-Micronesia biodiversity hotspot. Critical Ecosystem Partnership Fund, 128 pp.

Claudi, R. 2002. Environmental and Economic Costs of Alien Invasive Species in Canada. Picton, ON: RNT Consulting Inc.

Clavero, M. and E. García-Berthou. 2005. Invasive species are a leading cause of animal extinctions. Trends in Ecology and Evolution 20:110.

CPA. 2007a. Commonwealth Ports Authority. Saipan International Airport. Retrieved April 23, 2010 from http://www.cpa.gov.mp/spnapt.asp

CPA. 2007b. Commonwealth Ports Authority. Saipan International Airport. Retrieved April 23, 2010 from http://www.cpa.gov.mp/spnapt.asp

Crombie, R.I., and G.K. Pregill. 1999. A checklist of the herpetofauna of the Palau Islands (Republic of Belau), Oceania. Herpetological Monographs 13:29-80.

Cronk, Q.C.B. and J.L. Fuller. 1995. Plant Invaders: The Threat to Natural Systems. London: Chapman & Hall.

Crooks, J.A. 2002. Characterizing ecosystem-level consequences of biological invasions: the role of ecosystem engineers. Oikos 97(2): 153-166.

Deposa, M. 2010. Saipan Tribune. Only eight airlines using CNMI airport runways. Retrieved July 27, 2010 from http://www.saipantribune.com/newsstory.aspx?newsID=97672

Didham, R.K., J.M. Tylianakis, M.A. Hutchison, R.M. Ewers, and N.J. Gemmell. 2005. Are invasive species the drivers of ecological change? Trends in Ecology & Evolution 20:470-474.

DoD. 1992. Quarantine regulations of the Armed Forces. Department of Defense. Departments of the Army, the Air Force, and the Navy. AR 40–12/SECNAVINST 6210.2A/AFR 161–4.

DON. 2010. Final Environmental Impact Statement: Guam and the CNMI Military Relocation. July 2010.

Ehrlich, P.R. 1986. Which animals will invade?, Pages 79-95 *in* H. A. Mooney and J. A. Drake (ed.), Ecology of biological invasions in North America and Hawaii. Springer-Verlag, New York, NY.

Eldredge, L.G. 2006. Numbers of Hawaiian species for 2003-2005. Bishop Museum Occasional Papers (88): 62-79.

Federal Register Volume 72 No 44, March 7, 2007

Finnoff, D., J.F. Shogren, L. Brian, and D. Lodge. 2005. The importance of bioeconomic feedback in invasive species management. Ecological Economics 52:367-381.

Fritts, T.H. and G.H. Rodda. 1998. The role of introduced species in the degradation of island ecosystems: a case history of Guam. Annual Review of Ecology and Systematics 29:113-140.

FSM-NBSAP. 2002. Federated States of Micronesia- National Biodiversity Strategic Action Plan. 67 pp.

Fuller, P. 2003. Freshwater aquatic vertebrate introductions in the United States: patterns and pathways, p. 518 *in* G. M. Ruiz and J. T. Carlton (ed.), Invasive species: vectors and management strategies. Island Press, Washington, D.C.

Giambelluca, T.W. and T.A. Schroeder. 1998. Climate, pp. 49-59. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Gillespie, R.G. and G.K. Roderick. 2002. Arthropods on islands: colonization, speciation, and conservation. Annual Review of Entomology 47: 595-632

Gingerich, S.B. 2002. Geohydrology and numerical simulation of alternative pumping distributions and the effects of drought on the ground-water flow system of Tinian, Commonwealth of the Northern Mariana Islands: Water-Resources Investigations Report 02-4077, 46 p.

Gingerich, S.B. 2003. Hydrologic Resources of Guam: U.S. Geological Survey Water-Resources Investigations Report 03-4126, 2 Plates.

Glanznig, A. 2003. Weeds and pests: eradicating the invasive threat. Position Paper No. 03/01. Sydney: WWF Australia.

Guam BSP. 2009. Guam Bureau of Statistics and Plans. Reports. Retrieved September 28, 2009 from http://bsp.guam.gov/index.php?option=com_search&searchword=stati

Hamlin and Takasaki. 1996. Water-quality reconnaissance of ground water in the inhabited outer islands of Chuuk State, Federated States of Micronesia: USGS water resources investigations report 96-4180.

Harley, C.D.G., A.R. Hughes, K.M. Hultgren, B.G. Miner, C.J.B. Sorte, C.S. Thornber, L.F. Rodriguez, L. Tomanek, and S.L. Williams. 2006. The impacts of climate change in coastal marine systems. Ecol Lett 9: 228-241.

Hayes, K.R. and C.L. Hewitt. 1998. Risk assessment framework for ballast water introductions. CRIMP Technical Report No. 14, CSIRO Division of Marine Research Hobart, Australia.

HDBEDT. 2007. "State of Hawaii Facts & Figures." Honolulu: Hawaii Department of Business, Economic Development & Tourism. Retrieved March 2007, from http://www.hawaii.gov/dbedt/info/economic/library/facts/state

Hein, J.R., B.R. McIntyre, and D.Z. Piper. 2005, Marine mineral resources of Pacific Islands—A review of the Exclusive Economic Zones of islands of U.S. affiliation, excluding the state of Hawaii: U.S. Geological Survey, Circular 1286, 62 pp.

Helfman, G.S. 2007. Fish conservation: a guide to understanding and restoring global aquatic biodiversity and fishery resources. Island Press, Washington, D.C.

Hellmann, J.J., J.E. Byers, B.G. Bierwagen, and J.S. Dukes. 2008. Five Potential Consequences of Climate Change for Invasive Species. Conservation Biology, 22: 534–543.

Henderson, W. and M. Bomford. 2011. Detecting and preventing new incursions of exotic animals in Australia. Invasive Animals Cooperative Research Centre, Canberra.

Hewitt, C.L., M.L. Campbell, and G. Gollasch. 2006. Alien species in aquaculture. Considerations for responsible use. Gland, IUCN, 32 pp.

Howarth, F.G., S.L. Montgomery, and W.P. Mull. 1998. Insects and their kin, pp. 140-143. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Huber, D.M., M.E. Hugh-Jones, M.K. Rust, S.R. Sheffield, D. Simberloff, and C.R. Taylor. 2002. Invasive pest species: impacts on agricultural production, natural resources, and the environment. CAST Issue Paper (20): 1-18.

Huenneke, L.F. 1997. Outlook for plant invasions: interactions with other agents of global change, pp. 95-103. *In* J.O. Luken and J.W. Thieret (eds.). Assessment and Management of Plant Invasions. New York: Springer-Verlag.

Hulme, M. 2012. Recent climate change in the world's drylands. Geophysical Research Letters 23:61-64.

Hulme, P. E., S. Bacher, M. Kenis, S. Klotz, I. Kühn, D. Minchin, W. Nentwig, S. Olenin, V. Panov, J. Pergl, P. Pysek, A. Roques, D. Sol, W. Solarz, and M. Vilà. 2008. Grasping at the routes of biological invasions: a framework for integrating pathways into policy. Journal of Applied Ecology 45:403-414.

Ikuma, E.K., D. Sugano and J.K. Mardfin. 2002. Filling the gaps in the fight against invasive species. Honolulu, HI: Legislative Reference Bureau Report No. 1, 2002.

Joint Guam Program Office. 2010. Record of decision for Guam and the CNMI military relocation. http://www.guambuildupeis.us/documents/record_of_decision/Guam_Record_Of_Decision_FINAL.pdf

Joint Guam Program Office. 2014. Draft Supplemental Environmental Impact Statement: Guam and Commonwealth of the Northern Mariana Islands Military Relocation. http://www.guambuildupeis.us/draft-documents

Juvik, J.O. 1998. Biogeography, pp. 103-106. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Juvik S. & J. Juvik. 1998. *Atlas of Hawaii, 3rd Edition*. University of Hawaii Press.

Kraus, F. 2003. Invasion pathways for terrestrial vertebrates. Pages 68-92 in G. M. Ruiz and J. T. Carlton, editors. Invasive species: Vectors and management strategies. Island Press. Washington, D.C.

Kelly, J.L. 1998a. Agriculture, pp. 246-251. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Lander, M.A. and S. Khosrowpanah. 2004. Rainfall Climatology for Pohnpei Island, Federal State of Micronesia. *WERI Technical Report* No. 100: 58 pp.

Levine, J.M., M. Vilà, C.M. D'Antonio, J.S. Dukes, K. Grigulis, and S. Lavorel. 2003. Mechanisms underlying the impacts of exotic plant invasions. Proceedings of the Royal Society of London B 270: 775-781.

Lockwood, J.L. and M.L. McKinney, editors. 2001. Biotic homogenization: the loss of diversity through invasion and extinction. Springer, New York, N.Y.

Loope, L.L. 1998. Hawaii and the Pacific islands, pp. 747-774. *In* M.J. Mac, P.A. Opler, C.E. Puckett Haecker, and P.D. Doran (eds.). Status and Trends of the Nation's Biological Resources. Vol. 2. Reston, VA: U.S. Department of the Interior, U.S. Geological Survey.

Loope, L.L. and D. Mueller-Dombois. 1989. Characteristics of invaded islands, with special reference to Hawaii, Pages 257-280 *in* J. A. Drake and H. A. Mooney (ed.), Biological invasions: a global perspective. John Wiley & Sons, Chichester, NY.

Lovell, S.J. and S.F. Stone. 2005. The economic impacts of aquatic invasive species: a review of the literature. National Center for Environmental Economics Working Paper 05-02:1-64.

Mack, R.N., D. Simberloff, W.M. Lonsdale, H. Evans, M. Clout, and F. Bazzaz. 2000. Biotic invasions: Causes, epidemiology, global consequences and control. Ecological Applications 10:689-710.

Mack, M.C. and C.M. D'Antonio. 1998. Impacts of biological invasions on disturbance regimes. Trends in Ecology & Evolution 13(5): 195-198.

Mack, R.N., and W.M. Lonsdale. 2001. Humans as global plant dispersers: Getting more than we bargained for. Bioscience 51(2):95-102.

Maciolek, J.A. 1984. Exotic fishes in Hawaii and other islands of Oceania. Pages 131-161 in W.R. Courtenay and J.R. Stauffer, eds. Distribution, biology, and management of exotic fishes. Johns Hopkins University Press, Baltimore and London.

Magnacca, K.N. and B.N. Danforth. 2006. Evolution and biogeography of native Hawaiian *Hylaeus* bees (Hymenoptera: Colletidae). Cladistics 22(5): 393-411.

McKinney, M.L. and J.L. Lockwood. 1999. Biotic homogenization: a few winners replacing many losers in the next mass extinction. Trends in Ecology and Evolution 14:450-453.

McNeely, J.A., H.A. Mooney, L.E. Neville, P. Schei, and J.K.Waage (eds.) 2001. A Global Strategy on Invasive Alien Species. IUCN Gland, Switzerland, and Cambridge, UK. x + 50 pp.

McNeely, J.A. 2006. As the world gets smaller, the chances of invasion grow. Euphytica 148(1/2): 5-15.

Messing, R.H. and M.G. Wright. 2006. Biological control of invasive species: solution or pollution? 4(3): 132-140. Frontiers in Ecology and the Environment 4(3):132-140.

Michener, C.D. 2007. The Bees of the World, 2nd ed. Baltimore, MD: Johns Hopkins University Press.

Millennium Ecosystem Assessment. 2005. Ecosystems and human wellbeing: Synthesis. Island Press, Washington D.C.

Monaco, T.J., S.C. Weller, and F.M. Ashton. 2002. Weed Science: Principles and Practices, 4th ed. New York: John Wiley & Sons.

Mooney, H.A. 2005. Invasive alien species: the nature of the problem, pp. 1-15. *In* H.A. Mooney, R.N. Mack, J.A. McNeely, L.E. Neville, P.J. Schei, and J.K. Waage (eds.). Invasive Species: A New Synthesis (SCOPE 63). Washington, D.C.: Island Press.

Mooney, H.A. and E.E. Cleland. 2001. The evolutionary impact of invasive species. Proceedings of the National Academy of Sciences 98(10): 5446-5451.

Mooney, H.A. and J.A. Drake. 1989. Biological invasions: a SCOPE program overview, pp. 491-506. *In* J.A. Drake, H.A. Mooney, F. di Castri, R.H. Groves, F.J. Kruger, M. Rejmánek, and M. Williamson (eds.). Biological Invasions: A Global Perspective (SCOPE 37). Chichester, U.K.: John Wiley & Sons.

Mullin, B.H., L.W.J. Anderson, J.M. DiTomaso, R.E. Eplee, and K.D. Getsinger. 2000. Invasive plant species. CAST Issue Paper (13): 1-18.

Naylor, R.L., S.L. Williams, and D.R. Strong. 2001. Aquaculture—a gateway for exotic species. Science 294: 1655-1656.

NISC (National Invasive Species Council). 2001. Meeting the invasive species challenge: national invasive species management plan. National Invasive Species Council, Washington D.C. *http://www.invasivespeciesinfo.gov/docs/council/mpfinal.pdf*

NRC (National Research Council). 2000. Incorporating science, economics, and sociology in developing sanitary and phytosanitary standards in international trade: proceedings of a conference. National Academy Press, Washington D.C., 290 p.

Olckers, T. 1999. Introduction, pp. 1-2. *In* T. Olckers and M.P. Hill (eds.). Biological Control of Weeds in South Africa (1990-1998) (African Entomology Memoir No. 1). Entomological Society of Southern Africa.

Olden, J.D., L.N. Poff, M.R. Douglas, M.E. Douglas, and K.D. Fausch. 2004. Ecological and evolutionary consequences of biotic homogenization. Trends in Ecology and Evolution 19:18-24.

Olden, J.D. and L.N. Poff. 2004. Ecological processes driving biotic homogenization: testing a mechanistic model using fish faunas. Ecology 85:1867-1875.

Office of Technology Assessment. 1993. Harmful Non-Indigenous Species in the United States (U.S. Congress Office of Technology Assessment OTA-F-565). Washington D.C.: U.S. Government Printing Office.

Palau National Invasive Species Committee. 2007. Operation Counter Invasion. Summary Report, 7 pp.

Parham, J.E., G.R. Higashi, E.K. Lapp, D.G. K. Kuamo'o, R.T. Nishimoto, S. Hau, J.M. Fitzsimons, D.A. Polhemus, and W.S. Devick. 2008. Atlas of Hawaiian Watersheds & Their Aquatic Resources, Island of Hawaii, Bishop Museum & Division of Aquatic Resources. 1262 p. (3 volumes).

Paulay, G. 1994. Biodiversity on oceanic islands: its origin and extinction. American Zoologist 34:134-144.

Peck, S.B., P. Wigfull, and G. Nishida. 1999. Physical correlates of insular species diversity: the insects of the Hawaiian Islands. Annals of the Entomological Society of America 92(4): 529-536.

Pheloung, P. C. 2003. An Australian perspective on the management of pathways for invasive species, Pages 249-269 *in* G. M. Ruiz and J. T. Carlton (ed.), Invasive species: vectors and management strategies. Island Press, Washington D.C.

Pacific Invasives Initiative. 2010. Invasive Species Management in the Pacific: a review of national plans and current activities. Unpublished report for the Pacific Invasives Partnership. Prepared by Natasha Doherty and Souad Boudjelas. Pacific Invasives Initiative, Auckland, New Zealand. 26pp.

Pimentel, D., L. Lach, R. Zuniga, and D. Morrison. 2000. Environmental and economic costs of nonindigenous species in the United States. BioScience 50:53-65.

Pimentel, D., S. McNair, J. Janecka, J. Wightman, C. Simmonds, C. O'Connell, E. Wong, L. Russel, J. Zern, T. Aquino, and T. Tsomondo. 2001. Economic and environmental threats of alien plant, animal, and microbe invasions. Agriculture, Ecosystems & Environment 84(1):1-20.

Pimentel, D., R. Zuniga, and D. Morrison. 2005. Update on the environmental and economic costs associated with alien---invasive species in the United States. Ecological Economics 52(3): 273-288.

POI. 2010. POI Aviation Services. Retrieved July 27, 2010 from http://www.poiaviation.com/

Price J.P. 2004. Floristic biogeography of the Hawaiian Islands: influences of area, environment and paleogeography. J. Biogeogr. 31, 487–500.

Rahel, F.J. 2002. Homogenization of freshwater faunas. Annual Review of Ecology and Systematics 33:291-315.

Reichard, S.H., and P. White. 2001. Horticulture as a pathway of invasive plant introductions in the United States. Bioscience 51(2):103-113.

Richardson, D.M., P. Pyšek, M. Rejmánek, M.G. Barbour, F.D. Panetta, and C.J. West. 2000. Naturalization and invasion of alien plants: concepts and definitions. Diversity and Distributions 6(2): 93-107.

Rockwell, H.W. Jr. 2003. Summary of a survey of the literature on the economic impact of aquatic weeds. The Economic Impact of Aquatic Weeds. Aquatic Ecosystem Restoration Foundation.

Rodda, G.H., T.H. Fritts, and D. Chiszar. 1997. The disappearance of Guam's wildlife. BioScience 47:565-574.

Rooney, T.P., J.D. Olden, M.K. Leach, and D.A. Rogers. 2007. Biotic homogenization and conservation prioritization. Biological Conservation 134:447-450.

Rosenzweig, M.L. 2001. Loss of speciation rate will impoverish future diversity. Proceedings of the National Academy of Sciences of the United States of America 98: 5404-5410.

Ruiz, G.M., P.W. Fofonoff, J.T. Carlton, M.J. Wonham, and A.H. Hines. 2000. Invasion of coastal marine communities in North America: Apparent patterns, processes, and biases. Annual Review of Ecology and Systematics 31:481-531.

Ruiz, G.M. and J.T. Carlton. 2003. Invasion vectors: a conceptual framework for management. Pages 459-504 *in* G. M. Ruiz and J. T. Carlton, editors. Invasive Species: Vectors and management strategies. Island Press, Washington D.C.

Russell J.C., D.R. Towns, and M.N. Clout. 2008. Review of rat invasion biology. Implications for island biosecurity. Science for Conservation 286. Wellington. New Zealand, Department of Conservation.

Sala, O.E., F.S. Chapin III, J.J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L.F. Huenneke, R.B. Jackson, A. Kinzig, R. Leemans, D.M. Lodge, H.A. Mooney, M. Oesterheld, N.L. Poff, M.T. Sykes, B.H. Walker, M. Walker, and D.H. Wall. 2000. Global biodiversity scenarios for the year 2100. Science 287: 1770-1774.

Schmitt, R.C. 1998. Population, pp. 183-197. *In* S.P. Juvik and J.O. Juvik (eds.). Atlas of Hawaii, 3rd ed. Honolulu: University of Hawaii Press.

Scott, D.A. (ed.) 1993. A Directory of Wetlands in Oceania. IWRB, Slimbridge, U.K. and AWB, Kuala Lumpur, Malaysia. 444 pp.

Shluker, A.D. 2003. State of Hawaii aquatic invasive species management plan. Hawaii Department of Land and Nature Resources, Division of Aquatic Resources, Honolulu, 140 pp.

Shogren, J.F. and J. Tschirhart. 2005. Integrating ecology and economics to address bioinvasions. Ecological Economics 52:267-271.

Simberloff, D. 1995. Why do introduced species appear to devastate islands more than mainland areas? Pacific Science 49:87-97.

Sinden, J., R. Jones, S. Hester, D. Odom, C. Kalisch, R. James, and O. Cacho. 2004. The economic impact of weeds in Australia. CRC for Australian Weed Management Technical Series No. 8.

Space, J.C., D.H. Lorence, and A.M. LaRosa. 2009. Report to the Republic of Palau: 2008 update on invasive plant species. United States Department of Agriculture, Forest Service, Pacific Southwest Research Station, Institute of Pacific Islands Forestry. March 2.

Stachowicz, J.J., H. Fried, R.W. Osman, and R.B. Whitlatch. 2002. Biodiversity, invasion resistance, and marine ecosystem function: reconciling pattern and process. Ecology 83:2575-2590. http://dx.doi.org/10.1890/0012-9658(2002)083[2575:BIRAME]2.0.CO;2

Stanford, J.W. and G.H. Rodda. 2007. The Brown Treesnake Rapid Response Team. In: G.W. Witmer, W.C. Pitt, and K.A. Fagerstone (eds.). Managing Vertebrate Invasive Species – Proceedings of a Symposium, Fort Collins, Colorado, August 7-9, 2007. Fort Collins, CO: National Wildlife Research Center. p. 175-217. http://www.aphis.usda.gov/wildlife_damage/nwrc/symposia/invasive_symposium/content/Stanford175_217_MVIS.pdf

Steadman, D.W. 2006. Extinction and biogeography of tropical Pacific birds. University of Chicago Press, Chicago, IL, U.S.A.

Tye, A. 2009. Guidelines for invasive species management in the Pacific: a Pacific strategy for managing pests, weeds and other invasive species. Secretariat of the Pacific Regional Environmental Programme. 23 pp.

United States Fish and Wildlife Service. 2006. Biological Opinion on the Establishment and Operation of an Intelligence, Surveillence, Reconnaissance, and Strike Capability Project on Andersen Air Force Base, Guam.

United States Fish and Wildlife Service. 2009a. Biological Opinion for the Mariana Islands Range Complex, Guam and the Commonwealth of the Northern Mariana Islands 2010-2015.

United States Fish and Wildlife Service. 2009b. Amendment to the Biological Opinion for the Mariana Islands Range Complex, Guam, and the Commonwealth of the Northern Mariana Islands 2010 to 2015.

United States Fish and Wildlife Service. 2010. Biological Opinion for the Joint Guam Program Office Relocation of the US Marine Corps from Okinawa to Guam and Associated Activities on Guam and Tinian, US Department of the Navy.

van der Brug, O. 1983a. Water resources of the Truk Islands: U.S.G.S., Water Resources Investigations Report 82-4082.

van der Brug, O. 1983b. Water resources of the Yap Islands: U.S.G.S., Water Resources Investigations Report 82-357.

van der Brug, O. 1984a. Water resources of Kosrae, Caroline Islands: U.S.G.S., Water Resources Investigations Report 83-4161.

van der Brug, O. 1984b. Water resources of Ponape, Caroline Islands: U.S.G.S., Water Resources Investigations Report 83-4139.

van der Brug, O. 1984c. Water resources of the Palau Islands: U.S.G.S., Water Resources Investigations Report 83-4140.

van der Brug, O. 1985. Compilation of water resources development and hydrologic data of Saipan, Mariana Islands: U.S.G.S., Water Resources Investigations Report 84-4121.

van Wilgen, B.W., D.M. Richardson, and D.C. Le Maitre. 2001. The economic consequences of alien plant invasions. Environment, Development, and Sustainability, 3, 145-168.

Vermeij, G.J. 1991. When biotas meet: understanding biotic interchange. Science 253:1099-1104.

Vitousek, P.M., C.M. D'Antonio, L.L. Loope, and R. Westbrooks. 1996. Biological invasions as global environmental change. American Scientist 84(5): 468-478.

Vitousek, P.M., C.M. D'Antonio, L.L. Loope, M. Rejmánek, and R. Westbrooks. 1997. Introduced species: a significant component of human-caused global change. New Zealand Journal of Ecology 21(1): 1-16.

Westbrooks, R.G. 1998. Invasive Plants: Changing the Landscape of America—Fact Book. Washington D.C.: Federal Interagency Committee for the Management of Noxious and Exotic Weeds.

Wilcove, D.S., D. Rothstein, J. Dubow, A. Phillips, and E. Losos. 1998. Quantifying threats to imperiled species in the United States. BioScience 48:607-615.

Williams, P.A. and S. Timmins. 2002. Economic impacts of weeds in New Zealand. Biological invasions, economic and environmental costs of alien plants, animals and microbe species (ed. D. Pimetel), pp.175-184. CRC Press, London.

Wilson, E.O. 1992. The diversity of life. Belknap Press, Cambridge, MA.

Wittenberg, R. and M. J. W. Cock. 2001. Invasive Alien Species: A Toolkit of Best Prevention and Management Practices. CAB International, Wallingford, Oxon, UK, xvii 228.

Woods, K.D. 1997. Community response to plant invasion, pp. 56-68. *In* J.O. Luken and J.W. Thieret (eds.). Assessment and Management of Plant Invasions. New York: Springer-Verlag.

Yamamoto, M.N. and A.W. Tagawa. 2000. Hawaii's native and exotic freshwater animals. Mutual Publishing, Honolulu, Hawaii. 200 pp.

Zedler, J.B. and S. Kercher. 2004. Causes and consequences of invasive plants in wetlands: opportunities, opportunists, and outcomes. Critical Reviews in Plant Sciences 23(5): 431-452.

Zimmerman, E.C. 1948. Insects of Hawaii. Volume 2, Apterygota to Thysanoptera. Hawaii: University of Hawaii Press.

Zimmerman, E.C. 1970. Adaptive radiation in Hawaii with special reference to insects. Biotropica 2:32-38.

14. List of Abbreviations*

ABRPI	Aquatic Bioinvasion Research and Policy Institute
ACE	Air Combat Element
ACEM	Amphidromous, catadromous, euryhaline, and marine
ACFW	Amphidromous, catadromous, freshwater
AFB	Air Force Base
AFJI	Air Force Joint Instruction
AFP	Air Force Policy
AHS	African horse sickness
AIC	Akaike's Information Criterion
AIV	Avian Influenza Virus
ALSC	American Lumber Standard Committee
AMDTF	Army Air and Missile Defense Task Force
ANS	Aquatic Nuisance Species
ANSTF	Aquatic Nuisance Species Task Force
AOR	Area of Responsibility
APHIS	Animal and Plant Health Inspection Service (USDA)
AQAS	Agricultural Quarantine Activity System
AQI	Agricultural Quarantine Inspection
AQIM	Agriculture Quarantine Inspection Monitoring
Army	United States Army
ASF	African Swine Fever
AusAID	Australian Agency for International Development
AWA	Animal Welfare Act
AWRAM	Aquatic Weed Risk Assessment Model
BAPHIQ	Bureau of Animal and Plant Health Inspection and Quarantine
BIISC	Big Island Invasive Species Committee
BISH	Bishop Museum Herbarium
BMP	Best management practice
BO	Biological opinion
BOA	Bureau of Agriculture
BOC	Bureau of Customs
BRS	Biotechnology Regulatory Service
BTS	Brown Treesnake
CAPS	Cooperative Agriculture Pest Survey
CAT	Civic Action Teams
CBP	U.S. Customs and Border Protection
C-CAP	NOAA Coastal Change and Analysis Program
CDC	Centers for Disease Control and Prevention
CEM	Contagious Equine Metritis
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGAPS	Coordinating Group on Alien Pest Species
CIKM	Carbonate Island Karst Model
CI-MCBC	Conservation International—Melanesia Center for Biodiversity Conservation

CISMA	Cooperative Invasive Species Management Area
CIST	Chuuk Invasive Species Taskforce
CITES	Convention on International Trade in Endangered Species
CNMI	Commonwealth of the Northern Mariana Islands
CNMI-UWAWG	Commonwealth of the Northern Mariana Islands Unified Watershed Assessment Working Group
CPHST	Center for Plant Health Science and Technology
CQUA-CEM	Central Queensland University, Australia, Centre for Environmental Management
CRB	Coconut Rhinoceros Beetle
CSA	Customer Service Agreements
CSAR	Combat Search and Rescue
CSF	Classical Swine Fever
CSG	Carrier Support Group
CSP	Conservation Society of Pohnpei
CTSA	Center for Tropical and Subtropical Agriculture
CTUS	Customs territories of the United States
CVN	Carrier Vessel Nuclear
DAF	Yap Division of Agriculture and Forestry
DAR	Defense Access Road
DAWR	Division of Aquatic and Wildlife Resources, Guam Department of Agriculture
DFW	Division of Fish and Wildlife
DHS	Department of Homeland Security
DLNR	Department of Land and Natural Resources
DoD	U. S. Department of Defense
DOI	U.S. Department of the Interior
DON	U.S. Department of the Navy
DOGC	Directorate General of Customs
DOT	U.S. Department of Transportation
DTR 5	Defense Transportation Regulation 4500.9-R, Part V
EEE	Eastern Equine Encephalitis
EIA	Equine Infectious Anemia
EIS	Environmental Impact Statement
EIS/OEIS	Environmental Impact Statement/Overseas Environmental Impact Statement
EMRS	Emergency Management Response System
EMUA	Exclusive Military Use Area
END	Exotic Newcastle's Disease
EO	Executive Order
EOCs	Emergency Operations Centers
EP	Equine Piroplasmosis
EPA	Environmental Protection Agency
EPPO	European and Mediterranean Plant Protection Organization
FAVIR	Fruits and Vegetables Import Requirements
FAVN	Fluorescent Antibody Virus Neutralization
FDA	U.S. Department of Health and Human Services Food and Drug Administration
FedEx	Federal Express
FFDP	Fruit Fly Detection Program
FIA	USFS Forest Inventory and Analysis Program

FMD	foot and mouth disease
FSM	Federated States of Micronesia
FSMC	Code of the Federal States of Micronesia
FSM-DEA	Federated States of Micronesia Department of Economic Affairs
FSM-QS	Federated States of Micronesia Quarantine Services
GADTC	Guam Aquaculture Development Training Center
GARR	Guam Administrative Rules and Regulations
GCA	Guam Code Annotated
GCE	Ground Combat Element
GCQA	Guam Customs and Quarantine Agency
GDAWR	Guam Division of Aquatic and Wildlife Resources
GDOA	Guam Department of Agriculture
GISC	Guam Invasive Species Council
GNA	Guam Nature Alliance, formally known as the Environmental Education Committee
HBOA	Hawaii Board of Agriculture
HDBEDT	Hawaii Department of Business, Economic Development, and Tourism
HDAR	Hawaii Division of Aquatic Resources
HDOA	Hawaiian Department of Agriculture
HASLA	Hawaii Chapter American Society of Landscape Architects
HBS	Hawaii Biological Survey
HEAR	Hawaiian Ecosystems at Risk
HEPEP	Hawaii Exotic Plant Evaluation Protocol
HFRS	Hemorrhagic Fever and Renal Syndrome
HISC	Hawaii Invasive Species Council
HMU	Habitat Management Unit
HNL	Honolulu International Airport
HPAI	Highly pathogenic avian influenza
HPAIV	Highly Pathogenic Avian Influenza Viruses
HPWRA	Hawaii/Pacific Weed Risk Assessment protocol
HRS	Hawaii Revised Statutes
HS	Harmonized Schedule
HSC	Helicopter Sea Combat Squadron
HSV	High-Speed Vessels
HQ	Headquarters
IAPS	Invasive alien plant species
IAS	Invasive alien species (also commonly referred to as invasive species)
IC	Incident Commander
ICS	Incident Command System
IPPC	International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
ISC	Invasive Species Committee
ISR	Intelligence, Surveillance, and Reconnaissance
iSTOP	Invasive Species Taskforce of Pohnpei
JE	Japanese encephalitis
JEV	Japanese encephalitis virus
JGPO	Joint Guam Program Office
JHSV	Joint High Speed Vessels

KISC	Kauai Invasive Species Committee
KIST	Kosrae Invasive Species Taskforce
LBA	Leaseback Area
LCAC	Landing Craft Air Cushion
LCE	Logistics Combat Element
LCS	Littoral Combat Ships
LEMIS	Law Enforcement Management Information System
LFA	Little Fire Ant
LICH	Landscape Industry Council of Hawaii
LPAIV	Low Pathogenic Avian Influenza Viruses
MAC	Manual for Agricultural Clearance
MAGTF	Marine Air-Ground Task Force
Marine Corps	U.S. Marine Corps
MARFORPAC	Marine Forces Pacific
MBP	Micronesian Biosecurity Plan
MCBH	Marine Corps Base Hawaii
MCEs	Micronesia Chief Executives
MCES	Micronesia Chief Executives' Summit
MCI	Military Customs Inspection
MEF	Marine Expeditionary Force
MIA	Miami International Airport
MIIST	Marshall Island Invasive Species Taskforce
MIRC	Mariana Islands Range Complex
MIU	Maritime Intelligence Unit
MLA	Military Lease Area
MLG	Marine Logistic Group
MMDC	Micronesian Mariculture Demonstration Center
MOU	Memorandum of Understanding
MPSA	Military Postal Service Agency
NAQS	Northern Australia Quarantine Strategy
NAVFAC	Naval Facilities Engineering Command
NAVFACPAC	Naval Facilities Engineering Command Pacific
NBS	National Biosecurity Strategy
NCAHEM	National Center for Animal Health Emergency Management
NDAA	National Defense Authorization Act
NDV	Newcastle disease virus
NECC	Navy Expeditionary Combat Command
NEPA	National Environmental Policy Act
NEPC	Palau National Environmental Protection Council
NGO	Nongovernmental Organization
NIMS	National Incident Management System
NIS	National Identification Services
NISC	U.S. National Invasive Species Council
NMC	Northern Marianas College
NMC-CREES	Northern Marianas College Cooperative Research Extension and Education Service
NOAA	National Oceanic and Atmospheric Administration
NPDN	National Plant Diagnostic Network

NRC	National Research Council
NRCS	Natural Resources Conservation Service (USDA)
NVS	National Veterinary Stockpile
NWDP	National Wildlife Disease Program
NWI	National Wetlands Inventory
OED	OISC's Oahu Early Detection Project
OIE	World Organization for Animal Health
OISC	Oahu Invasive Species Committee
OTA	Office of Technology Assessment
PACAF	Air Force Pacific
PAG	Port Authority of Guam
PBOA	Palau Bureau of Agriculture
PCS	Permanent Change of Station
PEQPB	Palau Environmental Quality Protection Board
PIER	Pacific Islands Ecosystems at Risk
PII	Pacific Invasives Initiative
PILN	Pacific Invasives Learning Network
PIP	Pacific Invasives Partnership
PIST	Pohnpei Invasive Species Taskforce. This group is now known as iSTOP.
PMDC	Palau Mariculture Demonstration Center
PNISC	Palau National Invasive Species Committee
PNRC	Palau Natural Resource Council
POV	Privately Owned Vehicle
PPA	Plant Protection Act
PPPO	Pacific Plant Protection Organization
PPQ	Plant Protection and Quarantine, APHIS
PPS	Plant Protection Station
PQ	Plant Quarantine Branch of HDOA
PRA	Pest Risk Assessment
PRI	Primary Training Area
PSI	Pacific Safeguarding Initiative
PSU-ABRPI	Portland State University, Aquatic Bioinvasion Research and Policy Institute
PWS	Public Water System
QM	Quarantine Plant and Animal Materials
QRAF	Quarantine Regulations of the Armed Forces
RAM-ANSTF	Risk Assessment and Management Committee—Aquatic Nuisance Species Task Force
RBP	Regional Biosecurity Plan
RCS	Ramsar Convention Secretariat
RIFA	Red Imported Fire Ants
RISC	Micronesia Regional Invasive Species Council
RMI	Republic of the Marshall Islands
Roadmap	United States- Japan Roadmap for Realignment Implementation
ROD	Record of Decision
SEC	Secondary Training Area
SERS	Surveillance and Emergency Response System
SERC	Smithsonian Environmental Research Center
SITC	Smuggling Interdiction and Trade Compliance

SLAMRAAM	Surface-Launched Advanced Medium-Range Air-to-Air Missile
SOP	Standard Operating Procedures
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SSN	Nuclear Submarine
SUA	Special Use Airspace
SVD	Swine Vesicular Disease
T-AE	Auxiliary Ammunition Ships
T-AFS	Auxiliary Combat Stores Ships
T-AKE	Auxiliary Dry Cargo/Ammunition Ships
THAAD	Terminal High-Altitude Area Defense
TSA	Transportation Security Administration
TSV	Theater Support Vessels
TT&E	Test, Training, and Exercise
TBEV	Tick-borne encephalitis virus
UNDP-GEF	United Nations Development Programme – Global Environmental Facility
UOG	University of Guam
UPS	United Parcel Service
U.S.	United States
USACE	U.S. Army Corps of Engineers
US AID	U.S. Agency for International Development
USAKA	U.S. Army Kwajalein Atoll
USARPAC	U.S. Army Pacific Command
USCBP	U.S. Customs and Border Patrol
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USDA-FS	U.S. Department of Agriculture, Forest Service
USFWS	U.S. Fish & Wildlife Service
USGS	U.S. Geological Service
USPS	U.S. Postal Service
U.S.C.	United States Code
USCS	U.S. Customs Service
USPACOM	U.S. Pacific Command
USTRANSCOM	United States Transportation Command
VEE	Venezuelan Equine Encephalitis Virus
VS	Veterinary Services
WBCA	Wild Bird Conservation Act
WEE	Western Equine Encephalitis
WERI	Water and Environmental Research Institute of the Western Pacific
WHO	World Health Organization
WNV	West Nile virus
WPM	Wood Packaging Material
WRA	Weed Risk Assessment
WS	USDA-Wildlife Services

***This list encompasses most, but possibly not all, acronyms used throughout the four volumes of the Regional Biosecurity Plan.**

15. Key Terms*

Animal Contamination: Something that comes in contact or association with animal secretion.

Antifouling paint: Any coating (generally applied as a paint) specifically designed to prevent or deter the settlement and growth of biofouling organisms on a submerged surface (e.g., vessel hull) including biocidal coatings and fouling-release coatings.

APHIS Compliance Agreement: Written agreement that demonstrates understanding between or among parties agreeing to follow APHIS procedures.

Ballast water: Any water (including associated sediments) taken on board a vessel for the express purpose of managing the trim and stability during a voyage.

Ballast water exchange: Emptying and refilling a ballast water tanks typically conducted in order to reduce the potential number of coastal organisms within the holding tank.

Benthic: Pertaining to the flora and fauna found on (or associated with) the bottom of the ocean.

Biofouling: Marine organisms attached to any submerged artificial structure, including wharves, jetties and any part of a vessel hull (including the hulls, rudders, propellers and other hull appendages) or internal seawater systems (including sea-chests and pipe work), or to any equipment or equipment spaces attached to or onboard the vessel (including mooring devices, anchor wells, cable lockers, cargo spaces, bilges, etc).

Bioinvasion or biological invasion: The movement of a living organism to an area outside its natural range, potentially resulting in the establishment or spread of the organism.

Bioregion: An area constituting a natural ecological community with characteristic flora, fauna, and environmental conditions, and bounded by natural rather than artificial borders.

Biosecurity: The management of the risks to animal, plant, human, and environmental health posed by pests and diseases. Managing the risks associated with pests, diseases, genetically modified organisms (GMOs), and other live organisms entering, emerging, establishing or spreading which would potentially cause harm to: human, animal or plant health, the environment or the economy.

Biotic resistance: The hypothesized intrinsic resistance to new species entering a community by the existing members. Elton (1957) suggested that well-connected, species rich communities would naturally resist new species entering by predation, parasitism, and direct and indirect competition.

Build-up:The United States Department of Defense proposed relocation of US Marine Corps forces from Okinawa to Guam and the CNMI.

Bulk Cargo: Cargo not enclosed in a container

Colonize: Refers to larvae or propagules that successfully settle and establish on a submerged substrata.

Dry and semi-dry ballast: The largely historic (though some vessels still use dry ballast) use of rocks, cobble, sand and other dry substances to help maintain the trim and stability of a vessel, semi-dry refers to the wet nature of the bilge, providing a humid environment.

Dunnage: Wood packaging material used to secure or support a commodity during transport, but which does not remain associated with the commodity.

Epibenthic species: Species found living on the surface of the benthic substrata on the bottom of the ocean or estuary.

Endemic species: A species unique to a defined geographic area, such as an island or group of islands.

Exotic: Not native to the specified region or country.

Fomite: An inanimate object or substance, such as a tool, clothing, packing or bedding materials, capable of carrying infectious organisms and thus transmitting from animal to animal (or human to human).

Fumigation: Treatment with a chemical agent that reaches the commodity wholly or primarily in a gaseous state.

Garbage: All waste material derived in whole or in part from fruits, vegetables, meats, or other plant or animal (including poultry) material, and other refuse of any character whatsoever that has been associated with any such material aboard any means of conveyance and includes food scraps, table refuse, galley refuse, food wrappers or packaging materials, and other waste material from stores, food preparation areas, passengers' or crews' quarters, dining rooms, or any other areas on vessels, aircraft, or other means of conveyances.

Hitchhiker: Species unintentionally moved to a different location in cargo, packing material, a shipping container used for transport, or on/in the conveyance of transport.

Inoculate/inoculation: Refers to the release of a non-indigenous species into the surrounding environment. This includes the release of offspring, fragments and/or direct transfer of individuals, but does not infer successful establishment.

Indigenous or native: Species that are naturally occurring in a region, having evolved or migrated into a region without human intervention.

Infestation: The occurrence of one or more pest species in an area or location where their numbers and impact are currently or potentially at unacceptable levels. A sudden increase in destructiveness or population numbers of a pest species in a given area.

Introduced species: Species that have been transported by human activities – intentionally or unintentionally – into a region in which they did not occur in historical time. See also 'invasive', 'non-indigenous', and 'non-native species'.

Invasive species (or invasive alien species): Exotic species, including animal and plant disease agents, microbes, and pests, whose introduction does or is likely to cause economic ,environmental, social, and/or cultural harm and/or harm to human health.

LLOYDS MIU: Lloyds compiles and provides data on the global fleet of commercial vessel, including vessel characteristics and traffic patterns (www.lloydslistintelligence.com).

Meroplankton: The category of organisms that spend a part of their life cycle in the water column as plankton. For invertebrates and many fishes, the planktonic stage is usually the larval stage.

Micronesian Region: Guam, the Republic of Palau, the Federated States of Micronesia, the Commonwealth of the Northern Mariana Islands, and the Republic of the Marshall Islands.

Niche area or vessel niche area: The wetted (submerged) surfaces of a vessel that are distinct from the contiguous hull, usually sheltered from laminar flow, including propulsion and steering gear, internal cooling circuits, sea strainers, sea chests, bow and stern thrusters, transducers, log probes, anchors, anchor chains, anchor lockers and bilge.

Non-indigenous or non-native species: see exotic species definition

Pest: Any species, strain or biotype of plant, animal or pathogenic agent considered injurious.

Phytosanitary Certificate: Official document which attests to the phytosanitary status of any consignment affected by phytosanitary regulations.

Propagative plant material: Plant material which may include nursery stock, plants, and other propagative parts such as bulbs, seeds, roots, rhizomes, tubers, corms, etc.

Recruitment: The post-settlement survival of an individual or species within a defined time period.
Reproductive phenology: The timing and period (duration) of reproductive activity for an individual species.

Sea-chests: Recesses built into a vessel's hull below the waterline that house the seawater intake pipes used for ballast uptake, engine cooling, firefighting and other onboard functions.

Sessile: Species that are firmly attached to the hard substratum (e.g., sponges, corals, barnacles).
Transport pressure: Refers to the numbers of vessels that arrive from a particular bioregion and multiplied by a port duration weighting.

Species richness: The number of species represented in an ecological community.

Wood Packaging Material (WPM): Wood or wood products used in supporting, a commodity to protect it during transport (includes dunnage).

Vector: The physical means, agent or mechanism which facilitates the transfer of organisms or their propagules from one place to another.

Zoonoses: Any disease or infection that is naturally transmissible from animals to humans.

***This list encompasses key terms used throughout the four volumes of the Regional Biosecurity Plan.**

16. Acknowledgments

The plan was created by a truly collaborative effort, as over 150 individuals had direct input into its development. This includes resource managers, policy makers, researchers, educators, representatives from the shipping, aquaculture, aquarium, and tourism industries, active ocean and inland water users, as well as other stakeholders throughout the region and from further afield.

The concept of the plan came originally from the RISC and the Micronesia Chief Executives. Personnel from NISC and the DOI were instrumental in further developing the concept and bringing the concept to the attention of the DoD. The DoD funded both the development of the risk assessments and the final RBP product and in addition has been extremely supportive throughout the developmental process.

The risk assessments were drafted by U.S. federal agencies including the Smithsonian Institute, USGS, and USDA. The risk assessments were reviewed by LandCare New Zealand as well as dozens of independent and agency level reviewers.

The University of Guam, SPC, and LandCare updated the risk assessments in regards to review of comments and worked synergistically on developing the other components of the RBP including the implementation strategy.

Development of the implementation strategy involved numerous consultations with thematic experts and government officials throughout the region with various feedback mechanisms incorporated into the process with the outlook of insuring the most effective and efficient end product possible for each of the jurisdictions.

Large components of the original risk assessments completed for this project by USDA, USGS, and the Smithsonian Institute, element of the peer review completed by LandCare, and hundreds of comments and remarks from stakeholders throughout the region have been incorporated into this body of work.

As in many collaborative projects, the list of names to be thanked is long and it is not possible to list everyone who has contributed to this plan. The contributions and participation of all involved is much appreciated and played a large part in the success of development of this plan.

Attachment A: Overview of the Island Jurisdictions Included in the Regional Biosecurity Plan

Territory of Guam

Guam is the largest and southernmost island in the Mariana archipelago as well as being the largest island within Micronesia (Figure A-1). The surface geology of the southern half of the island is primarily volcanic rock and the northern half is limestone (Gingerich 2003). Guam has extensive coastal reefs, eroded volcanic hills in the south and a raised limestone plateau in the north. Elevations range from sea level to the summit of Mount Lamlam at 406 meters (1,332 feet). The climate is warm tropical maritime, generally warm and humid; temperature varies little during the year, averaging 26°C (Western Regional Climate Center: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?piguam). Mean annual precipitation ranges from 216 to 292 cm (85 to 115 inches) (Gingerich 2003). A dry season occurs from January to June with a rainy season from July to December. The exact timing and extent of the dry season varies annually. About 40 watersheds are present on Guam, mostly on the southern half of the island. Artificial freshwater habitats on Guam consist primarily of small to large impoundments, the largest being Fena Reservoir. Since precolonial times, the island of Guam has been a center of trade and travel. Guam laid on the colonial trade route between the Philippines and Mexico and more recently was of strategic importance during World War II (WWII) and the Cold War and continues to play a major role in U.S military strategy. Guam has been a U.S. territory since 1898, and about a third of the island is currently devoted to military installations. Guam has 544 square kilometers of land with a 125.5-km (78-mile) coastline and a population of approximately 154,805 in 2010. Located about three-quarters of the way from Hawaii to the Philippines, Guam occupies a strategic location for the U.S. military in the western North Pacific, and it is the primary focus of the proposed military relocation of U.S. forces currently located in Okinawa, Japan.

According to data from the Guam Bureau of Statistics and Plans for 2009, the major suppliers for imported commodities were the United States (50%), Japan (14%), Western Europe (13%), and Asia (China, Korea, Taiwan, Hong Kong, Singapore, Thailand, and the Philippines) (16%). Food commodities and non-alcoholic beverages represented the largest commodity group, making up more than 30% of all imports in 2009 (Guam BSP 2009).

Guam's economy depends largely on U.S. military spending and tourism. Over the past 30 years, the tourism business has grown to become the largest income source following national defense. The Guam economy continues to expand in both tourism and military sectors. As military expansion continues, environmental protection and aesthetics should continue to be a primary focus for the protection and development of Guam's tourist industry. Most visitors to Guam arrive by air from Japan (78%) and Korea (10%).

Natural resources include the marine environment, agricultural products, and the terrestrial environment. Aquatic wildlife from the marine environment supports tourism and some recreational

and subsistence fishing. Guam's agricultural production is extremely limited and what does exist are mainly fruits and vegetables produced for local consumption. The terrestrial environment of Guam has been fairly heavily impacted by various elements including major battles during WWII, extensive and long term human habitation, and various established and highly detrimental invasive species.

Guam has a history of invasive species problems, including the establishment of the Brown Treesnake, Coconut Rhinoceros Beetle, and Little Fire Ant (*Wasmannia auropunctata*). Guam is a major transportation hub for the Micronesia region and could also be a hub for dispersal of IAS within the region. DoD, GDOA, GCQA, Guam Port Authority, UOG, USDA, USFWS, Guam Invasive Species Council (GISC) and Guam Invasive Species Advisory Committee (GISAC) are all involved in IAS control and management on Guam.

Figure A-1: The Territory of Guam

The U.S. Territory of Guam, commonly referred to as Guam

Summary details of the Territory of Guam:

1. Location: latitude 13°28'N and longitude 144°45'E
2. Number of islands: 1
3. Size: 544 km^2
4. Population: 154,805
5. Examples of native species that are imperiled: Guam Rail (*Gallirallus owstoni*), Mariana Fruit Bat (*Pteropus mariannus*), Guam subspecies of the Micronesian Kingfisher (*Todiramphus cinnamomina cinnamomina*), Mariana Crow (*Corvus kubaryi*), Mariana Common Moorhen (*Gallinula chloropus guami*), Mariana Swiftlet (*Aerodramus bartschi*), Green Sea Turtle (*Chelonia mydas*), Hawksbill Sea Turtle (*Eretmochelys imbricata***)**, *Serianthes nelsonii* (organisms listed are only those considered at the federal level, local experts may want to expand this to include species of local concern)
6. Examples of established IAS of significant concern: Brown Treesnake, Coconut Rhinoceros Beetle, Little Fire Ant, various rat species (*Rattus* spp.), numerous plant species and arthropods
7. Example of an IAS with significant threat of establishing: Coqui Frog (*Eleutherodactylus coqui*)
8. Main economic drivers: Tourism, DoD, and local businesses
9. Main trade partners: U.S. mainland
10. Import examples
    a. Food stuffs and beverages
    b. White leg shrimp also known as Pacific white shrimp (*Litopenaeus vannamei*) post larvae and broodstock (Arthur et al. 2012). Adults were imported in 2007 from Hawaii and Kentucky.
    c. Mangrove Crab (*Scylla serrata*) annually imported from the FSM and the Philippines (Arthur et al. 2012)
    d. Mozambique Tilapia (*Oreochromis mossambicus*) fry annually imported from the Philippines and Taiwan POC (Arthur et al. 2012)
    e. Freshwater and Marine aquarium fish imported from Malaysia, Singapore, Taiwan POC, and US (Arthur et al. 2012). Pet shops import aquatic organisms on a monthly basis
11. Export example: Guam has a live export trade of the aquatic species *Litopenaeus vannamei* which is exported to China and the United Arab Emirates as brood stock (Arthur et al. 2012).
12. Ports and post offices points of entry
    a. Air
        1. Won Pat International Airport: Guam's Antonio B. Won Pat International Airport (A.B. Won Pat Airport), also known as Guam International Airport, serves as the hub for regional air travel, international cargo, and passenger transport. Fiscal Year (FY) 2006-2007 had an average of 756 aircraft operations/week and numbers of aircraft operating averaged 1,610/month (approximately 400/week). Several international airlines operate from Guam: United, Northwest, Japan, Korean Air, Philippine Airlines, China Airlines, and Asia Pacific. The airport has 21 aircraft parking positions with 18 common-use terminal gates. U.S. Customs and Border Protection (CBP) personnel provide immigration services, and Guam Customs and Quarantine Agency (GCQA) personnel conduct

customs and agriculture clearance during scheduled aircraft operations and on prior arrangements with field supervisors.

2. AAFB

b. Sea
   1. Guam commercial port
   2. Naval Base Guam

c. Post offices
   1. Barrigada
   2. DoD

Commonwealth of the Northern Mariana Islands

The 14 northern islands of the Mariana Archipelago make up the CNMI (Figure A-2). The three largest of these islands are currently the only ones with permanent human settlements. The three inhabited islands are Saipan, Tinian, and Rota. Saipan is the seat of the commonwealth government and also the island where most of the population resides. On Saipan, tourism is a main economic activity, while manufacturing which was an important economic resource has all but closed down in recent years. Rota and Tinian are primarily dependent on agricultural activities. Visitation to the CNMI is mainly from Southeast Asian countries with most visitors arriving and staying on Saipan and only a few visiting Tinian or Rota.

Several international airlines fly to the CNMI, mainly Saipan, while Tinian and Rota are generally accessed by Mariana Islands based commuter planes. Delta flies 21 times a week into Saipan with three flights daily from Nagoya and Narita, Japan. Asiana has 11 flights a week from Incheon, South Korea, four flights a week from Pusan, South Korea, and four flights a week from Osaka, Japan. Charters include China Southern, Air China, and Shanghai Airlines; China Southern and Shanghai Airlines bring two charter flights twice weekly from Guangzhou. Air China only occasionally operates (holidays, special occasions) from Beijing (Deposa 2010).

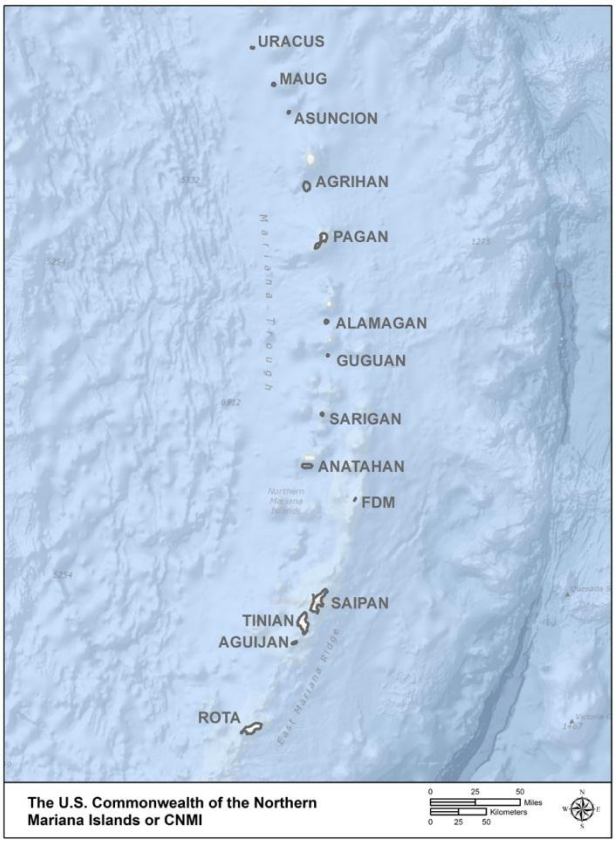
The climate of the CNMI is similar to that of Guam, with pronounced wet and dry seasons.

Saipan: Saipan is located between latitude 15°5'30" to 15°17'30" N and longitude 145°41'30" to 145°50'00"E. The island is about 21 km (13 mi) long and about 6.4 km (4 mi) wide, with a surface area of about 124 km^2 (48 mi^2), making it the largest island in the CNMI. Saipan also has the largest human population among all of the CNMI islands. A ridge extends centrally through the island and there is a wide coastal area to the west. The highest point is Mount Tapochau, with a maximum elevation of 466 m (1,530 ft.). Annual rainfall averages about 203 cm (80 inches) (van der Brug 1985).

Tinian: Tinian is located at 15°N and 145°E. With a surface area of about 101 km^2 (39 mi^2) it is the second largest island in the CNMI, and measures about 19 km (12 mi) long and 9.7 km (6 mi) wide. The surface topography is divided into five physiographic areas, with the southern part of the island having the greatest elevation; the highest point is Mt. Kastiyu (Lasso Hill), at 187 m (614 ft.) (Gingerich 2002).

Rota: Rota is located between latitude 14°06' to 14°12'N and longitude 145°07' to 145°17'E. It is the southernmost island of the CNMI and lies about 72 km (45 mi) north-northeast of Guam. The island is oriented east-west and is about 18.5 km (11.5 mi) long and 4.8 km (3 mi) wide. Including two small islands along its west shore, the surface area of Rota is approximately 85.5 km^2 (33 mi^2).

Figure A-2: The Commonwealth of the Northern Mariana Islands



Summary details of the Commonwealth of the Northern Mariana Islands:

1. Location: the western Pacific between latitudes 14°08 and 20°33'N and between longitude 144°54' and 146°04'E
2. Number of islands: 14 islands, including 3 which are inhabited (Saipan, Tinian, and Rota)
3. Size: 475 km^2
4. Population: 53,883 (2010 census); 90% of population lives on the island of Saipan
5. Examples of native species that are imperiled: Mariana Fruit Bat, Micronesian Megapode (*Megapodius laperouse*), Mariana Crow, Mariana Common Moorhen, Mariana Swiftlet, Nightingale Reed Warbler (*Acrocephalus luscinius*), Rota Bridled White-eye (*Zosterops rotensis)*, Green Sea Turtle, Hawksbill Sea Turtle, *Serianthes nelsonii*, *Nesogenes rotensis*, *Osmoxylon mariannense*

6. Examples of established IAS of concern: Giant African Snail (*Achatina fulica*) and Melon Fruit fly (*Bactrocera cucurbitae*)
7. Examples of IAS of significant concern of establishing: Coconut Rhinoceros Beetle, Brown Treesnake, Coconut Termite (*Neotermes rainbowi*)
8. Main economic drivers: Tourism, Services
9. Main trade partners: USA and Japan
10. Import examples: food, construction material and equipment, and petroleum products
11. Export examples: Garment production was a major revenue earner for the island of Saipan prior to 2010. Garments were exported to USA mainland. The industry has closed. At present exports are mainly sweet potato, yam and taro. These agricultural products are exported to Guam.
12. Ports
    a. Air
        1. Saipan International Airport: A Port of Entry responsible for enforcing the Immigration and Nationality Act (INA) for arriving aliens and establishing departure control for certain flights as part of the "Northern Mariana Islands Immigration, Security, and Labor Act." Officers perform admission of aliens; travel control of citizens and aliens; inspections; apprehensions; examinations; exclusions and removals**.** It is the gateway to the CNMI, serving Saipan, Rota and Tinian. It can accommodate wide-bodied aircraft, i.e. DC 10's and 747's. The runway is 8,700 feet long with a parallel taxiway and connecting taxiways. The main terminal accommodates international passengers with six jet ways and houses the Immigration and Customs processing areas. Major airlines operating include: United Airlines, All Nippon Airlines, Delta Airlines, Asiana Airlines, Shanghai Airlines, Sichuan Airlines, China Eastern and Fly Guam. Flights arrive direct from cities in Japan, Korea, Hong Kong, Philippines, China and Guam. Saipan International Airport operates mainly inter-island flights. In FY 2006–2007, the number of plane operations per week equaled those at Guam over roughly the same FY period with the majority (71%) from commuter traffic compared to 18% for commercial traffic. The commuter terminal serves as feeder for a Tinian and Rota. The airport operates 24 hours 7 days a week with 24-hour availability of aircraft rescue personnel and equipment (CPA 2007b). Ground handling is by POI Aviation Services affiliated with Tan Holdings Company (POI 2010). Immigration and customs are available during scheduled operations, otherwise by prior arrangements with the chief of Immigration in Saipan (CPA 2007b). DoD also utilizes this airport.
        2. Tinian International Airport: Tinian International Airport hosted approximately 252 plane operations in FY 2008–2009 with 99% commuter and fewer than 1% commercial (CPA 2007c). Tinian has multiple daily commuter flights from Saipan and is also utilized by privately chartered Star Marianas Airlines which provides services for the Tinian Dynasty Hotel & Casino customers originating primarily from China. Passenger traffic is mainly inter-island from Saipan, Rota, and Guam. The airport has accommodations for aircraft with capacities of up to 36 passengers. The current runway is 8,600 feet in length with a parallel taxiway and two connecting taxiways at each end. Construction of a high-speed taxiway has been advertised for bid and the runway expansion is expected to increase traffic. The airport is equipped for night operation with night flights from Saipan

and Guam transporting passengers destined mainly for the hotel and casino. DoD also utilizes this airport.

3. Rota International Airport: Rota International Airport hosts primarily inter-island traffic from Saipan and Guam. An average of 18 aircraft operations/day occurred in FY 2007-2008, 72% commuter and 27% commercial. In FY 2005-2006, a total of 6,550 aircraft operations averaging 17/day ranged from 94% air taxi to 4% general aviation. The airport can accommodate aircraft with capacities of up to 39 passengers. The airport is equipped for nighttime operations. U.S. Immigration (conducted by CBP) and CNMI Customs and Quarantine services are available during scheduled aircraft operations and on prior arrangements with field supervisors. Airlines operating include Freedom Air, Cape Air, and Arctic Circle Air Company. DoD also utilizes this airport.

b. Sea

1. Port of Saipan: The commercial seaport has 2,600 linear feet of berthing space and a 22-acre container yard. The channel, turning basin, and berthing areas have been widened and deepened to a uniform -40 feet in order to accommodate medium to deep draft vessels into port. The port has two fuel storage facilities and shares space with a bulk cement company, three freight forwarding companies and three shipping agents. Sunset Cruises, a private concession, also utilizes the port. The U.S. Coast Guard recently assisted with improved navigational aids and repositioned harbor buoys to mark the safest route into port. There is a quarantine zone established at the Saipan seaport which is enclosed in a snake proof barrier where suspect materials including multiple sea containers can be placed until appropriately investigated.
2. Port of Rota: One stevedoring company is available and two storage companies. Quarantine, Customs, and Immigration services are also available at the seaport. The port has sixteen 22-foot Boat Slips.
3. Port of Tinian: There are two stevedoring companies available at the Tinian harbor and a bulk fuel plant operated by Mobil Oil. Three finger piers are available for berthing including a small boat ramp. The port has a quarantine area enclosed with a snake repellent barrier.

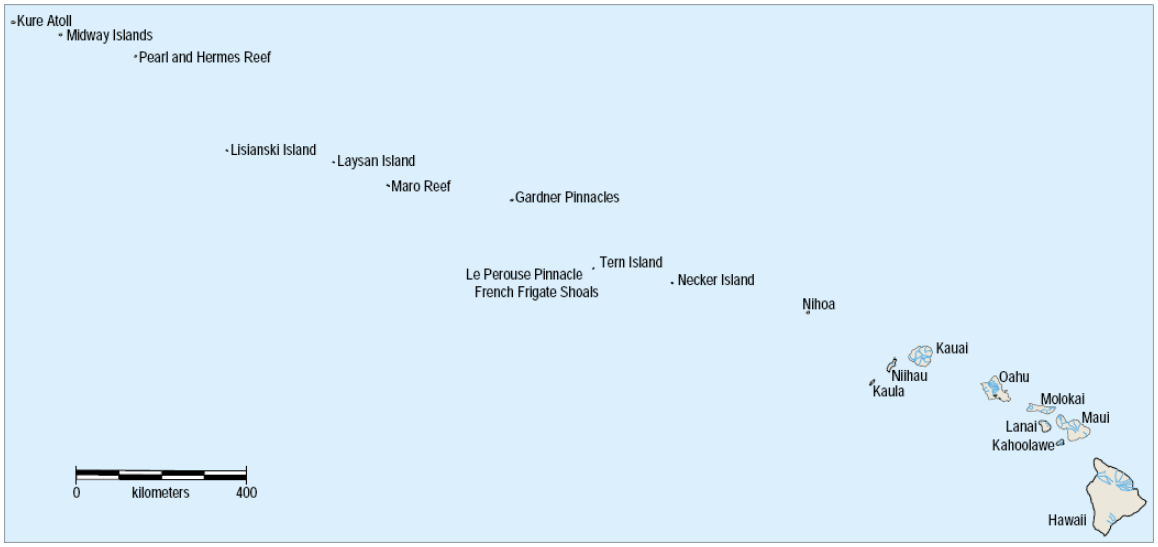
State of Hawaii

Elevations range from sea level to over 4,000 m (Loope and Mueller-Dombois 1989). The climate is tropical at sea level, although freezing conditions occasionally occur at high elevations (Juvik and Juvik 1998). Mean monthly temperatures in Honolulu range from 23° C (73° F) in January to 28° C (82° F) in August, and mean annual precipitation in Hawaii ranges from 38 to 1,016 cm (15 to 400 inches) (Juvik and Juvik 1998). The major islands of Hawaii have a wide diversity of inland and coastal aquatic habitats, including about 400 reservoirs and other artificial impoundments, 360 perennial streams, and 30 stream-mouth estuaries, as well as many irrigation ditches, a few natural lakes, and numerous fresh and saline wetlands (Maciolek 1984; Yamamoto and Tagawa 2000). Parham et al. (2008) provided detailed information about all of Hawaii's watersheds, including distributions of nonindigenous species. Streams in Hawaii tend to be steep with widely-varying flow rates.

1. Location: The Hawaiian archipelago is a series of volcanic islands in the central Pacific Ocean between latitudes 18°55' and 28°27'N and longitudes 154°48' and 178°22'W. The island group is over 3,000 km (1,864 mi) from the nearest continent.
2. Number of islands: There are eight major high islands
3. Size: The eight major high islands have a total land area of 16,500 km^2

The Hawaiian archipelago comprises eight main, or high, islands and a series of leeward atolls, banks, reefs, and shoals, extending southeast to northwest for about 2,400 kilometers (km) (1,491 miles) in the north Pacific Ocean, from approximately 19° to 28° north latitude (Loope 1998) (Figure A-3).

Figure A-3: The Hawaiian Archipelago



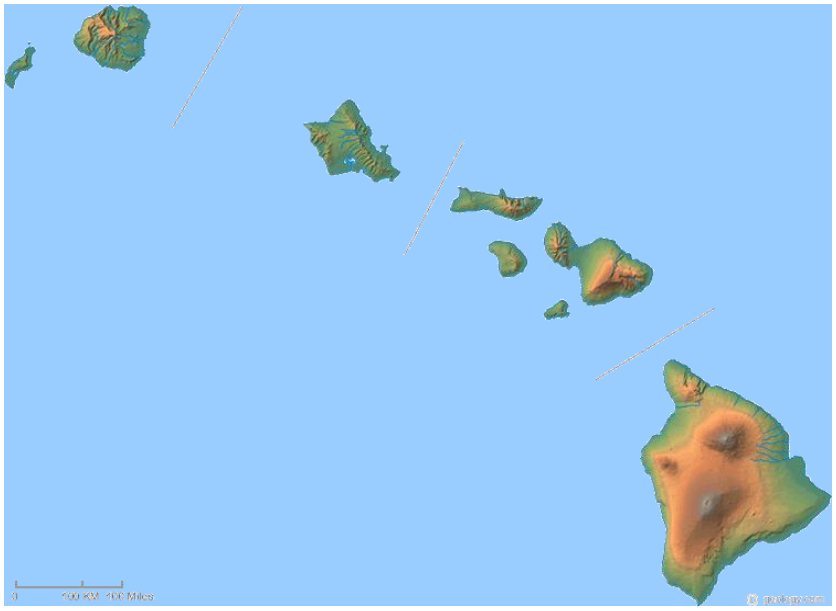
Source: Loope 1998

Hawaii's agreeable climate derives from its location mainly within the tropics (Giambelluca and Schroeder 1998). The annual variation in mean monthly temperatures is only about 5°C, and the length of the daylight period between the shortest and longest days of the year varies only by about 2.5 hours. Only two seasons generally are recognized in the state, the warm season (summer), extending from

about May through September, and a cooler and wetter season (winter), from October to April. Average annual rainfall ranges from 250 millimeters (mm) to 11,300 mm; the summit of Mt. Waialeale on the island of Kauai is one of the wettest places on Earth. Although generally equable, climate exhibits substantial spatial variability due to the influence of the islands' mountainous topography. Rainfall, solar radiation, temperature, humidity, and wind all may show spectacular differences over short distances (Giambelluca and Schroeder 1998). Changes in climate are particularly evident along elevation gradients where temperatures may dip below freezing on the highest mountain peaks. The varied topography and climate have been major influences on the high rates of speciation and resulting diversity within the Hawaiian biota (Peck et al. 1999; Price 2004).

As of 2006, the State of Hawaii (16,635 km^2 in land area; [USCB 2006]) had a population of 1,285,498 (HDBEDT 2007). This equates to an average density of 77 persons per km^2. Figure A-4 shows the State of Hawaii with counties demarcated, from upper left to lower right: Kauai County (comprising the islands of Kauai and Niihau), City and County of Honolulu (Oahu and the northwestern Hawaiian Islands excluding Midway), Maui County (Maui, Molokai, Lanai, and Kahoolawe), and Hawaii County (Hawaii Island) (HDBEDT 2007). The majority of residents (75% or more) lives on the island of Oahu (Schmitt 1998), at an average density of about 585 persons per km^2. In general, Hawaii residents exhibit educational levels, family incomes, and employment rates above the national average, while experiencing exceptionally high costs of living (Schmitt 1998).

Figure A-4: The Eight Main Islands of the State of Hawaii



Source: Modified from: http://geology.com/state-map/hawaii.shtml

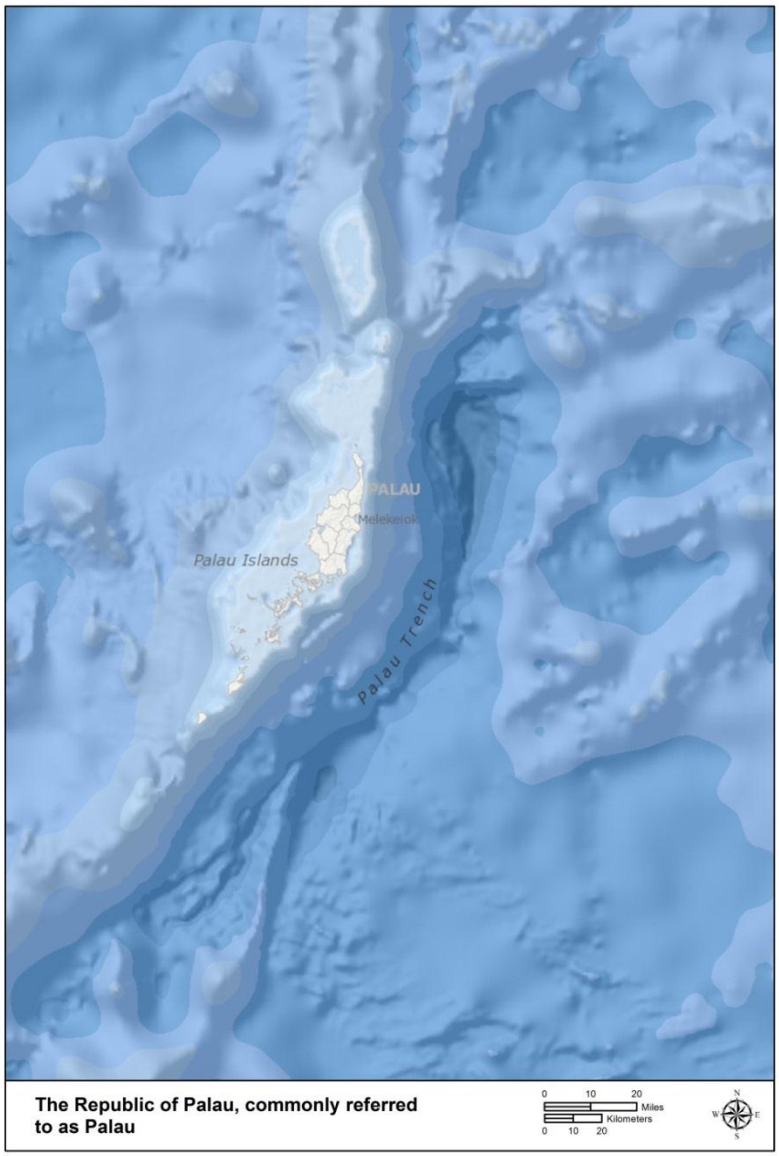
Gross state product in 2005 was $53.7 billion (HDBEDT 2007). The top three contributors are federal government expenditures ($12.2 billion in 2004, of which defense spending contributed $4.8 billion), tourism ($11.9 billion in 2005), and agriculture ($516.1 million in 2004).

During the first half of the twentieth century, agriculture dominated the economy in Hawaii, and was itself dominated by sugarcane and pineapple production; however, with the closing of several plantations in recent years, diversified agriculture has gained in importance (Kelly 1998a). The state's agriculture can be divided into three sectors: traditional plantation crops (pineapple and sugarcane) produced for export; commodities, such as vegetables, eggs, and milk, produced for local consumption; and newer export crops, such as macadamia nuts, flowers, and nursery stock. Although more than two-thirds of the food supply is imported, Hawaii is self- or near-self-sufficient in the production of certain commodities (Kelly 1998a). All of the papaya and most of the pineapple consumed in the state is grown locally, as are most of the head cabbage, Chinese cabbage, green onions, and watermelons. Fewer than half of the bananas, tomatoes, pork and other meats, onions, lettuce, and carrots consumed are produced in Hawaii.

Republic of Palau

The islands of Palau are within the western portion of the Caroline Islands (Figure A-5). Much of the information summarized below is taken from van der Brug (1984c), Scott (1993), Crombie and Pregill (1999), and Hein et al. (2005). The islands of Palau range in size from very small islets to quite large islands, with a total land area of only about 494 km2 (Scott 1993; Crombie and Pregill 1999). Of the islands in the chain, only 12 are greater than 1 km^2 in land area (Steadman 2006). Babeldaob, with an area of about 396 km^2, approximately 80% of Palau's total land area, is the largest island in Palau and one of the largest in the entire western Pacific. A few of the other larger islands of Palau, all dwarfed by Babeldaob, include Koror (9.3 km^2), Arakabesang (2.3 km^2), and Malakal (0.8 km^2). The island of Koror and its major town (also known as Koror) contains the largest proportion of inhabitants and is the commercial center of the republic. The highest point is Mount Ngerchelchuus on the northern part of Babeldaob Island, cited as ranging anywhere from about 242 m to 287 m (794 ft. to 941 ft.) in elevation (Crombie and Pregill 1999; Hein et al. 2005). The Palau Islands are physiographically diverse, with various areas categorized as volcanic, high limestone, low platform, reef, or atoll. Some islands (e.g., Koror, Peleliu, and Angaur) contain multiple physiographic areas. The northern group of larger islands form a dissected volcanic plateau characterized by rolling uplands, sharp ridges and cliffs, flat alluvial areas, and extensive coastal mangroves. Most of the Palau Islands are coralline limestone ridges covered by dense tropical vegetation. The climate within the archipelago is warm and humid; mean annual temperature is about 27.6°C (81.7°F) and average annual rainfall is about 376 cm (148 inches) per year (van der Brug 1984c). The wettest months are from July to October and the driest months are from December to April when northeast trade winds prevail. Although Palau lies outside the main paths of severe typhoons, the islands occasionally receive strong tropical storms. Most visitors to Palau are from Southeast Asia.

Figure A-5: The Republic of Palau



The Republic of Palau, commonly referred to as Palau

Summary details of the Republic of Palau:

1. Location: The Republic of Palau extends across nearly 240 km (150 mi) in western Micronesia between latitude 6°53’ to 8°12’N and longitude 134°07’ to 134°44’E. It is located about 770 km (480 mi) north of New Guinea, 800 km (500 mi) east of the Philippines, and 1,135 km (700 mi) southwest of Guam.
2. Number of islands: 250+ (approximately 200 of these are the uninhabited rock islands)

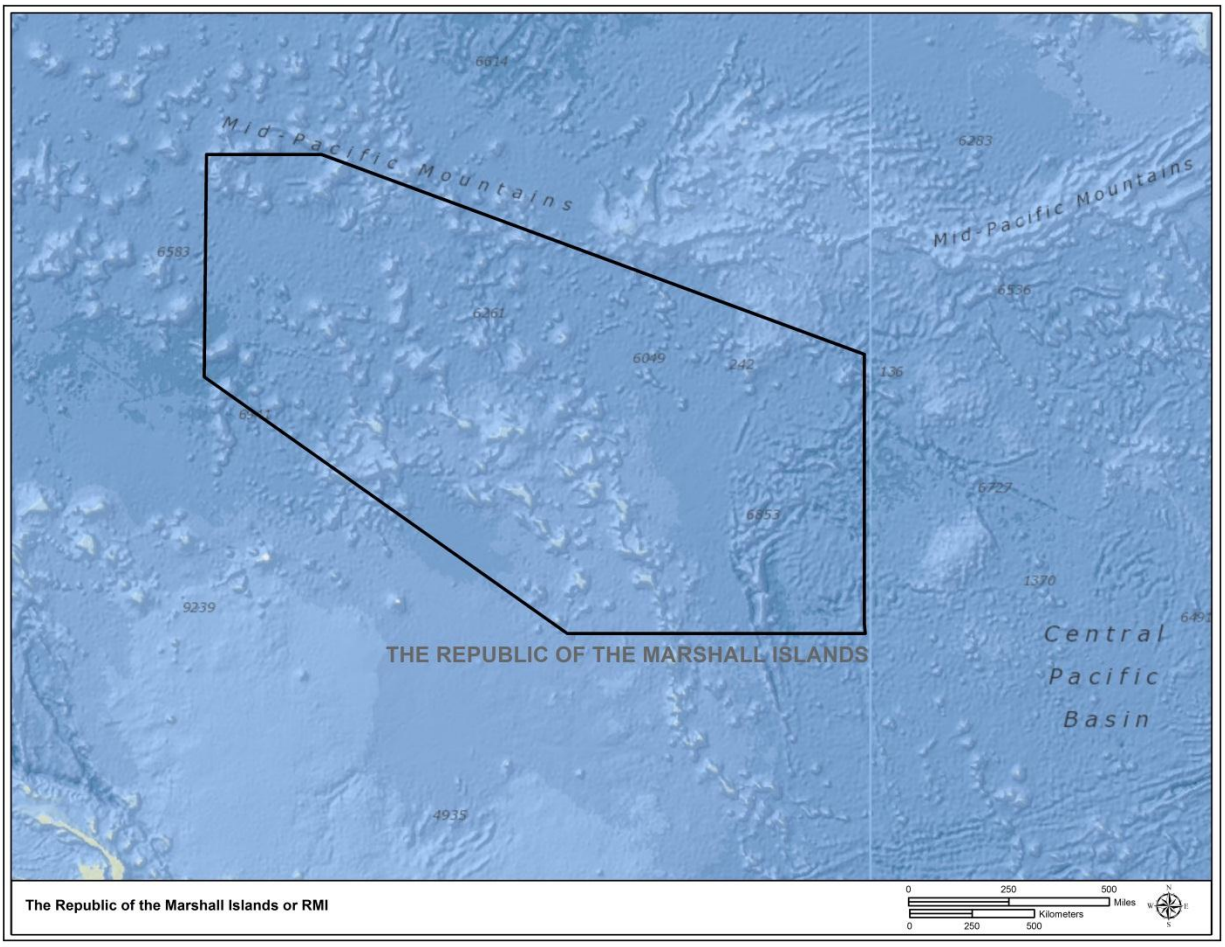
a. Koror
b. Barbeldaob
c. Angaur
d. Peleliu
e. Kayangel
f. Rock Islands
g. Southwest Islands

3. Size: 458 km^2
4. Population: approximately 21,000 spread across 16 states with more than half of the population living in the state of Koror
5. Main economic drivers: Tourism, agriculture, and fisheries
6. Examples of native species that are imperiled: Hawksbill Sea Turtle, Dugong (*Dugong dugon*), Micronesian Megapode, Saltwater Crocodile (*Crocodylus porosus***)**, Rock Island Palm (*Gulubia palauensis*), Palau Palm (*Ponapea palauensis*) (IUCN listed species)
7. Examples of established IAS of concern: Long-tailed macaque monkey (*Macaca fascicularis)*, Tilapia (*Oreochromis mossambicus*), Mikania (*Mikania micrantha*), Cogon grass (*Imperata cylindrica*), Philippine Fruit Fly (*Bactrocera philippinensis*), Praxelis (*Praxelis clematidea*), Water Hyacinth (*Eichornia crassipes*), Singapore ant (*Monomorium destructor*), Giant reed (*Arundo donax*), Cycad scale (*Aulacaspis yasumatsui*), Rats – (*Rattus spp.* 3 species) (PNISC 2013)
8. Examples of IAS of significant concern of establishing: Brown Treesnake, Little Fire Ant, Coqui Frog (*Eleutherodactylus coqui*), Red Imported Fire Ant (*Solenopsis invicta*), Other tilapia species, and hybrids, Other frogs, Ivy Gourd (*Coccina grandis*) (PNISC 2013)
9. Import examples: electronic parts, cars and beverages (Japan, Philippines, China, South Korea, Australia)and Milkfish (*Chanos chanos*) fry (Arthur et al. 2012) imported from Taiwan POC
10. Export examples: Marine products (93%) to Japan (94%)
11. Ports
    a. Air
        1. Palau International Airport on the island of Barbeldaob has international flights to and from various counties including: Guam (USA), Yap (FSM), Manila (Philippines), Seoul (South Korea), Taipei, and Narita (Japan). DoD also utilizes this airport.
    b. Sea
        1. Malakal Harbor, Malakal Islands is the main seaport

Republic of the Marshall Islands

The Republic of the Marshall Islands is composed of a large number of islands on the western side of Micronesia (Figure A-6). The Marshall Islands are bordered to the east by the Federated States of Micronesia, to the north by Wake Island, and to the south Kiribati and Nauru.

Figure A-6: The Republic of the Marshall Islands



Summary details of the Republic of the Marshall Islands:

1. Number of islands: 1156 islands spread out within 29 coral atolls and 5 isolated islands
   a. Majuro
   b. Ebeye
   c. Arno
   d. Kwajalein

e. Other islands
2. Size: 181 km^2
3. Population: 68,000 (2009 UN estimate)
4. Main economic drivers: Service, fisheries, and agriculture
5. Examples of native species that are imperiled: Hawksbill Sea Turtle, Leatherback Sea Turtle, Green Sea Turtle, Loggerhead Sea Turtle, Pacific Ridley Sea Turtle (*Lepidochelys olivacea*), Ratak Micronesian Pigeon (*Ducula oceanica ratakensis*), various cetaceans (IUCN listed species, CITES and/or RMI listed species)
6. Examples of established IAS of concern: Siam Weed (*Chromolaena odorata*), Merremia (*Merremia peltata*), Mile-a-minute Vine (*Mikania micrantha*), Ivy Gourd (*Coccinia grandis*), Rats (*Rattus* spp.), Feral Pigeon (*Columba livia*), Red-vented Bulbul (*Pycnonotus cafer*)
7. Examples of IAS of significant concern of establishing: Coconut Rhinoceros Beetle, Brown Treesnake
8. Import examples
    a. Giant Clam (for export to the US) imported from the FSM (Arthur et al. 2012)
    b. Coral (for export to the US) imported from the FSM (Arthur et al. 2012)
9. Export examples: Copra oil, Copra, Frozen fish
    1. Aquarium fish (US, Taiwan POC, China, Japan, Korea) (Arthur et al. 2012)
    2. Coral (US)
    3. Giant clams (US)
10. Ports
    a. Air (official ports of entry are listed, other minor airstrips exist)
        1. Amata Kabua International Airport, Majuro: 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. In 2003 the Republic of the Marshall Islands port authority took over the management of the airport from the Marshall Islands Airport Authority. Three airlines utilize this airport: United Airlines, Air Marshall Islands, and Our Airline. Japan Airlines also occasionally runs charter flights to Majuro direct from Tokyo. Air Marshall Islands provides links to the following islands: Airok, Aur, South Tarawa, Ebon, Enejit, Jaluit, Jen, Kaben, Kili, Kwajalein, Majkin, Maloelap, Mejit, Mili, Namdrik, Utirik, and Wotje. It is not clear how often flights take place nor what types of materials may be moving around the Marshall Islands via these linkages, but there is definite potential that IAS could be transported and internal mechanisms should be considered to reduce this potential. With the opening of Our Airline, Micronesia now (again) has direct air linkages with several South Pacific locations via flights from Majuro. Destinations with Our Airline from Majuro include: Fiji, Brisbane, Nauru, and Tarawa. Both passengers and air cargo are moved between Majuro and these destinations via multiple flights per week. 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.
        2. The Bucholz Army Airfield: This U.S. Army airfield is 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

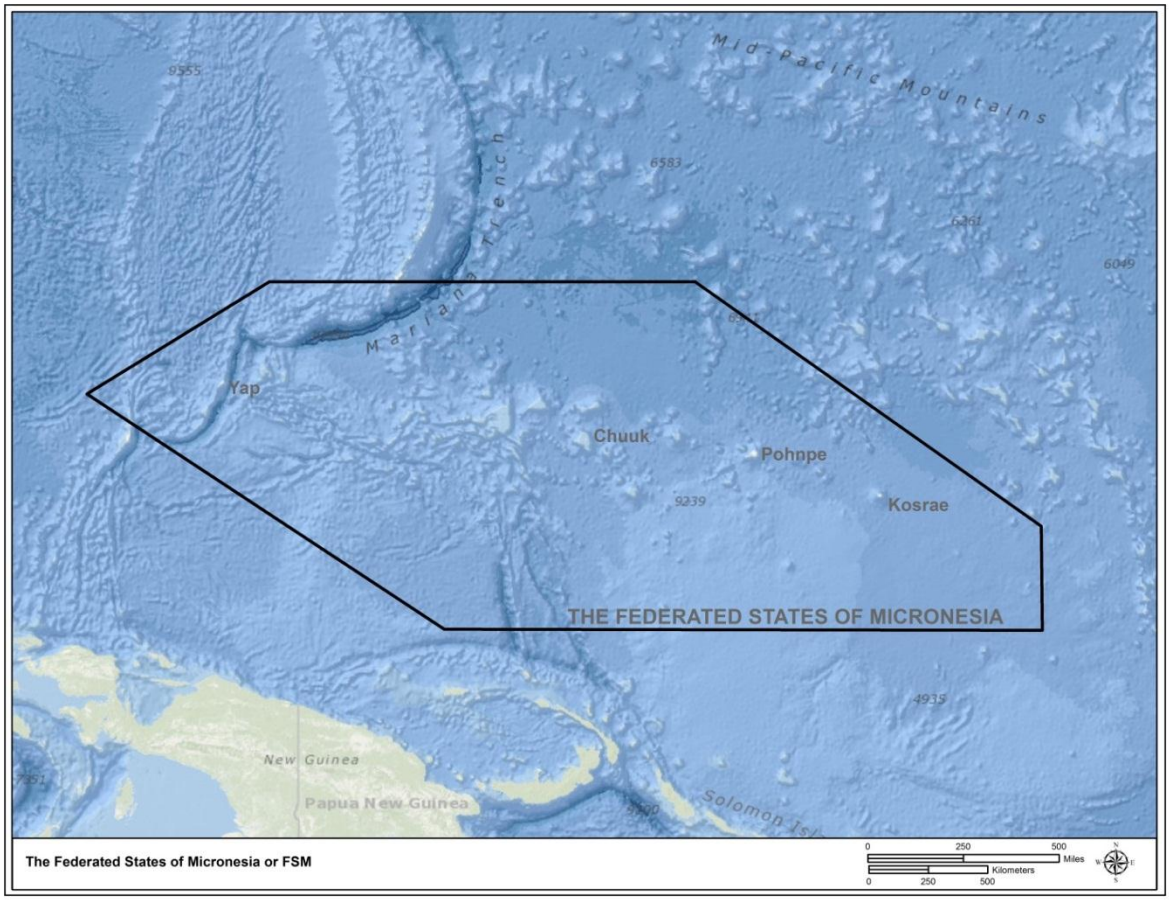
Ralik Chain and is 2,100 nautical miles (3900 kilometers) south west of Honolulu, Hawaii.

b. Sea (official ports of entry are listed, other anchorages also exist)
    1. Port of Majuro
    2. Port of Kwajalein

Federated States of Micronesia

The FSM comprises a vast region of over 600 islands spanning a distance of about 2,700 km (1,678 mi). It is located within that part of Micronesia and the western Pacific known as the Caroline Islands, just north of the equator and north-northwest of New Guinea (Figure A-7). The FSM is an independent island nation that includes four states, three located in the eastern part of the Caroline Islands (Chuuk, Pohnpei and Kosrae) and one (Yap) in the western part of the Caroline Islands. Most visitors to FSM are from the United States (43%), Japan (16%), and Europe (13%). IAS of concern already established in the FSM include: Mile-a-Minute (*Mikania micrantha)*, Cane Toad (*Rhinella marinus)*, various rat species (*Ratus* spp.), feral pigs (*Sus scrofa*) and feral cats *(Felis catus*) (FSM NBSAP 2002). Main imports are: food and beverages (topping the list were rice, poultry meat, canned fish and beer) (30% of total imports in 2005). Main exports are: offshore fish (91% total exports in 2005), reef fish, and betelnut. Japan and Guam are the two main recipients of exports. On a smaller scale, the FSM also exports coral, aquarium fish, *Tridacna* spp. (to Europe), and sponges (to New Zealand) (Arthur et al. 2012). Imports include: *Tridacna* spp. from Palau and the RMI.

Figure A-7: The Federated States of Micronesia



Summary details of the four states of the FSM:

a. Chuuk State (Figure A-8)
   Mean annual air temperature in Chuuk State is about 27°C (81°F) and varies little throughout the year. Annual rainfall averages about 356 cm (140 inches) per year, ranging from about 254-457 cm (100-180 inches) per year for the Chuuk Island group. Droughts are common; rainfall from January through March is about half that of the remainder of the year (Hamlin and Takasaki 1996).
   1. Location: The islands of Chuuk State are located between latitude 4° to 10°N and longitude 148° to 154°E.
   2. Number of islands: 19 high volcanic islands and about 65 smaller coralline islands divided into five major island groups: Chuuk, Western, Namonweito, Hall, and Mortlock (Hamlin and Takasaki 1996).
   3. Size: 91 km^2 (van der Brug 1983a). The volcanic islands comprise about 97% of the total land area (van der Brug 1983a).
   4. Population: 48,651
   5. Ports
      a. Air (official ports of entry are listed, other minor airstrips may also exist)
         1. Chuuk International Airport
         2. Satowan Airstrip
         3. Ta Airstrip
      b. Sea (official ports of entry are listed, other anchorages also exist)
         1. Weno Anchorage: This is the main seaport for the state of Chuuk.
         2. Satowan Anchorage
      c. Post office
         1. Weno

b. Kosrae State (Figure A-9)
   The summit of Mount Finkol (Mt. Crozer), elevation 629 m (2,065 ft.), is the highest point of the Kosrae island, and one of the highest peaks in the western Pacific (van der Brug 1984a). Mean annual air temperature near the coast is about 27°C (81°F) and fluctuates relatively little throughout the year. Annual rainfall is about 508 cm (200 inches) per year near the coast and as high as 571 cm (225 inches) inland, although the latter value was an estimate based on drainage runoff calculations rather than actual rainfall stations (van der Brug 1984a).
   1. Location: Kosrae is the easternmost of the Caroline Islands, situated near the equator between latitude 5°16’ to 5°23’N and longitude 162°55’ to 163°03’E
   2. Number of islands: 1
   3. Size: 110 km^2
   4. Population: 6616 (2010)
   5. Main trade partners: USA, Japan
   6. Main imports: food, building material and equipment, fuel
   7. Main exports: marine products, Kosrae lime
   8. Ports
      a. Air
         1. Kosrae International Airport
      b. Sea
         1. Lelu harbor

2. Okat harbor

c. Post office

1. Tofol

c. Pohnpei State (Figure A-10)

Pohnpei Island is the third largest island in Micronesia and contains the highest peaks which include Mt. Nahna Laud, at about 782 m (2,565 ft.) in elevation and Ngihneni Peak, at about 768 m (2,519 ft.) in elevation (van der Brug 1984b). Pohnpei Island is circular in shape, and the deeply dissected mountainous interior is dome shaped, with valleys and steep ridges extending radially to the coasts. Monthly air temperatures on Pohnpei Island are similar to those on Kosrae and also vary relatively little throughout the year. Pohnpei receives extensive rainfall that varies considerably with topography; mean annual rainfall in coastal areas and at the town of Kolonia is about 305-482 cm (120-190 inches). The greatest mean annual rainfall occurs in the interior highland rainforest with about 762-864 cm (300-340 inches) (van der Brug 1984b; Landers and Khosrowpanah 2004).

1. Location: between latitude 6°47’ to 7°01’N and longitude 158°06’ to 158°22’E.
2. Number of islands: Pohnpei State consists of the volcanic, high island of Pohnpei and six smaller atolls.
3. Size: 344 km^2 (Pohnpei island makes up most of the state’s territory at 334 km^2)
4. Population: 35,981 (2010 census)
5. Ports
   a. Air (official ports of entry are listed, other minor airstrips may also exist)
      1. Pohnpei International Airport
      2. Kapingamarangi airstrip
      3. Sapwuahfik airstrip
   b. Sea (official ports of entry are listed, other anchorages also exist)
      1. Mesenieng Harbor
      2. Temwem Harbor
      3. Kapingamarangi anchorage
   c. Post offices
      1. Kolonia
      2. Palikir

d. Yap State (Figure A-11)

Maximum elevation is about 183 m (600 ft.) on Yap Island and about 76 m (250 ft.) on the other islands. Mean annual air temperatures are about 27°C (81°F), with a maximum difference between monthly extremes of about 2.6°C (7.1°F) (van der Brug 1983b). Annual rainfall totals about 310 cm (122 inches) per year and on the islands of Yap and Tomil-Gagil about half of the yearly rainfall drains directly to the ocean.

1. Location: between latitude 9°27’ to 9°38’N and longitude 138°03’ to 138°12’E.
2. Number of islands: Yap proper is composed of four major islands which include Yap, Tomil-Gagil, Map, and Rumung. In addition there are 14 outer atolls reaching to the east and south for about 800 km.
3. Size: 100 km^2 (Yap proper encompasses approximately 98 km^2)
4. Population: 6300 (2003)
5. Ports
   a. Air (official ports of entry are listed, other minor airstrips also exist)
      1. Yap International Airport

2. Ulithi airstrip
3. Woleai airstrip

b. Sea (official ports of entry are listed, other anchorages also exist)
   1. Tomil Harbor
   2. Ulithi anchorage
   3. Woleai anchorage

c. Post office
   1. Colonia

Figure A-8: Chuuk State

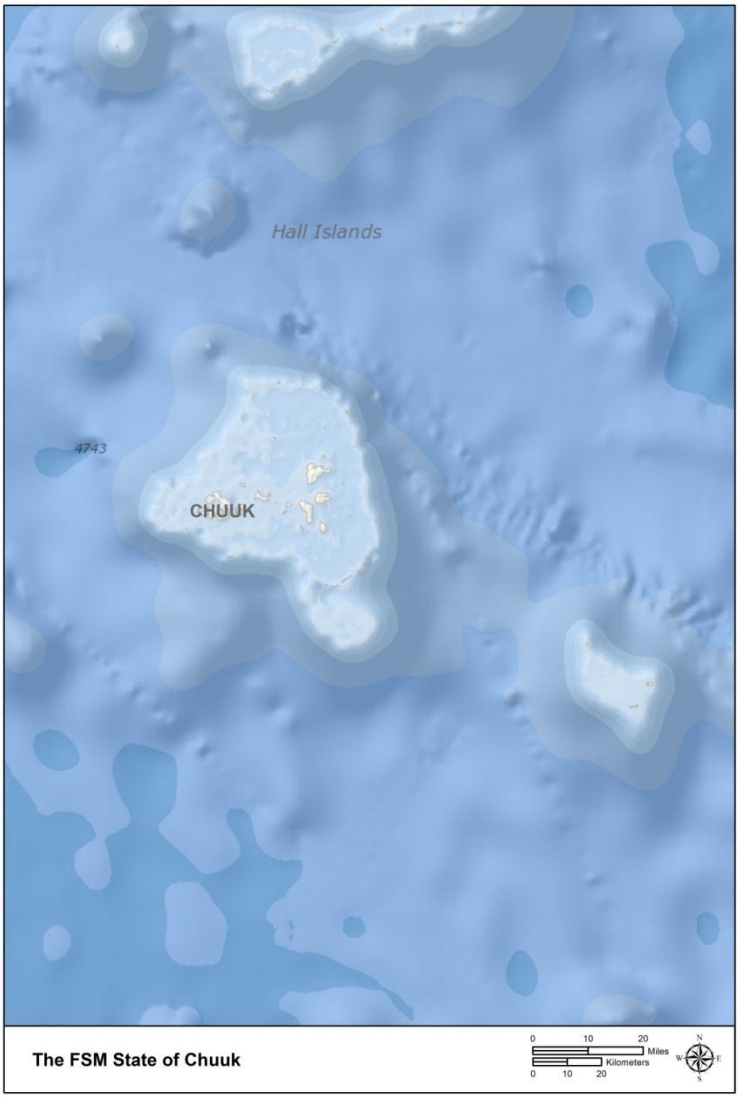


Figure A-9: Kosrae State

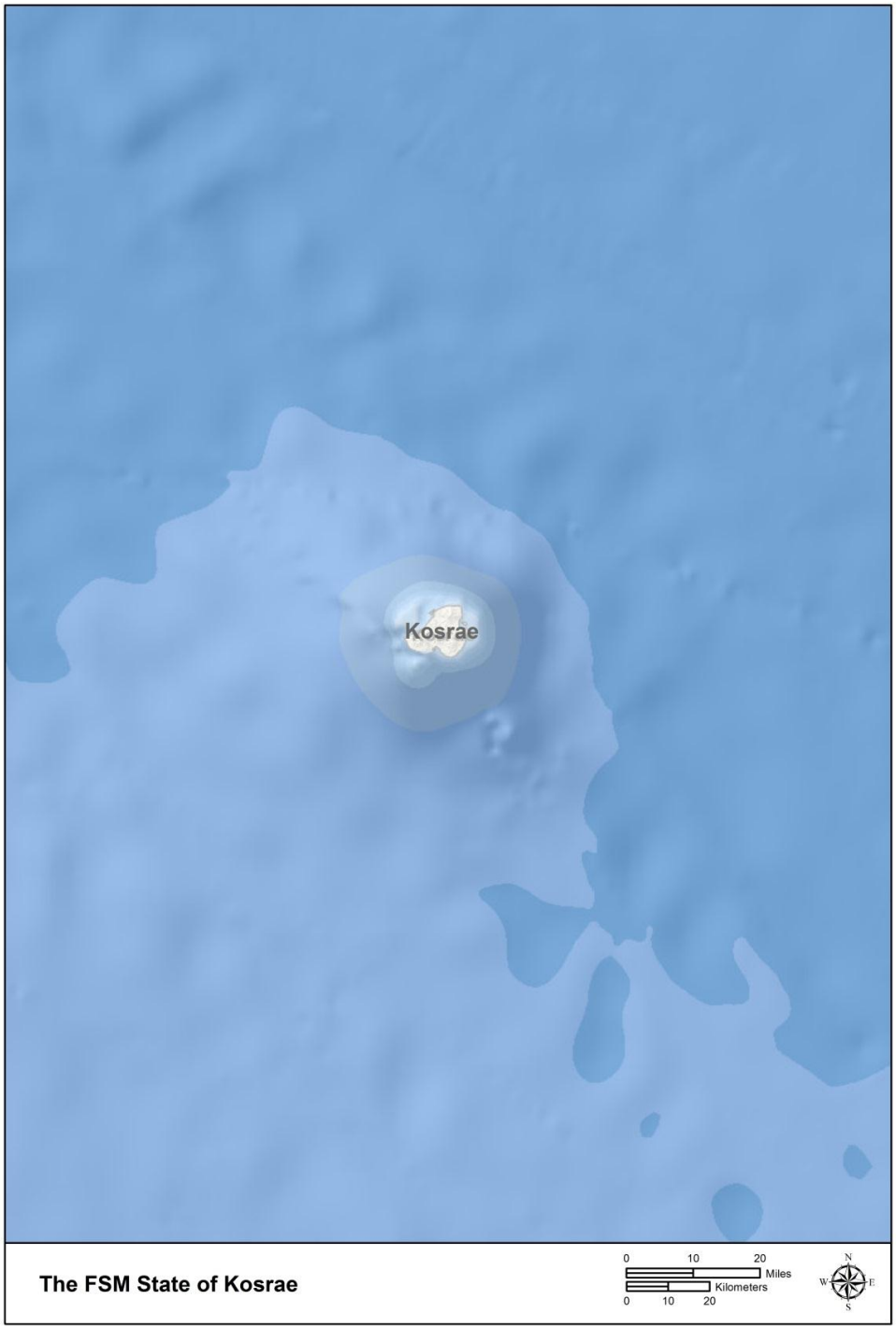


Figure A-10: Pohnpei State

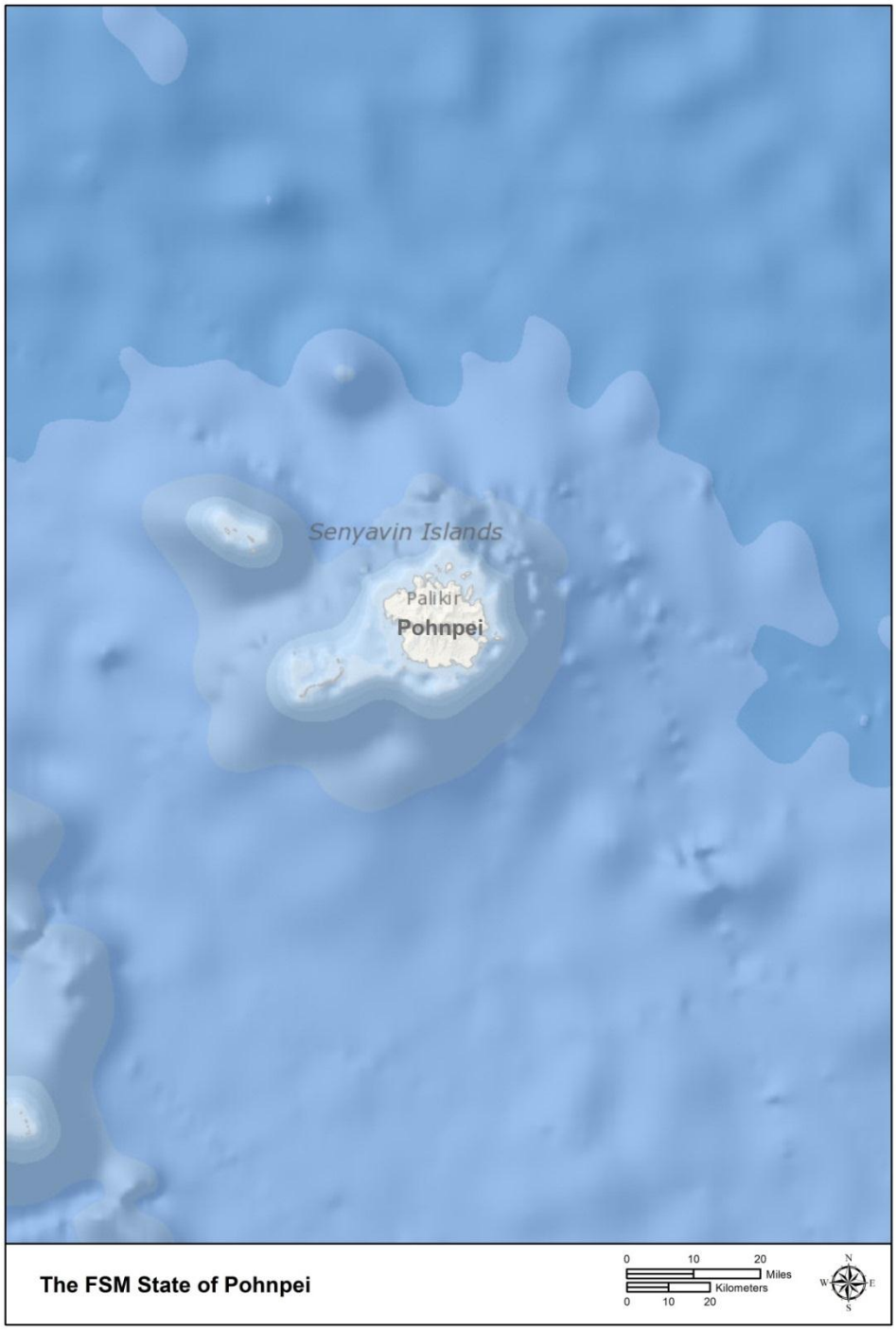
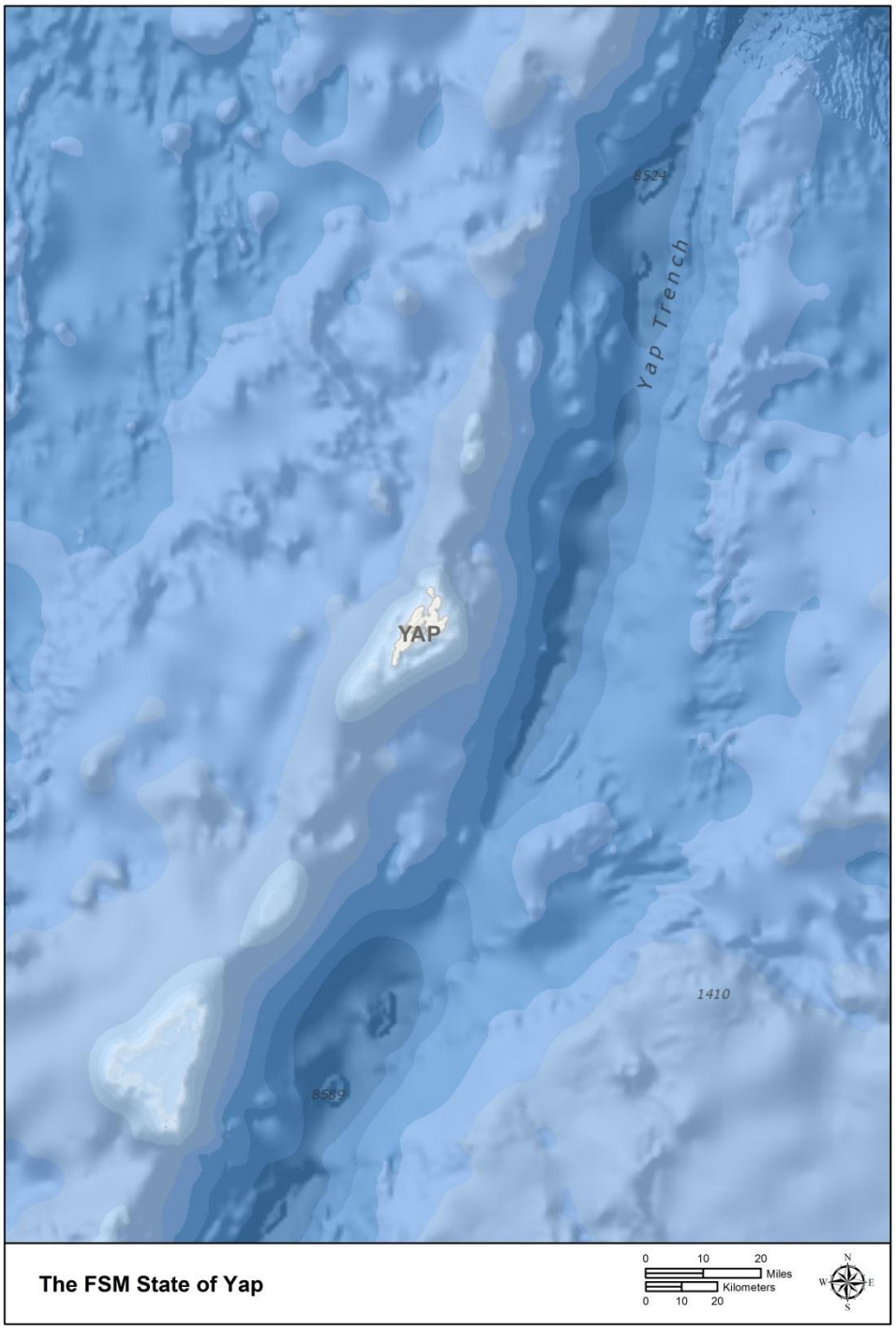


Figure A-11: Yap State



Attachment B: Existing Pertinent Rules and Regulations

The independent nations of the FSM, RMI and Palau have each entered a compact of Free Association with the United States. They are therefore not bound by the U.S. Constitution, but are subject to the National Environmental Policy Act, which was enacted prior to declarations of independence. National invasive species action plans have been formed by each of these countries (Pacific Invasives Initiative 2010).

A. Global Biosecurity Directives, Statutes and Regulations

The global concern about biological invasions is reflected by a diverse number of international agreements and strategies to minimize risks associated with invasions. These global agreements and strategies include, but are likely not limited to the following:

- The International Plant Protection Convention (1951, revision 1987; 1997 FAO Conference)
- The United Nations Convention of the Law of the Sea (1982, Article 196(1))
- The European Inland Fisheries Advisory Commission (EIFAC) Codes of Practice and Manual of Procedures for Consideration of Introductions and Transfers of Marine and Freshwater Organisms (1988)
- The Convention on Biological Diversity (1992, Article 8; see also Global Biodiversity Outlook 3 2010, www.cbd.int/GBO3)
- The World Trade Organization (Agreement on the Application of Sanitary and Phytosanitary Measures, 1995)
- The International Maritime Organization (IMO) (International Convention for the Control and Management of Ships' Ballast Water and Sediment, 2004)
- The International Council for the Exploration of the Sea (ICES) Code of Practice on the Introductions and Transfers of Marine Organisms (2004)
- The Convention on Biological Diversity's "Consideration for implementing international standards and codes of conduct in national invasive species strategies and plans" (2011): http://www.cbd.int/invasive/doc/cbd-invasive-species-strategies-en.pdf
- The International World Organization for Animal Health (Fifth Strategic Plan, 2011-2015)
- The United Nations Food and Agriculture Organization (FAO) Code of Conduct for Responsible Fisheries
- The FAO Code of Conduct for the Import and Release of Exotic Biological Control Agents

- The FAO/Network of Aquaculture Centers in Asia-Pacific (NACA) Asia Regional Guidelines on Fish Health

- The Convention on the International Trade of Endangered Species of Wild Fauna and Flora (CITES)

- The Global Convention on Migratory Species

- The Ramsar Convention on Wetlands, resolution VII.14: Invasive Species and Wetlands. http://www.ramsar.org/cda/en/ramsar-documents-resol-resolution-vii-14/main/ramsar/1-31-107%5E20830_4000_0__

As an example of how these international agreements work, trade in certain live organisms is regulated at the international level by CITES, to which the US and Palau are signatories, and whose conventions are followed in the FSM and the RMI. With the goal of protecting endangered or threatened species, CITES restricts the trade of organisms appearing in its three appendices. Of relevance to the region, giant clams (those in the Family Tridacnidae) and many coral species are CITES species, and are thus subject to specific restrictions. By working to protect CITES listed species, it is possible to address numerous invasive species concerns.

It is important to note that currently there are no international conventions specifically prohibiting trade of organisms considered to be non-native, invasive, or potentially invasive species. Trade in live marine organisms and plants/plant products are both known major vectors for the transfer of non-native species around the globe. Trade in other organisms such as reptiles is also likely an important contributor of both direct and indirect movement of non-native species.

B. United States Biosecurity Directives, Statutes, Regulations, and Guidance

A patchwork of U.S. Federal laws and regulations address invasive species. There is no one agency or office with sole leadership on, or authority for, invasive species within the United States. While many invasive plant issues fall under the purview of the U.S. Department of Agriculture, IAPS are also covered by agencies with additional oversight of aquatic invasive species. U.S. federal and local government mandates and regulations include guidance promulgated by USDA-APHIS, EPA, USFWS, and DoD. The U.S. does not have a specific biosecurity department or agency.

- Lacey Act of 1900: the Lacey act combats trafficking in “illegal” wildlife, fish, and plants.

- Animal Damage and Control Act: 7 U.S.C. §§ 426-426c, 2 March 1931, as amended in 1987 and 1991. This Act gives the Secretary of Agriculture broad authority to investigate and control certain predatory or wild animals and nuisance mammal and bird species.

- National Environmental Policy Act (NEPA) of 1969 [as amended 42 U.S.C. 4321 et seq.]: http://www.nepa.gov.jm/

- Endangered Species Act (ESA) of 1973 [as amended 16 U.S.C. 1531 et. seq.] requires U.S. federal agencies to not jeopardize the continued existence of any listed threatened or endangered species or adversely affect critical habitat for such species. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by USFWS and the National Marine Fisheries Service.

- Federal Noxious Weed Act of 1974 (7 U.S.C. 2814) although the Plant Protection Act (PPA) superseded and repealed most of the Federal Noxious Weed Act of 1974 (FNWA), it left intact section 15, "management of undesirable plants on federal lands" (7 U.S.C. 2814). Section 15 of the FNWA requires U.S. federal land management agencies to develop and establish a management program for control of undesirable plants that are classified under state or federal law as undesirable, noxious, harmful, injurious, or poisonous, on federal lands under the agency's jurisdiction (7 U.S.C. 2814(a)). Based on authorities established in the PPA, USDA-APHIS is the primary agency responsible for preventing introductions of invasive species into the U.S. and its territories. The APHIS plant protection and quarantine (PPQ) program is responsible for safeguarding agricultural and natural resources by implementing plant importation regulations and permitting, and operating the pest detection and the federal noxious weed programs.

- Executive Order (EO) 12114 – Environmental effects abroad of major Federal actions (January 4, 1979): the purpose of this EO is to enable responsible officials of federal agencies having ultimate responsibility for authorizing and approving actions encompassed by this EO to be informed of pertinent environmental considerations and to take such considerations into account, with other pertinent considerations of national policy, in making decisions regarding such actions.

- Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, revised and renamed the National Invasive Species Act in 1996 (as amended, p.l. 106–580, 29 December 2000) addresses unintentional introductions of aquatic invasive species. The act established the aquatic nuisance species task force under the leadership of the USFWS and NOAA. The act also promoted the development and implementation of state plans for managing aquatic species as well as regional panels (Guam and Hawaii are part of the western regional panel).

- Alien Species Prevention Enforcement Act of 1992: section 631 of the Treasury, Postal Service and General Government appropriations for fiscal year 1993, Public Law 102-393, 6 October 1992, requires the Secretary of Agriculture to operate a program to protect the state of Hawaii from the introduction of prohibited plants, plant pests, and injurious animals that may be contained in the mail.

- Wild Bird Conservation Act (WBCA) of 1992: importation of exotic birds into the U.S. must comply with APHIS and USFWS requirements. Certain exotic birds are protected by CITES and the WBCA.

- Executive Order 13112 (3 February 1999) created the National Invasive Species Council (NISC) and directed U.S. federal agencies to: prevent the introduction of invasive species; detect and respond rapidly to and control invasive species in a cost-effective and environmentally sound manner; restore native species and habitat conditions in ecosystems that have been invaded; promote public education on invasive species and the means to address them; and to not authorize, fund, or carry out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to prescribed guidelines, the benefits of such actions clearly outweigh the potential harm caused by invasive species and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

- Plant Protection Act (PPA) of 2000 consolidates the authorities formerly based within the Plant Quarantine Act, Federal Plant Pest Act (7 U.S.C. 150a et seq.), Federal Noxious Weed Act of 1974 (7 U.S.C. 2801 et seq.), and others (7 U.S.C. §7701 et seq.). The PPA allows the U.S. Secretary of Agriculture to restrict or prohibit the importation, entry, exportation or movement in interstate commerce, including Hawaii, Guam and the CNMI, of any plant, plant product, or noxious weeds. Plant products include all flowers, fruits, vegetables, roots, bulbs, seeds, or other plant parts. Noxious weeds are defined broadly to include any plant that may cause harm to "crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, the natural resources of the U.S., the public health, or the environment" (7 U.S.C. 7702). Civil and criminal penalties for violations of the PPA serve as a deterrent to individuals and businesses interested in cultivating or transporting invasive plant species and other invasive organisms.

- Animal Health Protection Act (AHPA) of 2002: the AHPA is purposed to prevent, detect, control, and eradicate diseases and pests of animals in efforts to protect animal health, the health and welfare of the people of the United States, the economic interest of the livestock and related industries of the U.S., the environment of the U.S., and the interstate and foreign commerce of the U.S. in animals and other articles (7 U.S.C. § 8301 et seq.).

- Animal Welfare Act (AWA): a modification to AWA, the Animal Fighting Enforcement Act of 2007, made interstate commerce of a bird for the purpose of participation in a fighting venture illegal, regardless of the law in the destination state, including Guam.

- Implementing recommendations of the 9/11 commission act of 2007: the implementing recommendations of the 9/11 commission act of 2007 (public law 110-53) implements some of the recommendations of the 9/11 commission including mandating 100% inspection of all air and sea cargo entering the U.S., and a new method of redistributing antiterrorism funding.

- National Defense Authorization Act of 2008, public law 110-181, section 314: requires prohibiting the transport and spread of Brown Treesnake via aircraft.

- USCG Regulations 33 CFR Part 151 and 46 CFR Part 162 will enter into force on 21 June 2012 and apply to all new ships constructed on or after December 2013 as well as to existing ships from 2014 onwards at certain time intervals. The USCG is amending its ballast water management regulations by establishing a standard for the allowable concentration of living organisms in ships' ballast water discharged in U.S. waters. The USCG is also amending its engineering equipment regulations by establishing an approval process for ballast water management systems. Ships calling at U.S. ports and intending to discharge ballast water must either carry out exchange or treatment, in addition to fouling and sediment management (there are some exceptions to this). The exchange of ballast water will only be allowed until the implementation deadlines for treatment systems. A third option is to use potable water (from the U.S. public water system) and in such case the ballast tanks need to be cleaned and sediments removed beforehand.

- USDA-APHIS plant health regulations (title 7 code of federal regulations): 7 cfr §§ 318.13-9; 318.60; 319; 330.111; 330.400-403.

- USDA-APHIS animal health regulations (title 9 code of federal regulations): 9 cfr §§ 71-89, 92, 93, 93.201, 209, 94.5, 94.6, 95, 166.

- USDA animal product manual: guidelines for regulating the importation of specific animal products and by-products. The manual can be downloaded at: http://www.aphis.usda.gov/import_export/plants/manuals/ports/apm.shtml

- USDA combined animal and plant health risk ratings for countries: USDA-APHIS analysis of relative risks presented from other countries as a result of animal and plant diseases found inside their borders (CPHST, VS-center for epidemiology and animal health, October 2010).

- USDA fruits and vegetables import requirements (FAVIR) online reference: www.aphis.usda.gov/favir/

- USDA-APHIS manual for agricultural clearance: the APHIS manual of agricultural clearance (MAC) provides comprehensive guidance for practices required for safeguarding imported products and articles. Safeguarding is a preventive action for handling, maintaining, or disposing of prohibited or restricted products and articles to maintain cargo control and eliminate the risk of plant and animal pest and disease dissemination. The manual can be downloaded at: http://www.aphis.usda.gov/import_export/plants/manuals/ports/downloads/mac.pdf

- USDA-APHIS PPQ manuals: guidelines for regulating the importation of specific plants, plant products, and international regulated garbage.

In the U.S., some non-native species are specifically listed and prohibited from importation by the Lacey Act 1900 (for animals) and the Plant Protection Act 2000 (for plants and plant pests). Organisms listed as "injurious wildlife" are prohibited for importation or interstate movement of live

organisms without a federal permit. Organisms listed as "noxious weeds" under the Plant Protection Act are also prohibited for importation into the U.S. or transportation across state boundaries without federal permit. The importation of live organisms into the U.S. for any purpose, including food, pets, bait, and aquaculture is regulated through the USFWS and the USDA for animals and plants (and plant pests), respectively. Importers and exporters are required to have a license to do business, to file a declaration at an official port of entry, and to receive clearance from Customs before these goods can be released. In most cases, they also need to present health certifications from the importing country. In addition to U.S. federal regulations, many states and territories, including Hawaii, Guam and CNMI, have their own regulations regarding live organism imports. In general Hawaii, Guam and the CNMI, as U.S. jurisdictions, must abide by U.S. Federal regulations and requirements.

Enforcement of U.S. live import regulations is carried out by state and federal quarantine inspectors at airports and seaports. On Guam and CNMI, imports of wildlife arriving by air or sea cargo are monitored by USFWS (Guam), U.S. Customs and Border Patrol, Department of Fish and Wildlife (CNMI) and DAWR, with some assistance from NOAA (Guam) when illegal imports of marine life are suspected. Under federal law, U.S. mail cannot be inspected unless there is a reason to suspect that it contains an illegal substance or import, so routine inspections are not carried out on mail arriving into Hawaii, Guam, or CNMI.

All commercial airline baggage is screened by Transportation Security Administration (TSA) agents/airline employees upon departure using X-ray machines on Guam, Saipan, and Hawaii. Inspectors are looking for weapons and other prohibited items, but could potentially find and confiscate live organisms.

Regulatory drivers are in place to prevent the transport of vertebrate species within the U.S., but these regulations are only realized under well-funded, comprehensive enforcement.

Two pertinent regulatory drivers are the National Defense Authorization Act (NDAA), Public Law 110-181, Section 314 that requires prohibiting the transport and spread of Brown Treesnake via aircraft, and the Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990 that authorizes a cooperative program to control Brown Treesnake outside its historic range. These two regulations if fully implemented could result in the mandatory 100% inspection of vessels and cargo departing Guam.

Enforcement of existing biosecurity regulations may differ across sectors. For example, the military is exempt from biosecurity inspections if such inspections jeopardize national security (e.g., when craft is actively engaged in warfare, cargo is classified, or mission is an emergency situation). Also, within the United States, regulatory drivers have the tendency to differ in level of enforcement by state. This is seen in the implementation of biocontrol where policies can differ vastly in stringency by state, leading to disjointed implementation of the regulation (Messing and Wright 2006). Therefore, monitoring and surveillance of enforcement such as detailed reports, summaries of prosecution of regulation breaches, and corresponding trends of introduction incidences are all

necessary checks and balances to evaluate the efficacy of the upholding of regulations regarding invasive species through enforcement.

Biological Opinions (BOs), resulting from Endangered Species Act consultations, are critical regulatory drivers for the management of species including some IAS such as Brown Treesnake.

C. United States Department of Defense Biosecurity Guidance and Instructions

- Air Force Instruction (AFI) 32-1053 integrated pest management program
- AFI 32-7064 integrated natural resources management
- Air Force Joint Instruction (AFJI) 48-104, quarantine regulations of the armed forces: incorporates regulations to mitigate the risk for introduction and dissemination of arthropod vectors by movement of vessels, aircraft, and other transport of the armed forces arriving at or leaving U.S. and foreign ports, installations, or other facilities. The quarantine regulations of the armed forces (QRAF), AFJI 48-104, states that cargo is subject to inspection by a representative of the USDA to prevent the introduction or spread of animal and plant diseases or pests (DoD 1992). For the purposes of these regulations, Guam is considered part of the U.S. DoD maintains customs and border clearance policies and procedures for wildlife, agricultural and animal products, pets, plants and plant products.
- Air Force Policy Directive (AFPD) 32-10 installations and facilities
- Armed Forces Pest Management Board (AFPMB) Technical Guide No. 31 (2004): delineation of responsibilities for the military with meeting USDA APHIS requirements for internal and external inspections for terrestrial vertebrate species, insects, and plant species. This guide covers retrograde wash-downs–cleaning and inspection procedures.
- Andersen Air Force Base Integrated Pest Management Plan
- Army Regulation 40-12 quarantine regulation of the armed forces
- COMNAVMAR Instruction 5090.10a: Brown Treesnake control and interdiction plan. This instruction outlines specific responsibilities and establishes policy for coordination and procedures governing the control and interdiction of Brown Treesnake on Navy installations on Guam and during military training within the Commander, U.S. Naval Forces Marianas (COMNAVMAR) Area of Responsibility (AOR).
- DoD Instruction 4150.07 DoD pest management program
- DoD Foreign Clearance Manual 25 January 2012 issued under authority of DoD Directive 4500.54e

- DoD Instruction 4500.9-r defense transportation regulations: (http://www.transcom.mil/dtr/part-i)
- DoD Instruction 4715.03 natural resource conservation program
- DoD Directive 5158.04 U.S. Transportation Command (USATRANSCOM)
- DoD memorandum: DoD memorandum outlines Navy personnel with authority to inspect and issue ship sanitation certificates (ship sanitation control exemption certificate and ship sanitation control certificate) for Navy, Army, military sealift command, Coast Guard, and National Oceanic and Atmospheric Administration vessels to provide standard procedures and policy-IAW article 39 of the WHO 2005–certificate (good for 6 months) with section for observed rodent infestations.
- Defense electronic foreign clearance guide (https://www.fcg.pentagon.mil/fcg/fcg.cfm)
- DoD SDDC PPCIG 2010 personal property consignment: the DoD personal property consignment instruction guide online system, which provides guidance to military and DoD civilian personnel being assigned to foreign duty stations, states that there are "no restrictions identified" for plant movement into Guam.
- Guam and the CNMI military relocation EIS/OEIS: the Guam and the CNMI military relocation EIS/OEIS provides a description of military relocation plans, schedules, impacts and mitigations.
- MIL-STD-904b: provides guidance on the detection, identification, and prevention of pest infestations.
- Naval supplemental publication number 486, volume 1: Naval policy parallels APHIS requirements for foreign garbage.
- NAVFAC Pacific 2010: master planning process, Navy sustainability summary report
- NAVMED P-5010-8, the Naval Manual of Preventative Medicine, Chapter 8, Navy Entomology and Pest Control Technology (U.S. Navy BMS 2004) outlines preventive measures for rodent control on ships, including proper sanitation, pier side inspections, rat guards, illumination and movement restrictions, glue boards, snap traps, and limitations on vessel access points.
- NAVMED p-5052-26: U.S. Navy shipboard pest control manual provides guidance on inspection and de-ratting procedures for ships.
- Naval Base Guam Integrated Pest Management Plan
- OPNAVINST 5090.1D Environmental Readiness Program

- OPNAVINST 6210.2: quarantine regulations of the Navy. This instruction is intended to prevent the introduction and dissemination, domestically or internationally originated, of diseases affecting humans, plants, and animals; prohibited or illegally taken wildlife; arthropod vectors; and pests of health and agricultural importance. USDA APHIS PPQ personnel may inspect cargo to prevent the introduction of plant and animal pests or diseases.
- OPNAVINST 6250.4b pest management program
- SECNAVINST 6210.2a afr 161-4, DoD, 1992, section 9: rat guards are used at ports with known rodent infestations
- Senior officer present afloat Pearl Harbor instruction 5000.1g
- Subsistence manual COMDTINST m4061.3c: waste disposal requirements
- USAF 36 WG INSTRUCTION 32-7004 (2006) Brown Tree Snake Management
- USAF 611 CES Wake Island biosecurity plan

D. Territory of Guam Biosecurity Directives, Statutes, and Regulations

- Guam Administrative Rules and Regulations (GARR) Titles 8, 9, and 10: Title 8, division 2-plant industry, chapter 10 provides regulations for food and agriculture and importation of plants and plant products. Title 9, division 1, chapter 1 of the GARR provides regulations regarding the importation of live animals. Section 2 of § 1103 (GARR) states that under no circumstances shall any animal be turned loose at the port, and that hogs and sheep may be confined in temporary pens or crates, cattle and horses may be tied, and dogs and cats shall be confined in crates. GDOA: Title 8 GARR chapter 10; Title 9 GARR 1 §§ 1100-1113, 2101 and 2102, division 1, chapter 1. Title 9 GARR, division 1, chapter 1, § 1109 requires that all cats and dogs originating from Africa, Asia, or islands of the Pacific Ocean (except Australia, Hawaii and New Zealand) must have a certificate from the national chief livestock sanitary officer stating that the animals originated in a state, country, or other political subdivision officially declared free of Surra, animal African Trypanosomiasis, and Leishmaniasis. Title 9 GARR 1 § 1110 of Guam territorial regulations require all imported birds and hatching eggs to be accompanied by an entry permit and a health certificate approved by the chief livestock sanitary officer, or a state or federal veterinarian. Subchapters §§ 2101 and 2102 provide regulations for the importation of pet birds (all birds except poultry).
- Title 5 Guam Code Annotated (GCA) §60108: the importation of pets to Guam is regulated by the Guam Department of Agriculture (GDOA). Title 10 GCA chapter 34 article 3 states that animals imported are to complete a maximum of 120-day confinement in a commercial quarantine facility.

- Guam public law 31-43 establishes the Guam invasive species council (GISC) and states that GISC will develop a Guam invasive species management plan (GISMP). This law also authorizes the Guam Department of Agriculture to establish a Guam Invasive Species Inspection fee. This fee is to support an invasive species coordinator position for Guam and to fund a biosecurity division within the Guam Department of Agriculture. This law and the GISC are to support and update the Guam interagency biosecurity task force work plan originally established 10 November 2009. The Guam invasive species council (GISC) was established in 2005 by executive order no. 2005-13 and enacted into law in 2011 by bill no. 111-31 (COR). The purpose of the GISC is for "providing policy direction, coordination, and planning among government of Guam departments and federal government agencies; to provide local initiatives for the control and eradication of harmful invasive species throughout the island of Guam; and to assist in preventing the introduction of other invasive species that may be potentially harmful to Guam". The GISC is co-chaired by the director of the GDOA, and the president of UOG. Other members include the directors of GCQA, Department of Administration, Bureau of Statistics and Plans; the Homeland Security advisor; the administrator of the Guam EPA; the executive manager of the Guam International Airport Authority, the general manager of the Port Authority of Guam, and the Guam Visitors Bureau. The GISC will develop an invasive species management plan which shall "detail and recommend performance-oriented goals and objectives and specific measures of success for Government of Guam agency efforts concerning invasive species". The plan will be updated biennially. Bill no. 111-31 also establishes the Guam invasive species inspection fee and fund which imposes a one dollar per ton fee on all freight brought into Guam. The fees collected will be used to "support efforts to provide inspection, quarantine, and eradication of invasive species contained in freight brought to Guam; support efforts to eradicate invasive species present on Guam by means of a rapid response team; and develop the Guam invasive species management plan and its updates." Finally, the bill authorizes the Department of Agriculture to "create a biosecurity division to function as its first responders in efforts to address invasive species coming to, and present on, Guam." **Bill No. 111-31 (Cor) "An Act to Add a New Chapter 70 to Division 6 of Title 5, Guam Code Annotated, Relative to Establishing the Guam Invasive Species Council; to Establishing the Guam Invasive Species Inspection Fee and Fund; and to Authorizing the Department Of Agriculture To Establish A Biosecurity Division**"

- Agricultural inspections and quarantine of cargo in Guam are performed by APHIS PPQ as well as GDOA. The authority to "inspect cargo, stores, quarters, baggage and any other thing" is granted to GDOA according to Title 5 GCA § 61103. Regulations exist for the importation of nursery stock, herbs, rhizomes, seed, leaf, root, fruit, or any other plant-growth or plant-product to Guam (Title 9 GARR 1-§4201). Importation and sale of aquatic plants is limited to a white list, however, this list is not codified in rule or statute. Commercial shipments of aquatic plants are held by GCQA until DAWR can inspect the contents and confirm plants are on the white list. Guam's Department of Aquatic and Wildlife Resources (DAWR) maintains an informal "white list" of marine and aquatic organisms that can be imported live, including aquarium species and

food species, such as New England lobster (*Homarus americanus*) and Pacific oysters (*Crassostrea gigas*). The white list mainly includes species already present on Guam (native or already established non-natives) and those that have a long history of importation into Guam with no known negative impacts. A few organisms are allowed for import only for Underwater World, Guam's main public aquarium, as the biosecurity and sanitation procedures at the aquarium presumably meet high standards. Permits must be obtained to bring in species on the white list, even small numbers of individuals for personal use. Importers can submit requests for permits to import organisms not on the list; these are reviewed and approved on a case-by-case basis, with the onus on the importer to prove an organism is not harmful. Importers must have a certificate of health from the point of origin for organisms being brought to Guam.

- As a territory of the United States, Guam is subject to Federal regulations that restrict the importation of certain live aquatic animals intended for aquaculture food production. For example, under the injurious wildlife provisions of the Lacey Act (P.L. 97-79 as amended), the USFWS prohibits the importation and interstate transport of certain injurious terrestrial and aquatic animals, including various species of mammals, birds, fish, amphibians, reptiles, mollusks, and crustaceans.

- Any animal found clinically affected or recently exposed to any infectious, contagious, or communicable disease or infested with ectoparasites must be returned to the point of origin or destroyed (GARR 2004).

E. State of Hawaii Biosecurity Directives, Statutes, and Regulations

Hawaii has the most extensive and active IAS policies in the Region. Large amounts of cargo move through Hawaii before passing on to other locations including Guam. Materials from foreign countries or U.S. territories are inspected by U.S. Customs, USDA PPQ, or U.S. Fish and Wildlife Service Law Enforcement Division (USFWS - LE). USDA APHIS and PPQ conduct pre-departure agricultural inspections of baggage and cargo leaving Hawaii and heading to the U.S. Mainland or Guam. No agricultural/quarantine inspections are made on cargo leaving the region except in Hawaii.

- Hawaii Department of Agriculture (HDOA) is the sole state agency with responsibility to prevent introductions from the U.S. to ports in Hawaii. The HDOA plant quarantine program is responsible for inspecting domestic cargo and passengers incoming to Hawaii air and sea ports (HRS 150a) (Ikuma et al. 2002). Imported plants are either regulated (require permits, treatments and /or require quarantine, or may be prohibited), restricted (noxious weed list), or allowed entry subject to inspection and clearance (Shluker 2003).

- Hawaii's Department of Agriculture maintains a list of organisms that cannot be brought into the state, including many marine fishes and some species of crabs, octopus, and jellyfish (scyphozoans), as well as a list of conditionally approved and restricted organisms, both of which contain numbers of marine species. An importer must have a permit to import anything on the

list of conditionally approved organisms. Businesses wishing to import organisms on the restricted list must, as a condition of obtaining a permit, undergo a site inspection. Although terrestrial plants, microorganisms, and pathogens appear on the various lists, we could find no lists for macroalgae. The state's rules and lists are available on the state Department of Agriculture's website: http://hdoa.hawaii.gov/.

- The Hawaii Division of Aquatic Resources (HDAR) in the Hawaii Department of Land and Natural Resources (HDLNR) is responsible for management of Hawaii's aquatic resources (HRS 187a-2.1). Release of non-native fish or other aquatic life into state waters is prohibited (except for permitted fish stocking) and HDLNR staff may seize, confiscate, or destroy any prohibited or restricted organisms (HRS 187a-6.5). Violation of this statute may result in a petty misdemeanor charge and a fine from $250 to $1000 (HRS 187a-13).

- The Hawaii Invasive Species Council (HISC), established in 2003 by HRS 194-2, is co-chaired by the HDLNR and the HDOA. The HISC has five working groups that make recommendations to the council; the prevention working group is chaired by the HDOA and recognizes the need to understand and minimize all pathways for both terrestrial and aquatic species into Hawaii and between Hawaiian islands. Designation of noxious weeds follows criteria set by the HDOA (HRS 152-2). The list of invasive species recognized by the HISC (HAR 4-68) is nearly 20 years old and includes just three freshwater aquatic plants: Budda Pea (*Aeschynomene indica)*, Giant Sensitive Tree (*Mimosa pigra)*, and Torpedo Grass (*Panicum repens)* (HAR 4-68). The import or sale of Giant Salvinia (*Salvinia molesta)*, Common Salvinia (*Salvinia minima)* and Water Cabbage (*Pistia stratiotes)* plants and propagative material is prohibited by statute (HRS §150a-6.1). The authority to control recognized invasive species, including noxious weeds, on private property is granted through HRS 194-5 to any department that is a member of the HISC.

- The HISC provides policy recommendations, coordination and planning between agencies and initiatives for the control or eradication of potentially harmful invasive species (HRS 194-2). HISC developed the Hawaii invasive species strategy 2008-2013. County-level invasive species committees (ISCs) exist on the Big Island (Hawaii), Kauai, Maui, Molokai and Oahu. County ISCs focus on localized needs for early detection, rapid response and outreach to the general public.

- The Hawaiian Ecosystems at Risk (HEAR) project (http://www.hear.org/) provides "technology, methods, and information to; and to facilitate communication among: decision-makers, resource managers, and the general public to help support effective science-based management of harmful non-native species in Hawaii and the Pacific". HEAR provides general information regarding the threat of invasive species, as well as a species-specific bibliography and other information. Information on weed risk assessments (WRA) are available on the HEAR website, including the Hawaii/Pacific weed risk assessment protocol (HPWRA). HPWRA was developed based on the Australian and New Zealand WRA (Daehler and Carino 2000; Daehler et al. 2004). The HPWRA is designed to identify species with high and low risk for invasion. Working in

tandem with HPWRA, the Hawaii exotic plant evaluation protocol (HEPEP) gathers field observations of plants in order to evaluate ecosystem impacts.

F. Commonwealth of the Northern Marina Islands Biosecurity Directives, Statutes, and Regulations

Offices in the CNMI that play a role in biosecurity include: CNMI Department of Lands and Natural Resources including the Division of Fish and Wildlife and the Division of Agriculture and the CNMI Department of Finance, Division of Customs. The CNMI Division of Agriculture in the Department of Land and Natural Resources (DLNR) is responsible for inspection of imported and exported commercial and passenger cargo and implements quarantine programs in order to protect natural resources from invasive species. DLNR agricultural inspectors are, similar to operations by GCQA in Guam, guided by Federal regulations and work under the guidance of APHIS PPQ (D. Berringer, APHIS-PPQ, pers. comm.).

Imports to CNMI are regulated by USFWS and the Commonwealth's Department of Fish and Wildlife (DFW) and the Department of Agriculture. The DFW website (http://www.dfw.gov.mp/Enforcement/Fishing%20Regulations.html) lists species that are allowed for importation; these include several species of birds and mammals. No amphibians or reptiles are permitted. For invertebrates, including marine invertebrates, only those that can be demonstrated to be "not harmful" are permitted. Marine invertebrate importations tend not to be closely regulated. Giant clam spat (young clams)have been provided to the CNMI from Palau on several occasions over the past 25 years. The only requirements were health certificates from Palau that stated that the clams were not harmful for human consumption. No fish or algae are listed on the DFW website, although enforcement officers are using an unofficial "white list" of freshwater fish species from Australia to make determinations for import permits to CNMI. These rules apply regardless of the number of individuals or purpose of the importation.

Aircraft from foreign countries arriving in the CNMI are cleared by CNMI Quarantine. Fourteen quarantine officers are assigned to the Saipan Airport. Intensive blooms/blossoms and cut flowers examinations are undertaken to check for import violations, and orchid shipments are limited to a total of 12 individuals per shipment. Plants imported into CNMI arrive via Guam from California or Hawaii. Propagative plant shipments and cut flowers are inspected for plant pests and diseases and for import permit violations. Every large bag or box brought into CNMI by a foreign passenger is inspected visually. The CNMI is part of the alien snake rapid response team and has federal and commonwealth staff on the ground to inspect incoming cargo and planes from Guam for Brown Treesnakes. Current Brown Treesnake inspection capacity includes visual searches, detector dogs, and sentinel traps as well as specific quarantine facilities at the sea ports in Saipan and Tinian.

- Council on environmental quality (CEQ): environmental impact statement; 40 CFR §§ 1502.09 and 1502.20

- CNMI regulations part 5 sections 10 and 20 cover importation and introduction of animals to the CNMI. Section 10 includes a list of permitted species (and also indicates some prohibited species or groups of species). These regulations are enforced by the CNMI DLNR.

G. Republic of the Marshall Islands Biosecurity Directives, Statutes and Regulations

Offices in the RMI which pay a role with biosecurity include: the Ministry of Resources and Development, Department of Quarantine and the Environmental Protection Authority; Ministry of Finance, Division of Customs, Treasury, Revenue, and Taxation. Within the RMI, inspections of aircraft and vessel cargo, baggage and ships stores are permitted by agricultural quarantine inspectors who have authority to seize and destroy any materials subject to plant and animal quarantines and regulations (MIRC Title 8 §102 et seq.). The Division of Agriculture in the RMI Ministry of Resources and Development processes plant quarantine permits for all plants, plant parts, and seeds, but it is unclear what specific plants are currently prohibited from import, export, or transit within RMI. The Marshall Islands Invasive Species Taskforce (MIIST) has drafted the Marshall Islands Invasive Species Taskforce Strategic Action Plan 2007-2010 that addresses threats to marine habitats, including ballast water introductions, and four targeted organisms (fire ants and three terrestrial species) (Pacific Invasives Initiative 2010). The Ministry of Resources and Development enacted its Animal and Plant Inspection Act in 2004. The act is responsible for the protection of endangered areas and the designation, maintenance, and surveillance of pest-free areas and areas of low pest prevalence. It is also responsible for the inspection of consignments of plants and plant products moving in international traffic and, where appropriate, the inspection of other regulated articles, particularly with the object of preventing the introduction and/or spread of pests. The RMI has trained inspectors who are part of the regional alien snake rapid response team and they have an ERP for alien snakes.

The RMI does not maintain a list of either prohibited or allowed marine species. Requests for importation permits are decided on a case-by-case basis by Marine Resources and Agricultural Quarantine. For a permit to be approved, an importer must make the case that a proposed species does not pose an environmental threat. A health certificate from an independent veterinarian must accompany live imports. The RMI is in the process of reviewing its quarantine regulations. A draft biosecurity bill is also now being reviewed and if enacted may revise import and export regulations and practices. In this bill, discharge of ballast or bilge water is prohibited “at sea” in the Marshall Islands rather than specifically in port and the maximum fine for such discharge is $100,000 (no specific fine is listed in the Palauan bill). This is the only specific reference to marine species and their vectors.

Aquatic organisms imported into the RMI (and not for direct export to other countries) require the following: quarantine for 1-2 weeks, sterilization of quarantine media using UV light before release from the holding tanks, and visual inspection for signs of stress/disease (Arthur et al. 2012).

Evaluation of the risk associated with the import of live aquatic organisms is conducted by an interagency committee (including members from the Coastal Management Advisory Council & the Marshall Islands Invasive Species Taskforce). At the moment, this is done in an ad-hoc style, because the Biosecurity Bill is still pending with the legislature (Arthur et al. 2012).

- RMI Code Title 7 Public Health, Safety and Welfare.
- RMI Code Title 8 Agriculture and Animals, especially Chapter 3: Quarantine Restrictions and Chapter 4: Export meat inspections
- RMI Code Title 9 Public Lands and Resources
- RMI Code Title 10 Planning and Economic Development
- RMI Code Title 11 Taxation and Finance, especially Chapter 5: Import duty.
- RMI Code Title 12 Aeronautics
- RMI Code Title 33 Marine Resources
- RMI Code Title 34 Admiralty and Maritime Affairs
- RMI Code Title 35 Environment
- RMI Code Title 38 Postal Service
- RMI Revised Code Title 51 Management of Marine Resources: Marshall Islands Marine Resources Act (MIMRA) 1997

H. Federated States of Micronesia Biosecurity Directives, Statutes and Regulations

- FSM Code Title 18 Territory, Economic Zones and Ports of Entry, especially chapter 2: Ports of Entry.
- FSM Code Title 19 Admiralty and Maritime
- FSM Code Title 20 Aeronautics
- FSM Code Title 22 Agriculture and Livestock, especially Chapters 4: Quarantines and Chapter 5: Export meat inspection, and Section 42: Aquatic animal health
- FSM Code Title 23 Resource Conservation
- FSM Code Title 24 Marine Resources
- FSM Code Title 25 Environmental Protection

- FSM Code Title 38 International Trade
- FSM Code Title 39 Postal System
- FSM Code Title 41 Pubic Health, Safety and Welfare
- FSM Plant & Animal Quarantine Regulations (2000)

Agencies and/or departments responsible for aquatic animal health at the national level: FSM Quarantine Office and FSM R&D Office

Agencies and/or departments responsible for aquatic animal health for Pohnpei State: Pohnpei State Office of Fisheries and Aquaculture (OFA), Environmental Protection Agency Office, Pohnpei State and Conservation Society of Pohnpei (CSP) Office

Offices in the FSM which play a role in biosecurity include: Resources and Development Agriculture Unit, Yap Department of Resources and Development; Kosrae Department of Economic Affairs; Department of Finance, FSM Division of Customs, departments of Agriculture for each of the 4 states. Within the FSM (Chuuk, Kosrae, Pohnpei, and Yap) quarantine inspectors may inspect all aircraft and vessels, or their cargoes, for animals and plants or their parts and refuse their entry (FSMC Title 22 §410). Customs inspections, agricultural inspections and quarantines may be performed on all vessels or aircraft entering or departing from any ports of entry (FSMC Title 18 §206). Noxious weeds have not been designated by FSM, but the Plant and Animal Quarantine Regulations (2000) includes two lists that specify plants prohibited for import from outside FSM (Schedule 1), and plants prohibited from transport between states of FSM (Schedule 2); neither schedule includes aquatic plants. Plants or plant material produced within the FSM may be issued a phytosanitary certificate by inspectors following pre-export inspections according to the FSM Plant and Animal Quarantine Regulations of 2000.

FSM Resources & Development, Agriculture Unit, enacted the FSM Plant and Animal Quarantine Regulations in 1991, revised them in 2000, and began to enforce the FSM Biotechnology and Biosafety Act in 2007. The FSM Resources & Development, Agriculture Unit, is responsible for the protection of endangered areas and the designation, maintenance, and surveillance of pest-free areas and areas of low pest prevalence as well as for the inspection of consignments of plants and plant products moving in international traffic and, where appropriate, the inspection of other regulated articles, particularly with the object of preventing the introduction and/or spread of pests.

The FSM national government and/or the individual states have a variety of draft plans for responding to invasive organisms. These include a national government draft contingency plan for Avian Influenza, draft Coconut Rhinoceros Beetle ERP, and draft Alien Snake ERPs for each of the states. Several FSM quarantine staff members have received advanced training in alien snake early detection and rapid response.

The FSM National Biodiversity Strategy and Action Plan (FSM-NBSAP 2002) recognizes the top ten invasive weed species (all are terrestrial) within FSM. The plan acknowledges that a comprehensive lists of aquatic invasive organisms (e.g. African land snail and cane toad) is not available (FSM-NBSAP 2002).

By federal law, Federated States of Micronesia prohibits the importation of exotic plants or animals, except under permit by the Director of Resources and Development (FSM Code, Title 23, Resource Conservation, Section 315). The code also states that no CITES species can be imported (FSM Code, Title 23, Section 8). All import permits must be approved by federal quarantine and undergo a pest risk analysis before a permit is approved. Under Kosrae State Code, if a plant or animal is not already found in the state, an importer must apply to the Department of Agriculture, Land and Fisheries for permission (KSC Title 14 Section 14.204), but it appears that review of permit applications happens at the federal level. Importers must have a certificate of health from the point of origin. Elsewhere in FSM, there do not appear to be any additional regulations at the state level regarding the importation of live marine species. A biosecurity bill is being considered for the FSM, which if enacted, may change some of the existing biosecurity regulations.

The Invasive Species Taskforce of Pohnpei (ISTOP) surveys and manages invasive species for the state. The ISTOP Strategic Action Plan 2010-2013 targets ten invasive plant and animal species; outlines goals, objectives, and activities; and identifies partners and funding sources.

Chuuk State's Invasive Species Taskforce has developed a draft strategic action plan (Chuuk Invasive Species Task Force Strategic Action Plan, draft version November 2010). The plan focuses on programmatic development, including finding funding and resources, building capacity, increasing coordination between agencies, and generating public awareness. However, it also (a) includes eradication/control measures for two terrestrial plants on the island of Weno, (b) identifies one marine species – the crown-of-thorns sea star (*Acanthaster planci*), a native species which can severely impact coral reefs -- for control measures in Chuuk Lagoon as well as some of the outer islands and (c) calls for 10 surveys in the Chuuk Lagoon and six on outer islands to identify other invasive marine species. No measures for preventing non-native species transfers are addressed.

Kosrae's Invasive Species Action Plan is modeled on the SPREP plan, based on that plan's three major theme areas and nine sub-themes (Section 6.1.3). The Kosrae plan lists specific objectives to achieve the more general objectives suggested by SPREP, however the proposed activities do not appear to meet objectives in many instances. For example, the general Objective 2 in Table B1.2 is "Monitoring invasive species movement on island, and between countries and territories." The matching proposed specific objective is to "review existing port and border surveillance and rapid response arrangements" and the proposed activity is "quarterly visits to Quarantine for bio-security updates." It is not evident how this would result in species-level monitoring information. Although marine species are mentioned in the Kosrae plan, no specific vectors are addressed nor are any actions proposed to deal with marine species.

I. Republic of Palau Biosecurity Directives, Statutes and Regulations

The Palau Ministry of Natural Resources, Environment, and Tourism houses several bureaus involved with national biosecurity, including the Bureau of Marine Resources, the Bureau of Agriculture, and the Bureau of Protected Areas Network. The Republic of Palau Bureau of Agriculture established its Plant and Animal Quarantine regulations in 1999 and revised them in 2008 and is responsible for the inspection of consignments of plants and plant products moving in international traffic and, where appropriate, the inspection of other regulated articles, particularly with the object of preventing the introduction and/or spread of pests. Palau's Plant and Animal Quarantines and Regulations (1999) contain schedules of prohibited plants and animals. These schedules were updated in 2002 to include any species or hybrid of tilapia (*Oreochromis* spp.), which is currently the only listed marine or aquatic species; however, the government is currently considering removing tilapia from the prohibited list to promote its use in agriculture. In 2006, the regulations were again amended, giving the Palau National Invasive Species Council (Palau NISC) the responsibility of reviewing applications for the importation of any species not already present within Palau. The Palau NISC has 30 days to carry out its review, but may request longer if further study (at the importer's expense) is required. This amendment also gives the Palau NISC the responsibility of advising the Palau Department of Agriculture on species that should be added or removed from the prohibited species schedules.

At ports of entry, including the post office, inspectors from the Palau Bureau of Agriculture are charged with carrying out inspections of cargo, mail, baggage, passengers, ships and airplanes. All live imports must have a permit issued by the Palau Bureau of Agriculture and live organisms must have received a certificate of health from their country of origin. Imported organisms can be placed in quarantine for further observation and treatment at the importer's cost if necessary.

In Palau, species intended for aquaculture must be approved by the Bureau of Aquaculture, and are to be held in quarantine for seven days for observation by the Bureau of Marine Resources. Nonetheless, there appears to be little capacity to do more than qualitative, visual screening to make a judgment about whether organisms "look healthy" and to sort out obvious non-target species accidentally included in shipments before release. Quarantine officials have the legal authority to inspect an importer's facilities after organisms have passed through quarantine and can order organisms back into quarantine and/or destroy them after release, but it is not clear how frequently, if ever, this has been done.

The national government of Palau is tasked by the National Environmental Protection Council (NEPC) to "provide and enforce an appropriate legislative framework, including quarantine and environmental legislation, necessary to prevent the introduction or reduce the impact of invasive species and prevent them from spreading" according to the Palau National Invasive Species Strategy originally developed in 2004.

The Bureau of Agriculture has the authority to inspect plants and animals intended for export, but it is unclear how frequently this occurs.

- Bureau of Agriculture: in Palau, quarantine laws are enforced by the Bureau of Agriculture (Title 25 PNC § 2003). Quarantine inspectors may inspect "all aircraft and vessels or their cargoes, including baggage, ship's stores, and ballast, entering or moving" within Palau for "all animals and plants or parts thereof, including seeds, fruits, vegetables and cuttings" (Title 25 PNC § 2005). Plants and plant material require a permit to enter Palau and, if in transit through the country, material requires a permit to transit and must follow certain safeguarding measures.

- Executive Order 219, issued in November 2003 by the President of the Republic of Palau, instructed the National Environmental Protection Council (NEPC) to create the Palau National Invasive Species Committee (PNISC).

- Palau National Invasive Species Strategy drafted by PNISC lays out the roles and responsibilities of landowners, land users, communities, industry, traditional leaders, and the state and national governments. According to the Palau National Invasive Species Strategy, the national government of Palau is tasked to "provide and enforce an appropriate legislative framework, including quarantine and environmental legislation, necessary to prevent the introduction or reduce the impact of invasive species and prevent them from spreading".

- The invasive weeds committee (also known as weedbusters) of the Palau Natural Resource Council (PNRC) has worked on invasive plant issues, but according to Space et al. 2009, this group has been inactive recently.

Palau's National Invasive Species Strategy (2004) includes consideration of marine species and outlines a number of action items:

1) Periodic review of the country's legal and regulatory framework with regards to invasive species, and the revision and adoption of updates to these as needed;

2) Preparation of a National Invasive Species Strategy (below), which was drafted nearly simultaneously with the National Invasive Species Policy;

3) Surveys in terrestrial and marine environments to identify and quantify invasive species;

4) Identification of priority species for management actions, and the identification of areas at greatest risk for entry and establishment of invasive species;

5) Prevention of new invasions, detection through regular monitoring, and management/eradication of established species;

6) Restoration and re-establishment of native species to be included as part of management activities; and

7) Cooperation between various local, regional and international agencies working on invasive species.

Many of these items have since moved forward.

Palau's National Invasive Species Strategy (2004), or NISS, acknowledges explicitly the potential importance of marine invasions in a country that depends heavily on a healthy marine environment. The NISS was written by the country's National Invasive Species Committee, after a review of relevant documents from Australia, SPREP, the Global Invasive Species Programme, the Convention on Biological Diversity, and the Bahamas National Invasive Species Strategy. The NISS lays out a series of objectives to meet four major goals:

1) The provision of a national framework for dealing with invasive species;

2) The prevention of new invasions;

3) Management of invasive species already in Palau; and

4) Coordination with other regional and international organizations dealing with invasive species.

Additionally, the document details the roles and responsibilities for dealing with invasive species for the national and state governments, traditional leaders and community members.

The NISS was formed after a SPREP-led workshop in 2003, and recommendations from this workshop appear as an appendix to the strategy document. Two specific recommendations for dealing with aquatic/marine species in Palau came out of this workshop: 1) immediate action to eradicate tilapia and 2) working with dive operators to involve recreational divers in hull inspections of yachts and commercial vessels. In addition, the appendices include voluntary codes of conduct for many sectors (vectors), including aquaculture. It was agreed that use of non-native species for aquaculture ought to be discouraged generally, and, wherever used, the species should be contained in secure facilities.

In 2006, the PNISC reviewed the NISS. The committee modified language for clarity and to make several of the major goals and objectives more comprehensive. The NISS added a fifth major goal, that of increasing public awareness and support for invasive species prevention and management.

Following its review of the NISS, PNISC developed an Action Plan (Palau National Invasive Species Committee 2007). The PNISC Action Plan follows the structure of the NISS closely, laying out specific actions to be taken to achieve the goals and objectives of the NISS as well as time frames for these.

Palau has taken initial steps to gather baseline data on invasive marine species within its borders. With help from Australian scientists, the PNISC and other agencies carried out a training workshop and a baseline survey of its major port in 2007. Several new non-native species were found as a result of this survey and a manual removal of some of these was attempted. In addition, a public

awareness campaign was carried out by Koror state on an invasive anemone in Jellyfish Lake (Palau National Invasive Species Committee 2007).

Palau also launched major campaigns to eradicate tilapia that involved the assistance and support of many agencies and community members. Tilapia was also added to the list of species prohibited for import into Palau, although the government is now reconsidering this.

Palau is considering the adoption of a biosecurity bill. The bill would create a Division of Biosecurity, increasing the ability of biosecurity agents to inspect incoming vessels and goods and to act to control or eradicate pest or disease outbreaks. The bill would specifically prohibit the release of bilge or ballast water in Palauan ports (draft version February 2010), but otherwise would not address ship-mediated invasions. Many of its provisions, such as requiring an incoming vessel to submit voyage records prior to arrival, and granting biosecurity agents the power to sample vessels or parts of vessels, would create an initial framework to reduce ship-mediated invasions associated with ballast water and hull biofouling.

Palau has trained alien snake rapid response team members and Palau has developed an ERP for alien snakes. Palau also has ERPs for fruit flies and tramp ants. There is also an established emergency response standard operating procedure for Avian Influenza.

Palau Code Title 25 Chapter 20 Plant and Animal Control: This Chapter regulates certain aspects of the international trade in plants and animals in order to protect Palau against the introduction and further dissemination of injurious insects, pests, and diseases into and within the Republic. With the prior approval of the President, the Chief of the Division of Agriculture shall issue plant and animal quarantines and regulations relating to the administration and enforcement of the controls established by this Chapter. Letters and memoranda may be issued from time to time by the Chief of the Division of Agriculture and the President relating to the administration and enforcement of such quarantines and regulations. The Chief of the Division of Agriculture shall administer the provisions of the plant and animal quarantines and regulations. Agricultural quarantine inspectors may be appointed by the President, and shall, under the direction of the Chief of the Division of Agriculture, enforce the provisions of the plant and animal quarantines and Regulations.

Live aquatic organisms for import require 3-7 days holding quarantine to examine the stock for any contamination by alien species and the presence of diseased or sick fry as well as a health certificate issued by a veterinarian certifying that the stock being imported is free from Finfish disease, Mollusk disease, Crustacean disease, and the bacterium *Vibrio anguillarum*.

Requests to introduce new species must by reviewed by the National Invasive Species Committee before the Director of Agriculture may issue an import permit.

Attachment C: Chuuk State Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Chuuk section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	Chuuk Invasive Species Taskforce	Biosecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	FSM RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Chuuk RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including distributing a written report to the region and beyond.	continuous, yearly	State RISC Representatives and ISC	Biosecurity cost recovery system	High
Establish a jurisdictional invasive species coordination office that is tasked with supporting statewide IAS efforts across agencies and offices as well as working nationally and regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the invasive species coordination position.	2015	CIST and Governor's office	Biosecurity cost recovery system	High
	Once established this office should support and assist in coordinating efforts with invasive species within the state. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that state governance is regularly updated regarding both state and regional invasive species developments.	2015	CIST	Biosecurity cost recovery system	High
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of R&D	Biosecurity cost recovery system	High
	Add GMO and LMO coverage to the draft bill.	Complete by August 2014	Ministry of R&D	Biosecurity cost recovery system	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	2014	Ministry of R&D	Biosecurity cost recovery system	High
	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	2014	CIST	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	Chuuk RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support state efforts with engaging external resources to support state invasive species efforts.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	Chuuk RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Assistance with protocol and methods development.	As soon as the office can be established	Chuuk RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Support with establishing ER &RR capacity.	As soon as the office can be established	Chuuk RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support the development of guidelines and regulations.	As soon as the office can be established	Chuuk RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Seek and coordinate regional funding.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support management, response, and eradication efforts.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts within the state.	As soon as the office can be established	Chuuk RISC representatives and the Chuuk ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve state level communication and coordination	Develop a state invasive species task force (CIST) or council and includes NGOs, state and national government stakeholders.	2015	Governor's Office	Biosecurity cost recovery system	High
	Ensure the task force meets regularly (quarterly).	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Develop a state invasive species action plan and update regularly (every 3-5 years).	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Report annually on the status of elements of the state invasive species action plan.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Develop State biosecurity act.	2016	Chuuk ISC or Task force	Biosecurity cost recovery system	High
Improve capacity to identify biosecurity intercepts and organisms detected post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity such as SPC) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	Chuuk Invasive Species Coordinator	Biosecurity cost recovery system	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Chuuk Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	College of Micronesia	external donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of Micronesia	external donor	Low
	Support the development of a algal risk assessment for the region.	2016	College of Micronesia	external donor	Medium
	Support the development of a arthropod risk assessment for the region.	2016	College of Micronesia	external donor	Medium
	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	Office of the Governor	SPC	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.)	2015 and on-going	Chuuk ISC	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Chuuk ISC	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region.	2016	College of Micronesia	external donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Chuuk RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Chuuk RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	Chuuk RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Chuuk RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Chuuk RISC representatives	NA	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Chuuk RISC representatives	external donor	Medium
Prevention					
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 support national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	Biosecurity cost recovery system	High
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve border biosecurity	Support national government efforts to acquire X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Support national government efforts to ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Support national government efforts to ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border biosecurity (continued)	Support 100% x-ray of all arriving passenger baggage.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support the development of a canine pest detection program for items such as snakes, fruits, and vegetables. Consider the potential to combine this program with similar programs for detection of illicit materials such as drugs.	2016 hold national consultation on the need for a biosecurity canine program; 2017 establish program if deemed appropriate	Ministry of Resources and Development	Initial support might have to be sought in the form of external donor funding; once the program is established, it should be supportable under an appropriately managed cost recovery system for biosecurity	Low
	Develop specific regulations and enforcement SOPs for imported seeds. All imported and viable seeds should require completed risk assessments and permitting.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support biosecurity cross training of staffs from agencies which are involved in border inspection processes.	implement in 2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Develop appropriate inspection facilities including a biosecure inspection facility at the seaport large enough for sea containers and wash-down areas with appropriate retention and treatment facilities for waste water produced.	2015 Develop planning; 2016 fund and move forward with developing infrastructure; 2017 operational	Ministry of Resources and Development	External donor support may be needed for infrastructure; once completed, cost recovery funds should be able to support up keep	Medium
	Establish a centralized facility for quarantine offices, including quarantine areas (plant and animal and aquatic organisms), treatment areas, laboratory space, offices, and equipment storage.	2017	Ministry of Resources and Development	External donor support may be needed for infrastructure; once completed, cost recovery funds should be able to support up keep	Medium
	Ensure that quarantine freezer facilities are restricted used (only quarantine should have access to these) and that they are functional back up power supplies.	2015	Ministry of Resources and Development		Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border biosecurity (continued)	Ensure that inspectors have access to freezers and incinerators at both air and sea ports for destroying pests and other materials as needed.	2015	Ministry of Resources and Development	Equipment may best come from external donors; Space and maintenance of equipment will need to be under agreements with local port authorities	High
	Support improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection. Mail should be inspected via x-ray and visual inspections (as well as by canine teams if possible) and should be standardized, not only by request from Customs (which is the current procedure).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, etc.).	on-going	Ministry of Resources and Development	SPC	Medium
	Support development of quarantine exchange programs with New Zealand, Australia, and/or U.S. biosecurity agencies as a mechanism for improving inspector capacity and further development of the nation's biosecurity program.	2016	Ministry of Resources and Development	External donor	High
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Support efforts to ensure that FSM quarantine is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts in all 4 states).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border biosecurity (continued)	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Address IAS concerns as they relate to smuggled goods by developing appropriate SOPs, enhancing inspections, instituting fines and other actions such as confiscation and destruction of smuggled goods. Efforts should be both border and pre-border and will need the support of both national and state offices to ensure the best level of protection possible.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support development of legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	SPC, Regional ISC Office	Medium
	Support national efforts to address the lack of marine biosecurity oversight by FSM quarantine. Need to build legislation to support FSM quarantine having marine biosecurity capacity.	should be added to current draft legislation 2014	Ministry of Resources and Development	External donor	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2016	Ministry of Resources and Development	SPC, Regional ISC Office	Low
	support the establishment of national standards for the importation and use of GMO and LMO.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	CIST	external donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of WPM (continued)	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering Chuuk should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve ability to better enforce pre-departure sanitation	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	SPC	Medium
	Develop and institute standards which would increase pre-departure inspections. Visual inspections are conducted pre-departure which focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture. All jurisdictions should add quarantine inspections to the SOP of departing materials.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
Improve overall post border biosecurity	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2017	Chuuk ISC	External donor	Low
	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	2016 develop strategy; 2017 begin implementation	Chuuk ISC	External donor	Low
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement “clean” practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	Chuuk ISC	External donor	Medium
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the state.	2015	Chuuk ISC	Biosecurity cost recovery system	Medium
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct onsite capacity training in ant id and inspection in the near future.	2015	Chuuk Agriculture	SPC and/or UH	Medium
	Establish watch list of high risk non-native species that can or may pose significant ecological, economic, social or cultural impacts.	2015	Chuuk ISC	Biosecurity cost recovery system	Medium
	Develop surveillance programs for high risk species not yet established such as fruit flies, coconut rhinoceros beetle, tramp ants, and alien snakes.	2015	Chuuk ISC	Biosecurity cost recovery system	Medium
Improve biosecurity for intra-state and inter-state away from the main air and seaports	Develop biosecurity standards for ports throughout the state.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve biosecurity for intra-state and inter-state away from the main air and seaports (continued)	Coordinate National Government field trip ship and Quarantine inspections at each port.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement and enforce biosecurity standards at ports throughout the state.	2017	lead will be determined during consultation and planning phases	Biosecurity cost recovery system	Medium
	Conduct an state wide consultation regarding intrastate biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	Chuuk Agriculture and Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct risk assessments for outer islands for terrestrial and aquatic concerns.	commence planning in 2015; risk assessments should be completed by 2018	Chuuk Agriculture and Marine Resources	External donor	Low
	Helicopters and private planes (or small scale commercial ventures) can be used to move passengers and cargo and where they exist or where there are plans for their use, they should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Establish internal biosecurity to prevent spread of established non-natives from one island to another e.g. tramp ants.	2017	Chuuk Agriculture and Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Implement and follow up recommendation to improvement of internal biosecurity.	2017	Chuuk Agriculture and Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Use Pohnpei (Nukuoro Island) as model for quarantine protocols and biosecurity standards.	2016	Chuuk Agriculture and Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve biosecurity for intra-state and inter-state away from the main air and seaports (continued)	Develop state biosecurity regulations to support intra-state efforts.	2017	Chuuk Agriculture and Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns	Develop a state endorsed white list of species permitted for import.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Update white list.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop a state endorsed black list of prohibited species.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	update black list.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national level efforts to ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts to the state. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list. The state does this now for plant species proposed for import.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Support national government with developing and updating public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via existing FSM government website and linked to state websites.	Implement in 2015; update annually once implemented	Ministry of Resources and Development	Biosecurity cost recovery system	Low
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade.	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity system	High
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	FSM Office of the Attorney General	Biosecurity cost recovery system	High
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	Office of Environmental Planning and Policy Coordination	Biosecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Department of Agriculture	Biosecurity cost recovery system	Medium
	Improve capacity and infrastructure regarding animal health. There should be a national veterinarian with support staff (para-vets?) in each state.	2016	Department of Agriculture	Animal health cost recovery system	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Develop biosecurity standards for small scale, private citizen aquaculture set-ups and enforce these standards.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support national government efforts to establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Develop plan for containment and control measures in regards to exotic farmed and traded species.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Improve screening and reporting system for lawful export of live organisms.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	Chuuk Invasive Species Coordinator	external donor	Low
Increase export potential	Support national efforts to establish produce export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national efforts to establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Improve capacity to export crops, which will involve finding/establishing markets with trade partners.	2016	Chuuk Agriculture	Biosecurity cost recovery system	High
	train and certify state agricultural staff to support local farmers with enhancing the potential for export crops.	2016	Chuuk Agriculture	SPC	Medium
	Support local farms with capacity development to increase potential to export crops.	2016	Chuuk Agriculture	SPC	Medium
	Ensure that fumigation for export crops is available and appropriate used.	2016	Chuuk Agriculture	SPC	Medium
	State officials should work with proposed external trade partners to ensure that export crops of interest are permitted for importation.	2015	Chuuk Agriculture	SPC	High
	Improve ability to meet import standards imposed by trade partners in regards to agricultural produces and processed foods.	2015	Chuuk Agriculture	SPC/USDA	High
	Increase protection of export crops from invasive pests by better management of established species and improved border security to reduce the introduction of new pests to the state.	on-going	Chuuk Agriculture	SPC	High
	Ensure that all proposed agricultural exports go through an establish protocol to ensure cleanliness before entering the shipping lines to reduce the potential for transport of unwanted pests.	2016	Chuuk Agriculture	SPC	High
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	USCG	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	USCG	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Develop capacity to deal with grounded and/or abandoned vessels (continued)	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
Support the national government with establishing and enforcing biofouling standards	Support establishment of standards and regulations regarding biofouling, including inspection and certification for all vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support establishment of additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support establishment of additional regulations for impounded vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support development of capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	Ministry of Resources and Development	External donor	High
	Support establishment of regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support the establishment of criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government with establishing and enforcing biofouling standards (continued)	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support establishment of the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	External donor	High
	Review and revise (as needed) legal authority to implement a biofouling management program.	2014: this should be included in the current draft biosecurity legislation; May need to update and expand in 2016-17 as elements come on line	FSM Office of the Attorney General	Biosecurity cost recovery system	High
	Support ensuring that regulations include the ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Support the national government with establishing and enforcing ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national level participation and enforcement of globally ballast water requirements including discharge 200nm from shore and inspection of ship logs for compliance.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support of establishment of ballast water management and reporting requirements for all vessels utilizing ballast water.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government with establishing and enforcing ballast water standards (continued)	Support development of capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support national level adoption of proposed USCG regulations to move to in hull sanitation of ballast water.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Increase marine system protection from invasive species	Support the establishment of biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for fishing vessels that operate in jurisdictional waters to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	external donor	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015	Ministry of Health	external donor	Low
Address climate change linkages to invasive pests		Framework should be in place by 2016	Chuuk ISC	US AID	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address food security for the state in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of Micronesia	FAO	Low
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	Chuuk ISC or Task force	Regional ISC office	High
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	Chuuk ISC or Task force	External donor	Medium
	Develop taxa specific ERPs as needed.	On-going	Chuuk ISC or Task force	Regional ISC office	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	Chuuk ISC or Task force	External donor	Medium
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2016	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2016	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2016	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Develop protocols for responding to non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Hold consultations to determine what agency(s), office(s) and/or groups will be responsible for surveillance programs.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Increase support for BTS Early Detection/Rapid Response.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	Medium
	Develop and institute surveillance programs for non-established species consider high risk of arrival such as CRB, alien snakes, fruit flies, tramp ants, etc.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	High
	Work with police to develop MOU to assist with enforcing internal quarantine if needed during a response action.	2015	Chuuk ISC or Task force	Biosecurity cost recovery system	Low
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	start in 2015	Chuuk ISC or Task force	Biosecurity cost recovery system	Low
Management and eradication					
Increase management and control of established invasive species	Determine which established invasive species are actionable and proceed with developing management strategies.	conduct consultations 2015; develop strategies 2016	Chuuk ISC	External donor	Medium
	Create GIS layers regarding the distribution of established IAS and use to support biosecurity and IAS management efforts.	2015	College of Micronesia	External donor	Low
	Key staff need to receive GIS training both in regards to field data collection and the utilization of GIS databases and computer systems.	2015	College of Micronesia	SPC	Low
	Key offices need resources to support electronic mapping efforts (GIS), including computers, software, and GPS units.	2015	CIST	External donor	Low
	Train natural resource staffs at the local level in regards to IAS management support.	2015	Chuuk ISC	Regional ISC office	Low
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	2015	Chuuk ISC	Regional ISC office	Low
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2015	Chuuk Agriculture	External donor	Low
	Develop standardized SOPs for IAS monitoring and surveys.	2015	Chuuk ISC	External donor	Low
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distribution is current.	2015	Chuuk Agriculture	External donor	Low
	Identify frog found on Satowan Island.	2014	CIST	External donor	High
	Investigate spiders encountered on Polowat.	2014	CIST	External donor	High
	Coordinate management of monitor lizards on Houk Island.	2015	Chuuk Agriculture	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase management and control of established invasive species (continued)	Survey islands within the state to determine baseline information regarding both native species and established non-natives such as tramp ants.	Develop strategy 2015; start survey work in 2016	Chuuk Agriculture	External donor	Low
	Train natural resource staffs at the local level in regards to IAS management support.	2015 this should be implemented	Chuuk ISC	SPC, Regional ISC Office	Low
	Document the differences between established non-native species such as ant faunas amongst various islands.	2015 develop strategy; 2016 begin implementation	Chuuk Agriculture	External donor	Low
Increase efforts to eradicate targeted species	Conduct surveys and hold stakeholder consultations to determine what established species are viable candidates for eradiation efforts.	2015 consultations; 2016 develop strategy; 2017 implement	Chuuk ISC	External donor	Low
	Develop strategies to conduct eradication campaigns including securing funding streams to support these efforts.	2016	Chuuk ISC	External donor	Low
	Develop resources to respond to new pest incursions beyond ED & RR, including conducting delimiting surveys and potential eradication efforts.	2016	Chuuk ISC	Biosecurity cost recovery system	Medium
	Eradicate small and feasible invasive species incursions promptly, while it is most feasible, least expensive, and before extensive damage has occurred.	Develop capacity by 2017; process should be on-going from that point	Chuuk ISC	External donor	Medium
	Determine feasibility of fruit fly eradication on Chuuk in relation to current biosecurity levels.	2016	Chuuk Agriculture	USDA	Low
	Consider ant species with limited distribution for eradication.	2016	Chuuk Agriculture	SPC	Low
Awareness					
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and state wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	CIST	External donor	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the state from unwanted pests.	2015	CIST	External donor	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	CIST	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	CIST	External donor	High
	Coordinate existing outreach efforts.	2015	CIST	External donor	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2015	Chuuk ISC	Regional ISC office	Medium
	Support adding invasive species education as a standard part of school curriculums region wide.	2017	CIST/Ministry of Education	External donor	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2016	CIST/Ministry of Education	External donor	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	on-going	CIST	External donor	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	On-going	CIST	External donor	Medium
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	CIST	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	C ISC	Regional ISC office	Medium
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Develop a wildlife reference collection (i.e., taxidermy mounts, computer photo files, etc.) to aid identification of incoming species. Adequate resources (taxonomic keys, microscopes, etc.) should be available for assistance in taxonomic identifications.	2016	Chuuk Agriculture	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	Chuuk RISC representatives	External donor	Medium
	Provide reports and newsletters to educators, journalists, lawmakers, and business and community leaders.	2016	CIST	External donor	Medium
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials in Chuuk , including the potential loss of business if invasive species are permitted to establish.	2015	CIST	Biosecurity cost recovery system	High
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of Micronesia	External donor	Low
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2016	College of Micronesia	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment D: Kosrae State Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Kosrae section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	KIST	Biosecurity Cost Recovery System	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	Kosrae RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Kosrae RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including distributing a written report to the region and beyond.	continuous, yearly	State RISC Representatives and ISC	Biosecurity Cost Recovery System	High
Establish a jurisdictional invasive species coordination office that is tasked with supporting statewide IAS efforts across agencies and offices as well as working nationally and regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Conduct a state wide consultation to determine the most appropriate way forward with establishing a single office which can support state wide IAS efforts.	2015	Governor's Office	External donor	High
	Following consultations, develop planning and implement strategy, including staffing the office.	2015	Governor's Office	External donor	High
	Once established this office should support and assist in coordinating efforts with invasive species within the state. Part of this effort will	on-going	Governor's Office	Biosecurity Cost Recovery System	High
	Once established this office should serve as the main linkage between the state and the region on invasive species issues, communicating state activities to the region as well as engaging the region and beyond when feasible to support and assist with invasive species efforts within the state.	0n-going	Governor's Office	Biosecurity Cost Recovery System	High
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward (continued)	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	2014	KIST	Biosecurity Cost Recovery System	High
Update and regularly maintain the state invasive species action plan and annually report on progress	Update current plan.	2014	KIST	External donor	High
	Establish protocol to revisit and update every 3 to 5 years.	On-going	KIST	External donor	High
	Include annual reporting on progress of the state ISAP at the MCES and development a short annual 1-2 pagers to share progress regionally and beyond (combine with similar activities for the RBP).	On-going annually	State RISC Representatives and State ISC	External donor	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office	ideally this office would be up and running before the end of 2015	Kosrae RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support state efforts with engaging external resources to support state invasive species efforts	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued)	Engage the regional invasive species coordination office to support capacity building, training, and advice	As soon as the office can be established	Kosrae RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Assistance with protocol and methods development	As soon as the office can be established	Kosrae RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support with establishing ER &RR capacity	As soon as the office can be established	Kosrae RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued)	Support the development of guidelines and regulations	As soon as the office can be established	Kosrae RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Seek and coordinate regional funding	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support management, response, and eradication efforts	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued)	Engage the regional invasive species coordination office to support outreach and education efforts within the state	As soon as the office can be established	Kosrae RISC representatives and the Kosrae ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve capacity to identify biosecurity intercepts and organisms detected post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	Kosrae Invasive Species Coordinator	Biosecurity Cost Recovery System	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Kosrae Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	College of Micronesia	External donor	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of Micronesia	External donor	Low
	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	Office of the Governor	SPC	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	Kosrae ISC	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Kosrae ISC	Regional ISC office	Low
	Support the development of a algal risk assessment for the region.	2016	College of Micronesia	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of a arthropod risk assessment for the region.	2016	College of Micronesia	External donor	Medium
	Support the development of a weeds risk assessment for the region.	2016	College of Micronesia	External donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Kosrae RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Kosrae RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	Kosrae RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Kosrae RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Kosrae RISC representatives	NA	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Kosrae RISC representatives	External donor	Medium
Ensure that the Kosrae Invasive Species Taskforce (KIST) is functional and meeting regularly	KIST should ensure that it is endorsed and supported by the governance and state agencies and has appropriate bi-laws in place	2014	Governor's Office	Biosecurity Cost Recovery System	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Ensure that the Kosrae Invasive Species Taskforce (KIST) is functional and meeting regularly (continued)	KIST should elect officers (minimally a chairperson, treasurer and secretary)	annually	Governor's Office	Biosecurity Cost Recovery System	High
Prevention					
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations.	2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
Improve communication and information sharing in regards to IAS and biosecurity	SOPs should be developed at the state level to facilitate communication and information sharing between offices and agencies within the state in regards to invasive species.	2015	Kosrae ISC	External donor	High
	Support the development of SOPs at the national level to facilitate communication and information sharing between offices and agencies in regards to invasive species and biosecurity.	2015	Kosrae ISC and FSM ISC	External donor	High
	Support the improvement of communication, information sharing, and active support between agencies and offices at the national and state levels.	2015	Kosrae ISC and FSM ISC	External donor	High
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 support national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	Biosecurity Cost Recovery System	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve pre-border sanitation efforts (continued)	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
Improve border security	Support national government efforts to acquire X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Establish a quarantine buoy, develop standards for it use, and enforce these standards.	2016	Ministry of Resources and Development	External donor	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support national government efforts to ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support national government efforts to ensure appropriate long term maintenance for X-ray machines used for biosecurity	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, etc.).	on-going	Ministry of Resources and Development	SPC	Medium
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	Biosecurity Cost Recovery System	Low
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Support development of legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2016	Ministry of Resources and Development	SPC, Regional ISC Office	Low
	Support efforts to ensure that FSM quarantine is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts in all 4 states).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	SPC, Regional ISC Office	Medium
	Support national efforts to address the lack of marine biosecurity oversight by FSM quarantine. Need to build legislation to support FSM quarantine having marine biosecurity capacity.	should be added to current draft legislation 2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	support the establishment of national standards for the importation and use of GMOs and LMOs.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
Improve overall post border biosecurity	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2016	KIST	External donor	Low
	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	2016 develop strategy; 2017 implement	KIST	External donor	Low
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the state.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement “clean” practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	Ministry of Resources and Development	External donor	Medium
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species.	2015	KIST	Biosecurity Cost Recovery System	Medium
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	Ministry of Resources and Development	External donor	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering Kosrae should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of WPM (continued)	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
Improve ability to better enforce pre-departure sanitation	Develop a secure departure area for both personnel and baggage which reduces the potential for invasive species to hitchhike on air passengers and cargo. Currently this area is open air and therefore there is little potential in stopping the movement of potential pest species from Kosrae to other locations such as Pohnpei, Kwajalein, and Majuro.	2016	Port Authority and Ministry of Resources and Development	External donor	Medium
	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	SPC	Medium
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Mandate and enforce regulations for handling palletized cargo. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	External donor	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015	Ministry of Health	External donor	Low
Increase export potential	Support national efforts to establish produce export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Support national efforts to establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Develop capacity to export citrus and other produce. For citrus, there is currently a experimental effort to reduce citrus canker which should be supported and if found viable, instituted state wide.	2016	Kosrae Agriculture	External donor	Medium
	Ensure that fumigation for export crops is available and appropriate used.	2016	Kosrae Agriculture	Biosecurity Cost Recovery System	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase export potential (continued)	Improve ability to meet import standards imposed by trade partners in regards to agricultural produces and processed foods.	2015	Kosrae Agriculture	SPC/USDA	High
	Ensure that all proposed agricultural exports go through an establish protocol to ensure cleanliness before entering the shipping lines to reduce the potential for transport of unwanted pests.	2016	Kosrae Agriculture	SPC	High
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity	High
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or traded in Kosrae.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms within Kosrae.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Improve capacity and infrastructure regarding animal health. There should be a national veterinarian with support staff (para-vets?) in each state.	2016	Kosrae Department of Agriculture	Animal health cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Establish explicit aquaculture biosecurity practices for Kosrae (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Support national government efforts to establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Develop biosecurity standards for small scale, private citizen aquaculture set-ups and enforce these standards.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	Low
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	Kosrae Invasive Species Coordinator	External donor	Low
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns	Develop a state endorsed white list of species permitted for import.	2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Update white list.	annually	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Develop a state endorsed black list of prohibited species.	2014	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Update black list.	annually	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Support national government with developing and updating public dissemination of white and black lists as well as details on the risk assessment process for proposed species imports. This could likely be done via existing FSM government website and linked to state websites.	Implement in 2015; update annually once implemented	Ministry of Resources and Development	Biosecurity Cost Recovery System	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns (continued)	Support national level efforts to ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts to the state. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
Better develop infrastructure to support port biosecurity efforts	Support national government efforts to provide adequate offices, inspection space, laboratory for pest identification, quarantine areas, treatment areas, etc. proximal to the ports for quarantine staff and activities.	2017	Ministry of Resources and Development	External donor	Medium
	Support national government efforts to ensure that quarantine staff has appropriate day to day resources such as computers, phones, internet access, vehicles, fuel, microscopes, etc. and that equipment can be both utilized and maintained.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
Support the national government with establishing and enforcing biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Establish the capacity to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government with establishing and enforcing ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Support national level participation and enforcement of globally ballast water requirements including discharge 200nm from shore and inspection of ship logs for compliance.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Support national level adoption of proposed USCG regulations to move to in hull sanitation of ballast water.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	USCG	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
Increase marine system protection from invasive species	Support the establishment of biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
	Establish biosecurity practices and requirements for fishing vessels that operate in jurisdictional waters to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase marine system protection from invasive species (continued)	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity Cost Recovery System	Medium
Address climate change linkages to invasive pests		Framework should be in place by 2016	Kosrae ISC	US AID	Medium
Address food security for the state in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of Micronesia	FAO	Low
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	KIST	Regional ISC office	High
	Establish a watch list of high-risk non-native species that are known or thought to pose significant ecological, economic, social, or cultural impacts to Kosrae.	2015	KIST	External donor	Medium
	Develop a detection program and response plan for new incursions by a few focal non-native species on the watch list of high-risk non-native species for Kosrae, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	KIST	Biosecurity Cost Recovery System	Medium
	Develop taxa specific ERPs as needed.	On-going	KIST	Regional ISC office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	KIST	External donor	Medium
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2016	KIST	Biosecurity Cost Recovery System	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2016	KIST	Biosecurity Cost Recovery System	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2016	KIST	Biosecurity Cost Recovery System	High
	Develop protocols for responding to non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response.	2015	KIST	Biosecurity Cost Recovery System	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	KIST	Regional ISC Office	High
	Work with police to develop MOU to assist with enforcing internal quarantine if needed during a response action.	2015	KIST	Biosecurity Cost Recovery System	Low
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	KIST	Regional ISC Office	Low
Management and eradication					
Increase management and control of established invasive species	Determine which established invasive species are actionable and proceed with developing management strategies (this should be part of the state ISAP).	2015	KIST	External donor	Medium
	Create GIS layers that delineate management zones, land tenure, and current distribution of established IAS and use to support biosecurity and IAS management efforts.	2015	KIST	External donor	Low
	Advance efforts to address the Giant African Snail infestation.	on-going	KIST	External donor	High
	Train natural resource staffs at the local level in regards to IAS management support.	2015	KIST	Regional ISC office	Medium
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	2015	KIST	Regional ISC office	Low
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2015	Kosrae Agriculture	Biosecurity Cost Recovery System	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase management and control of established invasive species (continued)	Advance efforts to address the white fly outbreak. There is work already being done in regards to the white fly, it is not clear if sufficient resources are available or have been brought to bear to ensure appropriate levels of management. Stakeholders and experts should convene to discuss the topic and agree on a plan of action which should include appropriate identification of the pest, surveys to determine extent of the spread and surveys outside of Kosrae to determine if it has been transported to other locations outside of the state. Effectiveness of released biocontrol agents needs to be determined as well as if more biocontrol need to be raised and released and if so how many and by whom should this be done. Field crews and funding will also need to be established to deal with the management of this pest.	on-going	KIST	External donor	High
	Advance efforts to address the coconut termite infestation. A response plan should be developed with clear, concise actions and who or what agencies/groups will be response for these actions. Extent of the spread of this pest on the island, when it arrived, where it came from and if it has spread from Kosrae to other locations all need to be determined (if feasible). Ground crews and funding to support the response and/or management plan for this pest need to be established.	on-going	KIST	External donor	High
	Develop standardized SOPs for IAS monitoring and surveys.	2015	KIST	External donor	Medium
	Develop a management plan for the established non-native oyster.	2016	KIST	External donor	Medium
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distribution is current.	2016	KIST	External donor	Low
Increase efforts to eradicate targeted species	Conduct surveys and hold stakeholder consultations to determine what established species are viable candidates for eradiation efforts.	2015	KIST	External donor	Medium
	Develop strategies to conduct eradication campaigns including securing funding streams to support these efforts.	2015	KIST	External donor	Medium
	Develop resources to respond to new pest incursions beyond ED & RR, including conducting delimiting surveys and potential eradication efforts.	2015	KIST	External donor	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase efforts to eradicate targeted species (continued)	Eradicate small and feasible invasive species incursions promptly, while it is most feasible, least expensive, and before extensive damage has occurred.	on-going	KIST	External donor	High
Improve usage and better regulation of pesticides used for both agricultural purposes and to treat specific pest infestations (termites, etc.)	Pesticide training courses should be held to provide farmers and others with basis skills in pesticide use. Use of restricted pesticides should be done by licensed applicators only.	2015	KIRMA	External donor	Low
	Educational materials regarding pesticides are needed for distribution to assist farmers and others with appropriate use of chemicals, but also to better inform the public regarding pesticide use. UH extension has already developed posters for chemical education which could be used once verbiage in local language(s) is add to these posters.	2015	KIRMA	University of Hawaii	Low
Awareness					
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and state wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	KIST	External donor	High
	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the state from unwanted pests.	2015	KIST	External donor	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	KIST	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	KIST	External donor	High
	Coordinate existing outreach efforts.	2015	KIST	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Support adding invasive species education as a standard part of school curriculums region wide.	2017	KIST/Ministry of Education	External donor	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2016	KIST/Ministry of Education	External donor	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	on-going	KIST	External donor	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	On-going	KIST	External donor	Medium
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	KIST	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	Kosrae ISC	Regional ISC office	Medium
	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	Kosrae RISC representatives	RISC	Medium
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2015	Kosrae ISC	Regional ISC office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials in Kosrae, including the potential loss of business if invasive species are permitted to establish.	2015	Ministry of Resources and Development	Biosecurity Cost Recovery System	High
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of Micronesia	External donor	Low
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2015	College of Micronesia	External donor	Low
Restoration					
Increase restoration efforts of native systems where IAS management and/or eradication efforts are underway or have been successful.		on-going	KIST	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment E: Pohnpei State Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Pohnpei section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	iSTOP	Bisoecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	Pohnpei RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Pohnpei RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report distributed to the region and beyond.	continuous, yearly	State RISC Representatives and ISC	Bisoecurity cost recovery system	High
Establish a jurisdictional invasive species coordination office that is tasked with supporting statewide IAS efforts across agencies and offices as well as working nationally and regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the invasive species coordination position. The concept of this position is established in the state ISAP but until funding can be ensure the position remains unfilled.	2015	Governor's Office	Bisoecurity cost recovery system	High
	Once established this office should support and assist in coordinating efforts with invasive species within the state. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that state governance is regularly updated regarding both state and regional invasive species developments.	2015	Governor's Office	Bisoecurity cost recovery system	High
	Once established this office should serve as the main linkage between the state and the region on invasive species issues, communicating state activities to the region as well as engaging the region and beyond when feasible to support and assist with invasive species efforts within the state.	2015	Governor's Office	Bisoecurity cost recovery system	High
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of R&D	Bisoecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward (continued)	Add GMO and LMO coverage to the draft bill.	Complete by August 2014	Ministry of R&D	Bisoecurity cost recovery system	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	2014	Ministry of R&D	Bisoecurity cost recovery system	High
	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	2014	iSTOP	Bisoecurity cost recovery system	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	Pohnpei RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support state efforts with engaging external resources to support state invasive species efforts.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	Pohnpei RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Assistance with protocol and methods development.	As soon as the office can be established	Pohnpei RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support with establishing ER &RR capacity.	As soon as the office can be established	Pohnpei RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Support the development of guidelines and regulations.	As soon as the office can be established	Pohnpei RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Seek and coordinate regional funding.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support management, response, and eradication efforts.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support outreach and education efforts within the state.	As soon as the office can be established	Pohnpei RISC representatives and iSTOP	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve capacity to identify biosecurity intercepts and organisms detected post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity such as SPC) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	Pohnpei Invasive Species Coordinator	Bisoecurity cost recovery system	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Pohnpei Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	College of Micronesia	External donor	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of Micronesia	External donor	Low
	Support the development of a algal risk assessment for the region.	2016	College of Micronesia	External donor	Medium
	Support the development of a arthropod risk assessment for the region.	2016	College of Micronesia	External donor	Medium
	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	Office of the Governor	SPC	High
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Pohnpei Invasive Species Coordinator	Regional ISC office	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	Pohnpei Invasive Species Coordinator	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region.	2016	College of Micronesia	External donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Pohnpei RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Pohnpei RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	Pohnpei RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Pohnpei RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Pohnpei RISC representatives	NA	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Pohnpei RISC representatives	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Prevention					
Improve pre-border sanitation efforts	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 support national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	Bisoecurity cost recovery system	High
Improve border security	Support national government efforts to acquire X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and	External donor	High
	Establish a quarantine buoy, develop standards for it use, and enforce these standards.	2016	EPA/Port Authority	External donor	Medium
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support national government efforts to ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Support national government efforts to ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, etc.).	on-going	Ministry of Resources and Development	SPC	Medium
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	External donor	Low
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Support efforts to ensure that FSM quarantine is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts in all 4 states).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Review and update ship clearance procedures.	2014	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Support development of legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2016	Ministry of Resources and Development	SPC, Regional ISC Office	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	SPC, Regional ISC Office	Medium
	Support national efforts to address the lack of marine biosecurity oversight by FSM quarantine. Need to build legislation to support FSM quarantine having marine biosecurity capacity.	should be added to current draft legislation 2014	Ministry of Resources and Development	External donor	High
	Support the establishment of national standards for the importation and use of GMO and LMO. GMOs and LMOs should be labelled as such.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Support review of the draft FSM biosafety act in regards to its coverage of GMOs and LMOs.	June 2014	Pohnpei Economic Affairs	Bisoecurity cost recovery system	Low
	Support national review of GMOs and LMOs and if and how they may be covered by intellectual property rights.	2014	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Develop MOU's between FSM Quarantine and other agencies involved in border inspections so that these offices/agencies can support FSM Quarantine with biosecurity aspects.	2015	Ministry of Resources and Development	NA	Low
	Support review of official ports of entry for the nation to better determine if and how FSM Quarantine's biosecurity role needs to be expanded to include additional ports.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Support review of field ship ports of call and development of biosecurity standards for field ships and other intra and inter state conveyances.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Support development of regulations regarding biosecurity and visiting cruise ships. These ships, if visiting multiple jurisdictions should fund having a biosecurity office on board during their time within the FSM, provide for inspection services at all ports of call, cover all travel expenses for the biosecurity office, and coordinate with FSM Quarantine to ensure that the inspector's home port does not experience a drop in quarantine services during their absence (this may including paying for overtime).	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Develop SOPs regarding specifics of how other agencies and offices can support the role of FSM Quarantine during border inspection process.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Support biosecurity cross training of staffs from agencies which are involved in border inspection processes such as the office of health and social affairs, Pohnpei EPA, Port Authority, and Customs.	implement in 2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	NA	High
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	Ministry of Resources and Development	External donor	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering Palau should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	Bisoecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	SPC	Medium
	Mandate and enforce regulations for handling palletized cargo. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
Improve overall post border biosecurity	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2016	iSTOP	External donor	Low
	Develop a local depository for pest information.	Implement in 2015	College of Micronesia	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve overall post border biosecurity (continued)	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	2016 develop strategy; 2017 begin implementation	iSTOP	External donor	Low
	Develop best management practices for public utilities and contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement "clean" practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	iSTOP	External donor	High
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the state.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Support development of a regional depository for pest information.	2015	Pohnpei Invasive Species Coordinator	Regional ISC office	Low
	Adopt a voluntary code of conduct for nurseries, landscaping companies, hotels, and other businesses as appropriate to promote the sale and use of locally sourced plants, preferably native plants. If non-natives are going to be used for landscaping, ensure that they are non-invasive species. If plants will be brought into an area from outside for landscaping, ensure that they are pest free. This code of conduct should encourage businesses: to make their staff knowledgeable about invasive plants, to inform their customers about invasive plants, to report immediately any likely exotic pest organisms found on their premises, and to use native or non-invasive plants locally sourced.	2015	iSTOP	External donor	Low
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species.	2015	iSTOP	Bisoecurity cost recovery system	Medium
Improve capacity for intra-state biosecurity	Develop MOUs between the State Economic Affairs Office, iSTOP, and FSM Quarantine. Pohnpei State Control Plan Indicates that the State Department of Economic Affairs is responsible for all IAS issues within the state but iSTOP and the national quarantine office would have the best capacity.	2015	Economic Affairs	NA	High
	As the agency responsible for IAS within the state, the Office of Economic Affairs should be updated on a regular basis regarding IAS issues and a primary partner in any ERP documents.	2015	iSTOP	NA	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve capacity for intra-state biosecurity (continued)	Develop biosecurity standards for all ports.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Implement and enforce biosecurity at all ports.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Conduct an state wide consultation regarding intrastate biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	iSTOP	External donor	Medium
	Conduct risk assessments for outer islands for terrestrial and aquatic concerns.	commence planning in 2015; risk assessments should be completed by 2018	iSTOP	External donor	Low
	Consider example of Nukuoro Island (which does have its own biosecurity standards which FSM Quarantine supports) when considering how to develop intra-state biosecurity.	2016	iSTOP and Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Helicopters, private planes and small boats (or other small scale commercial ventures) can be used to move passengers and cargo and where they exist or where there are plans for their use, they should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns	Develop a state endorsed white list of species permitted for import.	2014	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Update white list, working with and informing local partners.	annually	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Develop a state endorsed black list of prohibited species.	2014	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	update black list, working with and informing local partners.	annually	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns (continued)	Support national level efforts to ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts to the state. Organisms which are deemed potentially harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Support national government with developing and updating public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via existing FSM government website and linked to state websites.	Implement in 2015; update annually once implemented	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
Better develop infrastructure to support port biosecurity efforts	Support national government efforts to provide adequate offices, inspection space, laboratory for pest identification (have lab but lacking equipment), quarantine areas, treatment areas, etc. proximal to the ports for quarantine staff and activities.	2016	Ministry of Resources and Development	External donor	Medium
	Support national government efforts to ensure that quarantine staff has appropriate day to day resources such as computers, phones, internet access, vehicles, fuel, microscopes, etc. and that equipment can be both utilized and maintained.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Seaport inspection site needs to be developed and should include an indoor biosecure inspection site large enough to enclose an entire container.	2016	Ministry of Resources and Development	External donor	High
	Develop an appropriate wash down area at the seaport (USDA has guidelines which should be considered).	2016	Ministry of Resources and Development	External donor	High
	Airport inspection area should be enclosed.	2016	Ministry of Resources and Development	External donor	High
	Develop partnership with health care facilities in regards to sharing incinerator facilities at the land fill (proximal to Kolonia air and sea ports).	2015	FSM Quarantine	Bisoecurity cost recovery system	Medium
Increase export potential	Support national efforts to establish produce export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase export potential (continued)	Support national efforts to establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Improve ability to sanitize produce prior to shipping. Consider forced hot air and/or fumigation treatments.	2016	Pohnpei Agriculture	SPC	Medium
	Improve ability to meet import standards imposed by trade partners in regards to agricultural produces and processed foods.	2015	Pohnpei Agriculture	SPC/USDA	Medium
	Ensure that all proposed exports go through an establish protocol to ensure cleanliness before entering the shipping lines to reduce the potential for transport of unwanted pests. Should be clean and free of pest and disease.	2016	Pohnpei Agriculture	SPC	Medium
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	External donor	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015	Ministry of Health	External donor	Low
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a state/national biosecurity advisory committee to review proposals for the importation of exotic species. There is currently a national risk assessment process but no specific protocol in place.	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity system	High
Reduce risk associated with live traded species (continued)	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	Pohnpei office of Economic Affairs	Bisoecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Improve capacity and infrastructure regarding animal health. There should be a national veterinarian with support staff (para-vets?) in each state.	2016	Pohnpei Department of Agriculture	Animal health cost recovery system	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Low
	Support national government efforts to establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Develop biosecurity standards for small scale, private citizen aquaculture set-ups and enforce these standards.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Finalize state draft plan for containment and control measures in regards to exotic farmed and traded species.	2014	iSTOP	NA	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	Pohnpei Invasive Species Coordinator	External donor	Low
Support the national government with establishing and enforcing ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Support national level participation and enforcement of globally ballast water requirements including discharge 200nm from shore and inspection of ship logs for compliance.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Support national level adoption of proposed USCG regulations to move to in hull sanitation of ballast water.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
Support the national government with establishing and enforcing biofouling standards	Support the establishment of criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	External donor	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Establish the capacity to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	USCG	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Develop capacity to deal with grounded and/or abandoned vessels (continued)	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel	2017	Ministry of Resources and Development	USCG	Medium
Increase marine system protection from invasive species	Support the establishment of biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for fishing vessels that operate in jurisdictional waters to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Bisoecurity cost recovery system	Medium
Address climate change linkages to invasive pests		Framework should be in place by 2016	iSTOP	US AID	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address food security for the state in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of Micronesia	FAO	Low
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and the government. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	iSTOP	Development of a generic ERP is mentioned in the 2013 state ISAP	High
	Consider linking invasive species ED & RR capacity with the State disaster management office.	2014	iSTOP	NA	Medium
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species on the watch list (established in the 2013 state ISAP) of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	iSTOP	External donor	Medium
	Develop taxa specific ERPs as needed.	On-going	iSTOP	ERPs exist for fruit flies, alien snakes; Ministry of R^D is currently developing a tamp ant ERP, and planning is underway to develop a CRB ERP	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	iSTOP	Bisoecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable). Currently have 8 advertised office numbers plus port numbers which are available 24/7. But no dedicated pest hotline and no protocols in place for reacting to calls coming in on currently advertised lines.	2015	iSTOP	Bisoecurity cost recovery system	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2015	iSTOP	Bisoecurity cost recovery system	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2015	iSTOP	Bisoecurity cost recovery system	High
	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	iSTOP	Bisoecurity cost recovery system	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	iSTOP	Regional ISC Office	High
	Work with police to develop MOU to assist with enforcing internal quarantine if needed during a response action.	2015	iSTOP	Bisoecurity cost recovery system	Low
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	iSTOP	Regional ISC Office	Low
Management and eradication					
Improve post border invasive species control and management capacity	Develop a coordinated mosquito monitoring program	2015	State offices of EPA, Health, and Agriculture	External donor	Medium
	Develop a coordinated mosquito control program	2015	State offices of EPA, Health, and Agriculture	External donor	Medium
Improve usage and better regulation of pesticides used for both agricultural purposes and to treat specific pest infestations (termites, etc.)	Pesticide training courses should be held to provide farmers and others with basis skills in pesticide use. Use of restricted pesticides should be done by licensed applicators only.	2015	Pohnpei EPA	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve usage and better regulation of pesticides used for both agricultural purposes and to treat specific pest infestations (termites, etc.) (continued)	Support development of a regional standard in pesticide labelling (US pesticides are already labelled, but those coming from Asia typically are not). US Mainland standards may not be appropriate for the region and therefore while they should be consider, they should not necessarily be the final determination.	2015	Pohnpei EPA	FAO may in fact being developing something similar and they should be consulted and worked with in this regard	Medium
	Educational materials regarding pesticides are needed for distribution to assist farmers and others with appropriate use of chemicals, but also to better inform the public regarding pesticide use. UH extension has already developed posters for chemical education which could be used once verbiage in local language(s) is add to these posters.	2015	Pohnpei EPA	University of Hawaii	Medium
Improve the management of established invasive species	Conduct surveys to determine the extent of the Tilapia and catfish invasions.	2015	iSTOP	External donor	Medium
	Determine what species/hybrids of Tilapia and catfish are present and extent of the range of each if more than one.	2015	iSTOP	External donor	Medium
	Develop and implement a Tilapia management/eradication plan.	2016	iSTOP	External donor	Medium
	Develop and implement a catfish management/eradication plan.	2016	iSTOP	External donor	Medium
	Train natural resource staffs at the local level in regards to IAS management support.	2015	iSTOP	External donor	Low
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distribution is current. SPC did some of this 2012. Existing survey information needs to be compiled, made available to managers, and updated as needed.	2016	iSTOP	See state ISAP	Low
Awareness					
Increase outreach and education on biosecurity and invasive species	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	iSTOP	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	iSTOP	External donor	High
	Coordinate existing outreach efforts.	2015	iSTOP	External donor	Medium
	Support adding invasive species education as a standard part of school curriculums region wide.	2017	iSTOP/Ministry of Education	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and analysis to assess the role of citizens and visitors in regards to protecting the state from unwanted pests.	2015	iSTOP	External donor	High
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2016	iSTOP/Ministry of Education	External donor	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	on-going	iSTOP	External donor	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	On-going	iSTOP	External donor	Medium
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	iSTOP	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	Pohnpei Invasive Species Coordinator	Regional ISC office	Medium
	Support the development of a regional video to be shown on air flights prior to arrival and at baggage claim areas which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	Pohnpei RISC representatives	RISC	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2015	iSTOP	Regional ISC office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish.	2015	Ministry of Resources and Development	Bisoecurity cost recovery system	High
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of Micronesia	External donor	Low
Identify knowledge gaps for existing IAS concerns	Expand research capabilities and projects in regards to IAS	2015	College of Micronesia	External donor	Low
	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2015	College of Micronesia	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment F: Yap State Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Yap section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	YIST	Biosecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	Yap RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Yap RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including distributing a written report to the region and beyond.	continuous, yearly	State RISC Representatives and ISC	Biosecurity cost recovery system	High
Improve support and functionality of the state invasive species coordination office/position.	This office supports and assists in coordinating efforts with invasive species within the state. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that state governance is regularly updated regarding both state and regional invasive species developments.	on-going	Governor's Office	Biosecurity cost recovery system	High
	This office should serve as the main linkage between the state and the region on invasive species issues, communicating state activities to the region as well as engaging the region and beyond when feasible to support and assist with invasive species efforts within the state.	0n-going	Governor's Office	Biosecurity cost recovery system	High
Coordinate with stakeholders both at the national level and with other states to support a united effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of R&D	Biosecurity cost recovery system	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	41883	Ministry of R&D	Biosecurity cost recovery system	High
	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	41974	YIST	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Update and regularly maintain the state invasive species action plan and annually report on progress	Update current plan.	2014	YIST	Biosecurity cost recovery system	High
	Establish protocol to revisit and update every 3 to 5 years.	On-going	YIST	Biosecurity cost recovery system	Medium
	Include annual reporting on progress of the state ISAP at the MCES and development a short annual 1-2 pagers to share progress regionally and beyond (combine with similar activities for the RBP).	On-going annually	State RISC Representatives and State ISC	Biosecurity cost recovery system	High
Improve communications and ability to address biosecurity concerns between US DoD and civilian government agencies	Establish an MOU between the state and DoD regarding biosecurity within Yap in regards to DoD activities.	2015	Governor's Office	External donor	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	Yap RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support state efforts with engaging external resources to support state invasive species efforts.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	Yap RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Assistance with protocol and methods development.	As soon as the office can be established	Yap RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support with establishing ER &RR capacity.	As soon as the office can be established	Yap RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Support the development of guidelines and regulations.	As soon as the office can be established	Yap RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Seek and coordinate regional funding.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Support management, response, and eradication efforts.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support outreach and education efforts within the state.	As soon as the office can be established	Yap RISC representatives and the Yap ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve capacity to identify biosecurity intercepts and organisms detected post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity such as SPC) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	Yap Invasive Species Coordinator	Biosecurity cost recovery system	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Yap Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	College of Micronesia	External donor	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of Micronesia	External donor	Low
	Support the development of a algal risk assessment for the region.	2014	Office of the Governor	SPC	High
	Support the development of a arthropod risk assessment for the region.	2015 and on-going	YIST	Regional ISC office	Low
	Request that SPC develop a biosecurity position specifically for supporting the region.	2015 and on-going	YIST	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2016	Yap Invasive Species Coordinator	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2016	Yap Invasive Species Coordinator	External donor	Medium
	Support the development of a weeds risk assessment for the region.	2016	College of Micronesia	External donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Yap RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Yap RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	Yap RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Yap RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Yap RISC representatives	NA	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Yap RISC representatives	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Prevention					
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 support national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	Biosecurity cost recovery system	High
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve border security	Support national government efforts to acquire X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Support national government efforts to ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	Support national government efforts to ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support 100% x-ray of all arriving passenger baggage.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support the development of a canine pest detection program for items such as snakes, fruits, and vegetables. Consider the potential to combine this program with similar programs for detection of illicit materials such as drugs.	2016 hold national consultation on the need for a biosecurity canine program; 2017 establish program if deemed appropriate	Ministry of Resources and Development	Initial support might have to be sought in the form of external donor funding; once the program is established, it should be supportable under an appropriately managed cost recovery system for biosecurity	Low
	Develop specific regulations and enforcement SOPs for imported seeds. All imported and viable seeds should require completed risk assessments and permitting.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support biosecurity cross training of staffs from agencies which are involved in border inspection processes.	implement in 2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Develop appropriate inspection facilities including a biosecure inspection facility at the seaport large enough for sea containers and wash-down areas with appropriate retention and treatment facilities for waste water produced.	2017	Ministry of Resources and Development	External donor	Medium
	Establish a centralized facility for quarantine offices, including quarantine areas (plant and animal and aquatic organisms), treatment areas, laboratory space, offices, and equipment storage.	2017	Ministry of Resources and Development	External donor	Medium
	Ensure that quarantine freezer facilities are restricted used (only quarantine should have access to these) and that they are functional back up power supplies.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that inspectors have access to freezers and incinerators at both air and sea ports for destroying pests and other materials as needed.	2015	Ministry of Resources and Development	Equipment may best come from external donors; Space and maintenance of equipment will need to be under agreements with local port authorities	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection. Mail should be inspected via x-ray and visual inspections (as well as by canine teams if possible) and should be standardized, not only by request from Customs (which is the current procedure).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, etc.).	on-going	Ministry of Resources and Development	SPC	Medium
	Support development of quarantine exchange programs with New Zealand, Australia, and/or U.S. biosecurity agencies as a mechanism for improving inspector capacity and further development of the nation's biosecurity program.	2016	Ministry of Resources and Development	External donor	High
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Develop a lab for quarantine and ensure that appropriate support linkages are in place with USDA, SPC, and others to support pest intercept identification.	2017	Ministry of Resources and Development	External donor	Medium
	Support efforts to ensure that FSM quarantine is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts in all 4 states).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Address IAS concerns as they relate to smuggled goods by developing appropriate SOPs, enhancing inspections, instituting fines and other actions such as confiscation and destruction of smuggled goods. Efforts should be both border and pre-border and will need the support of both national and state offices to ensure the best level of protection possible.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Support development of legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2016	Ministry of Resources and Development	SPC, Regional ISC Office	Low
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	SPC, Regional ISC Office	Medium
	Support national efforts to address the lack of marine biosecurity oversight by FSM quarantine. Need to build legislation to support FSM quarantine having marine biosecurity capacity.	should be added to current draft legislation 2014	Ministry of Resources and Development	External donor	High
	support the establishment of national standards for the importation and use of GMO and LMO.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve overall post border biosecurity	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2017	YIST	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve overall post border biosecurity (continued)	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	2017	YIST	External donor	Low
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement "clean" practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2016	YIST	External donor	Medium
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the state.	2015	YIST	Biosecurity cost recovery system	Medium
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species	2015	Ministry of Resources and Development	External donor	Medium
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replace of WPM with recycled plastics.	on-going	Ministry of Resources and Development	External donor	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering Yap should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	SPC	Medium
	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Develop and institute standards which would increase pre-departure inspections. Visual inspections are conducted pre-departure which focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture. All jurisdictions should add quarantine inspections to the SOP of departing materials.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Low
Improve biosecurity for intra-state and inter-state away from the main air and seaports	Develop biosecurity standards for ports throughout the state, potentially including having FSM quarantine staff in Woleai, Ulithi, and Satwal.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve biosecurity for intra-state and inter-state away from the main air and seaports (continued)	Implement and enforce biosecurity standards at ports throughout the state.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct an state wide consultation regarding intrastate biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	YIST	Biosecurity cost recovery system	Medium
	Conduct risk assessments for outer islands for terrestrial and aquatic concerns.	commence planning in 2015; risk assessments should be completed by 2018	Yap Agriculture and State Marine Resources office	External donor	Low
	Helicopters and private planes (or small scale commercial ventures) can be used to move passengers and cargo and where they exist or where there are plans for their use, they should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	External donor	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015	Ministry of Health	External donor	Low
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns	Develop a state endorsed white list of species permitted for import.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Update white list.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop a state endorsed black list of prohibited species.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Update black list.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve national capacity to regulate the importation of live organisms, including ensuring that national capacity supports state concerns (continued)	Support national level efforts to ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts to the state. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list. The state does this now for plant species proposed for import.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Support national government with developing and updating public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via existing FSM government website and linked to state websites.	Implement in 2015; update annually once implemented	Ministry of Resources and Development	Biosecurity cost recovery system	Low
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a state/national biosecurity advisory committee to review proposals for the importation of exotic species. There is currently a national risk assessment process but no specific protocol in place.	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity system	High
	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	FSM Office of the Attorney General	Biosecurity cost recovery system	High
	Improve capacity and infrastructure regarding animal health. There should be a national veterinarian with support staff (para-vets?) in each state.	2016	Ministry of Resources and Development	Animal health cost recovery system	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Develop biosecurity standards for small scale, private citizen aquaculture set-ups and enforce these standards.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national government efforts to establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Develop plan for containment and control measures in regards to exotic farmed and traded species.	2015	YIST	Biosecurity cost recovery system	Medium
	Improve screening and reporting system for lawful export of live organisms.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	Yap Invasive Species Coordinator	External donor	Low
Support the national government efforts with establishing and enforcing biofouling standards	Support establishment of standards and regulations regarding biofouling, including inspection and certification for all vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government efforts with establishing and enforcing biofouling standards (continued)	Support establishment of additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support establishment of additional regulations for impounded vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support development of capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	Ministry of Resources and Development	External donor	High
	Support establishment of regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	Ministry of Resources and Development	External donor	Medium
	Support the establishment of criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support establishment of the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	External donor	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government with establishing and enforcing biofouling standards (continued)	Review and revise (as needed) legal authority to implement a biofouling management program.	2014: this should be included in the current draft biosecurity legislation; May need to update and expand in 2016-17 as elements come online	FSM Office of the Attorney General	Biosecurity cost recovery system	High
	Support ensuring that regulations include the ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	Ministry of Resources and Development		Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	USCG	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
Support the national government with establishing and enforcing ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national level participation and enforcement of globally ballast water requirements including discharge 200nm from shore and inspection of ship logs for compliance.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the national government with establishing and enforcing ballast water standards (continued)	Support of establishment of ballast water management and reporting requirements for all vessels utilizing ballast water.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support development of capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2017	Ministry of Resources and Development	External donor	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support national level adoption of proposed USCG regulations to move to in hull sanitation of ballast water.	2016	Ministry of Resources and Development	USCG	Medium
Increase marine system protection from invasive species	Support the establishment of biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Increase marine system protection from invasive species (continued)	Establish biosecurity practices and requirements for fishing vessels that operate in jurisdictional waters to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Address climate change linkages to invasive pests		Framework should be in place by 2016	YIST	US AID	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address food security for the state in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of Micronesia	FAO	Low
Early detection and rapid response					
Improve early detection and rapid response capacity	Consider linking invasive species ED & RR capacity with the State disaster management office.	2014	YIST	NA	Medium
	State agriculture office should be an active part of the disaster management team.	2014	Yap Agriculture	NA	Medium
	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	YIST	External donor	High
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	YIST	External donor	Medium
	Develop taxa specific ERPs as needed.	On-going	YIST	External donor	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	YIST	Biosecurity cost recovery system	High
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2015	YIST	Biosecurity cost recovery system	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2015	YIST	Biosecurity cost recovery system	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2015	YIST	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	YIST	Regional ISC Office	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	YIST	Regional ISC Office	High
	Hold consultations to determine what agency(s), office(s) and/or groups will be responsible for surveillance programs.	2015	YIST	Biosecurity cost recovery system	Medium
	Develop and institute surveillance programs for non-established species consider high risk of arrival such as CRB, alien snakes, fruit flies, tramp ants, etc.	2015	YIST	Biosecurity cost recovery system	High
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	YIST	Regional ISC Office	Low
	Work with police to develop MOU to assist with enforcing internal quarantine if needed during a response action.	2015	YIST	Biosecurity cost recovery system	Low
Management and eradication					
Increase management and control of established invasive species	Determine which established invasive species are actionable and proceed with developing management strategies.	conduct consultations 2015; develop strategies 2016	YIST	External donor	Medium
	Create GIS layers regarding the distribution of established IAS and use to support biosecurity and IAS management efforts.	2015	College of Micronesia	External donor	Low
	Key staff need to receive GIS training both in regards to field data collection and the utilization of GIS databases and computer systems.	2015	College of Micronesia	External donor	Low
	Key offices need resources to support electronic mapping efforts (GIS), including computers, software, and GPS units.	2015	Yap Agriculture	External donor	Low
	Train natural resource staffs at the local level in regards to IAS management support.	2015	YIST	Regional ISC Office	Low
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	2015	YIST	Regional ISC Office	Low
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2015	Yap Agriculture	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase management and control of established invasive species (continued)	Develop standardized SOPs for IAS monitoring and surveys.	2015	YIST	External donor	Low
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distribution is current.	2015	Yap Agriculture	External donor	Low
	Conduct surveys to determine the extent of the Tilapia invasion.	2015	YIST	External donor	High
	Determine what species/hybrids of Tilapia are present and extent of the range of each if more than one.	2015	YIST	External donor	High
	Re-engage rodent control efforts throughout the state.	2016	Yap Health Office	External donor	Medium
	Develop and implement a Tilapia management/eradication plan (increased awareness in local communities will need to be a significant part of this program).	2016	YIST	External donor	High
	Develop control plan for mile a minute vine (*Mikania micrantha*).	2015	YIST	External donor	High
	Implement action against mile a minute vine.	2016	YIST	External donor	High
Increase efforts to eradicate targeted species	Conduct surveys and hold stakeholder consultations to determine what established species are viable candidates for eradiation efforts.	2015 consultations; 2016 develop strategy; 2017 implement	YIST	External donor	Low
	Develop strategies to conduct eradication campaigns including securing funding streams to support these efforts.	2016	YIST	External donor	Low
	Develop resources to respond to new pest incursions beyond ED & RR, including conducting delimiting surveys and potential eradication efforts.	2016	YIST	External donor	Medium
	Eradicate small and feasible invasive species incursions promptly, while it is most feasible, least expensive, and before extensive damage has occurred.	Develop capacity by 2017; process should be on-going from that point	YIST	External donor	Medium
Increase export potential	Support national efforts to establish produce export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support national efforts to establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Improve capacity to export crops, including betelnut, which will involve finding/establishing markets with trade partners.	2016	Yap Agriculture	SPC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase export potential (continued)	train and certify state agricultural staff to support local farmers with enhancing the potential for export crops.	2016	Yap Agriculture	SPC	Medium
	Support local farms with capacity development to increase potential to export crops.	2016	Yap Agriculture	SPC	Medium
	Ensure that fumigation for export crops is available and appropriate used.	2016	Yap Agriculture	SPC	Medium
	State officials should work with proposed external trade partners to ensure that export crops of interest are permitted for importation (example: betelnut).	2015	Yap Agriculture	SPC	High
	Improve ability to meet import standards imposed by trade partners in regards to agricultural produces and processed foods.	2015	Yap Agriculture	SPC/USDA	High
	Increase protection of export crops from invasive pests by better management of established species and improved border security to reduce the introduction of new pests to the state.	on-going	Yap Agriculture	SPC	High
	Ensure that all proposed agricultural exports go through an establish protocol to ensure cleanliness before entering the shipping lines to reduce the potential for transport of unwanted pests.	2016	Yap Agriculture	SPC	High
Improve usage and better regulation of pesticides used for both agricultural purposes and to treat specific pest infestations (termites, etc.)	Pesticide training courses should be held to provide farmers and others with basis skills in pesticide use. Use of restricted pesticides should be done by licensed applicators only.	2015	Yap Agriculture	External donor	Medium
	Support development of a regional standard in pesticide labelling (US pesticides are already labelled, but those coming from Asia typically are not). US Mainland standards may not be appropriate for the region and therefore while they should be consider, they should not necessarily be the final determination.	2016	Yap Invasive Species Coordinator	FAO may in fact being developing something similar and they should be consulted and worked with in this regard	Medium
	Educational materials regarding pesticides are needed for distribution to assist farmers and others with appropriate use of chemicals, but also to better inform the public regarding pesticide use. UH extension has already developed posters for chemical education which could be used once verbiage in local language(s) is add to these posters.	2016	Yap Agriculture	University of Hawaii	Low
Increase alien snake detection capacity	FSM quarantine officers and state counterparts should be trained in alien snake inspection SOPs, detection and response.	2015	Ministry of Resources and Development	Regional ISC Office	High
	Install a snake proof fence at main seaport.	2016	Port Authority	External donor	Low
	Institute snake sentinel trapping at main ports.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Awareness					
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and state wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	YIST	External donor	High
	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the state from unwanted pests.	2015	YIST	External donor	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	YIST	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	YIST	External donor	High
	Coordinate existing outreach efforts.	2015	YIST	External donor	Medium
	Support adding invasive species education as a standard part of school curriculums region wide.	2017	YIST/Ministry of Education	External donor	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2016	YIST/Ministry of Education	External donor	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	on-going	YIST	External donor	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	On-going	YIST	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	Yap Invasive Species Coordinator	Regional ISC office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	YIST	External donor	Medium
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	Yap RISC representatives	RISC	Medium
	Develop a wildlife reference collection (i.e., taxidermy mounts, computer photo files, etc.) to aid identification of incoming species. Adequate resources (taxonomic keys, microscopes, etc.) should be available for assistance in taxonomic identifications.	2016	Yap Agriculture	External donor	Low
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials in Yap, including the potential loss of business if invasive species are permitted to establish.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2015	YIST	Regional ISC office	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of Micronesia	External donor	Low
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2015	College of Micronesia	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Restoration					
Increase restoration efforts of native systems where IAS management and/or eradication efforts are underway or have been successful.	Implement investigations into firefly and dragonfly declines (may be associated with IAS).	2015	Yap Agriculture	External donor	Low
	Improve documentation of native species declines.	2015	Yap Agriculture	External donor	Low
	Investigate primary causes of mangrove die offs which reported have been extended by wind damage.	2015	Yap Agriculture	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment G: Federated States of Micronesia National Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the FSM section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	FSM RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	FSM RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	continuous, yearly	RISC Representatives and National ISC	Biosecurity cost recovery system	Medium
Establish a national invasive species coordination office that is tasked with supporting nation wide IAS efforts across agencies and offices as well as working regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the national invasive species coordination position.	2015	Ministry of Resources and Development	This should be part of the cost recovery biosecurity system	Medium
	Once established this office should support and assist in coordinating efforts with invasive species within the nation. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that the heads of government are regularly updated regarding both national and regional invasive species developments.	2015	Ministry of Resources and Development	This should be part of the cost recovery biosecurity system	Medium
	Once established this office should serve as the main linkage between the nation and the region on invasive species issues, communicating national activities to the region as well as engaging the region and beyond when feasible to support and assist with invasive species efforts within the nation.	2015	Ministry of Resources and Development	This should be part of the cost recovery biosecurity system	Medium
Coordinate with stakeholders both national and state levels to support a united effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of R&D	NA	High
	Add GMO and LMO coverage to the draft bill.	Complete by August 2014	Ministry of R&D	NA	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	Complete by September 2014	Ministry of R&D	NA	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordinate with stakeholders both national and state levels to support a united effort towards moving draft biosecurity legislation forward (continued)	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	Complete by December 2014	FSM ISC	NA	High
Improve communication and information sharing in regards to IAS and biosecurity	Develop SOPs at the national level to facilitate communication and information sharing between offices and agencies at both national and state levels in regards to invasive species and biosecurity.	2015	FSM ISC	Biosecurity cost recovery system	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	FSM RISC representatives and President's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	FSM RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with supporting protocol and methods development.	As soon as the office can be established	FSM RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	As soon as the office can be established	FSM RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	As soon as the office can be established	FSM RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued)	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts.	As soon as the office can be established	FSM RISC representatives and the FSM ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve capacity to identify biosecurity intercepts and organisms detected post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity such as SPC) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	FSM Invasive Species Coordinator	Biosecurity cost recovery system	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	FSM Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going, finalize by 2018	College of Micronesia	External donor	Low
	Support the development of a algal risk assessment for the region.	2016	College of Micronesia	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of Micronesia	External donor	Low
	Support the development of a arthropod risk assessment for the region.	2016	College of Micronesia	External donor	Medium
	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	FSM Office of Foreign Affairs	SPC	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	FSM ISC	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going		Regional ISC office	Low
	Support the development of a weeds risk assessment for the region.	2016	College of Micronesia	External donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	FSM RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	FSM RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	FSM RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	FSM RISC representatives	RISC	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve the functionality of RISC	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	FSM RISC representatives	NA	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	FSM RISC representatives	External donor	Medium
Prevention					
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 Hold national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	External donor	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	Biosecurity cost recovery system	High
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security	Acquire and install X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	Ministry of Resources and Development	External donor	High
	ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Institute 100% x-raying of all arriving passenger baggage.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Consider developing SOPs for incoming baggage and cargo inspections which are based on successful models (such as New Zealand); would require hiring and training additional personnel, installing appropriate equipment (X-ray, etc.), training additional canine teams for detection of specific high risk IAS (reptiles, fruits, meats, etc.); insuring appropriate data collection and development and maintaining of databases to track efforts and interceptions.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that inspections process while targeting high risk goods also ensure random sampling of all imports, travelers, and baggage in order to better detect hitchhiker pests.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	An area not well covered by biosecurity currently is the use of the internet for trade. Regulated and prohibited goods arrive in the region via the mail pathway with bogus labelling from people buying on the internet. A plan will be needed to address this pathway. Of significant concern in this regard is the potential for shipping of pets such as reptiles and plant material via the mail system with little ability to detect and intercept these organisms by current biosecurity systems within the region. Trained detector dogs, visual inspections and X-ray machines could all be utilized to reduce the potential for illicit mail trade, but appropriate regulations need to be established which would permit the potential inspection of most if not all arriving mail.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Ensure that restrictions on soil importation are backed up with regulations supported by legislation.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Establish a canine pest detection program for items such as snakes, fruits, and vegetables. Consider the potential to combine this program with similar programs for detection of illicit materials such as drugs.	2016 hold national consultation on the need for a biosecurity canine program; 2017 establish program if deemed appropriate	Ministry of Resources and Development	Initial support might have to be sought in the form of external donor funding; once the program is established, it should be supportable under an appropriately managed cost recovery system for biosecurity	Low
	All imported animal products, including food items should be check for compliance with international standards (or national standards if they exist). Standards should be enforced equally and items found to be non-compliant should be either turn away or destroyed.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Implement advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, identification of livestock, wildlife and poultry diseases and pests, etc.).	on-going	Ministry of Resources and Development	SPC	Medium
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Ensure that restrictions on soil importation are applied to all soils, including bags of soil and other similar items which can also harbor live organisms. If pre-bagged soil and soil like materials are going to be imported, then they should be pre-treated to insure that they are sterile on arrival.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	External donor	Low
	ensure that the national quarantine office is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts nation wide).	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Hire and train additional quarantine staff as needed. Should be based on needs assessment. An inspections database should be able to document existing needs.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Develop legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Protocols need to be established regarding quarantine inspection of arriving vessels: manifest should be check, cargo, ships stores, galleys, garbage, and cabins should all be inspected. Distinct SOPs are most likely needed for a variety of vessel types including aircraft, fishing vessels, support ships, cargo ships, tankers, yachts, barges. Non-compliance with regulations should be noted and appropriate follow-up actions should be taken including fines, confiscations, and turning away cargo and possibly entire vessels if needed. Inspection data should be collected and recorded into a system wide database.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Establish an electronic database for quarantine inspection data that can be searched and data extracted for analysis. Such a database would support better targeting of vectors and pathways, permit tracking of known violators, provide documentation regarding interceptions, fee and penalty payments, demonstrate appropriate use of resources, quantify gaps and needs in current system, assist in determining pathways associated with post border detections, tracking of live imported species and number of individuals, tracking changes in vector arrivals and embarkation locations, etc.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Training quarantine staff in data collection, entry, management and analysis, develop appropriate field inspection forms, conduct quality control of data systems, ensure that field data is entered into system in a scheduled manner to prevent backlogging, ensure that the data system is appropriately and regularly backed up to prevent systematic losses.	2015	Ministry of Resources and Development	SPC	High
	Protocols should be established by quarantine for documenting interceptions and final disposition of materials. These reports should be entered into a database and information should be shareable to assist all locations within the FSM to better protect borders but also with other jurisdictions of the region to better protect the region. Protocols should be established regarding how and when (how often) this type of	2015	Ministry of Resources and Development	should be covered by the cost recovery system	High
	Institute quarterly reporting on quarantine inspections based on database information and ensure that reports are appropriate shared.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Develop regulations regarding garbage as it pertains to arriving vessels. Regulations need to be enforce and systems need to be developed and in place to deal with regulated garbage. Protocols for regulated garbage should include specifics on handling, where it will be take, how it will be transported, and how it will be handled once it has arrived at final location (burned?, buried? Or treated?). Regulated garbage because of its potential of harboring IAS needs to be kept separate from other trash and needs to be sterilized in some fashion.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Develop and institute quarantine exchange programs with New Zealand, Australia, and/or U.S. biosecurity agencies as a mechanism for improving inspector capacity and further development of the nation's biosecurity program.	2016	Ministry of Resources and Development	External donor	High
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	SPC, Regional ISC Office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Address the lack of marine biosecurity oversight. Need to build legislation to support national quarantine having marine biosecurity capacity.	should be added to current draft legislation 2014	Ministry of Resources and Development	External donor	High
	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations. Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2016	Ministry of Resources and Development	SPC, Regional ISC Office	Low
	Establish national standards for the importation and use of GMO and LMO. GMOs and LMOs should be labelled as such.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Low
	Conduct a national review of GMOs and LMOs regarding if and how they may be covered by intellectual property rights.	2014	Ministry of Resources and Development	External donor	Low
	Develop MOU's between the national quarantine office and other agencies involved in border inspections (such as customs) so that these offices/agencies can support the quarantine office with biosecurity aspects.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop SOPs regarding specifics of how other agencies and offices can support the role of the national quarantine office during border inspection process.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Institute biosecurity cross training of staffs from agencies which are involved in border inspection processes.	2015	Ministry of Resources and Development	Regional ISC office	Low
	Review official ports of entry for the nation to better determine if and how biosecurity aspects can be expanded to include additional ports.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Review field ship ports of call and develop biosecurity standards for field ships and other conveyances that operate within the nation or internationally.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Develop regulations regarding biosecurity and visiting cruise ships. These ships, if visiting multiple sites within the nation should fund having a biosecurity office on board during the period that they within national waters, provide for inspection services at all ports of call, cover all travel expenses for the biosecurity officer, and coordinate with the national quarantine office to ensure that the inspector's home port does not experience a drop in quarantine services during their absence (this may including paying for overtime).	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	Ministry of Resources and Development	External donor	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering the FSM should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
Improve ability to better enforce pre-departure sanitation	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	SPC	Medium
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Ministry of Resources and Development	should be covered by the cost recovery system	Medium
	Develop and institute standards which would increase pre-departure inspections. Visual inspections are conducted pre-departure which focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture. All jurisdictions should add quarantine inspections to the SOP of departing materials.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Low
Address the fact that humans can serve as vectors of invasive species	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address the fact that humans can serve as vectors of invasive species (continued)	National health authorities should work with CDC to determine what, if any, role DoD can support in the advent of a human pathogen outbreak. For example, could CDC direct DoD to transport sick patients to appropriate support facilities either within or outside of the national in the case of a human pathogenic outbreak?	2015	Ministry of Health	External donor	Low
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015: Develop agreements with shippers for medical services (consider working with airlines and/or DoD)	Ministry of Health	External donor	Medium
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Update white list on a regular basis.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop a government endorsed black list of prohibited species.	2014	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Update black list on a regular basis.	annually	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	Implement in 2015; update annually once implemented	Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a national biosecurity advisory committee to review proposals for the importation of exotic species.	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity system	High
	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	FSM Office of the Attorney General	External donor	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Ministry of Resources and Development	External donor	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Improve capacity and infrastructure regarding animal health. There should be a national veterinarian with support staff (para-vets?) in each state.	2016	Ministry of Resources and Development	Develop a cost recovery system that supports national animal health services	Medium
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	FSM ISC	External donor	Low
Increase export potential	Establish produce export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Establish and enforce biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish standards and regulations regarding biofouling, including inspection and certification for all vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Establish additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish additional regulations for impounded vessels.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	Ministry of Resources and Development	External donor	High
	Establish regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards (continued)	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	External donor	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	External donor	High
	Ensure that regulations include ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a biofouling management program	2014: this should be included in the current draft biosecurity legislation; May need to update and expand in 2016-17 as elements come on line	FSM Office of the Attorney General	Biosecurity cost recovery system	High
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase marine system protection from invasive species	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for fishing vessels that operate in Micronesia to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Establish and enforce ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Adopt and enforce international ballast water regulations (discharge at least 200nm off shore). Inspection of ship logs for compliance.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Establish ballast water management and reporting requirements for all vessels utilizing ballast water.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2017	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support national level adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	Ministry of Resources and Development	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	NA	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	USCG	Medium
Address climate change linkages to invasive pests		Framework should be in place by 2016	FSM ISC	US AID	Medium
Address food security for the nation in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of Micronesia	FAO	Low
Awareness					
Increase outreach and education on biosecurity and invasive species	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the nation from unwanted pests.	2015	FSM ISC	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	FSM ISC	External donor	High
	Coordinate existing outreach efforts.	2015	FSM ISC	External donor	Medium
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	FSM ISC	External donor	High
	Add invasive species education as a standard part of school curriculums.	2016	FSM ISC/Ministry of Education	External donor	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2015	FSM ISC/Ministry of Education	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Develop an educational strategy that is long term, extensive and nation wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	FSM ISC	External donor	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	2016	FSM ISC	External donor	Low
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts	on-going	FSM ISC	External donor	Low
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	FSM ISC	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	FSM ISC	Regional ISC office	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2014	FSM ISC	External donor	Medium
	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	FSM ISC	RISC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish.	Start in 2014	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of Micronesia	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment H: Republic of the Marshall Islands Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the RMI section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	MIIST	Biosecurity cost recovery program should fund this activity	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	MIIST	Regional ISC office	Medium
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	MIIST	Regional ISC office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	continuous, yearly	RISC Representatives and National ISC	NA	High
Establish a jurisdictional invasive species coordination office that is tasked with supporting nation wide IAS efforts across agencies and offices as well as working regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the invasive species coordination position.	2015	MIIST	This should be a long term position with funding and other resources coming from the port biosecurity cost recovery program	High
	Once established this office should support and assist in coordinating efforts with invasive species within the nation. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that the heads of government are regularly updated regarding both national and regional invasive species developments.	continuous	RMI Invasive Species Coordinator	This should be a long term position with funding and other resources coming from the port biosecurity cost recovery program	High
	Once established this office should serve as the main linkage between the nation and the region on invasive species issues, communicating national activities to the region as well as engaging the region and beyond when feasible to support and assist with invasive species efforts within the nation.	continuous	RMI Invasive Species Coordinator	This should be a long term position with funding and other resources coming from the port biosecurity cost recovery program	High
Coordinate with stakeholders to provide a united and active effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by August 2014	Ministry of Resources and Development	NA	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordinate with stakeholders to provide a united and active effort towards moving draft biosecurity legislation forward (continued)	Add GMO and LMO coverage to the draft bill.	Complete by August 2014	Ministry of Resources and Development	NA	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	2014	Ministry of Resources and Development	NA	High
	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	2014	MIIST	NA	High
Update and regularly maintain the national invasive species action plan (ISAP) and annually report on progress	Update current plan.	in progress completed July 2013	Office of Environmental Planning and Policy Coordination	External donor	High
	Establish protocol to revisit and update every 3 to 5 years.	On-going	MIIST	NA	High
	Include annual reporting on progress of the national ISAP at the MCES and development a short annual 1-2 pagers to share progress regionally and beyond (combine with similar activities for the RBP).	On-going annually	RISC Representatives and RMI ISC	NA	High
Improve communications and ability to address biosecurity concerns between US DoD and the RMI civilian government agencies	Establish an MOU between the RMI and DoD regarding biosecurity within the RMI in regards to DoD activities and facilities.	2015	Ministry of Foreign Affairs	NA	High
Improve communication and information sharing in regards to IAS and biosecurity	Develop SOPs at the national level to facilitate communication and information sharing between offices and agencies in regards to invasive species and biosecurity.	2015	MIIST	RMI Biosecurity Cost Recovery system	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	RMI RISC representatives and President's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	RMI RISC representatives and the RMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	As soon as the office can be established	RMI RISC representatives and MIIST	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	RMI RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting protocol and methods development.	As soon as the office can be established	RMI RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	As soon as the office can be established	RMI RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	RMI RISC representatives and the RMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	As soon as the office can be established	RMI RISC representatives and the Ministry of Resources and Development	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	As soon as the office can be established	RMI RISC representatives and the RMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	As soon as the office can be established	RMI RISC representatives and the RMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	RMI RISC representatives and the RMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts.	As soon as the office can be established	RMI RISC representatives and MIIST	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve capacity to identify biosecurity intercepts and organisms detection post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity such as SPC) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	RMI Invasive Species Coordinator	Biosecurity cost recovery system	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	RMI Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going	College of the Marshall Islands	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of the Marshall Islands	External donor	Low
	Support the development of a algal risk assessment for the region.	2016	College of the Marshall Islands	External donor	Medium
	Support the development of a arthropod risk assessment for the region.	2016	College of the Marshall Islands	External donor	Medium
	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	Office of Environmental Planning and Policy Coordination	SPC	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	Office of Environmental Planning and Policy Coordination	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Office of Environmental Planning and Policy Coordination	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region.	2016	College of the Marshall Islands	External donor	Medium
Improve the functionality of RISC	RISC members should work with national governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	RMI RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the invasive species community and governance.	Reviews should correspond with turn over in Government	RMI RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	RMI RISC representatives	RISC	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve the functionality of RISC (continued)	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	RMI RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	on-going	RMI RISC representatives	NA	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	RMI RISC representatives	External donor	Medium
Prevention					
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 Hold national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve pre-border sanitation efforts (continued)	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
Improve border security	Acquire and install X-ray machines for biosecurity at all ports of entry.	2015	Ministry of Resources and Development	External donor	Medium
	ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2015	Ministry of Resources and Development	External donor	Medium
	ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2015	Ministry of Resources and Development	External donor	Medium
	Institute 100% x-raying of all arriving passenger baggage.	2015	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	Medium
	Consider developing SOPs for incoming baggage and cargo inspections which are based on successful models (such as New Zealand); would require hiring and training additional personnel, installing appropriate equipment (X-ray, etc.), training additional canine teams for detection of specific high risk IAS (reptiles, fruits, meats, etc.); insuring appropriate data collection and development and maintaining of databases to track efforts and interceptions.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	Medium
	Ensure that inspections process while targeting high risk goods also ensure random sampling of all imports, travelers, and baggage in order to better detect hitchhiker pests.	2015	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	Medium
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	Medium
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Ministry of Resources and Development	External donor	Low
	Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	An area not well covered by biosecurity currently is the use of the internet for trade. Regulated and prohibited goods arrive in the region via the mail pathway with bogus labelling from people buying on the internet. A plan will be needed to address this pathway. Of significant concern in this regard is the potential for shipping of pets such as reptiles and plant material via the mail system with little ability to detect and intercept these organisms by current biosecurity systems within the region. Trained detector dogs, visual inspections and X-ray machines could all be utilized to reduce the potential for illicit mail trade, but appropriate regulations need to be established which would permit the potential inspection of most if not all arriving mail.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	Medium
	All imported animal products, including food items should be check for compliance with international standards (or national standards if they exist). Standards should be enforced equally and items found to be non-compliant should be either turn away or destroyed.	2015	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	Medium
	Implement advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, identification of livestock, wildlife and poultry diseases and pests, etc.).	on-going	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	Medium
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	Review relevant APHIS guidelines 2014; Develop and implement RMI guidelines 2015	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity; technical support from the Regional ISC Office and SPC	Medium
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	Immediate	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2015	Ministry of Resources and Development	External donor	Medium
	ensure that the national quarantine office is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts nation wide).	Conduct a national review in 2015; move forward with planning and development of cost recovery system in 2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	High
	Hire and train additional quarantine staff as needed. Should be based on needs assessment. An inspections database should be able to document existing needs.	Conduct needs assessment 2014; Hire and train additional staff in 2015 as indicated by the needs assessment	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	High
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	on-going	Ministry of Resources and Development	External donor	Low
	Protocols need to be established regarding quarantine inspection of arriving vessels: manifest should be check, cargo, ships stores, galleys, garbage, and cabins should all be inspected. Distinct SOPs are most likely needed for a variety of vessel types including aircraft, fishing vessels, support ships, cargo ships, tankers, yachts, barges. Non-compliance with regulations should be noted and appropriate follow-up actions should be taken including fines, confiscations, and turning away cargo and possibly entire vessels if needed. Inspection data should be collected and recorded into a system wide database.	Draft protocols 2014; review and finalize before end of 2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Establish an electronic database for quarantine inspection data that can be searched and data extracted for analysis. Such a database would support better targeting of vectors and pathways, permit tracking of known violators, provide documentation regarding interceptions, fee and penalty payments, demonstrate appropriate use of resources, quantify gaps and needs in current system, assist in determining pathways associated with post border detections, tracking of live imported species and number of individuals, tracking changes in vector arrivals and embarkation locations, etc.	Consultation on this topic should occur no later than early 2015; design and development should begin before the end of 2015; Database should be in place and staff trained in its use and up keep before the end of 2016	Ministry of Resources and Development	External donor	High
	Training quarantine staff in data collection, entry, management and analysis, develop appropriate field inspection forms, conduct quality control of data systems, ensure that field data is entered into system in a scheduled manner to prevent backlogging, ensure that the data system is appropriately and regularly backed up to prevent systematic losses.	Should be developed in tandem with the biosecurity database	Ministry of Resources and Development	External donor	High
	Protocols should be established by quarantine for documenting interceptions and final disposition of materials. These reports should be entered into a database and information should be shareable to assist all locations within the RMI to better protect borders but also with other jurisdictions of the region to better protect the region. Protocols should be established regarding how and when (how often) this type of information is shared. Information collected and stored should include date of incident, inspector in charge, what was intercepted, what IAS were found, numbers of pests found, origin of the material in question, disposition of the material(s) and specimen(s), what remedial actions (if any) were taken against the shipper, and if fines were instituted, were they collected.	Should be developed in tandem with the biosecurity database	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	High
	Establish of national standards for the importation and use of GMO and LMO. GMOs and LMOs should be labelled as such.	2015	Ministry of Resources and Development	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Institute quarterly reporting on quarantine inspections based on database information and ensure that reports are appropriately shared.	Reports should be forthcoming before the end of 2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	Review USDA user fee structure 2014; On passage of the RMI biosecurity legislation (2014), specific regulations regarding fees should follow	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	High
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	Consult with the region 2014; Develop and implement fee 2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Develop regulations regarding garbage as it pertains to arriving vessels. Regulations need to be enforce and systems need to be developed and in place to deal with regulated garbage. Protocols for regulated garbage should include specifics on handling, where it will be take, how it will be transported, and how it will be handled once it has arrived at final location (burned?, buried? Or treated?). Regulated garbage because of its potential of harboring IAS needs to be kept separate from other trash and needs to be sterilized in some fashion.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system would ideally cover the costs of these needs. Until this system is functional, other funding sources may be required to fill the funding gap	Medium
	Develop and institute quarantine exchange programs with New Zealand, Australia, and/or U.S. biosecurity agencies as a mechanism for improving inspector capacity and further development of the nation's biosecurity program.	2015	Ministry of Resources and Development	External donor	Low
	Institute biosecurity cross training of staffs from agencies which are involved in border inspection processes.	2015	Ministry of Resources and Development	SPC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Address the lack of marine biosecurity oversight. Need to build legislation to support national quarantine having marine biosecurity capacity.	2014 should be added to the current draft biosecurity legislation under consideration	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Security protocols for ports should be established, enforced and applied equally to all. For example having a badge system with gated entry to all ports should be established and appropriately utilized.	2014	Port Authorities	RMI Biosecurity Cost Recovery system	High
	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations. Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2014	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Conduct a national review of GMOs and LMOs regarding if and how they may be covered by intellectual property rights.	2014	Ministry of Resources and Development	External donor	Medium
	Develop MOU's between the national quarantine office and other agencies involved in border inspections (such as customs) so that these offices/agencies can support the quarantine office with biosecurity aspects.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop SOPs regarding specifics of how other agencies and offices can support the role of the national quarantine office during border inspection process.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Establish a centralized joint facility for customs and quarantine offices, including quarantine areas, treatment areas, laboratory space, offices, and equipment storage.	Further develop planning and coordination for this effort in 2015; develop facilities in 2016-17	Ministry of Resources and Development	External donor	Medium
	Enforce biosecurity regulations, including the collection of fines and fees.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	High
	Develop a mechanism so that fines, fees and other monies are placed into a revolving fund that is used specifically to support biosecurity activities.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Establish a taskforce amongst RMI offices involved in border protection. This taskforce could coordinate activities and develop options for improving overall border protection including determining where offices can assist each other with joint tasks. Currently, all RMI border offices seem to have similar problems (lack of funding, staff, capacity, and resources). A joint taskforce could establish more clearly what needs to be done to improve the situation across the board, how the RMI could best address these issues and then find funding to support efforts to move forward with development, training, and implementation. Generally RMI offices need improved resource availability, increased staffing, and increased training.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop a system in which arriving sea vessels submit pre-clearance biosecurity information and wait to receive approval prior to entering lagoons or be turned away. Such information	2016	Ministry of Resources and Development	External donor	Medium
	Review official ports of entry for the nation to better determine if and how biosecurity aspects can be expanded to include additional ports.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop national biosecurity standards. For example, quarantine inspectors must be present to clear arriving containers.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	High
	Review field ship ports of call and develop biosecurity standards for field ships and other conveyances that operate within the nation or internationally.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2014	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop regulations regarding biosecurity and visiting cruise ships. These ships, if visiting multiple sites within the nation should fund having a biosecurity office on board during the period that they within national waters, provide for inspection services at all ports of call, cover all travel expenses for the biosecurity officer, and coordinate with the national quarantine office to ensure that the inspector's home port does not experience a drop in quarantine services during their absence (this may including paying for overtime).	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
Improve overall post border biosecurity	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	on-going	MIIST	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve overall post border biosecurity (continued)	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2016	Office of Environmental Planning and Policy Coordination	External donor	Medium
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement "clean" practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	Office of Environmental Planning and Policy Coordination	External donor	Medium
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the nation: develop guidelines and implement policy including inspections and follow-up as required.	2014	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop a local depository for pest information including an intercept reference collection.	Set up depository by 2016; continuously update once established	College of the Marshall Islands	External donor	Low
	Support development of a regional depository for pest information.	2017	RMI Invasive Species Coordinator	External donor	Low
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	MIIST	External donor	Medium
	Require treatment of all WPM according to ISPM No. 15. All WPM entering the RMI or moving between islands within the RMI should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of wood packaging material (WPM) (continued)	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
Improve ability to better enforce pre-departure sanitation	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Ministry of Resources and Development	SPC	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop and institute standards which would increase pre-departure inspections. Visual inspections are conducted pre-departure which focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture. All jurisdictions should add quarantine inspections to the SOP of departing materials.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
Improve capacity for internal biosecurity	Develop biosecurity standards for ports other than those at Majuro Atoll and Kwajalein Atoll.	2016	Ministry of Resources and Development	External donor	Medium
	Implement and enforce biosecurity at ports other than those at Majuro and Kwajalein Atolls.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Conduct a nation wide consultation regarding internal biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	Ministry of Resources and Development	External donor	High
	Conduct risk assessments for outer islands for terrestrial and aquatic concerns.	this should be an on-going process	Office of Environmental Planning and Policy Coordination	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve capacity for internal biosecurity (continued)	Helicopters and private planes (or small scale commercial ventures) can be used to move passengers and cargo and where they exist or where there are plans for their use, they should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import.	2014	MIIST	Biosecurity cost recovery system	High
	Update white list.	annually	MIIST	Biosecurity cost recovery system	Medium
	Develop a government endorsed black list of prohibited species.	2014	MIIST	Biosecurity cost recovery system	High
	Update black list.	annually	MIIST	Biosecurity cost recovery system	Medium
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	Ministry of Resources and Development oversees risk assessment process and determines if it is sufficient and rules on outcome	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	Implement in 2015; update annually once implemented	MIIST	Biosecurity cost recovery system	Low
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a national biosecurity advisory committee to review proposals for the importation of exotic species.	2015	Ministry of Resources and Development	This should be supported by user fees as part of the cost recovery biosecurity system	High
	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Ministry of Resources and Development	External donor	Medium
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	RMI Office of the Attorney General	External donor	High
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	Office of Environmental Planning and Policy Coordination	Biosecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Office of Environmental Planning and Policy Coordination	External donor	Medium
	Improve capacity and infrastructure regarding animal health, including development of quarantine/holding facilities and hiring of a national veterinarian.	2016	Ministry of Resources and Development	External donor	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Establish a certification system for the movement (domestic and international) of live organisms.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Ministry of Resources and Development	Biosecurity cost recovery system	Medium
	Develop biosecurity standards for small scale, private citizen aquaculture set-ups and enforce these standards.	2015		Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Ministry of Resources and Development	Biosecurity cost recovery system	High
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	RMI Invasive Species Coordinator	External donor	Low
Establish and enforce biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Ministry of Resources and Development	External donor	Medium
	Establish standards and regulations regarding biofouling, including inspection and certification for all vessels.	2017	Ministry of Resources and Development	External donor	High
	Establish additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	Ministry of Resources and Development	External donor	Medium
	Establish additional regulations for impounded vessels.	2017	Ministry of Resources and Development	External donor	Medium
	Develop capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Establish regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	Ministry of Resources and Development	External donor	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Ministry of Resources and Development	External donor	Medium
	Establish the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards (continued)	Establishment biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	External donor	Medium
	Review and revise (as needed) legal authority to implement a biofouling management program	2014: this should be included in the current draft biosecurity legislation; May need to update and expand in 2016-17 as elements come on line	RMI Office of the Attorney General	External donor	High
	Ensure that regulations include ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	Ministry of Resources and Development	External donor	Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	External donor	Medium
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Ministry of Resources and Development	Technical support: USCG	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Ministry of Resources and Development	Technical support: USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	Technical support: USCG	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Develop capacity to deal with grounded and/or abandoned vessels (continued)	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Ministry of Resources and Development	Technical support: USCG	Medium
Establish and enforce ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Ministry of Resources and Development	External donor	Medium
	Adopt and enforce international ballast water regulations (discharge at least 200nm off shore). Inspection of ship logs for compliance.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Establish ballast water management and reporting requirements for all vessels utilizing ballast water.	2015	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	High
	Support national level adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	Ministry of Resources and Development	External donor	Medium
Increase marine system protection from invasive species	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase marine system protection from invasive species (continued)	Establish biosecurity practices and requirements for fishing vessels that operate in Micronesia to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2017	Ministry of Resources and Development	RMI Biosecurity Cost Recovery system	Medium
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	External donor	Medium
	National health authorities should work with CDC to determine what, if any, role DoD can support in the advent of a human pathogen outbreak. For example, could CDC direct DoD to transport sick patients to appropriate support facilities either within or outside of the national in the case of a human pathogenic outbreak?	2015	Ministry of Health	NA	Low
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved (i.e. donors need to be have dependable and rapid shipping available for medical supplies, etc. if such a situation was to arise).	2015: Develop agreements with shippers for medical services (consider working with airlines and/or DoD)	Ministry of Health	Emergency response	Medium
Address climate change linkages to invasive pests		2015 develop framework	Office of Environmental Planning and Policy Coordination	US AID	Medium
Address food security for the nation in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	College of the Marshall Islands	FAO	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Early detection and rapid response					
Improve early detection and rapid response capacity	Establish a watch list of high-risk non-native species that are known or thought to pose significant ecological, economic, social, or cultural impacts	2015	MIIST	External donor	Medium
	Develop a detection program and response plan for new incursions by a few focal non-native species on the watch list of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	MIIST	External donor	Medium
	Develop taxa specific ERPs as needed.	on-going	MIIST	RMI Biosecurity Cost Recovery system	High
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	MIIST	RMI Biosecurity Cost Recovery system	High
	Develop a generic national emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	MIIST	External donor	High
	Establish a watch list of high-risk non-native species that are known or thought to pose significant ecological, economic, social, or cultural impacts.	2015	MIIST	External donor	Medium
	Develop a detection program and response plan for new incursions by a few focal non-native species on the watch list of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	MIIST	External donor	Medium
	Develop taxa specific ERPs as needed.	on-going	MIIST	RMI Biosecurity Cost Recovery system	High
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	MIIST	RMI Biosecurity Cost Recovery system	High
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2015	MIIST	RMI Biosecurity Cost Recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Ensure that the public reporting system is fully functional including supported by trained staff.	2015	MIIST	RMI Biosecurity Cost Recovery system	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	this should be an on-going process	MIIST	RMI Biosecurity Cost Recovery system	High
	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	MIIST	RMI Biosecurity Cost Recovery system	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	MIIST	Regional ISC office	High
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	this should be an on-going process	MIIST	External donor	Low
Management and eradication					
Increase management and control of established invasive species	Create GIS layers that delineate management zones, land tenure, and current distribution of established IAS and use to support biosecurity and IAS management efforts.	2015	College of the Marshall Islands	External donor	Low
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	on-going, start in 2015	RMI Invasive Species Coordinator	SPC, regional ISC office	Low
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2016	College of the Marshall Islands	SPC	Low
	Develop standardized SOPs for IAS monitoring and surveys.	2015	MIIST	External donor	Medium
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distributions are current.	on-going	MIIST	External donor	Medium
	Determine if the explosive algal growth seen on the ocean side of some areas of Majuro Atoll is due to an invasive species or a native species experiencing release. Once the species and its context is know, develop a control/management program to get it under control or possibly eradicate if it is in fact invasive.	2014	College of the Marshall Islands	External donor	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase management and control of established invasive species (continued)	Work with stakeholders and experts on a long term rodent management and control program for the country. Consider contracting outside experts (if needed) to assist with both the program development and implementation of specific aspects of the program as warranted. Specific components of the rodent control program should include: enforcement of the use of rat excluders on all mooring lines when vessels are docked, developing monitoring strategies, implement trapping strategies to reduce current rodent densities, and to ensure that port areas are clean and waste free.	Hold national consultancy (consider including outside experts) 2015; Develop planning 2016; implement program 2017	Ministry of Health/MIIST	External donor	Medium
	Determine which established invasive species are actionable and proceed with developing management strategies	Hold national consultancy 2016; Select actionable elements and develop management strategies 2017; implement 2018	MIIST	External donor	Medium
	Train natural resource staffs at the local level in regards to IAS management support.	on-going, start in 2015	Office of Environmental Planning and Policy Coordination	SPC, regional ISC office	Low
Increase efforts to eradicate targeted species	Conduct surveys and hold stakeholder consultations to determine what established species are viable candidates for eradiation efforts.	2016	Office of Environmental Planning and Policy Coordination	External donor	Medium
	Develop strategies to conduct eradication campaigns including securing funding streams to support these efforts.	2016	Office of Environmental Planning and Policy Coordination	External donor	Medium
	Develop resources to respond to new pest incursions beyond ED & RR, including conducting delimiting surveys and potential eradication efforts.	2016	Office of Environmental Planning and Policy Coordination	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase efforts to eradicate targeted species (continued)	Develop and implement an eradication effort for the Majuro non-native caterpillar.	2014	MIIST	External donor	High
	Develop and implement an eradication effort for the Red-vented Bulbul.	2015	MIIST	External donor	High
	Eradicate small and feasible invasive species incursions promptly, while it is most feasible, least expensive, and before extensive damage has occurred.	should be an on-going effort	Office of Environmental Planning and Policy Coordination	External donor	Medium
Awareness					
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and nation wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	MIIST/College of the Marshall Islands	External donor	High
	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the nation from unwanted pests.	2015	MIIST/College of the Marshall Islands	External donor	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	MIIST/College of the Marshall Islands	External donor	High
	Establish long term funding to support core outreach and educational efforts.	2016	MIIST/College of the Marshall Islands	NA	High
	Coordinate existing outreach efforts.	2015	MIIST/College of the Marshall Islands	NA	Medium
	Add invasive species education as a standard part of school curriculums.	2016	Ministry of Education/College of the Marshall Islands	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2015	Ministry of Education/ College of the Marshall Islands	External donor	Medium
	Develop posters, brochures and other print media to support invasive species awareness campaigns. Insure that these types of items are tied into the larger outreach strategy for the nation.	2016	MIIST/College of the Marshall Islands	External donor	Low
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	on-going	MIIST/College of the Marshall Islands	External donor	Low
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2015	MIIST/College of the Marshall Islands	External donor	Medium
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2014	Ministry of Resources and Development	Biosecurity cost recovery program should fund this activity	High
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	RMI Invasive Species Coordinator	RISC	High
	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations.	2015	RISC representatives	RISC	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2014	RMI Invasive Species Coordinator	Regional ISC office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish.	Start in 2014	RMI Invasive Species Coordinator	External donor	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2015	College of the Marshall Islands	External donor	Low
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the nation that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts.	2016	College of the Marshall Islands	External donor	Low
Policy					
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations.	2014	Ministry of Resources and Development	NA	High
	Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2014	Ministry of Resources and Development	External donor	High
Restoration					
Increase restoration efforts of native systems where IAS management and/or eradication efforts are underway or have been successful.		on-going	Office of Environmental Planning and Policy Coordination	External donor	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment I: Republic of Palau Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Palau section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	Palau NISC	Biosecurity cost recovery program	Medium
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	Palau RISC representatives	Regional ISC Office	Medium
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Palau RISC representatives	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	continuous, yearly	RISC Representatives and Palau NISC	NA	Medium
Improve support and functionality of the national invasive species coordination office/position.	This position should work country wide with appropriate offices, agencies, and NGOs involved in biosecurity efforts as well as internationally within the region and broader scope as needed.	on-going	President's Office	Funding should be in part from the biosecurity cost recovery system, in part from natural resources funding, and in part from donor grants	Medium
	This position/office should be adequately funded and supported technically and politically to ensure that Palau's needs in regards to IAS are being appropriate addressed and that the support for regional concerns is maximized.	on-going	President's Office	Funding should be in part from the biosecurity cost recovery system, in part from natural resources funding, and in part from donor grants	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve support and functionality of the national invasive species coordination office/position (continued).	Palau has a National Invasive Species Coordinator position, but not a separate office – the Coordinator reports to the Director of the Bureau of Agriculture at the present time. Consideration should be given to whether or not this is the best organizational structure. When the Coordinator position was first created, it sat in the Office of Environmental Response and Coordination with the President's Office. The Palau National Invasive Species Committee (PNISC) recommended this location so that the Coordinator could work with all Ministries without being part of one Ministry or another.	2015	President's Office	Funding should be in part from the biosecurity cost recovery system, in part from natural resources funding, and in part from donor grants	Low
	Ensure that the Palau National Invasive Species Coordination position is a long term endeavor.	2014	President's Office	Funding should be in part from the biosecurity cost recovery system, in part from natural resources funding, and in part from donor grants	High
Coordinate with stakeholders to provide a united and active effort towards moving draft biosecurity legislation forward	Ensure that the current draft legislation is adequate specifically in regards to aquatic concerns.	Complete by April 2014	Palau NISC	NA	High
	Ensure that final draft legislation, including any updating, is available for appropriate authorities, including the national legislature to review and consider.	Complete by April 2014	Palau NISC	NA	High
	Ensure that supporters of the bill are advocating for it with the legislature and president's office on a regular basis with the expectation that it will be passed before the end of the calendar year.	Complete by April 2014	Palau NISC	NA	High
Improve communications and ability to address biosecurity concerns between US DoD and civilian government agencies	Establish an MOU between Palau and DoD regarding biosecurity responsibilities and actions within the nation pertaining to mitigation of DoD activities and facilities.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	NA	Medium
	Establish SOPs on aspects of how DoD and Palau's civilian agencies work together regarding biosecurity inspection process, etc. Turn over at DoD facilities in Palau is frequent and having established SOPs would assist with keeping processes in place.	2015	BOA	Biosecurity cost recovery program	High
Improve communication and information sharing in regards to IAS and biosecurity	Develop SOPs at the national level to facilitate communication and information sharing between offices and agencies at both national and state levels in regards to invasive species and biosecurity.	2015	Palau NISC	NA	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	2014 - 2015	Palau RISC representatives and President's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	Palau RISC representatives	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	As soon as the office can be established	Palau RISC representatives and Palau NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office with supporting protocol and methods development.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Palau RISC representatives	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	As soon as the office can be established	Palau RISC representatives	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	Palau RISC representatives and BOA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
	Engage the regional invasive species coordination office to support outreach and education efforts.	As soon as the office can be established	Palau RISC representatives and Palau NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	Medium
Improve capacity to identify biosecurity intercepts and organisms detection post border, including micro organisms and viruses	Develop linkages with Hawaii (or other proximal locations with established capacity) for rapid shipment of specimens for testing and identification. SOPs should be developed once agreements with testing and identification facilities have been established.	2015	Palau Invasive Species Coordinator	Biosecurity cost recovery program	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2015	Ministry of Resources and Development	This should be covered as part of the biosecurity cost recovery system	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Palau Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going, establish by 2018	Palau Community College	external donor support	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	Palau Community College	external donor support	Low
	Support the development of a algal risk assessment for the region.	2016	Palau Community College	external donor support	Medium
	Support the development of a arthropod risk assessment for the region.	2016	Palau Community College	external donor support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Request that SPC develop a biosecurity position specifically for supporting the region.	2014	Palau Office of Foreign Affairs	SPC	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	Palau ISC	external donor support	Medium
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Palau ISC	Regional ISC office	Medium
	Support the development of a weeds risk assessment for the region.	2016	Palau Community College	external donor support	Low
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Palau RISC representatives	RISC	Medium
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Palau RISC representatives	RISC	Medium
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance).	Within 1 month of the December MCES on an annual basis	Palau RISC representatives	RISC	Medium
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Palau RISC representatives	RISC	Medium
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Palau RISC representatives	NA	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Palau RISC representatives	external donor support	Low
Prevention					
Improve pre-border sanitation efforts	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 Hold national consultation including review of pertinent models (New Zealand); 2016 Develop draft national standards; 2017 implement standards	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP. This concept was utilized already in Palau when gravel was brought in for the compact road and should be used as an example of what should be done across the board to better protect the nation from IAS. As an example, all imported plywood should meet minimal sanitation levels.	Should track with the preceding action item	BOA	Biosecurity cost recovery program	Medium
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	BOA	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security	Acquire and install X-ray machines for biosecurity at all ports of entry.	2016	BOA	external donor support	High
	ensure appropriate capacity for the use of X-ray machines for biosecurity at all ports of entry.	2016	BOA	external donor support	High
	ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	BOA	external donor support	High
	Institute 100% x-raying of all arriving passenger baggage.	2016	BOA	Biosecurity cost recovery program	High
	Consider developing SOPs for incoming baggage and cargo inspections which are based on successful models (such as New Zealand); would require hiring and training additional personnel, installing appropriate equipment (X-ray, etc.), training additional canine teams for detection of specific high risk IAS (reptiles, fruits, meats, etc.); insuring appropriate data collection and development and maintaining of databases to track efforts and interceptions.	2016	BOA	Biosecurity cost recovery program	High
	Re-establish fumigation capacity specifically for re-conditioning items like cut flowers on arrival if they are found to harbor pests.	2016	BOA	TBD	High
	Develop a canine pest detection program for items such as snakes, fruits, and vegetables. Consider the potential to combine this program with similar programs for detection of illicit materials such as drugs.	2017	BOA	external donor support	Medium
	Develop a wildlife reference collection (i.e., taxidermy mounts, computer photo files, etc.) to aid identification of incoming species. Adequate resources (taxonomic keys, microscopes, etc.) should be available for assistance in taxonomic identifications.	2016	BOA	external donor support	Medium
	Ensure that quarantine has access to freezers and incinerators at ports. Freezers need to have back up power supplies to ensure functionality. Freezers need to be restricted access for quarantine only.	2015	BOA	Biosecurity cost recovery program	High
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Bins should be placed so as to support use (not directly in front of quarantine stations). Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	BOA	Biosecurity cost recovery program	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Ensure that port authorities are working with quarantine in regards to use and placement of amnesty bins. Standard trash bins should also be located in appropriate areas and well signed so that passengers don't use amnesty bins for regular trash.	2015	BOA	Biosecurity cost recovery program	High
	Develop appropriate inspection facilities including a biosecure inspection facility at the seaport large enough for sea containers and wash-down areas with appropriate retention and treatment facilities for waste water produced.	2017	BOA	external donor support	Medium
	Ensure that inspections process while targeting high risk goods also ensure random sampling of all imports, travelers, and baggage in order to better detect hitchhiker pests.	2015	BOA	Biosecurity cost recovery program	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2015	BOA	Biosecurity cost recovery program	High
	Develop and institute quarantine exchange programs with New Zealand, Australia, and/or U.S. biosecurity agencies as a mechanism for improving inspector capacity and further development of the nation's biosecurity program.	2016	BOA	external donor support	Medium
	An area not well covered by biosecurity currently is the use of the internet for trade. Regulated and prohibited goods arrive in the region via the mail pathway with bogus labelling from people buying on the internet. A plan will be needed to address this pathway. Of significant concern in this regard is the potential for shipping of pets such as reptiles and plant material via the mail system with little ability to detect and intercept these organisms by current biosecurity systems within the region. Trained detector dogs, visual inspections and X-ray machines could all be utilized to reduce the potential for illicit mail trade, but appropriate regulations need to be established which would permit the potential inspection of most if not all arriving mail.	2015	BOA	Biosecurity cost recovery program	Medium
	Ensure ability to implement fines and collect fees to recover costs of re-conditioning when this option is utilized.	2015	BOA	Biosecurity cost recovery program	High
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	BOA	external donor support	Medium
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	BOA	Biosecurity cost recovery program	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Implement advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, identification of livestock, wildlife and poultry diseases and pests, etc.).	on-going	BOA	SPC, regional ISC Office, UH, others	High
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	BOA	Biosecurity cost recovery program	High
	Ensure that quarantine officers have adequate day to day resources such as computers, phones, vehicles, etc.	2015	BOA	Biosecurity cost recovery program	High
	Ensure that the national quarantine office is appropriate funded and that all biosecurity elements have adequate funding and day to day operational resources. Support the establishment of a cost recovery system for biosecurity so that any efforts beyond standard inspections have costs covered by the party or parties involved in the importation/shipping and that these costs as paid go directly to support the national biosecurity system (revolving fund that is used to support biosecurity efforts nation wide).	2015	BOA	Biosecurity cost recovery program	Medium
	Improved biosecurity standards in regards to mail services, including inspection of mail at port of arrival rather than at postal facilities which are post border. All mail should pass through biosecurity inspection.	2016	BOA	Biosecurity cost recovery program	High
	Hire and train additional quarantine staff as needed. Should be based on needs assessment. An inspections database should be able to document existing needs. Hired staff should need to meet minimal qualifications set by the oversight office (Bureau of Agriculture) and come through appropriate channels.	2016	BOA	Biosecurity cost recovery program	Medium
	Institute quarterly reporting on quarantine inspections based on database information and ensure that reports are appropriate shared.	2016	BOA	Biosecurity cost recovery program	Medium
	Review (and update if necessary) penalty assessment structure for noncompliance with biosecurity regulations.	2015	BOA	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Protocols need to be established regarding quarantine inspection of arriving vessels: manifest should be check, cargo, ships stores, galleys, garbage, and cabins should all be inspected. Distinct SOPs are most likely needed for a variety of vessel types including aircraft, fishing vessels, support ships, cargo ships, tankers, yachts, barges. Non-compliance with regulations should be noted and appropriate follow-up actions should be taken including fines, confiscations, and turning away cargo and possibly entire vessels if needed. Inspection data should be collected and recorded into a system wide database.	2015	BOA	Biosecurity cost recovery program	Medium
	Establish an electronic database for quarantine inspection data that can be searched and data extracted for analysis. Such a database would support better targeting of vectors and pathways, permit tracking of known violators, provide documentation regarding interceptions, fee and penalty payments, demonstrate appropriate use of resources, quantify gaps and needs in current system, assist in determining pathways associated with post border detections, tracking of live imported species and number of individuals, tracking changes in vector arrivals and embarkation locations, etc.	2016	BOA	Cost recovery biosecurity system	Medium
	Training quarantine staff in data collection, entry, management and analysis, develop appropriate field inspection forms, conduct quality control of data systems, ensure that field data is entered into system in a scheduled manner to prevent backlogging, ensure that the data system is appropriately and regularly backed up to prevent systematic losses.	2016	BOA	Biosecurity cost recovery program	High
	Develop legislation to create a user fee structure similar to that employed by USDA to support biosecurity efforts.	2015	BOA	Biosecurity cost recovery program	Medium
	Consider implementation of a visitor's fee to support biosecurity efforts. A standardized fee employed throughout the region would be ideal.	2015	BOA	Biosecurity cost recovery program	Low
	Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	2015	BOA	Biosecurity cost recovery program	High
	Address the lack of marine biosecurity oversight. Need to build legislation to support national quarantine having marine biosecurity capacity.	2015	BOA	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Protocols should be established by quarantine for documenting interceptions and final disposition of materials. These reports should be entered into a database and information should be shareable to assist all locations within the Palau to better protect borders but also with other jurisdictions of the region to better protect the region. Protocols should be established regarding how and when (how often) this type of information is shared. Information collected and stored should include date of incident, inspector in charge, what was intercepted, what IAS were found, numbers of pests found, origin of the material in question, disposition of the material(s) and specimen(s), what remedial actions (if any) were taken against the shipper, and if fines were instituted, were they collected.	2016	BOA	Biosecurity cost recovery program	Medium
	Consider developing a national tax on imports to support biosecurity development in Palau. A tax similar to the Green Fee but levied on certain imports (high risk items?) is desirable. This would basically be a user fee. Funds collected in this manner should be held separate and made available to support enhance biosecurity capacity.	2015	BOA	Biosecurity cost recovery program	Low
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	2015	BOA	Biosecurity cost recovery program	High
	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations. Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2015	BOA	Biosecurity cost recovery program	Medium
	Develop MOU's between the national quarantine office and other agencies involved in border inspections (such as customs) so that these offices/agencies can support the quarantine office with biosecurity aspects.	2015	BOA	Biosecurity cost recovery program	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2015	BOA	SPC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Develop SOPs regarding specifics of how other agencies and offices can support the role of the national quarantine office during border inspection process.	2015	BOA	Biosecurity cost recovery program	Medium
	Institute biosecurity cross training of staffs from agencies which are involved in border inspection processes.	2015	BOA	SPC	Medium
	Establish a centralized facility for quarantine offices, including quarantine areas (plant and animal and aquatic organisms), treatment areas, laboratory space, offices, and equipment storage.	2017	BOA	external donor support	High
	Develop regulations regarding biosecurity and visiting cruise ships. These ships, if visiting multiple sites within the nation should fund having a biosecurity office on board during the period that they within national waters, provide for inspection services at all ports of call, cover all travel expenses for the biosecurity officer, and coordinate with the national quarantine office to ensure that the inspector's home port does not experience a drop in quarantine services during their absence (this may including paying for overtime).	2015	BOA	Biosecurity cost recovery program	Medium
	Develop specific regulations and enforcement SOPs for imported seeds. All imported and viable seeds should require completed risk assessments and permitting.	2015	BOA	Biosecurity cost recovery program	Medium
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2015	BOA	Biosecurity cost recovery program	High
	Undertake to implement more comprehensive data collection and better data management on IAS vectors and pathways, including detailed inspection processes, intercept records, preservation and compiling of voucher specimens, detailed records on where shipments, etc. are arriving from and specifically what is known to have harbored IAS and where it come from and how it arrived. Ensure that records are entered into a useable database and that data is analyzed and shared with partners as warranted. The tracking of live organisms would be better enabled with a data collection systems which tracked not only shipments but species and number of individuals as well.	2017	BOA	Biosecurity cost recovery program	Medium
Improve overall post border biosecurity	Create community funding sources for local programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2017	Palau NISC	external donor support	Medium
	Conduct localized risk assessments of terrestrial, freshwater, and marine systems as feasible.	2017	Palau NISC	external donor support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve overall post border biosecurity (continued)	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement "clean" practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	Palau NISC	external donor support	Medium
	Ensure proper cleaning of all large equipment and construction materials prior to moving between sites within the state.	2015	BOA	Biosecurity cost recovery program	Medium
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry in regards to invasive species.	2015	BOA	Biosecurity cost recovery program	Medium
	Adopt a voluntary code of conduct for nurseries, landscaping companies, hotels, and other businesses as appropriate to promote the sale and use of locally sourced plants, preferably native plants. If non-natives are going to be used for landscaping, insure that they are non-invasive species. If plants will be brought into an area from outside for landscaping, insure that they are pest free. This code of conduct should encourage businesses: to make their staff knowledgeable about invasive plants, to inform their customers about invasive plants, to report immediately any likely exotic pest organisms found on their premises, and to use native or non-invasive plants locally sourced.	2015	Palau NISC	external donor support	Medium
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replace of WPM with recycled plastics.	on-going	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering Palau should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	BOA	Biosecurity cost recovery program	Medium
	Do not permit the unloading of noncompliant WPM.	2015	BOA	Biosecurity cost recovery program	High
	Treat or destroy any noncompliant WPM that is offloaded.	2015	BOA	Biosecurity cost recovery program	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of wood packaging material (WPM) (continued)	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	BOA	Biosecurity cost recovery program	High
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	BOA	Biosecurity cost recovery program	High
Improve ability to better enforce pre-departure sanitation	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	BOA	Biosecurity cost recovery program	Medium
	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping. Currently rented containers are inspected for internal cleanliness before departure. This should be expanded to include all containers and both internal and external surfaces.	2015	BOA	SPC	Medium
	Develop and institute standards which would increase pre-departure inspections. Visual inspections are conducted pre-departure which focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture. All jurisdictions should add quarantine inspections to the SOP of departing materials.	2016		Biosecurity cost recovery program	Medium
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	BOA	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2015	BOA	Biosecurity cost recovery program	Medium
Improve intra-state biosecurity and foreign arrivals at ports other than the main air and sea ports	Develop biosecurity standards for ports other than the main air and sea ports.	2016	BOA	Biosecurity cost recovery program	Medium
	Implement and enforce biosecurity at ports other than the main air and sea ports.	2016	BOA	Biosecurity cost recovery program	Medium
	Conduct a nation wide consultation regarding intrastate biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	BOA	Biosecurity cost recovery program	Medium
	Conduct risk assessments for outer islands for terrestrial and aquatic concerns.	2017	Palau NISC	external donor support	Medium
	States should develop biosecurity (kayangel is doing this now) others states should consider following suite, especially the outlying states.	2016	Individual States	NA	Medium
	Helicopters and private planes (or small scale commercial ventures) can be used to move passengers and cargo and where they exist or where there are plans for their use, they should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	BOA	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Ministry of Health	external donor support	Low
	National health authorities should work with CDC to determine what, if any, role DoD can support in the advent of a human pathogen outbreak. For example, could CDC direct DoD to transport sick patients to appropriate support facilities either within or outside of the national in the case of a human pathogenic outbreak?	2015	Ministry of Health	external donor support	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015: Develop agreements with shippers for medical services (consider working with airlines and/or DoD)	Ministry of Health	external donor support	Medium
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import.	Dec-14	BOA	Biosecurity cost recovery program	Medium
	Update white list on a regular basis.	annually	BOA	Biosecurity cost recovery program	Medium
	Develop a government endorsed black list of prohibited species.	Dec-14	BOA	Biosecurity cost recovery program	High
	Update black list on a regular basis.	annually	BOA	Biosecurity cost recovery program	Medium
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	BOA	Importer pays for all aspects of the risk assessment (regardless of outcome)	Medium
	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	2015	BOA	utilize student support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a national biosecurity advisory committee to review proposals for the importation of exotic species.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Funding: should be part of the biosecurity cost recovery system; technical support SPC/FAO	High
	Palau is currently considering importing shrimp from the CNMI and should be aware of what potential diseases, etc. may be associated with the CNMI stock and which if any of these are not yet established within the state and therefore should be kept out.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Funding: should be part of the biosecurity cost recovery system; technical support SPC/FAO	High
	Improve reporting and screening systems for import of live organisms, such that all live organisms to be imported need to be fully vetted with written documentation on species, numbers, origin, anticipated final disposition, pre-arrival sanitation inspection and health check, arrival inspection and health check are all clearly documented. Additionally live imports should receive prior approve for importation and any new species will need to go through a risk assessment process to be paid for by the user.	2015	BOA	Funding: should be part of the biosecurity cost recovery system; technical support SPC/FAO	Medium
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	BOA	external donor support	High
	Develop plan for containment and control measures in regards to exotic farmed and traded species.	2015	BOA	Biosecurity cost recovery program	Medium
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	BOA	Biosecurity cost recovery program	Medium
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2014, should be included in the current draft biosecurity legislation	Palau Office of the Attorney General	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	High
	Develop specific guidelines for unwanted pets. PAWS has something that should be review and further expanded as needed.	2015	BOA	NA	Medium
	Improve capacity and infrastructure regarding animal health. Koror State does have a veterinarian and perhaps this office should be engaged to support national efforts.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Develop biosecurity standards for household aquaculture set ups and enforce these standards. Small scale crab farming is currently developing.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Get support from FAO	Medium
	Develop guidelines for cages.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish a certification system for the movement (domestic and international) of live organisms. Might be difficult to do for the entire nation but may be feasible for outlying islands.	2015 conduct an national consultation; 2016 develop draft system; 2017 implement system nation wide	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	BOA	NA	High
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	Palau Invasive Species Coordinator	external donor support	Medium
Increase export potential	Establish produce and live organism export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	BOA	FAO	Low
	Establish processed foods export standards. Appropriate sanitation and consistency over time will be essential to insuring long term external market engagement.	2016	BOA	FAO	Low
	Improve capacity to export crops, which will involve finding/establishing markets with trade partners.	2016	BOA	FAO/SPC	Medium
	Train and certify agricultural staff to support local farmers with enhancing the potential for export crops.	2015	BOA	SPC	Medium
	Support local farms with capacity development to increase potential to export crops.	2016	BOA	SPC	Medium
	Ensure that fumigation for export crops is available and appropriate used.	2015	BOA	SPC	Medium
	Work with proposed external trade partners to ensure that export crops of interest are permitted for importation (example: betelnut).	2016	BOA	FAO	Medium
	Improve ability to meet import standards imposed by trade partners in regards to agricultural produces and processed foods.	2016	BOA	SPC/USDA	Medium
	Increase protection of export crops from invasive pests by better management of established species and improved border security to reduce the introduction of new pests to the state.	2015	BOA	external donor support	Medium
	Support appropriate development of slaughter house for pork product production. If appropriate established and sanitation guidelines are develop and established then it might be feasible to consider exportation in regards to this on-going development.	2015	BOA	FAO	Medium
	Ensure that all proposed agricultural exports go through an establish protocol to ensure cleanliness before entering the shipping lines to reduce the potential for transport of unwanted pests.	2015	BOA	SPC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish standards and regulations regarding biofouling, including inspection and certification for all vessels. Inspections can be trained to inspect hulls from top side with mirrors. If further inspection is warranted, then the craft pays for divers to inspect and make a report. If determined to be dirty, then the craft must either be cleaned or leave port and jurisdictional waters. Self clean outside of jurisdictional waters could be an option. Hull needs to be clean of all organisms, as the ability to identify all marine organisms is not available.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish additional regulations for impounded vessels.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium
	Develop capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards (continued)	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Ensure that regulations include ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Review and revise (as needed) legal authority to implement a biofouling management program.	2014: this should be included in the current draft biosecurity legislation; May need to update	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Develop capacity to deal with grounded and/or abandoned vessels	Determine what agency has the legal authority for removal of grounded and/or abandoned vessels.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	USCG	Medium
	Develop a response plan for grounded and abandoned vessels that includes assessment and removal of non-native species in a timely manner to reduce the potential of incursions.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	USCG	Medium
	Establish a core team of responders (likely from a variety of agencies) with established SOPs for use in the advent of a grounded or abandoned vessel.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	USCG	High
	Ensure that funding is in place and can be utilized without delay in the case of a grounded or abandoned vessel.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	USCG	High
Increase marine system protection from invasive species	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium
	Biosecurity inspection of vessels (including the hull) before entering the rock islands should be added to the current permitting process. Permits already required, so why not ensure vessels are clean before departing for this protected area. Koror State could run this program. They have divers already and could do the inspections themselves.	2015	Koror State	Funding should come from entry fees	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase marine system protection from invasive species (continued)	Establish biosecurity practices and requirements for fishing vessels that operate in Micronesia to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
Establish and enforce ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	external donor support	Medium
	Adopt and enforce international ballast water regulations (discharge at least 200nm off shore). Inspection of ship logs for compliance.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Establish ballast water management and reporting requirements for all vessels utilizing ballast water.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2017	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
	Support national level adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium
Address climate change linkages to invasive pests		2016	Palau NISC	US AID	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address food security for the nation in regards to invasive pests.	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2016	Palau Community College	FAO	Medium
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	Palau NISC	external donor support	High
	The Palau national emergency framework includes IAS and has a process for mobilizing funding. Consider utilizing this framework as the basis for the IAS ED and RR efforts. Stakeholders need to be fully engaged in this framework if it is to be utilized as such.	2015	Palau NISC	NA	Medium
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	Palau NISC	external donor support	Medium
	Develop taxa specific ERPs as needed.	On-going	Palau NISC	Biosecurity cost recovery program	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	Palau NISC	Biosecurity cost recovery program	Medium
	Ensure that the public reporting system is fully functional including supported by trained staff.	2015	Palau NISC	Biosecurity cost recovery program	Medium
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2015	Palau NISC	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
improve early detection and rapid response capacity (continued)	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2015	Palau NISC	Biosecurity cost recovery program	Medium
	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	Palau NISC	Biosecurity cost recovery program	Medium
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2015	Palau NISC	Regional ISC office	Medium
	Hold consultations to determine what agency(s), office(s) and/or groups will be responsible for surveillance programs.	2015	Palau NISC	external donor support	Medium
	Develop and institute surveillance programs for non-established species consider high risk of arrival such as alien snakes, fruit flies, tramp ants, etc.	2015	Palau NISC	external donor support	Medium
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	Palau NISC	Regional ISC office	Medium
Management and eradication					
Increase management and control of established invasive species	Determine which established invasive species are actionable and proceed with developing management strategies. Covered in part by national ISAP.	2015	Palau NISC	ISSAP	Medium
	Create GIS layers regarding the distribution of established IAS and use to support biosecurity and IAS management efforts.	2015	Palau Community College	external donor support	Medium
	Train natural resource staffs (including protected areas staffs) at the local level in regards to IAS management support.	2015	Palau NISC	Regional ISC office	Medium
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	2015	Palau NISC	Regional ISC office	Medium
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2015	Palau NISC	external donor support	Low
	Develop standardized SOPs for IAS monitoring and surveys.	2015	Palau NISC	external donor support	Medium
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distribution is current.	2015	BOA	external donor support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase management and control of established invasive species (continued)	Create community funding sources for local (village level) programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2016	Palau NISC	external donor support	Medium
	Conduct terrestrial and aquatic risk assessments for all protected areas.	2016	Palau Conservation Society	Palau Green Fund or external funding sources	Medium
Increase efforts to eradicate targeted species	Conduct surveys and hold stakeholder consultations to determine what established species are viable candidates for eradiation efforts.	2016	Palau NISC	external donor support	Medium
	Develop strategies to conduct eradication campaigns including securing funding streams to support these efforts.	2016	Palau NISC	external donor support	Medium
	Develop resources to respond to new pest incursions beyond ED & RR, including conducting delimiting surveys and potential eradication efforts.	2016	Palau NISC	external donor support	Medium
	Continue with Tilapia eradication efforts and document. Report to the region on outcome. Continue to monitor for Tilapia.	2014	Palau NISC	external donor support	High
	Continue with management efforts with invasive primates established In specific areas within the country.	2014	Palau NISC	external donor support	Medium
	Develop and conduct surveys for primates in areas where primates have been reported but currently are not know to exist.	2015	Palau NI	external donor support	Medium
	Eradicate small and feasible invasive species incursions promptly, while it is most feasible, least expensive, and before extensive damage has occurred. Covered in part by national ISAP.	2016	Palau NISC	external donor support	Medium
Awareness					
Increase outreach and education on biosecurity and invasive species	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	Palau NISC	external donor support	Medium
	Conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the nation from unwanted pests.	2015	Palau NISC	external donor support	Medium
	Establish long term funding to support core outreach and educational efforts.	2016	Palau NISC	external donor support	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species(continued)	Develop an educational strategy that is long term, extensive and nation wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	Palau NISC	external donor support	Medium
	Coordinate existing outreach efforts.	2015	Palau NISC	external donor support	Medium
	Add invasive species education as a standard part of school curriculums.	2016	Palau NISC/Palau Ministry of Education	external donor support	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2015	Palau NISC/Palau Ministry of Education	external donor support	Medium
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	2016	Palau NISC	external donor support	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	on-going	Palau NISC	external donor support	Medium
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2016	Palau NISC	external donor support	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2015	Palau ISC	Regional ISC office	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2015	Palau ISC	RISC	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges. Create awareness of the potential legal consequences of violating biosecurity regulations. Palau could develop their section of the video or their own entire video with the support of the PVA.	Start in 2014	Palau ISC	external donor support	High
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish.	2015	Palau NISC	external donor support	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Conduct baseline surveys.	2016	Palau Community College	external donor support	Medium
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2015	Palau Community College	external donor support	Low
Policy					
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations.	2015	Palau NISC	Biosecurity cost recovery program	Medium
	Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2015	Palau Ministry of Natural Resources, Environment, and Tourism	Biosecurity cost recovery program	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance (continued)	Current system of fines and penalties needs to be improved to better support biosecurity efforts.	2015	BOA	Biosecurity cost recovery program	High
Restoration					
Increase restoration efforts of native systems where IAS management and/or eradication efforts are underway or have been successful.		2016	Palau Conservation Society	external donor support	Medium

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment J: Commonwealth of the Northern Mariana Islands Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support					
Increase funding for biosecurity	Ensure adequate long-term funding is available for biosecurity equipment and infrastructure.	2016	Quarantine	External donor	High
	Ensure sufficient funding for agriculture and wildlife disease and pest exclusion activities by developing legislation to create a user fee structure similar to that employed by the DHS and USDA.	2016	Quarantine	Biosecurity cost recovery system	High
	Consider developing and institution user fees for passengers and baggage inspections.	2016	Quarantine	Biosecurity cost recovery system	High
	Visitors to the CNMI should be able to support biosecurity efforts via user fees. Any fees which are collected should go to the appropriate biosecurity agency for each jurisdiction and should be held in a revolving fund and utilized as needed to support biosecurity work. It would be ideal if a Micronesia wide fee schedule was established.	2016	Quarantine	Biosecurity cost recovery system	High
	Identify and establish dedicated, long-term and short-term funding to implement the various biosecurity recommendations. In addition to advancing individual objectives, there is a critical need to sustain biosecurity as a long-term and vital activity, just as customs and border security (for goods and people) is an ongoing activity. To sustain biosecurity and provide long-term continuity requires some core level of activities, personnel, and coordination, which will require dedicated funding.	2017	Quarantine	TBD	Medium
	Ensure sufficient funding to conduct routine surveillance, implement response plans, and provide outreach and education, in addition to port of entry exclusion activities and training for inspectors.	2016	Quarantine	Biosecurity cost recovery system	High
	Increased funding for regional biosecurity so necessary efforts to prevent, control, and eradicate animal and plant pests and diseases throughout the region are effective.	2017	CNMI RISC representatives	TBD	Low
	Identify funding and mechanisms to assess and respond to biosecurity threats across a broad geographic range in the CNMI. Efforts should include resources to also support efforts in Tinian, Rota, Aguigan, Pagan and even the Monument Islands of Uracas, Maug and Asuncion.	2017	TBD	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the CNMI section of the RBP on a regular basis and share regionally.	continuous, at least every 5 years	CNMI Invasive Species Task Force	Biosecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Develop a region wide communication plan for biosecurity and IAS. Examine the potential of using existing models for the plan development including that which was produced for Oahu recently (maybe 4 years ago). The Oahu plan was ultimately not utilized but it potentially could serve as a model for networking regionally.	2015	CNMI RISC representatives	Regional ISC Office	High
	Establish communication and coordination system for information derived from outreach programs, port inspections, pest identifications, and reports from the public of sightings or encounters with suspected invasive species or illegal movements of foods, plants, animals, insects, etc.	2016	CNMI Invasive Species Task Force	External donor	High
	Implement more comprehensive data collection and better data management on IAS vectors and pathways, including detailed inspection processes, intercept records, preservation and compiling of voucher specimens, detailed records on where shipments, etc. are arriving from and specifically what is known to have harbored IAS and where it come from and how it arrived. Ensure that records are entered into a useable database and that data is analyzed and shared with partners as warranted.	2016	CNMI Quarantine	Biosecurity cost recovery system	High
	Develop a region wide net of experts to support IAS efforts throughout the region. The general concept would be for each jurisdiction to have an IAS coordinator who could work extensively with RISC. Additionally a regional IAS coordinator should be developed to support and assist as well as coordinate efforts both within and between jurisdictions. Agreements with key thematic experts could then be developed and utilized as needed to support regional and jurisdictional activities.	2016	CNMI RISC representatives	Regional ISC Office	Medium
Improve communications and ability to address biosecurity concerns between US DoD and civilian government agencies	Establish an MOU detailing responsibilities, actions and cooperative agreements between the CNMI and DoD to work jointly on biosecurity issues related to DoD activities and mitigation within the CNMI.	2015	DNLR	DoD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish a jurisdictional invasive species coordination office that is tasked with supporting commonwealth wide IAS efforts across agencies and offices as well as working nationally and regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the invasive species coordination position(s), possibly having a coordination position for each island (Rota, Tinian, and Saipan).	2015	Governor's Office	Biosecurity cost recovery system	High
	Once established this office should support and assist in coordinating efforts with invasive species within the CNMI. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that governance is regularly updated regarding both commonwealth and regional invasive species developments.	2015	Governor's Office	Biosecurity cost recovery system	High
Improve communication and information sharing in regards to IAS and biosecurity	Although areas outside Micronesia and Hawaii are understandably not included in the RBP, information sharing outside the area should be better developed in regards to biosecurity and IAS. In particular, communication and info sharing from Micronesian governments and biosecurity authorities/organizations to other entities outside the region (with respect to notification about species that will or might be problematic and which could originate from within the region) should be developed. Establishing a regional IAS office would facilitate these efforts.	2016	CNMI Invasive Species Task Force	External donor	Low
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	CNMI RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting protocol and methods development.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts	As soon as the office can be established	CNMI RISC representatives and the CNMI ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	CNMI Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	College of the Northern Mariana Islands	External donor	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	College of the Northern Mariana Islands	External donor	Low
	Support the development of a algal risk assessment for the region.	2016	College of the Northern Mariana Islands	External donor	Medium
	Support the development of a arthropod risk assessment for the region.	2016	College of the Northern Mariana Islands	External donor	Medium
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	CNMI Invasive Species Coordinator	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	CNMI Invasive Species Coordinator	Regional ISC office	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of a weeds risk assessment for the region.	2016	College of the Northern Mariana Islands	External donor	Medium
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	CNMI RISC representatives	External donor	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC bi-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	CNMI RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	CNMI RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance)	Within 1 month of the December MCES on an annual basis	CNMI RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	CNMI RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	CNMI RISC representatives	NA	High
Improve regional coordination regarding biosecurity and IAS	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2015	CNMI RISC representatives	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Prevention					
Improve pre-border biosecurity	Emphasis should be directed towards audited off-shore hygiene systems such as those utilized very successfully in Australia and New Zealand. This is ultimately the best way to prevent IAS incursions.	2015 Hold jurisdictional consultation including review of pertinent models (New Zealand); 2016 Develop draft standards; 2017 implement standards	Quarantine	Biosecurity cost recovery system	High
	Large, used machines such as tanks and bulldozers intended for importation should be cleaned and inspected for IAS at points of origin immediately prior to shipping.	2015	Quarantine	Biosecurity cost recovery system	High
	Insure proper cleaning of all large equipment such as construction and military items according to APHIS guidelines prior to entry.	2015: consider establishing guidelines based on existing USDA-APHIS materials	Quarantine	Biosecurity cost recovery system	High
Improve border security	Develop SOPs for border inspections.	2015	Quarantine	Biosecurity cost recovery system	High
	Improve capacity for IAS detection and interception at/within the transport pathways as well as ports of entry.	2016	Quarantine	Biosecurity cost recovery system	Medium
	Create and institute a mixed model biosecurity approach based on both vector sanitation and focusing on key high risk species for terrestrial, freshwater, and marine habitats.	2015	Quarantine	Biosecurity cost recovery system	High
	Consider developing SOPs for incoming baggage and cargo inspections which are based on successful models (such as New Zealand); would require hiring and training additional personnel, installing appropriate equipment (X-ray, etc.), training additional canine teams for detection of specific high risk IAS (reptiles, fruits, meats, etc.); insuring appropriate data collection and development and maintaining of databases to track efforts and interceptions.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Institute 100% x-raying of all arriving passenger baggage.	2016	Quarantine	Biosecurity cost recovery system	Medium
	Follow up consideration should be given to current agricultural imports and importer locations to adjust the risk assessment results to the current situation. The same is true for exports.	2016	DLNR	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Provide essential equipment to inspection services, including x-ray machines, computer, communication devices, etc. and support for both the use and maintenance of this equipment.	2015	Quarantine	External donor	High
	Develop appropriate vector management with feedback and monitoring mechanisms.	2016	Quarantine	Biosecurity cost recovery system	High
	Establish decontamination sites for cleaning both military and civilian equipment.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Improve capacity to inspect and track permitted imports. Consider enhancing quarantine requirements for specific species or taxon groups when imported (need to develop facilities for this in most cases) which would help with disease detection and control.	2015	Quarantine	Biosecurity cost recovery system	High
	Insure proper cleaning of all large equipment such as construction and military items according to APHIS guidelines prior to moving between sites (islands or locations on specific islands).	2015	DLNR	Biosecurity cost recovery system	High
	Establish a protocol which will permit the inspection of US, and all other types of mail, including private courier items.	2016	Quarantine	Biosecurity cost recovery system	Medium
	Provide quarantine agents with the necessary legal authority, training, and support to enforce requirements at border entry and post-border locations (e.g. aquaculture facilities and sales outlets).	2015	Quarantine	Biosecurity cost recovery system	High
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	Quarantine	External donor	Low
	Develop a plan to address the IAS introduction pathway of mail. Of significant concern in this regard is the potential for shipping of pets such as reptiles via the mail system with little ability to detect and intercept these organisms by current biosecurity systems within the region. Trained detector dogs, visual inspections and X-ray machines could all be utilized to reduce the potential for illicit mail trade, but appropriate regulations need to be established which would permit the potential inspection of most if not all arriving mail.	2016	Quarantine	Biosecurity cost recovery system	Medium
	Develop/enhance the tracking system for all cargo with unique identifiers for cargo shipments. Include an electronic system for tracking, identifying, and collecting data from manifests for containerized commercial cargo arrivals to the CNMI to streamline the import process while maintaining biosecurity.	2017	Quarantine	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Develop a wildlife reference collection (i.e., taxidermy mounts or computer photo files with APHIS-WS) to aid identification of incoming species. Adequate resources (taxonomic keys, microscopes, etc.) should be available for assistance in taxonomic identifications.	on-going	DLNR	External donor	Low
	Programs could be established that would allow passengers of airlines or ships to be able to surrender any potentially invasive animals with assurances that there would be no prosecution (excluding illegally smuggled animals protected by law, such as species listed under CITES). Similar to "honor bins" placed in some airports that allow passengers to anonymously dispose of contraband, such as fruit or other plant products, mechanisms could be established that would allow travelers to surrender nonindigenous species that have been transported in luggage. Such an option could be disseminated by means of mass media outlets as part of public outreach.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Conduct sanitary inspections of all incoming construction materials including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	Quarantine	Biosecurity cost recovery system	High
	Conduct annual invasive species awareness and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect, capture, or detain the invasive species upon discovery at the port, and point of contact to report an incident.	2015	DLNR	Biosecurity cost recovery system	Low
	Conduct biosecurity inspection for all arriving conveyances, military and non-military, for plant pests and animal contamination. Inspection must include a thorough search of the exterior and the interior of the conveyance for plant and animal pests and wildlife of concern. CNMI quarantine officers must be allowed to inspect military vessels as USDA-APHIS cooperators.	2015	Quarantine	Biosecurity cost recovery system	High
	Helicopters and private planes (or small scale commercial ventures) should be considered as possible IAS vectors and therefore a biosecurity threat that needs to be appropriate monitored and inspected.	2015	Quarantine	Biosecurity cost recovery system	Low
	Ensure that the biosecurity system is tracking changes in aircraft arrivals, especially as new linkages are established and/or additional carriers are added.	2015	Quarantine	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests. Follow all APHIS policies and guidelines as applicable (or establish similar guidelines). Evaluate the effectiveness of current cleaning methods, and improve as appropriate.	2015	Quarantine	Biosecurity cost recovery system	High
	Improve detection methods for rodents and other wildlife on vessels and in cargo. Rodents and other wildlife have been implicated in the transmission of zoonotic diseases. Methods may include trapping, monitoring for signs, etc. Rodent detection methods are not well developed and other wildlife detection methods have not been well documented.	2016	DLNR	External donor	Low
	Vessels need to have SOPs for safe keeping of garbage and basic standards in regards to garbage need to be enforced. Port inspects should include insuring garbage is in an enclosed bin and secured. In proper garbage management should be addressed ASAP and fines levied to better insure future compliance.	On-going	Quarantine	Biosecurity cost recovery system	High
Improve regulation and compliance of wood packaging material (WPM)	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign, military and non-military WPM entering the Micronesia Region should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	on-going	Quarantine	Biosecurity cost recovery system	Medium
	Do not permit the unloading of noncompliant WPM.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Conduct phytosanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign, military and non-military WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Support a regional approach to switch from WPM to other options such as recycled plastics; interim solution is the enforce certification of WPM and to inspect regularly.	2014	Quarantine	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2016	Quarantine	Biosecurity cost recovery system	Low
	Mandate and enforce regulations for handling palletized cargo. Contamination can occur during the packing, handling, and staging processes prior to arrival as imported cargo or after arrival when staged for loading for inland transport. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for labeling, packing, and transport prior to arrival and for eventual staging and loading for inland transport after arrival. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places, especially for BTS detection by canine inspection teams.	2016	Quarantine	Biosecurity cost recovery system	Medium
	Establish and utilize container racks at all locations where containers are stored for preloading, etc. and establish SOPs with shippers for pre-departure cleanliness in regards to containers.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2016	Quarantine	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve ability to better enforce pre-departure sanitation (continued)	Adopt standards which would increase pre-departure inspections. In the CNMI, commercial airline baggage is screened by Transportation Security Administration (TSA) agents/airline employees immediately prior to departure using X-ray machines. These pre-departure inspections focus on searching for weapons and other prohibited items, but during these inspections, inspectors could potentially find and confiscate live organisms. These inspectors should receive training in IAS detection and capture.	2018	Quarantine	Biosecurity cost recovery system	Medium
Improve overall post border biosecurity	Provide training and support to DFW to conduct post border inspections and follow-up activities.	2016	DFW	Biosecurity cost recovery system	Medium
	Develop and/or improve capacity to carry out investigations and effective enforcement beyond ports of entry.	2016	DFW	Biosecurity cost recovery system	Medium
	Develop jurisdictional capacity in regards to post-border IAS concerns. Train natural resource staffs at the local level in regards to IAS management support. Train interested citizens to support IAS management efforts.	2016	DLNR	External donor	Medium
	Conduct periodic surveys of ethnic markets, pet stores, and grocery stores to identify and intercept prohibited animals and animal and plant products following the model of the USDA-APHIS-PPQ Smuggling, Interdiction, and Trade Compliance program.	On-going	Quarantine	Biosecurity cost recovery system	Low
	Establish and develop relationships with key industrials such as landscaping and pet stores to help develop their ability to institute internal standards to support IAS prevention.	2016	DLNR	TBD	Medium
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement “clean” practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	DLNR	TBD	Medium
	Improve capacity to identify biosecurity intercepts and organisms detection post border, including micro organisms and viruses.	2016	DLNR	External donor	Medium
	Ensure that funding mechanisms are established and that funding in available as needed to support IAS specimen sampling, testing, and identification.	2016	DLNR	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve overall post border biosecurity (continued)	Adopt a voluntary code of conduct for nurseries, landscaping companies, hotels, and other businesses as appropriate to promote the sale and use of locally sourced plants, preferably native plants. If non-natives are going to be used for landscaping, insure that they are non-invasive species. If plants will be brought into an area from outside for landscaping, insure that they are pest free. This code of conduct should encourage businesses: to make their staff knowledgeable about invasive plants, to inform their customers about invasive plants, to report immediately any likely exotic pest organisms found on their premises, and to use native or non-invasive plants locally sourced.	2015	Quarantine and Forestry	TBD	Low
Increase agricultural biosecurity/food security	Conduct background surveys as soon as possible to establish baselines for plant pests and livestock and wildlife populations and diseases.	2017	DLNR	External donor	Medium
	Implement initial surveillance and monitoring strategy to prevent introduction of livestock, poultry, and wildlife diseases and to determine whether measures perform adequately. These measures then should adjust to improve biosecurity.	2017	DLNR	External donor	Medium
	The collection and analysis of baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained. In a similar fashion collecting and analyzing data regarding both existing pests and pests at high risk of invasion should be a continuous effort. Information gathered should be shared on a regular basis within the region and beyond. There are existing models at least for some components of this process that should be considered and utilized where appropriate.	2017	DLNR	External donor	Medium
Improve internal biosecurity	Conduct a jurisdictional review and consultation period to determine: A. need for internal biosecurity, B. if needed, how it could best be implement, and C. Follow up with recommendations which come from this process.	2016	DLNR	Biosecurity cost recovery system	High
	Determine best methods for protecting currently uninhabited islands such as Pagan from additional IAS incursions and consider options for IAS management on these islands in regards to already established species.	2017	DLNR	Biosecurity cost recovery system	High
Increase alien snake detection capacity	Develop a BTS quarantine facility for the island of Rota as well as develop resources to enhance the BTS detection capacity for the island.	2017	DLNR	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Department of Health	External donor	Medium
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import.	2014	Quarantine	Biosecurity cost recovery system	High
	Update white list on a regular basis.	annually	Quarantine	Biosecurity cost recovery system	Medium
	Develop a government endorsed black list of prohibited species.	2014	Quarantine	Biosecurity cost recovery system	High
	Update black list on a regular basis.	annually	Quarantine	Biosecurity cost recovery system	Medium
	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	2015	Quarantine	utilize student support	Low
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	Quarantine	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Improve reporting and screening systems for import of live organisms.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Improve tracking of live plant and animals imports. Importers should list the types and numbers of each species in each shipment, and such information should be recorded by border agents, retained in an electronic database, and shared as appropriate.	2016	DLNR	Biosecurity cost recovery system	Medium
Reduce risk associated with live traded species	Establish a formal risk analysis process/guidelines for all organisms used or proposed for live trade.	2015	DLNR	This should be supported by user fees as part of the cost recovery biosecurity system	High
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	DLNR	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	Development of strict contingency plans/emergency preparedness programs regarding possible escapees of exotic organisms being farmed or traded.	2015	DLNR	Biosecurity cost recovery system	High
	Ensure that specific quarantine facilities are available (will need to build) and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species). Facilities need to include quarantine facilities for terrestrial and aquatic species, examination and inspection areas. Facilities are best located proximal or within port areas to reduce on island transit prior to reach quarantine.	2016	Quarantine	External donor	Medium
	Improve disease diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	DLNR	Biosecurity cost recovery system	Medium
	Ensure that all aquaculture facilities are secure including from natural disasters.	2015	DLNR	Biosecurity cost recovery system	High
	Support regional and international cooperation on the responsible use and control of exotic species.	continuous	CNMI Invasive Species Coordinator	External donor	Medium
	Develop standards for backyard aquaculture set ups and enforce as feasible.	2015	DLNR	Biosecurity cost recovery system	Low
	Develop specific guidelines for the adequate disposal of unwanted pets.	2015	DLNR	External donor	Low
Increase existing biosecurity capacity by providing adequate day to day resources	Provide training to increase inspection and identification expertise. Safeguarding inspectors (both civilian and military) should receive regular adequate training in proper techniques for detecting, collecting, recognizing, and identifying pests. A communication network for continuous sharing of new information is recommended.	2015	Quarantine	Biosecurity cost recovery system	High
	Increase capacity and training of both current and new quarantine inspectors to better enable them to handle current and future inspection levels, identify key IAS of concern, collect and enter data, and insure that all regulations are being equally applied to all (there should be no exceptions in regards to border security regardless of person or position).	2015	Quarantine	Biosecurity cost recovery system	High
	Train inspectors specifically in livestock, wildlife, and poultry diseases and pests.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Hire and train biosecurity staff in order to meet current inflow levels and any anticipated near term increases. This applies across the board: inspections, management and control operations, and early detection and rapid response.	2015	Quarantine	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase biosecurity surveillance measures at both military and commercial airports and harbors including all entry points and screening check points.	Keep a well-documented process of pest and disease prioritization, surveillance, data collection, and record keeping. Specific surveillance methodology should be appropriate for target species (i.e. modifying sampling programs to account for behavioral differences in diurnal and nocturnal lifestyles).	2016	Quarantine	Biosecurity cost recovery system	High
	Communicate survey results among all island mitigation programs.	2017	Quarantine	Biosecurity cost recovery system	High
	Utilize systematic surveillance for plant pests following the model of the Cooperative Agriculture Pest Surveys (CAPS), and include both military and civilian properties as appropriate.	2017	Quarantine	Biosecurity cost recovery system	High
	Biosecurity surveillance system should include routine surveillance for wildlife, livestock, and poultry diseases and vectors as well as plant pests.	2017	Quarantine	Biosecurity cost recovery system	Medium
Establish and enforce biofouling standards	Establish biosecurity criteria (requirements) for acceptable levels of hull biofouling for all commercial vessels (including cargo ships, cruise ships, passenger ships, barges, dredges, fishing vessels, and other vessel types).	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish reporting requirements on hull husbandry practices and operational characteristics for commercial vessels (including cargo ships, cruise ships, passenger ships, barges, dredges, fishing vessels, and other vessel types).	2017	DNLR	Biosecurity cost recovery system	Medium
	Establish requirements for routine inspection and certification of biofouling levels for any commercial vessel with a long port residence time or lay-up.	2017	DLNR	Biosecurity cost recovery system	Medium
	Review and establish criteria for in-water cleaning methods for commercial vessels that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	DLNR	Biosecurity cost recovery system	Medium
	Develop the capacity to (a) assess the extent to which commercial vessels achieve acceptable levels of biofouling, and (b) respond to high-risk commercial vessels (i.e., those with high biofouling) that arrive to a port.	2017	DLNR	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement biofouling management program for commercial ships.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of biofouling management requirements for commercial ships.	2017	DLNR	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards (continued)	Implement inspections of any impounded vessel (a) assess level of hull biofouling and (b) treat vessels (if needed) to reduce biofouling to acceptable level.	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat (if necessary) recreational vessels to reduce associated biofouling to an acceptable level.	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for recreational vessels to reduce the transfer of biofouling organisms.	2017	DLNR	Biosecurity cost recovery system	Medium
	Review and establish criteria for in-water cleaning methods for hull fouling that do not post a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement targeted outreach and administrative tools to increase compliance with biofouling requirements for military and civilian vessels.	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within the CNMI.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the fishing industry, ports, and resource management agencies of biofouling management requirements for fishing vessels.	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat (if necessary) in-water structures that are being moved into or within the CNMI to reduce associated biofouling to an acceptable level.	2017	DLNR	Biosecurity cost recovery system	Medium
Establish and enforce ballast water standards	Plan for in-hull treatment of ballast water with support from the USCG in regards to developing biosecurity for marine organisms. USCG has proposed to change regulations from ballast water exchange to in hull treatment. Matson's new ship builds already have treatment inline for ballast water.	2017	DLNR	USCG	Medium
	Implement a system for U.S. Navy ships to report ballast water discharge, modeled after that used by USCG, such that the data are compiled electronically at a centralized database.	2017	DLNR	DoD	Medium
	Establish ballast water management and reporting requirements for all commercial vessels (including cargo ships, cruise ships, passenger ships, barges, and any other vessel that can carry ballast water).	2017	DLNR	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce ballast water standards (continued)	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance by commercial vessels.	2017	DLNR	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement ballast water management program for commercial ships.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for commercial ships.	2017	DLNR	Biosecurity cost recovery system	Medium
Increase marine system protection from invasive species	Ensure the marine biosecurity regulations, inspections, quarantine, and outreach efforts are appropriate.	2017	DLNR	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within the CNMI.	2017	DLNR	Biosecurity cost recovery system	Medium
	Ensure capacity building training to inspectors regarding aquatic biosecurity and develop SOPs for inspections regarding both marine and freshwater biosecurity.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program for DoD and civilian populations with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within the CNMI.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program for DoD and civilian populations with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within the CNMI.	2017	DLNR	Biosecurity cost recovery system	Medium
	Implement a long-term monitoring program for key harbor and marina areas including other high use mooring and anchorage areas like those below the preposition ships.	2017	TBD	Biosecurity cost recovery system	Medium
Address climate change linkages to invasive pests		2017	DLNR	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	CNMI Invasive Species Task Force	External donor	High
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	DLNR	Biosecurity cost recovery system	High
	Develop taxa specific ERPs as needed (Little Fire Ant, Coconut Rhinoceros Beetle, etc.).	On-going	DLNR	External donor	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	CNMI Invasive Species Task Force	TBD	High
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable). This would be similar to 28-SNAKE but would be developed for all organisms, not just snakes.	2016	DLNR	Biosecurity cost recovery system	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2016	DLNR	Biosecurity cost recovery system	High
	Develop and institute surveillance programs for non-established species consider high risk of arrival such as CRB, alien snakes, fruit flies, tramp ants, etc.	2015	DFW, Forestry, and Quarantine	Biosecurity cost recovery system	High
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	DFW, Forestry, and Quarantine	Biosecurity cost recovery system	Low
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2016	DLNR	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve early detection and rapid response capacity (continued)	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2016	DLNR	Biosecurity cost recovery system	High
	Training and maintain a core group of ED & RR staff from local agencies/stakeholder groups.	2016	DLNR	Biosecurity cost recovery system	High
	Hold consultations to determine what agency(s), office(s) and/or groups will be responsible for surveillance programs.	2015	DLNR	External donor	Medium
Management and eradication					
Increase management and control of established IAS	Eradicate small and feasible IAS incursions promptly.	on-going	DFW, Quarantine, and Forestry	External donor	High
	Create GIS layers that delineate management zones, land tenure, and current distribution of established IAS.	2015	College of the Northern Mariana Islands	External donor	Low
	Develop and implement more control and management programs to deal with existing IAS and to reduce the potential of spreading them to non-infected locations both within and outside of the CNMI.	on-going	DLNR	External donor	Medium
	Improve surveillance and monitoring of existing invasive species.	2015	DLNR	External donor	Medium
Awareness					
Evaluate social, cultural, economic, and ecological values that may be impacted negatively by non-native species.	Establish a watch list of high-risk non-native species that are known or thought to pose significant ecological, economic, social, or cultural impacts.	2015	DLNR	External donor	Medium
	Raising awareness about the potential negative ecological, cultural, economic, and human health effects of invasive species is an important component of both prevention and early detection. The following measures could heighten public awareness among the military and the public: surveys of the current level of understanding of IAS and their impacts as well as more specific surveys on the procurement and use of plants, animals, and their products by local communities, transient workers, and visitors are all needed.	2016	DLNR	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and nation wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	CNMI Invasive Species Task Force	External donor	High
	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the nation from unwanted pests.	2015	CNMI Invasive Species Task Force	External donor	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	CNMI Invasive Species Task Force	External donor	Medium
	Establish long term funding to support core outreach and educational efforts.	2016	CNMI Invasive Species Task Force	External donor	High
	Coordinate existing outreach efforts.	2015	CNMI Invasive Species Task Force	External donor	High
	Add invasive species education as a standard part of school curriculums.	2017	CNMI Invasive Species Task Force/Department of Education	External donor	Medium
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2017	CNMI Invasive Species Task Force/Department of Education	External donor	Medium
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	2016	CNMI Invasive Species Task Force	External donor	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	2016	CNMI Invasive Species Task Force	External donor	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2016	CNMI Invasive Species Task Force	External donor	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2016	CNMI Invasive Species Task Force	External donor	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2016	CNMI Invasive Species Task Force	External donor	High
Research					
Prioritize IAS research for the CNMI	Develop standardized SOP's for IAS monitoring and implement surveys.	2016	DLNR	External donor	High
	More specific localized risk assessments should be conducted for all habitat types.	2018	DLNR	External donor	Low
	Identify experts in IAS taxonomy and proactively develop agreements with them for processing and identifying samples. Details should include preservation requirements and turnaround times.	2017	DLNR	External donor	Low
Policy					
Improve ability to address invasive species and biosecurity	Establish an IAS council, committee, or taskforce that is endorsed by and works with the governance.	2015	Governor's Office	Biosecurity cost recovery system	High
	Develop a comprehensive IAS SAP for the CNMI, including priority species, current capacity, and recommendations to address existing gaps.	2015	CNMI Invasive Species Task Force	Biosecurity cost recovery system	High
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance.	Conduct a review of existing laws and regulations governing biosecurity in the CNMI, particularly as they pertain to import from foreign countries and export to other areas of Micronesia and Hawaii.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Review relevant biosecurity related guidelines and SOPs to insure they are clear, complete, detailed, and in compliance with appropriate laws and regulations. Update existing guidelines and SOPs as needed. Develop guidelines or SOPs for specific activities if they are lacking.	2015	Quarantine	Biosecurity cost recovery system	Medium
	Expand existing or create new regulations (as needed) and SOP to encompass all potential IAS including terrestrial (agricultural and non-agricultural), freshwater, and marine concerns. Current systems are mainly based on agriculture and a handful of high risk species such as the Brown Treesnake.	2016	Quarantine	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Ensure that appropriate biosecurity regulations are in place and enforced. Regulations should support the issuance of penalties and fines to enforce compliance (continued).	Review (an update if necessary) penalty assessment structure for noncompliance with regulations covering animal and plant health as a source of additional funding.	2015	Quarantine	Biosecurity cost recovery system	Medium

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment K: State of Hawaii Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Hawaii section of the RBP regularly and share regionally.	continuous, at least every 5 years	HISC	Biosecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	HISC	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	HISC	Regional ISC Office	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	continuous, yearly	HISC	Biosecurity cost recovery system	High
Improve Statewide biosecurity and coordination	Develop statewide IAS SAP with input from stakeholders of the state (may be possible to utilize HISC strategic plan and HDOA biosecurity plan).	2014-15	HISC, HDOA	HISC, HDOA	High
	Update risk assessment for terrestrial IAS using current HDOA data.	2015	HDOA	TBD	Medium
	Rebuild biosecurity capacity at HDOA to at least 2009 levels (Fill vacated position, provide training to get staff up to speed).	2016	HDOA	Biosecurity cost recovery system	High
	Need to move forward with hiring and training staff members to meet current and future expected needs within HDOA quarantine.	2016	HDOA	Biosecurity cost recovery system	High
	HDOA should consider creating and filling a position that will be focused on IAS issues. This position may serve as the ISC for HDOA. Could be similar to the DOFAW IS coordinator and might serve as the primary point of contact for IS issues with the HDOA.	2016	HDOA	Biosecurity cost recovery system	Medium
	Document and analyze numbers and types of interceptions from all pathways and made available to appropriate agencies and staffs.	2015	HDOA	Biosecurity cost recovery system	Medium
	Hire and allocate additional staff and resources to support intra-island biosecurity efforts.	2017	HDOA	Biosecurity cost recovery system	High
	Create and institute a mixed model biosecurity approach based on both vector sanitation and focusing on key high risk species for all habitats.	2015	HDOA	Biosecurity cost recovery system	High
	Develop appropriate vector management with feedback and monitoring mechanisms. If INVICTA becomes fully operational it could serve as the feedback mechanism.	2015	HDOA, DOT, DOH	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve Statewide biosecurity and coordination (continued)	Implement a more comprehensive data collection and better data management on IAS vectors and pathways, including detailed inspection processes, intercept records, preservation and compiling of voucher specimens, detailed records on where shipments, etc. are arriving from and specifically what is known to have harbored IAS and where it come from and how it arrived.	2015	HDOA	Biosecurity cost recovery system	Medium
	Enter records into database, analysis and share results with partners as warranted.	2015	HDOA	Biosecurity cost recovery system	High
	Consider helicopters and private planes (or small scale commercial ventures) as possible IAS vectors and therefore a biosecurity threat that needs to be appropriately monitored and inspected.	2015	HDOA, DOT	Biosecurity cost recovery system	Low
	Identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of cargo staging facilities.	2016	HDOA	Biosecurity cost recovery system	Low
	Review relevant biosecurity related guidelines and SOPs to insure they are clear, complete, detailed, and in compliance with appropriate laws and regulations.	2015	HDOA, HISC	Biosecurity cost recovery system	Medium
	Update existing guidelines and SOPs as needed.	2015	HDOA	Biosecurity cost recovery system	Medium
	Improve communication between different levels of government, agencies, and others involved in biosecurity work.	2015	HISC, HDOA		Medium
	Document the cost of IAS control and management compared to prevention is needed.	on-going	HISC, HDOA	USFWS/USDA/DoD	Medium
	Hawaii state should implement an electronic inspection system.	2015	HDOA	TBD	High
	Better direct use of limited resources based on interception records.	2015	HDOA	Biosecurity cost recovery system	High
	Provide sufficient funds to conduct routine surveillance, implement response plans, and provide outreach and education, in addition to port of entry exclusion activities and training for inspectors.	2016	HDOA, HISC	Biosecurity cost recovery system	High
	Identify and establish dedicated, long-term and short term funding to implement the various biosecurity recommendations.	2016	HDOA, HISC	Biosecurity cost recovery system	High
	Identify a core level of activities, personnel, and coordination to sustain biosecurity and provide long-term continuity.	2016	HDOA, HISC	Biosecurity cost recovery system	High
	Support increased funding for regional biosecurity so that necessary efforts to prevent, control, and eradicate animal and plant pests and diseases throughout the region are effective.	2015	HISC	External donor	Medium
	Implement user fees attached to military related passengers and baggage inspections (as needed).	2015	HDOA, HISC	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve Statewide biosecurity and coordination (continued)	Conduct Hawaii port and hot spot risk assessments and tie into the RBP once completed.	2015	USDA, HDOA	TBD	Medium
	Conduct an aquatic plant risk assessment that includes potential impacts from Micronesia as this aspect is not well covered in the RBP risk assessments.	2016	DLNR, HDOA, HISC	USFWS/USDA/DoD	Medium
	HDOA and federal agencies should continue to work together on redevelopment of the HDOA detector dog program for port inspections.	on-going	HDOA, USDA	USFWS	High
	Ensure that the State of Hawaii continues to work with DoD to ensure that biosecurity needs are appropriately addressed regarding the potential movement of DoD components from Okinawa to Hawaii and any other DoD activities.	2015	HDOA	DoD	High
	Finalize process of merging State and Federal IAS risk lists and establish MOAs so that federal agents can react to and enforce state concerns.	2015	HDOA, CGAPS, HISC, USDA	USDA	High
	Ensure adequate long-term funding is available for equipment and infrastructure.	2016	HDOA	Biosecurity cost recovery system	High
Improve communications and ability to address biosecurity concerns between US DoD and civilian government agencies	Establish an MOU between Hawaii and DoD regarding biosecurity actions, responsibilities and mitigation in regards to DoD activities and facilities. In 2013 a MOU was developed between DoD and HDOA which is a good start but needs to be expanded.	2015	HDOA/DoD	DoD	Medium
	Establish SOPs on aspects of how DoD and Hawaii's civilian agencies work together regarding biosecurity inspection process, response actions and other activities as needed in response to increased DoD activities.	2015	DoD	DoD	Medium
Improve regional coordination regarding biosecurity and IAS	Establish a central repository for plant pathogens information for the region.	2017	University of Hawaii	TBD	Low
	Join RISC directly or minimally participate in RISC activities as an outside Micronesia stakeholder.	2014	HISC	RISC	High
	Develop pre-entry requirements for certain commodity imports from high-risk areas to reduce the likelihood of pest and invasive species introductions for a Regional monitoring and surveillance program.	2015	USDA, HDOA	Biosecurity cost recovery system	High
	Establish a biosecurity surveillance system to serve as an early detection program for plant, animal, and zoonotic pests and pathogens emerging in Pacific Rim countries.	2016	HDOA	Biosecurity cost recovery system	Low
	Support development of standardized SOPs for IAS monitoring and implement surveys throughout the region.	2016	USDOI, RISC	External donor	Low
	Strengthen regional and international cooperation on the responsible use and control of exotic species.	2016	RISC	External donor	Medium
	Develop eradication programs for extremely harmful species already present in Hawaii.	2016	DLNR, HDOA, HISC	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office	ideally this office would be up and running before the end of 2015	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with supporting protocol and methods development	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support management, response, and eradication efforts	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts	As soon as the office can be established	Hawaii RISC representative(s) and HISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	HISC	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going; finalized by 2018	University of Hawaii	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	University of Hawaii	TBD	Low
	Support the development of a algal risk assessment for the region.	2016	University of Hawaii	TBD	Medium
	Support the development of a arthropod risk assessment for the region.	2016	University of Hawaii	TBD	Medium
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	University of Hawaii	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	University of Hawaii	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region (Hawaii already has one, which could be used possibly as a model).	2016	University of Hawaii	TBD	Medium
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Hawaii RISC representative(s)	TBD	Medium
Prevention					
Improve pre-border biosecurity	Improve pre-departure cleanliness of items shipped to Hawaii. Orchids from Thailand were on item which was pointed out as needing improved pre-arrival sanitation.	2016	HDOA	Biosecurity cost recovery system	High
	Implement the use of pre-border sanitation compliance agreements with shippers and contractors. Consider using HACCP as a model.	Should track with the preceding action item	HDOA, USDA	Biosecurity cost recovery system	High
	All large, used machines (bulldozers, etc.) which are to be imported should be required to undergo through cleaning and inspection for invasive species immediately prior to shipping.	2015: consider establishing guidelines based on existing USDA-APHIS materials	HDOA	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve pre-border biosecurity (continued)	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized in Australia and New Zealand. Preventing the arrival of potential IAS is ultimately the most cost effective way to ensure appropriate biosecurity levels are in place and they offer the best protection from the potential hazards which IAS could cause.	2015 Hold state consultation including review of pertinent models (New Zealand); 2016 Develop draft standards; 2017 implement standards	HDOA	TBD	High
	Develop stronger pre-border regulations regarding the movement of non-native species.	2016	HDOA	Biosecurity cost recovery system	Medium
Improve WPM capacity	Require treatment of all domestic and foreign, military and non-military WPM entering Hawaii according to ISPM No. 15.	2015	HDOA	Biosecurity cost recovery system	Medium
	Conduct phytosanitary inspection of WPM.	2015	HDOA	Biosecurity cost recovery system	Medium
	Inspect thoroughly an adequate percentage of all domestic and foreign, military and non-military WPM accompanying agricultural and nonagricultural cargo for pests.	2015	HDOA	Biosecurity cost recovery system	Medium
	Require consistent inspection methods within SOPs.	2015	HDOA	Biosecurity cost recovery system	Medium
	Document all inspections and interceptions.	2015	HDOA	Biosecurity cost recovery system	Medium
	Record pest interceptions in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2016	HDOA	Biosecurity cost recovery system	Medium
	Prohibit the unloading of noncompliant WPM.	2015	HDOA	Biosecurity cost recovery system	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	HDOA	Biosecurity cost recovery system	Medium
	Treat or destroy infested WPM.	2015	HDOA	Biosecurity cost recovery system	High
	Treat Infested WPM as regulated garbage and incinerated or sterilized.	2015	HDOA	Biosecurity cost recovery system	High
	Support a regional approach to switch from WPM to other options such as recycled plastics.	2017	HDOA	External donor	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve agriculture biosecurity and food security	Collect, analyze, establish and maintain baseline data regarding key crops and animal stocks for internal consumption as well as for export	2016	HDOA	USDA	Low
	Collect and analyze data regarding both existing pests and pests at high risk of invasion.	2015	HDOA	Biosecurity cost recovery system	Low
	Share information on a regular basis within the region and beyond.	2015	HISC	TBD	Medium
	Conduct periodic surveys of ethnic markets, pet stores, and grocery stores to identify and intercept prohibited animals and animal and plant products following the model of the USDA-APHIS-PPQ Smuggling, Interdiction and Trade Compliance program.	2015	HDOA	Biosecurity cost recovery system	Low
Improve intra-state biosecurity and foreign arrivals at ports other than the main air and sea ports	Develop biosecurity standards for ports other than the main air and sea ports.	2017	HDOA, DOT, DOH	Biosecurity cost recovery system	High
	Implement and enforce biosecurity at ports other than the main air and sea ports	2017	HDOA, DOT, DOH	Biosecurity cost recovery system	High
	Conduct a state wide consultation regarding intrastate biosecurity before attempting to develop capacity and regulations to determine what is actually needed and what the citizenry will support.	2015	HDOA, DOT, DOH	Biosecurity cost recovery system	High
	Develop a comprehensive reporting system for intra-state biosecurity efforts.	2016	HDOA, DOT, DOH	Biosecurity cost recovery system	High
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a state biosecurity advisory committee to review proposals for the importation of exotic species.	2015	State agencies with support from feds	Biosecurity cost recovery system	High
	Improve reporting and screening systems for import of live organisms. Currently done for most marine organisms and should be expanded to all live organisms.	2015	State agencies with support from feds	Biosecurity cost recovery system	High
	Ensure that specific quarantine facilities are available and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species).	2016	State agencies with support from feds	TBD	High
	Develop plan for containment and control measures in regards to exotic farmed and traded species.	2015	State agencies with support from feds	Biosecurity cost recovery system	Medium
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	State agencies with support from feds	Biosecurity cost recovery system	High
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2015	HDOA/DLNR	Biosecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	HDOA, UH	Biosecurity cost recovery system	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	HDOA, DAR	Biosecurity cost recovery system	High
	Develop biosecurity standards for household aquaculture set ups and enforce these standards.	2015	HDOA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Reduce risk associated with live traded species (continued)	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	State agencies with support from feds	Biosecurity cost recovery system	Medium
	Develop specific guidelines for unwanted pets.	2015	State agencies	TBD	Low
	Establishment lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	USFWS, HDOA, DLNR	Biosecurity cost recovery system	Low
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	USDA	TBD	Low
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import.	2014	HDOA	Biosecurity cost recovery system	High
	Update white list on a regular basis.	annually	HDOA	Biosecurity cost recovery system	Medium
	Develop a government endorsed black list of prohibited species.	2014	HDOA	Biosecurity cost recovery system	High
	Update black list on a regular basis.	annually	HDOA	Biosecurity cost recovery system	Medium
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	HDOA	Importer pays for all aspects of the risk assessment (regardless of outcome)	High
	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	2015	HDOA	utilize student support	Low
Increase biosecurity surveillance measures and interception at both military and commercial airports and harbors including all entry points and screening check points	Address regulations to permit HDOA PQ to inspect containers as needed.	2015	HDOA	Biosecurity cost recovery system	High
	Find working solution to improve overall inspection levels of goods arriving to Hawaii from domestic ports.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Find working solution to improve inspection levels of housing goods arriving to Hawaii from Guam (both directly and indirectly).	2015	HDOA	DoD	High
	Train personnel in identifying high-risk cargo and handling to reduce contamination.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Track changes in aircraft arrivals, especially as new linkages are established and/or additional carriers are added.	2015	HDOA, USDA	Biosecurity cost recovery system	High
	Develop staging areas for safeguarding high and low risk cargo.	2015	HDOA, USDA	TBD	Medium
	Inspect shipping containers and other vessels holding goods as vectors for hitch-hiker IAS.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Provide training in proper techniques for detecting, collecting, recognizing, and identifying pests to increase inspection and identification expertise.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Increase biosecurity surveillance measures and interception at both military and commercial airports and harbors including all entry points and screening check points (continued).	X-ray all incoming passengers baggage.	2016	HDOA, USDA	Biosecurity cost recovery system	Medium
	Train inspectors specifically on livestock, wildlife, and poultry diseases and pests.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Training TSA inspectors in IAS detection and capture.	2015	HDOA/TSA	Biosecurity cost recovery system	Medium
	Develop a biosecurity surveillance system for improved data collecting, reporting, and information sharing.	2016	HDOA	(may already have with INVICTA)	Medium
	Follow a well-documented process of pest and disease prioritization, surveillance, data collection, and record keeping.	2016	HDOA	Biosecurity cost recovery system	Medium
	Include routine surveillance for wildlife, livestock, and poultry diseases and vectors as well as plant pests in biosecurity system.	2016	HDOA	Biosecurity cost recovery system	High
	Modify surveillance methodology as appropriate for targeted species, (i.e. modifying sampling programs to account for behavioral differences in diurnal and nocturnal lifestyles).	2016	HDOA	Biosecurity cost recovery system	Medium
	Utilize systematic surveillance for plant pests following the model of the Cooperative Agriculture Pest Survey (CAPS), and include both military and civilian properties as appropriate.	2015	State Government	Biosecurity cost recovery system	Medium
Improve mail biosecurity	Find a working solution which will permit the inspection of US mail (and all other mail types).	2016	HISC, USDA, Postal Service	Biosecurity cost recovery system	High
Improve biosecurity for the movement of vehicles and equipment	Develop functional cleaning facilities (wash racks, etc.) at all DoD instillations where warranted and provide appropriate training for military personnel to utilize these facilities.	2015	HDOA, DoD	DoD	High
	Utilize APHIS training courses or manuals to support wash down efforts.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Clean containers and conveyances that arrive contaminated with soil and/or exotic plant pests	2015	HDOA, USDA	Biosecurity cost recovery system	High
	Evaluate the effectiveness of current cleaning methods, and improve as appropriate.	2015	HDOA, USDA	Biosecurity cost recovery system	High
	Conduct inspections of all incoming construction materials including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Clean and inspect large, used machines such as tanks and bulldozers intended for importation for IAS at points of origin immediately prior to shipping.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve biosecurity for the movement of vehicles and equipment (continued)	Insure proper cleaning of all large equipment such as construction and military items according to APHIS guidelines prior to entry.	2015	HDOA, USDA	Biosecurity cost recovery system	Medium
	Insure proper cleaning of all large equipment such as construction and military items according to APHIS guidelines prior to moving between sites.	2015	HDOA, USDA	Biosecurity cost recovery system	High
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests.	2015	HDOA, USDA	TBD	Medium
	Implement “clean” practices at construction sites, including the minimization of land disturbance which may contribute to the spreads plant pests.	2015	HDOA	TBD	Medium
Establish and enforce biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish additional regulations for impounded vessels.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish standards and regulations regarding biofouling, including inspection and certification for all vessels. Inspections can be trained to inspect hulls from top side with mirrors. If further inspection is warranted, then the craft pays for divers to inspect and make a report. If determined to be dirty, then the craft must either be cleaned or leave port and jurisdictional waters. Self clean outside of jurisdictional waters could be an option. Hull needs to be clean of all organisms, as the ability to identify all marine organisms is not available.	2017	DLNR DAR	Biosecurity cost recovery system	High
	Develop capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2017	DLNR DAR	TBD	High
	Establish regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	DLNR DAR	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Establish and enforce biofouling standards (continued)	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Establish the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2017	DLNR DAR	TBD	High
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Ensure that regulations include ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2017	DLNR DAR	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a biofouling management program	2014: this should be included in the current draft biosecurity legislation; May need to update and expand in 2016-17 as elements come online	DLNR DAR	Biosecurity cost recovery system	High
Increase marine system protection from invasive species	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	DLNR DAR	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Establish and enforce ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	DLNR DAR	Biosecurity cost recovery system	High
	Establish ballast water management and reporting requirements for all vessels utilizing ballast water.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	DLNR DAR	Biosecurity cost recovery system	High
	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to support a ballast water management program.	2016	DLNR DAR	Biosecurity cost recovery system	High
	Support adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	DLNR DAR	Biosecurity cost recovery system	Medium
Address climate change linkages to invasive pests		2017	University of Hawaii, PICCC, HISC	TBD	Low
Early detection and rapid response					
Improve early detection and rapid response capacity	Increase BTS inspection of goods and conveyances arriving from Guam both directly and indirectly.	2015	HDOA	OIA	High
	Increase ability to respond effectively to alien snake encounter reports, through improved communication and cooperation with agencies on the ground as well as external supporters, by increasing the numbers of trained responders available on all vulnerable islands, by insure that trained responders received appropriate update training, and by insuring that there are sufficient support staff to assist primary trained responders.	2016	HDOA	OIA	High
	Re-instate mosquito vector monitoring for infectious diseases throughout the state.	2016	DOH, HISC	USFWS	Low
	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	HISC	USFWS/USDA/DoD	High
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2015	ISCs	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve early detection and rapid response capacity (continued)	Develop taxa specific ERPs as needed.	On-going	HISC	TBD	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	HISC	TBD	High
	Develop and institute surveillance programs for non-establish species consider high risk of arrival such as CRB, alien snakes, fruit flies, tramp ants, etc.	2016	HISC, ISCs	USFWS	Medium
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities.	2015	ISCs	TBD	Low
Management and eradication					
Increase management and control of established invasive species	Determine which established invasive species are actionable and proceed with developing management strategies. Covered in part by national ISAP.	2015	HISC	ISAP	Medium
	Train natural resource staffs (including protected areas staffs) at the local level in regards to IAS management support.	2015	HISC	TBD	Medium
	Train interested citizens to support IAS management efforts (volunteer citizen scientists).	2015	HISC	TBD	Low
	Conduct surveys on the procurement and use of plants, animals, and their products by local communities.	2015	HDOA	Biosecurity cost recovery system	Low
	Develop standardized SOPs for IAS monitoring and surveys.	2015	DLNR	USFWS	Medium
	Conduct regular background field surveys to ensure that knowledge of established invasive species and their distributions are current.	on-going	DLNR	USFWS	Medium
	Create community funding sources for local (village level) programs to promote environmental awareness and stewardship through local training, education, and eradication efforts.	2016	HISC	TBD	Low
	Support Little fire ant management and eradication efforts with funding and resources.	on-going	HISC, HDOA, DLNR, UH	TBD	High
	Conduct delimiting surveys for CRB, followed immediately by a well-developed management strategy and possibly eradication efforts.	2014	HDOA	TBD	High
	Provide funding and other resources immediately for the best possible chance at CRB eradication success.	2014	HDOA, USDA	TBD	High
	Address rats, especially their parasites, such as *Agrostrongylus patenetus* which is a major concern for public health.	2015	DLNR, USFWS	TBD	Medium
	Improve detection methods for rodents and other wildlife on vessels and in cargo.	2017		TBD	Low
	Adopt a voluntary code of conduct for nurseries, landscaping companies, hotels, and other businesses as appropriate to promote the sale and use of locally sourced plants, preferably native plants.	2015	CGAPS and HDOA	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Increase management and control of established invasive species (continued)	Encourage businesses to make their staff knowledgeable about invasive plants, to inform their customers about invasive plants, to report immediately any likely exotic pest organisms found on their premises, and to use native or non-invasive plants locally sourced.	2015	TBD	TBD	Low
	Establish and develop relationships with key industrials such as landscaping and pet stores to help develop their ability to institute internal standards to support IAS prevention.	2015	DLNR	TBD	Low
	Improve capacity to carry out investigations and effective enforcement beyond ports of entry.	2016	HDOA	Biosecurity cost recovery system	Medium
Awareness					
Increase outreach and education on biosecurity and invasive species	Develop an educational strategy that is long term, extensive and nation wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	HISC	TBD	High
	conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the nation from unwanted pests.	2015	CGAPS	TBD	High
	Conduct follow-up surveys and tweak system accordingly to insure long term viability and usefulness of the educational strategy	Every 3-5 years	CGAPS	TBD	High
	Provide information to local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	CGAPS	TBD	High
	Establish long term funding to support core outreach and educational efforts.	2016	HISC	TBD	High
	Increase coordinate existing outreach efforts.	2015	HISC, PCSU	TBD	High
	Add invasive species education as a standard part of school curriculums.	2016	CGAPS/Department of Education	TBD	High
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2016	CGAPS/Department of Education	TBD	High
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2016	HISC	Regional ISC Office	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2016	CGAPS	TBD	High
	Advertise amnesty/honor bin option by means of mass media outlets as part of public outreach.	2015	CGAPS	TBD	Medium
	Create awareness of the potential legal consequences of violations.	2016	CGAPS	TBD	Medium
	Distribute multi-lingual biosecurity poster free to pet shops, grade schools, universities, sporting goods stores, gardening stores, naturalist clubs, parks and natural areas, military facilities, air and sea ports, community centers and perhaps even seafood stores, farmers' markets and restaurants.	2016	CGAPS	TBD	Medium
	Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers to inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers.	2016	CGAPS	TBD	Medium
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish	2016	CGAPS	TBD	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted by invasions by non-native species.	Conduct baseline surveys.	2015	University of Hawaii	TBD	High
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the state that can be shared with universities and others. Such a list could be a positive influence in engaging research groups to support management efforts within the state.	2015	University of Hawaii	TBD	Low
Policy					
Improve laws and regulations	Conduct a review of both state and federal biosecurity regulations as they apply to Hawaii.	2015	CGAPS, HISC	Biosecurity cost recovery system	Medium
	Agriculturally driven regulations should be reviewed and revised to better address invasive pests whether they are agriculturally related or not.	2015	HDOA/USDA	Biosecurity cost recovery system	High
	Expand existing or create new regulations (as needed) and SOPs to encompass all potential IAS include terrestrial (agricultural and non-agricultural), freshwater, and marine concerns.	2016	HDOA, CGAPS	Biosecurity cost recovery system	High
	Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law.	2016	CGAPS, HDOA, DLNR	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/ Resources	Priority
Improve laws and regulations (continued)	Ensure that appropriate biosecurity regulations are in place and enforced.	2016	HDOA, USDA	Biosecurity cost recovery system	High
	Issue penalties and fines to enforce compliance.	2015	HDOA, DLNR	Biosecurity cost recovery system	High
Restoration					
Improve efforts to restore native ecosystems and species	Increase restoration efforts of native systems where IAS management and/or eradication efforts have been successful.	should be an on-going process	DLNR and UH	USFWS/DoD	Low
	Localized risk assessments should be conducted for all habitat types.	start process in 2016 as needed	DLNR and UH	TBD	Low

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment L: Territory of Guam Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the Guam section of the RBP regularly and share regionally.	continuous, at least every 3 years	GISAC	Biosecurity cost recovery system	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	Guam RISC representatives	Regional ISC Office	High
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2015	Guam RISC representatives	Regional ISC Office	Medium
	Work with managers and advisory councils of the Pacific Marine National Monuments (including the Mariana Trench Marine National Monument) to collaboratively address marine biosecurity threats.	2015	NOAA / USFWS	TBD	Medium
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	Yearly	Guam RISC representatives	TBD	High
Establish a jurisdictional invasive species coordination office that is tasked with supporting territory wide IAS efforts across agencies and offices as well as working nationally and regionally with IAS stakeholders to ensure appropriate levels of communication and support.	Develop funding to support the invasive species coordination position.	2015	Governor's Office	Biosecurity cost recovery system	High
	Hire and establish jurisdictional coordination office. Consider housing this office at the Governor's complex under direct supervision of the Governor's Office to insure its ability to work across offices and agencies on Guam.	2015	Governor's Office	Biosecurity cost recovery system	High
	Once established this office should support and assist in coordinating efforts with invasive species within the territory. Part of this effort will be ensure that information regarding emerging issues is appropriate disseminated and that governance is regularly updated regarding both territorial and regional invasive species developments.	2015	Governor's Office	Biosecurity cost recovery system	High
Improve communications and ability to address biosecurity concerns between US DoD and civilian government agencies	Establish an MOU between Guam and DoD regarding biosecurity within the territory in regards to DoD activities and facilities.	2015	GDOA	DoD	High
	Establish SOPs on aspects of how DoD and Guam's civilian agencies work together regarding biosecurity inspection process, etc.	2015	GDOA	DoD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	2015	Guam RISC representatives and the Governor's office	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with supporting protocol and methods development.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts.	2015	Guam RISC representatives and the Guam ISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	Guam Invasive Species Coordinator	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	University of Guam	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	University of Guam	TBD	Low
	Support the development of an algal risk assessment for the region.	2016	University of Guam	TBD	Medium
	Support the development of an arthropod risk assessment for the region.	2016	University of Guam	TBD	Medium
	Documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	Guam Invasive Species Coordinator	Regional ISC office	Low
	Documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	Guam Invasive Species Coordinator	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region	2016	University of Guam	TBD	Medium
Improve the functionality of RISC	RISC members should work with state governance to review the RISC by-laws and re-establish or enhance ties between appointed RISC members and jurisdictional leadership in order to facilitate communication between council members and leadership ensuring closer working relations.	2014	Guam RISC representatives	RISC	High
	Ensure that RISC membership is regularly reviewed and that council members are known to the state invasive species community and governance.	Reviews should correspond with turn over in Government	Guam RISC representatives	RISC	High
	RISC members should provide an annual overview of MCES activities regarding biosecurity to state stakeholders (both thematic and governance)	Within 1 month of the December MCES on an annual basis	Guam RISC representatives	RISC	High
	Support development of a clearly defined role for RISC to improve the council's ability to support biosecurity and invasive species efforts. RISC as a council established by and for the chief executives of Micronesia can and should play a major role in biosecurity of the region. RISC's ability to facilitate regional biosecurity and IAS initiatives needs to be improved.	2014	Guam RISC representatives	RISC	High
	Support participation of Hawaii in the RISC.	By the end of 2014 Hawaii should be part of RISC	Guam RISC representatives	NA	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve territorial IAS/biosecurity coordination	Share information between biosecurity offices at different levels of government between agencies as well as with DoD in regards to pathways, vectors, inspections, interceptions, and enforcement actions taken. Consider utilizing a joint agency work group to facilitate communication and sharing.	2014	GDOA, GCQA, UOG	Current funding	High
	Improve communication and coordination between GCQA and GDOA through establishment and utilization of Guam Biosecurity Division as dictated by Guam Public Law 31-43.	2014	GDOA, GCQA	Biosecurity Fee	High
	Develop list of recommended plants for landscaping	2015	GDOA - Division of Forestry	TBD	Medium
	Enhance collaboration between USFWS and GCQA through quarterly meetings and training.	2014	GCQA	USFWS	High
	Increase effectiveness of interdiction capabilities and inspections for wildlife and their products at the ports of entry to prevent the introduction of animal and zoonotic diseases by increasing rate of inspections and coordinating efforts of GCQA and other agencies with port-of-entry inspection responsibilities with USFWS.	2014	GCQA, Port Authority of Guam	USFWS	High
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	Guam RISC representatives	TBD	Medium
Support increased Federal assistance with biosecurity	Re-evaluate the operation and staffing needs of the Guam Plant Inspection Station.	2014	GDOA	USDA - APHIS	High
	Relocate the Guam Plant Inspection Station within the airport fence in order to limit the extent to which uninspected items need to be transported prior to inspection.	2015	GDOA	USDA - APHIS	Medium
	Train TSA inspectors in IAS detection and capture. An initial training for existing staff with yearly joint follow-up training with other agencies (GCQA, GDOA) would be appropriate. Train new cohorts as they are coming on board. Such training could be facilitated by SPC and/or UOG and/or USDA.	2015	GDOA, GCQA, UOG	TSA	Medium
	Ensure that the Guam Plant Inspection Station has adequate resources on hand for necessary day to day activities and the full range of inspections which may be required.	2015	GDOA	Biosecurity Fee	Medium
	The USDA-APHIS office on Guam needs to increase inspection and oversite of inspection processes.	2015	GDOA, GCQA	USDA - APHIS	Medium
	Increase USDA-WS pre-departure inspections of for brown treesnakes to enable WS to inspect 100% of all departing cargo and vessels as well as establishing enforcement standards and penalties for non-compliance.	2014	GCQA	USDA - WS, DOI	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support increased Federal assistance with biosecurity (continued)	Hire an additional federal wildlife inspector to ncrease the percentage of shipments which USFWS can inspect with goal of 100% inspection.	2015	GDOA - Biosecurity Division	USFWS	Medium
	Require that imported organisms be held in quarantine for a brief period to provide time to examine each shipment.	2015	GDOA - Biosecurity Division	USFWS	Medium
	Coordinate USDA-APHIS agreements with commercial air cargo shipping agencies to prevent invasive species transportation.	2015	GDOA - Biosecurity Division	USDA - APHIS	Medium
	Continue to improve partnering with the military (in each location where DoD has facilities) in regards to biosecurity, including when necessary working on DoD lands. The military should have their own staff at each DoD facility working in conjunction with local authorities to monitor for pests, to conduct biosecurity inspections, to respond to incursions, and to implement management efforts as needed. Where staff are in place, as they are at most facilities, improvements to existing systems, communication, and partnering with local civilian agencies should continue to be advanced.	2015	GDOA, GCQA	TBD	High
	Coordinate with agencies responsible for the Pacific Marine Monuments to address marine IAS prevention efforts.				Medium
Support efforts to increase marine and aquatic biosecurity efforts in the region	Raise awareness of potential threats from marine and aquatic IAS. With particular attention on inreach to local and federal decision makers and resource managers.	2015 and on-going	TBD	TBD	Medium
	Support capacity building to establish marine and aquatic IAS programs in the region.	2015 and on-going	TBD	TBD	Medium
	Establish and support monitoring efforts for marine and aquatic IAS.	2015 and on-going	TBD	TBD	Medium
	Increase collaboration between local and federal agencies working on marine and aquatic invasive species.	2015 and on-going	TBD	TBD	Medium
	Seek funding support for marine and aquatic IAS prevention and response.	2015 and on-going	TBD	TBD	Medium
Prevention					
Improve pre-border biosecurity	Utilize trapping, monitoring for signs, etc. to improve detection methods for rodents, insects and other wildlife on vessels and in cargo.	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	Develop risk assessments for Guam by identifying where guest workers, construction materials, and food stuffs will be coming from and then investigating both general and specific IAS concerns for these areas.	2015	GDOA, GCQA	TBD	Medium
	Develop risk assessments for Guam by identifying where guest workers, construction materials, and food stuffs will be coming from and then investigating both general and specific IAS concerns for these areas.	2015	GDOA, GCQA	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve pre-border biosecurity (continued)	Develop audited off-shore hygiene systems such as those utilized very successfully in Australia and New Zealand.	2015 Hold jurisdictional consultation including review of	GDOA - Biosecurity Division	Biosecurity Fee	High
	Develop the capacity to pre-screen vessels arriving at the seaport	2014	GDOA - Biosecurity Division, Port Authority of Guam	Biosecurity Fee	High
	Ensure inspection of gravel and other construction materials and equipment to be imported into Guam prior to shipping.	2015	GDOA - Biosecurity Division, Port Authority of Guam	USDA - APHIS	Medium
	Contracting efforts and language should establish minimal sanitation standards for all construction equipment and materials to be shipped to Guam and provide entry level training for guest workers in terms of how to assist in assuring that they are not bringing in invasive species.	2015	GDOA - Biosecurity Division, Port Authority of Guam	Biosecurity Fee	High
	Ensure that only companies which can ensure levels of biosecurity similar to HACCP guidelines should be considered for those who will need to bring in guest workers and materials from foreign ports. Check with Federal Acquisitions Regulation and legal to see if this type of restriction already exists.	2015	GDOA, GCQA	TBD	Medium
	Develop standardized SOPs as per HACCP guidelines to improve IAS surveillance and monitoring.	2014	GDOA, GCQA, UOG	Current funding	High
Improve border security	Develop an SOP that allows PPQ, GCQ, GDOA, and other authorities responsible for inspection and identification to react to changing risks based on countries of origin of arriving travelers and cargo.	2015	PPQ, GCQA, GDOA	Current funding	Medium
	Establish a communication and coordination system for information derived from outreach programs, port inspections, pest identifications, and reports from the public of sightings or encounters with suspected invasive species or illegal movements of foods, plants, animals, insects, etc.	2014	GCQA, GDOA, UOG, GISAC	Current funding	High
	Acquire and install X-ray machines for biosecurity at all ports of entry.	2016	Biosecurity Division	Biosecurity cost recovery system	Medium
	Ensure staff is appropriate trained for use of X-ray machines at all ports of entry.	2016	Biosecurity Division	Biosecurity cost recovery system	Medium
	Ensure appropriate long term maintenance for X-ray machines used for biosecurity.	2016	Biosecurity Division	Biosecurity cost recovery system	Medium
	Ensure that port authorities are working with quarantine in regards to use and placement of amnesty bins. Standard trash bins should also be located in appropriate areas and well signed so that passengers don't use amnesty bins for regular trash.	2015	Biosecurity Division	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Develop SOPs for incoming baggage and cargo inspections which are based on successful models (such as New Zealand); would require hiring and training additional personnel, installing appropriate equipment (X-ray, etc.), training additional canine teams for detection of specific high risk IAS (reptiles, fruits, meats, etc.); ensuring appropriate data collection and development and maintaining of databases to track efforts and interceptions.	2016	Biosecurity Division	Biosecurity cost recovery system	Medium
	Support the development of a canine pest detection program for items such as fruits, and vegetables. Consider the potential to combine this program with similar programs for detection of illicit materials.	2018	Biosecurity Division	Biosecurity cost recovery system	Medium
	Ensure that amnesty bins are available at ports and that they are well signed (identified) and are cleaned immediately after each arrival. Bins should be placed so as to support use (not directly in front of quarantine stations). Items deposited in amnesty bins should be treated as restricted garbage and destroyed promptly and on site to reduce the potential of spread of pests associated with anything within the bins.	2015	Biosecurity Division	Biosecurity cost recovery system	High
	Develop appropriate inspection facilities including a biosecure inspection facility at the seaport large enough for sea containers and wash-down areas with appropriate retention and treatment facilities for waste water produced.	2017	Biosecurity Division	Biosecurity cost recovery system	High
	Ensure that inspections process while targeting high risk goods also ensure random sampling of all imports, travelers, and baggage in order to better detect hitchhiker pests.	2015	Biosecurity Division	Biosecurity cost recovery system	High
	Improve compliance, enforcement and fee and penalty issuance and collection in regards to biosecurity measures.	2016	GDOA	Biosecurity cost recovery system	High
	Implement advanced on-site capacity training of quarantine officers such as specific taxon identification, data collection and entry, improved inspection methods, and new method/criteria based on updated regulations (such as training for tramp ant identification, inspection of aquatic conveyances, reporting on ballast water documentation, identification of livestock, wildlife and poultry diseases and pests, etc.)	on-going	GDOA	Biosecurity cost recovery system	Medium
	Clean containers and conveyances that arrive with soil and/or exotic plant pests. Establish guidelines similar to those used by APHIS in the US. Evaluate the effectiveness of current cleaning methods, and improve as appropriate. Importers/shippers should be required to pay for costs (cost recovery system).	2015	Biosecurity Division	Biosecurity cost recovery system	Medium
	Inspect all incoming construction materials and equipment as high risk for transporting pest species. Inspections should including materials previously treated or cleaned (due to the potential for recontamination after treatment).	2015	Biosecurity Division	Biosecurity cost recovery system	Medium
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	GDOA	TBD	Low
	Hire and train additional quarantine staff as needed. Should be based on needs assessment. An inspections database should be able to demonstrate needs.	2015	GCQA	Biosecurity cost recovery system	High
	Institute fines for soil packages if they continue to arrive harboring non-native species.	2015	GCQA/DOA	Biosecurity cost recovery system	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Establish an electronic database for quarantine inspection data that can be searched and data extracted for analysis. Such a database would support better targeting of vectors and pathways, permit tracking of known violators, provide documentation regarding interceptions, fee and penalty payments, demonstrate appropriate use of resources, quantify gaps and needs in current system, assist in determining pathways associated with post border detections, tracking of live imported species and number of individuals, tracking changes in vector arrivals and embarkation locations, etc.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Enforce the Guam law prohibiting the importation of soils for all soil and similar materials, specifically the bags of soil and soil like products soil in hardware stores. Either these items should not be imported or should need to be sterilized prior to import.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Train quarantine staff in data collection, entry, management and analysis, develop appropriate field inspection forms, conduct quality control of data systems, ensure that field data is entered into system in a scheduled manner to prevent backlogging, ensure that the data system is appropriately and regularly backed up to prevent systematic losses.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Institute quarterly reporting on quarantine inspections based on database information and ensure that reports are shared.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Protocols should be established by GCQA for documenting interceptions and final disposition of materials. These reports should be entered into a database and information should be shareable to assist Guam offices and agencies with improving border protection but also with other jurisdictions of the region to better protect the region. Protocols should be established regarding how and when (how often) this type of information is shared. Information collected and stored should include date of incident, inspector in charge, what was intercepted, what IAS were found, numbers of pests found, origin of the material in question, disposition of the material(s) and specimen(s), what remedial actions (if any) were taken against the shipper, and if fines were instituted, were they collected.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Support the development and implementation of regional standards for biosecurity inspections and data collection and management.	2017	Biosecurity Division	SPC	Low
	Conduct annual invasive species awareness, first detector training and outreach training sessions for port-of-entry workers. Training sessions should include basic biology of target pest species, point of origin and host materials associated with the invasive species. Provide participants with general means to collect capture or detain the invasive species upon discovery at the port, and point of contact to report an incident.	2015	UOG, GDOA, GISAC	USDA, SPC	Medium
	Develop MOU's between GCQA and other agencies involved in border inspections so that these offices/agencies can support the quarantine office with biosecurity aspects.	2016	GCQA	existing funding	Low
	Develop SOPs regarding specifics of how other agencies and offices can support the role of quarantine office during border inspection process.	2016	GCQA	existing funding	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Institute biosecurity cross training of staffs from agencies which are involved in border inspection processes.	2016	GCQA	existing funding	Low
	Treat all materials in amnesty bins as restricted garbage and appropriate destroyed.	2015	GCQA/DOA	existing funding	High
	Establish programs that would allow passengers of airlines or ships to be able to surrender any potentially invasive animals with assurances that there would be no prosecution (excluding illegally smuggled animals protected by law, such as species listed under CITES).	2016	Biosecurity Division	Biosecurity cost recovery system	Low
	Ensure that biosecurity regulations are applied to all equally (there should be no exceptions for diplomatic status or otherwise).	2015	Biosecurity Division	Biosecurity cost recovery system	Medium
	Develop multi-agency MOU to train USDA/APHIS and military personnel and authorize them to conduct border inspections for Guam.	2016	Biosecurity Division	Biosecurity cost recovery system	Medium
	Build physically secure facilities at the Guam Commercial Seaport with ample warehouse space and equipment and resources required to unload cargo and conduct agricultural inspections in order to centralize inspection of maritime cargo.	2017	Port Authority of Guam, GCQA	Biosecurity cost recovery system	Medium
	Conduct biosecurity inspection for all arriving conveyances, military and non-military, for plant pests and animal contamination.	2015	GCQA	Biosecurity cost recovery system	Medium
	Allow GCQA officers to inspect military vessels as USDA-APHIS cooperators.	2015	GCQA	Biosecurity cost recovery system	Medium
	Maintain secure areas for storage of vehicles and cargo at the air and sea facilities to prevent the dissemination of plant pests and reduce risks of cross contamination of other cargo items.	2015	GCQA	Biosecurity cost recovery system	Medium
	Establish decontamination sites for cleaning both military and civilian equipment.	2015	GCQA	Biosecurity cost recovery system	Medium
	Update the Port Authority of Guam Master Port Plan to address equipment and other resources needed to handle regulated international garbage properly.	2015	GCQA	Biosecurity cost recovery system	Medium
	Standardize methods similar to those of the APHIS-PPQ Agriculture Quarantine Inspection Monitoring program for random container searches.	2015	GCQA	Biosecurity cost recovery system	Medium
	Allocate funding to increase the number of containerized and crated air cargo shipments to be inspected.	2015	GCQA	Biosecurity cost recovery system	Medium
	Automate paperwork for air cargo shipments arriving in crates and containers for more rapid selection of containers to be screened.	2015	GCQA	Biosecurity cost recovery system	Medium
	Develop SOPs regarding container hygiene to support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping.	2015	GCQA	Biosecurity cost recovery system	Medium
	Provide essential equipment to inspection services, including computers, communication devices, etc. and support for both the use and maintenance of this equipment.	2015	GCQA/DOA	Biosecurity cost recovery system	High
	Standardize inspection practices between Guam and U.S. mainland.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve border security (continued)	Treat cargo shipments (import and export) as foreign in regards to inspection practices.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Biosecurity surveillance system should include routine surveillance for wildlife, livestock, and poultry diseases and vectors as well as insect and plant pests.	2015	GDOA - Biosecurity Division	Biosecurity cost recovery system	Medium
	Specify surveillance methodology to be appropriate for targeted species , (i.e. modifying sampling programs to account for behavioral differences in diurnal and nocturnal lifestyles).	2015	GDOA - Biosecurity Division	Biosecurity cost recovery system	Medium
	Utilize systematic surveillance for plant pests following the model of the Cooperative Agriculture Pest Survey (CAPS), and include both military and civilian properties as appropriate.	2015	GCQA	Biosecurity cost recovery system	Medium
	Standardize the use of reconditioning practices for both inter-state and international commodities arriving on Guam.	2015	GDOA	Biosecurity cost recovery system	Medium
	Create and institute a mixed model biosecurity approach based on both vector sanitation and focusing on key high risk species for terrestrial, freshwater and marine habitats.	2015	Biosecurity Division	Biosecurity cost recovery system	High
	Develop appropriate vector management with feedback and monitoring mechanisms.	2015	Biosecurity Division	Biosecurity cost recovery system	High
Improve post border biosecurity	Develop an IAS action plan for Guam and update regularly (every 3 to 5 years). This plan should be inclusive of all environments and taxa and be developed by all stakeholders (not only active GISAC members).	2014	GISAC	Current funding	High
	Develop and implement new IAS control and management programs to supplement current work and reduce the potential of spreading them to non-infected locations.	2014	GDOA, GCQA, UOG, GISAC	Biosecurity Fee	High
	Develop jurisdictional capacity where gaps exist through training or added resources.	2015	GDOA, GCQA, UOG, GISAC	Biosecurity Fee	Medium
	Eradicate small (new) IAS incursions promptly that are feasible and can be accomplished through current program limitations and funding.	2015	GDOA, GCQA, UOG, GISAC	Biosecurity Fee	Medium
	Eradicate population of Java Sparrows.	2015	GDOA	TBD	High
	Develop and enforce best management practices for contractors and construction sites. To include, the minimization of land disturbance and ensuring the proper cleaning of all construction items according to APHIS guidelines.	2014	GDOA, GCQA, UOG, GISAC	Current funding	High
	Ensure proper cleaning of all large equipment is treated prior to moving between sites on Guam or preparation for departure from Guam.	2014	GCQA, Port Authority of Guam, A.B. Won Pat	TBD	High
	Consider helicopters and private planes (or small scale commercial ventures) as possible IAS vectors and therefore a biosecurity threat that needs to be monitored and inspected as per USDA/APHIS guidelines.	2015	GCQA, A.B. Won Pat International Airport Authority	Biosecurity Fee	Medium
	Consider small boats and yachts (including small scale commerical ventures) as possible IAS vectors and determine if monitoring and inspection may be necessary to prevent IAS introduction or spread.	2015	TBD	TBD	
	Determine the extent of the little fire ant infestation and then to manage and/or eradicate this species.	2014	UOG, GDOA, GISAC	USFWS	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve post border biosecurity (continued)	Improve enforcement and enforcement capacity regarding smuggled animals.	2014	GCQA, GDOA, GISAC	USFWS	High
	Create GIS layers that delineate the distribution of established IAS and integrate them with other GIS layers such as land ownership, management areas, etc. to improve capacity to manage and control existing established invasive species.	2015	UOG, GDOA, GISAC	BSP, UOG	Medium
	Continue with Coconut Rhinoceros Beetle rearch and management efforts.	2014	CRB Eradication Team/ Task Force	Current funding	High
	Establish and develop relationships with key industrials such as landscaping, pet stores and fish hatcheries to develop their ability to institute internal standards to prevent IAS and curtail smuggling and create safe avenues for import (i.e. no imports or sales of prohibited animals or plant pests).	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	Train landscaping company staff to be knowledgeable about invasive plants, to inform their customers about invasive plants, to ensure only pest free plants are used, to report immediately any likely exotic pest organisms found on their premises, and to use native or non-invasive plants locally sourced. This could be a yearly training event run by a local agencies or with support from an external group such as SPC.	2014	GDOA - Division of Forestry	TBD	High
	Conduct periodic surveys of fish hatcheries, ethnic markets, pet stores, and grocery stores to identify and intercept prohibited animals and animal and plant products following the model of the USDA-APHIS-PPQ Smuggling, Interdiction and Trade Compliance program.	2015	GDOA - Biosecurity Division	USDA - APHIS, PPQ	Medium
	Develop and/or improve capacity through the addition of resources such as staff, training, equipment etc. to carry out investigations and effective enforcement beyond ports of entry.	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	Create an Island-wide green waste management program to reduce the amount of green waste breeding sites for CRB.	2014	CRB Eradication Team/ Task Force	Current funding	High
	Formalize the local production of bio-control options (GMF and virus) for the management of CRB on Guam.	2014	CRB Eradication Team/ Task Force	TBD	Medium
	Incorporate new/improved tools as they become available in regards to Brown Treesnake control and management activities.	2014	GDOA	OIA, USFWS, USDA	High
Improve biosecurity in regards to wood packaging material (WPM)	Require and enforce treatment of all WPM according to ISPM No. 15.	on-going	GQCA	Biosecurity cost recovery system	Medium
	Inspect an adequate percentage of all domestic and foreign, military and non-military WPM accompanying agricultural and nonagricultural cargo for pests. 100% inspection would be ideal but many not be feasible given capacity limitations and time constraints.	2015	GQCA	Biosecurity cost recovery system	Medium
	Prohibit the unloading of noncompliant WPM.	2015	GQCA	Biosecurity cost recovery system	Medium
	Incinerate or sterilize any noncompliant or infested WPM that is offloaded; it should be treated as regulated garbage .	2014	GQCA	Biosecurity cost recovery system	Medium
	Support a regional approach to switch from WPM to other options such as recycled plastics; interim solution is the enforce certification of WPM and to inspect regularly.	2014	GQCA	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase agricultural biosecurity/food security	Update terrestrial biosecurity risk assessment in regards to agricultural commodities.	2016	GDOA - Biosecurity Division	Biosecurity Fee	Low
	Update list of commodities and importer countries.	2016	GDOA - Biosecurity Division	Biosecurity Fee	Low
	Conduct background surveys for plant pests and livestock and wildlife populations and diseases.	2015	GDOA, UOG	TBD	Medium
	Implement initial surveillance and monitoring for the prevention of livestock, poultry, and wildlife diseases and determine whether measures perform adequately. Adjust efforts as needed to improve and ensure that potential gaps are addressed.	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	Collect and analyze baseline data regarding key crops and animal stocks for internal consumption as well as for export need to be established and maintained.	2015	GDOA, UOG	TBD	Medium
	Analyze biosecurity intercept data.	On-going	GDOA, UOG, GCQA	Current funding	Medium
	Share information gathered quarterly within the region and beyond via a working group. Create region communication network to facilitate information sharing.	On-going	GDOA, UOG, GCQA, RISC representative(s)	Current funding	High
Address the fact that humans can serve as vectors of invasive species.	Screening of humans either during the arrival or departure process needs to be considered. Even with screening in place the potential for missed detections is high and therefore dependence on rapid response to initial localized outbreaks of human disease vectors is essential and must be appropriately planned for and supported.	2015	Department of Health	TBD	Medium
	National health authorities should work with US DoD to determine what, if any, role DoD can support in the advent of a human pathogen outbreak. For example, could DoD transport sick patients to appropriate support facilities either within or outside of the national in the case of a human pathogenic outbreak?	2015	Department of Health	TBD	Medium
	Shipping conditions of medical items needs to support potential invasive pathogenic outbreaks must be improved.	2015	Department of Health	TBD	Medium
Improve capacity to regulate the importation of live organisms	Develop a government endorsed white list of species permitted for import.	2014	GQCA/DOA	existing funding	High
	Update white list on a regular basis.	annually	GQCA/DOA	existing funding	Medium
	Develop a government endorsed black list of prohibited species.	2014	GQCA/DOA	existing funding	High
	Update black list on a regular basis.	annually	GQCA/DOA	existing funding	Medium
	Ensure that all species proposed for import that are neither black or white listed undergo appropriate risk assessment to determine potential impacts. Organisms which are deemed potential harmful should be added to the black list. Organisms which are deemed non-harmful should be added to the white list.	Continuous	GDOA	Importer pays for all aspects of the risk assessment (regardless of outcome)	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve capacity to regulate the importation of live organisms (continued)	Develop and update regularly public dissemination of white and black lists as well as a details on the risk assessment process for proposed species imports. This could likely be done via an existing government website.	2015	GQCA/DOA	utilize student support	Low
Reduce risk associated with live traded species	Establish formal risk analysis process/guidelines for all organisms used or proposed for live trade. Institute a territorial biosecurity advisory committee to review proposals for the importation of exotic species.	2015	GDOA	Biosecurity cost recovery system	High
	Standardize reporting and screening systems for the importation of live organisms.	2015	GDOA	Biosecurity cost recovery system	High
	Regulations regarding the importation of pets and other animal species need to be standardized, applied to all equally, and enforced.	2015	GDOA	Biosecurity cost recovery system	Medium
	Develop plan for containment and control measures in regards to exotic farmed and traded species.	2015	GDOA	Biosecurity cost recovery system	Medium
	Develop emergency preparedness procedures regarding possible escape of exotic organisms being farmed or trade.	2015	GDOA	Biosecurity cost recovery system	High
	Ensure that specific quarantine facilities are available and establish specific quarantine SOPs for the movement of live organisms (plant and animal, including aquatic species).	2016	GDOA	Biosecurity cost recovery system	High
	Establish legal instruments/framework regarding the responsible use and control of exotic species.	2015	GDOA	Biosecurity cost recovery system	High
	Improve diseases diagnosis and monitoring, as well as epidemiological surveillance implementation for farmed organisms.	2015	GDOA	Biosecurity cost recovery system	Medium
	Ensure that all aquaculture, mariculture, and other captive breeding facilities of non-native species are secure including from natural disasters.	2015	GDOA	Biosecurity cost recovery system	High
	Develop biosecurity standards for household aquaculture set ups and enforce these standards.	2015	GDOA	Biosecurity cost recovery system	Low
	Establish explicit aquaculture biosecurity practices (e.g. control of stocking densities, use of all-male populations, use of triploids, etc.).	2015	GDOA	Biosecurity cost recovery system	Medium
	Require all health certificates and necessary permits accompany imported livestock, poultry, and other animals.	2014	GDOA	Biosecurity cost recovery system	Medium
	Ensure that all imported animals are subject to health inspection by the territorial veterinarian and appropriately quarantined as required.	2014	GDOA	Biosecurity cost recovery system	Medium
	Improve the regulation of the importation of exotic animals for zoos and aquaria.	2015	GDOA	Biosecurity cost recovery system	Low
	Develop specific guidelines for unwanted pets.	2015	GDOA	Biosecurity cost recovery system	Low
	Require all aquaculture shipments entering Guam must have an import permit, certificate of origin, and health certificate, and undergo physical inspection for amphibians and their eggs.	2014	GDOA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Reduce risk associated with live traded species (continued)	enhancing quarantine requirements for specific species or taxon groups when imported (need to develop facilities for this in most cases) which would help with disease detection and control.	2016	GDOA	Biosecurity cost recovery system	Medium
	Establish lists of countries and competent authorities in regards to introduction and trade of exotic species.	2015	GDOA	Biosecurity cost recovery system	Low
	Support regional and international cooperation on the responsible use and control of live exotic species.	continuous	GDOA	Biosecurity cost recovery system	Medium
Increase export biosecurity	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pest from entering or being stuck to the outside of containers prior to shipping. Currently rented containers are inspected for internal cleanliness before departure. This should be expanded to include all containers and both internal and external surfaces.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Preferentially load conveyances in a way that minimizes pest entry whenever possible, for example, avoid night-time loading because the lights attract insects. Workers should be trained in and cognizant of pest conditions at all times. Develop SOPs to support this practice and train workers accordingly.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Mandate and enforce regulations for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Mandate and enforce regulations for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Enforce the use of container racks for all loading and unloading areas to ensure that containers are kept dirt free when loading and to facilitate inspections during unloading.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Institute pre-departure biosecurity inspections for more than just BTS.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Develop staging areas to safeguard high and low risk cargo.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
	Identify the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of staging facilities.	2015	Biosecurity Division	Biosecurity cost recovery system	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase export biosecurity (continued)	Coordinate agreements and procedures with air cargo shipping agencies for handling cargo, including packing, over-land transport, cargo-staging, palletizing, canine inspection, and final loading.	2015	Biosecurity Division	Biosecurity cost recovery system	Low
Increase quarantine capabilities	Implement the Biosecurity fee at the port and hire biosecurity officer positions to staff the Biosecurity Division of DOA.	2014	GDOA, GCQA, Guam Legislature	Biosecurity cost recovery system	High
	Ensure that the Biosecurity Division is appropriately staffed and funded and that it has adequate resources to conduct day to day operations.	2014	GDOA, GCQA, Guam Legislature	Biosecurity Fee	High
	Define clear roles for proposed biosecurity division which dove tail with GCQA and GDOA's roles.	2014	GDOA, GCQA, Guam Legislature	Biosecurity Fee	High
	Provide preliminary training for biosecurity staff and then insure that advanced trainings are provided to improve capacity over time.	2014	GCQA	Current funding	High
	Increase coordination to address marine and aquatic IAS including GDOA, GEPA, UOGML, NOAA, USFWS and others.	2014	UOG	NOAA	
Improve biosecurity for the movement of vehicles/equipment	Inspect, clean, and treat, if needed, vehicles, construction materials and equipment, and other commercial equipment at the port of entry.	2014	Port Authority of Guam, GCQA	Biosecurity cost recovery system	High
	Ensure that vehicles are cleaned prior to shipping.	2014	Port Authority of Guam, GCQA	USDA - APHIS	High
	Clean containers and conveyances that arrive with soil and/or exotic plant pests according to APHIS guidelines.	2014	Port Authority of Guam, GCQA	USDA - APHIS	High
	Evaluate the effectiveness of current cleaning methods, and improve as appropriate.	2015	GDOA - Biosecurity Division	Biosecurity Fee	High
	Ensure that used machines such as wood chippers and bulldozers are cleaned and inspected at point of departure immediately prior to shipping.	2014	GCQA, Port Authority of Guam	Biosecurity Fee	High
	Ensure that all vessels and equipment, including barges, dry docks, and dredging equipment, are free of fouling organsims before introduction to Guam's waters.	2015	TBD	TBD	
Improve importation protocols	Develop/enhance the system for tracking cargo in order to streamline the importation process and improve biosecurity.	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	For the shipment of live organisms, require importers to list the types and numbers of each species in each shipment. This information should be recorded by border agents, retained in an electronic database, and shared as appropriate.	2015	GDOA - Biosecurity Division	Biosecurity Fee	Medium
	Importation of house plants should be restricted and controlled or prohibited as per USDA regulations (especially on plants coming from the Caribbean and Florida).	2015	GDOA - Biosecurity Division	USDA	Medium
	Improve capacity to monitor, inspect, treat or restrict and track permitted imports including all plants and propagative material. Require and enforce the use of USDA or GDOA VS import permits for restricted animal products.	2014	GDOA - Biosecurity Division	Biosecurity Fee, USDA, USFWS	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve biosecurity elements at the Guam International Airport	Reconsider the layout of the arrival area, including replacing the temporary barriers erected to segregate arriving passengers from departing passengers in accordance with Homeland Security regulations with a more permanent solution.	2015	GCQA, A.B. Won Pat International Airport Authority	Biosecurity Fee	Medium
	Ensure primary inspection facilities for arriving air passengers and goods are located within the secure zone internal to the perimeter fence to reduce the potential for the spread of IAS during transit from entry points to inspection facilities.	2015	GCQA, A.B. Won Pat International Airport Authority	Biosecurity Fee	Medium
	GCQA personnel should be stationed with DHS, Transportation Security Administration (TSA) personnel in order to better develop expertise in screening transiting passengers for restricted or prohibited materials or all transiting passengers should be routed through GCQA inspection before they move to the departure area.	2015	GCQA, Guam Homeland Security/Office of Civil Defense	DHS, TSA	Medium
	Provide sufficient inspection facilities for express courier operations at the airport.	2015	GCQA, A.B. Won Pat International Airport Authority	Biosecurity Fee	Medium
	Consider all garbage within the passenger sterile area for incoming and transiting passengers at the A.B. Won Pat International Airport to be regulated garbage.	2014	GCQA, A.B. Won Pat International Airport Authority	Biosecurity Fee	High
	Ensure that the biosecurity system is tracking changes in aircraft arrivals, especially as new linkages are established and/or additional carriers are added.	2015	GDOA - Biosecurity Division, A.B. Won Pat International Airport Authority	Biosecurity Fee	Medium
	Institute 100% x-raying of all incoming passengers baggage to reduce illegal importations.	2014	GDOA - Biosecurity Division, A.B. Won Pat International Airport Authority	TSA, Biosecurity Fee	High
Improve mail inspections	Develop a plan to address the IAS introduction pathway of mail. Of significant concern in this regard is the potential for shipping of pets such as reptiles via the mail system with little ability to detect and intercept these organisms by current biosecurity systems within the region.	2014	GDOA - Biosecurity Division	USPS	High
	Find and implement a working solution which will permit and increase the inspection of US mail (and all other mail types including private courier services) including mail arriving at both civilian and military facilities. Appropriate regulations should be established which would permit the potential inspection of most if not all arriving.	2014	GDOA - Biosecurity Division	USPS	High
	Use current x-ray technology for all foreign-origin mail. Ensure that it is in working order and operable.	2015	GDOA - Biosecurity Division	USPS	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve mail inspections (continued)	Utilize trained detector dogs, visual inspections and X-ray machines to reduce the potential for illicit mail trade.	2015	GDOA - Biosecurity Division	USPS	Medium
Establish and enforce biofouling standards	Establish criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish standards and regulations regarding biofouling, including inspection and certification for all vessels. Inspections can be trained to inspect hulls from top side with mirrors. If further inspection is warranted, then the craft pays for divers to inspect and make a report. If determined to be dirty, then the craft must either be cleaned or leave port and jurisdictional waters. Self clean outside of jurisdictional waters could be an option. Hull needs to be clean of all organisms, as the ability to identify all marine organisms is not available.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish additional regulations for impounded vessels.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Develop capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a biofouling management program.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Establish and enforce biofouling standards (continued)	Ensure that regulations include ability to levy and collect fines and/or require vessels to depart national waters for repeat offenders and for non-compliance with treatment requirements.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Ensure that any required in-depth inspections or treatments are funding in full by the owner/operator. Consider developing a cost recovery system.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Implement targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
Increase marine ecosystem protection from invasive species	Establish biosecurity practices and requirements for the movement of any construction materials that are sourced from marine waters and shores (including sand, gravel, rock, coral rubble, and dredge spoils) to reduce the transfer of marine organisms into or within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with diving gear (whether work or recreational) and fishing gear being moved into or within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Implement a targeted outreach program with specific guidelines on methods to minimize species transfers associated with small boats, jet skis, and other water sports gear being moved into or within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Inspection of boats travelling inter-island from the CNMI especially during fishing derby.	2015	GDOA - DAWR	Guam Fisherman's Coop, GOSA	Medium
	Establish biosecurity practices and requirements for fishing vessels that operate in Micronesia to prevent the release of viable organisms associated with flushing of tanks (live tanks, storage holds, and wells) or cleaning of fishing gear.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
Establish and enforce ballast water standards	Implement targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Establish ballast water management and reporting requirements for all vessels utilizing ballast water.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Develop the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Review and revise (as needed) legal authority to implement a ballast water management program.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Ensure that regulations include ability to levy and collect fines for non-compliance.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
	Support national level adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	GCQA/DOA	Biosecurity cost recovery system	Medium
Address climate change linkages to invasive pests		2018	Governor's Office	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Early detection and rapid response					
Improve early detection and rapid response capacity	Develop an SOP for communication between agencies within various levels of government in regards to risk detection and response.	2015	GDOA	existing funding	High
	Design and implement a public reporting system for new or suspected non-native species incursions (a 24 hour pest hotline is advisable).	2015	GDOA	existing funding	High
	Develop a generic state emergency response plan (ERP) that is funded and approved by key agencies and governance. The generic ERP should be readily modifiable to utilize for terrestrial, freshwater, and marine incursions. The ERP should list necessary actions in sequence, authorities, partners and available resources, including funding sources which can be brought to bear immediately for a response action. Ensure that all appropriate authorities are involved in the development and planning process including public health authorities for diseases with serious animal and/or human health and zoonotic potential.	2015	GDOA	existing funding	High
	Develop a detection(surveillance) program and response plan for new incursions by a few focal non-native species of high-risk non-native species, ensuring that these specific plans cover freshwater, marine, and terrestrial systems.	2016	GDOA	TBD	Medium
	Develop taxa specific ERPs as needed.	On-going	GDOA	TBD	Medium
	Update all ERPs (both generic and species specific) to ensure that they current and functional.	annually	GDOA	existing funding	High
	Ensure that the public reporting system is fully functional including supported by trained staff.	2015	GDOA	existing funding	High
	Ensure that the public reporting system is appropriately advertised and that the citizenry and visitors are aware of its existence, its purpose and how to utilize it.	2015	GDOA	existing funding	High
	Develop protocols for responding the non-native species reports in a timely manner including interview policies, interview formats, timelines, ground truthing, and field action response time.	2015	GDOA	existing funding	High
	Train and maintain a core group of early detection & rapid response staff from local agencies/stakeholder groups, including aquatic and marine IAS detection and response.	2015	GDOA	existing funding	High
	Hold consultations to determine what agency(s), office(s) and/or groups will be responsible for surveillance programs.	2015	GDOA	existing funding	High
	Develop and institute surveillance programs for non-established species consider as high risk for arrival.	2015	Guam DOA	TBD	Medium
	Provide training to interested citizens with regards to supporting ED & RR efforts. Frequency of training events would depend on interest levels but minimally there should be one such course per year that can be used to train and refresh volunteers from local communities. Such trainings could be developed and run with the assistance of the regional invasive species coordination office.	2015	GISAC	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Awareness					
Increase outreach and education on biosecurity and invasive species	Conduct a pre-education survey of residents, visitors, transient workers and other stakeholders to gauge their understanding of invasive species, their potential impacts, biosecurity regulations, and the role of citizens and visitors in regards to protecting the territory from unwanted pests.	2015	GNA/GISAC	TBD	High
	Develop an educational strategy that is long term, extensive and territory wide, reaching school students as well as all communities. Ensure that outreach efforts are extensive and engage citizenry to support and promote biosecurity and management efforts describing approaches to be used to reach the citizenry, organizations, businesses, and visitors (including visiting work forces and foreign business ventures) about potential risks from invasive species and methods to prevent, report, and control their introduction. In order to improve and expand outreach and awareness efforts, a coordinated approach must be utilized to guide activities between the various groups and agencies involved in outreach and awareness activities.	2015	Guam Nature Alliance (GNA), GISAC	TBD	High
	Improve overall coordination of existing IAS and biosecurity outreach and ensure that information is reaching local communities, businesses and visitors about the potential adverse consequences of the introduction and establishment of plant and animal pests and diseases and ways to prevent their spread.	2016	GNA/GISAC	TBD	High
	Establish long term funding to support core outreach and educational efforts.	2016	GNA/GISAC	TBD	High
	Work with the school systems and support efforts to provide educators with tools and services to support IAS awareness development as part of standard curriculums.	2017	GNA/GISAC/ Department of Education	TBD	High
	Develop posters, brochures and other print media to support invasive species awareness campaigns (minimally these types of outreach materials should be updated and distributed on a yearly basis both as part of systematic outreach efforts and as part of special events/circumstances).	2016	GNA/GISAC	TBD	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts.	2016	GNA/GISAC	TBD	Medium
	Develop invasive species informational videos which can be show on local TV stations. One such video could explain the potential problems which could arise from releasing pet species into the wild (especially non-native aquarium fish).	2016	GNA/GISAC	TBD	Medium
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity.	2016	Guam Invasive Species Coordinator	Regional ISC Office	Medium
	Increase engagement of donors and other support programs to develop and conduct additional outreach efforts.	2016	GNA/GISAC	TBD	High
	Advertise amnesty/honor bin option by means of mass media outlets as part of public outreach.	2015	GCQA	existing funding	Medium
	Designate an agency or working group to be responsible to the Government of Guam for developing high-priority outreach messages about invasive species and their pathways and fund efforts.	2015	GCQA, GDOA, UOG, GISAC, GNA	existing funding	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Increase outreach and education on biosecurity and invasive species (continued)	Support the development of a regional video to be shown on air flights prior to arrival which includes information on amnesty bins and documents the concern with invasive species asking visitors and residents to support biosecurity efforts to reduce the movement of pest species. Videos should be developed in multiple languages and could also be shown in departure and arrival lounges.	2015	Guam RISC representatives	external funding	Medium
	Create awareness of the potential legal consequences of violations.	2015	GCQA	existing funding	Medium
	Provide reports and newsletters to educators, journalists, lawmakers, and business and community leaders.	2016	GNA/GISAC	TBD	Medium
	Distribute multi-lingual biosecurity poster free to pet shops, grade schools, universities, sporting goods stores, gardening stores, naturalist clubs, parks and natural areas, military facilities, air and sea ports, community centers and perhaps even seafood stores, farmers' markets and restaurants.	2016	GNA/GISAC	TBD	Medium
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish.	2016	GNA/GISAC	TBD	Medium
	Develop IAS service learning opportunities for students to get hands on IAS experience.	2017	GDOE/GNA/GISAC	TBD	Medium
	Provide information on ways to prevent the spread of plant and animal pests and diseases to the public.	2015	DOA	TBD	Medium
Research					
Evaluate social, cultural, economic, and ecological values that may be impacted by invasions of non-native species.	Conduct baseline surveys.	2015	University of Guam	TBD	Low
Identify knowledge gaps for existing IAS concerns	Develop a priority research list for the territory that can be shared with universities and others. A list could be a positive influence in engaging research groups to support management efforts within the territory.	2015	University of Guam	TBD	Low
Policy					
Improve laws, regulations and guidelines	Coordinate laws and regulations for post-border biosecurity In order to manage IAS effectively.	2015	GQCA/DOA	existing funding	Medium
	Expand existing or create new regulations (as needed) and SOP to encompass all potential IAS include terrestrial (agricultural and non-agricultural), freshwater, and marine concerns.	2016	GQCA/DOA	existing funding	Medium
	Review relevant biosecurity related guidelines and SOPs to ensure they are clear, complete, detailed, and in compliance with appropriate laws and regulations.	2015	GQCA/DOA	existing funding	Medium
	Update existing guidelines and SOPs as needed.	2015	GQCA/DOA	existing funding	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve laws, regulations and guidelines (continued)	Ensure that biosecurity regulations are in place and enforced.	2016	GQCA/DOA	existing funding	Medium
	Include GDOA Division of Forestry into the building permitting process to review the landscaping component and ensure invasive plants are not being used.	2015	GDOA - Division of Forestry	TBD	Medium
	Issue penalties and fines to enforce compliance.	2015	GQCA/DOA	existing funding	Medium
Restoration					
Improve native ecosystems restoration efforts	Continue and move forward with restoration efforts of native systems where IAS management and/or eradication efforts have been successful.	2015	GDOA - DAWR	USFWS, State Wildlife Grant	Medium
	Specific localized risk assessments should be conducted for all habitat types.	2015	GDOA, UOG	TBD	Medium

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment M: United States Department of Defense Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
	Support				
Ensure long term support for biosecurity efforts within the region	INRMP's (JRM, NRH, KWAJ, Wake, Palau Seabees) shall depict IAS monitoring and surveillance, detection, rapid response actions for all taxa to ensure biosecurity efforts are planned and funding is requested.	on-going	TBD	TBD	High
	Coordination and collaboration				
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the DoD section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year	DoD	TBD	High
Improve communication, facilitation, and joint biosecurity activities with civilian counterparts	Establish agreements (MOUs) between DoD and local agencies tasked with IAS control and management in specific jurisdictions where DoD opperates. If not already in place, it should become SOP for DoD and specific jurisdictions to communicate and work in tandem to ensure appropriate biosecurity mechanisms are in place for all DoD activities related to individual jurisdictions. Activities covered by the MOU should include but not be limited to the facilitation of response planning, identification of command structure, and support of response actions to biosecurity threats posed by DoD ativities.	End of 2015	JRM/DoD	TBD	High
	Create a Unique Defense Transporation Regulation for the Hawaiian Marine Monument, applicable to all DoD entities. Ensure the regulation mimics current civilian standards for air and marine traffic within the Hawaiian marine monument.	2016	DoD/OPNAV	TBD	Medium
	Continue to improve partnering with civilian agencies (in each location where DoD has facilities) in regards to biosecurity. The military should have at least one invasive species biologist, in addition to a supporting pest control shop or equivalent contract team at each DoD facility working in conjunction with local authorities to monitor for pests, to conduct biosecurity inspections, to respond to incursions, and to implement management efforts as needed. Improvements to existing systems, communication, and partnering with local civilian agencies should continue to be advanced.	2015	JRM	TBD	High
	Complete support capability analysis to determine and quantify the DoD's ability to afford or provide support to severe outbreak scenarios. The scenarios shall attempt to model low, medium, high risk situations, to best determine the "support gaps" or elements out of DoD ability or jurisdictional abilities.	2015	DoD (partnering with the CDC and jurisdictional	TBD	Low
	Establish a MOU between USDA-APHIS and Pacific Military Commands to facilitate a role for APHIS as it pertains to offshore biosecurity, specific to military pre-clearance and self inspection training.	2015	PACOM/JRM	TBD	High
	Develop and update on a regular basis, the JRM and Navy Region Hawaii instructions for offshore and onshore biosecurity. Ensure that Quality Control processes are included in the instruction to ensure the efficacy is addressed.	On-going for relocation projects	TBD	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve communication, facilitation, and joint biosecurity activities with civilian counterparts (continued)	Include biosecurity requirements and provisions in contracts to reduce the risk of introduction of animal and plant pests and diseases. Provisions should include: 1) contractor-provided education for employees on import requirements and penalties associated with non-compliance; such educational materials should be developed in collaboration with regional SME's from private and government sectors; 2) contractor compliance with all import requirements [import permits, procedures at port of entry and beyond, etc.]; and 3) company-driven pre-inspection of their own materials for plant pests. Minimize pest contamination of containers and WPM by: Minimizing outdoor storage, Sealing storage site surfaces, Keeping storage sites clean, Controlling pests around storage sites, Limiting use of nighttime lighting around storage sites, and Treat storage areas with molluscicides or install barriers to prevent mollusks from infesting WPM and shipping containers. Remove weeds and other contaminants from container and WPM storage areas. Storage areas should be hard surface or gravel.	on-going	DoD, for DoD funded projects	TBD, funded by the individual project or where appropriate the Biosecurity Fee on Guam	High
Improve communication, facilitation, and joint biosecurity activities with civilian counterparts (continued)	Revise and update military guidelines and SOPs for biosecurity. In some cases, the military uses outdated guidance with inaccurate information. For example, the OPNAVINST 6210.2 lists only the States, District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands as the U.S., notably excluding the CNMI and American Samoa (7 CFR § 330.400[a] and 9 CFR § 94.5[a]).	2016	OPNAV	TBD	High
	Live animal imports by military personnel and dependents should follow civilian regulations in each jurisdiction. Review and continue to support these regulations. All health certificates and necessary permits should accompany imported animals. Ensure that all imported animals are subject to health inspection by appropriate animal health offices and appropriate quarantine periods are enforced.	On-going	JRM	TBD	Medium
	Utilize input and market research from Government biosecurity service providers, in addition to regulatory subject matter experts when developing biosecurity instructions and guidance for active duty and civilian DoD employees, in addition to DoD contractors.	2016 develop planning strategy	TBD	TBD	High
	Finalize and utilize the Joint Region Marianas Instruction: Brown Treesnake control and interdiction.	2015	JRM	TBD	High
Support regional biosecurity and invasive species control efforts	Provide assessment of outcomes and update DOD portion of the strategic implementation plan every 3-5 years.	3-5 years	TBD	Regional ISC office	High
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.)	2015 and on-going	TBD	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	TBD	Regional ISC office	Low
	Support the development of a weeds risk assessment for military installations in Hawaii and Micronesia. Share results with cooperating territorial and state agencies.	2016	TBD	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional biosecurity and invasive species control efforts (continued)	Support the development of a regional biosecurity coordination office. Establish an IAS regional management office minimally with an invasive species coordinator who is tasked with assisting individual jurisdictions as well as the region as a whole with IAS and biosecurity concerns. This position would need to be tied in closely with the RISC and the jurisdictional IAS coordinators. This office would play a key role with insuring appropriate, long term regional communication and support and could assist both individual jurisdictions and the region with IAS issues such as funding, regulatory development guidance, capacity development, linking existing resources including subject matter experts, and facilitating the coordinate of biosecurity efforts between jurisdictions.	2015	TBD	TBD	High
	Support development of a region-wide communication plan for biosecurity and IAS. Examine the potential of using existing models for the plan development including that which was produced for Oahu recently. The Oahu plan was ultimately not utilized but it potentially could serve as a model for networking regionally.	2016	TBD	TBD	High
	All jurisdiction should develop well thought out plans for response to incursions of IAS. In areas where DoD has facilities or otherwise opperates, DoD should work with local authorities to insure at DoD actions and activities are adequately covered response planning.	2016	TBD	TBD	High
	Support establishment of a centralized regional group with representatives from each country within the Micronesia Region to develop sustainable funding streams for efforts to manage interrelated risks that cross political boundaries. There should be sufficient funds to conduct routine surveillance, implement response plans, and provide outreach and education, in addition to port of entry exclusion activities and training for inspectors.	2016	TBD	TBD	High
Support improvement to biosecurity elements of partnering militaries	Risks of IAS carried by foreign military vessels and aircraft entering the region needs to be addressed. Partnering countries includes (but may not be limited to) Singapore, Philippines, Japan, and Australia. These and other countries military vessels and aircraft may enter the region to take part in training and joint exercises with the DoD. Differences in specific country practices and protocols may include actions that would not meet US biosecurity standards. Support establishing SOPs which require partner countries to comply with local/regional standards when operating within any part of the region may be appropriate. Mechanisms for driving this would likely need to between specific jurisdictions or countries and the DoD partners which would like to train in specific jurisdictions. Monitor visiting countries and their military forces ability to abide by the JRM/NRH Biosecurity Instruction.	2015	PACOM/JRM/civilian authorities	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Prevention					
Improve border security	Construction and other commercial equipment must be inspected, cleaned, and washed down at the port of entry, Tracked vehicles can be cleaned on shore only if they can be reloaded without recontamination of the treads; otherwise they should be cleaned on the ship's well-deck. They should be cleaned to USDA-APHIS standards (USDA-APHIS-PPQ Treatment Manual 2008) prior to shipment from the port of departure. Vehicles may be cleaned at the port of entry provided wastewater soil is collected and drained fully into an approved collection system.	2016	TBD	TBD	High
	Construction materials are currently inspected as part of the build-up efforts to improve biosecurity. Inspection of contruction materials should be instituted as standard policy for all activities throughout the region (not only the build-up).	2016	TBD	TBD	High
	Military aircraft and other military vehicles arriving as maritime cargo should be inspected, cleaned, and washed down at a retrograde wash facility before entry. Wash down procedures for military vehicles should target soil, plants, insects, and other wildlife. Tracked vehicles can be cleaned on shore only if they can be reloaded without recontamination of the treads; otherwise they should be cleaned on the ship's well-deck. They should be cleaned to USDA-APHIS standards (USDA-APHIS-PPQ Treatment Manual 2008) prior to shipment from the port of departure. Vehicles may be cleaned at the port of entry provided wastewater soil is collected and drained fully into an approved collection system.	2016	DoD	TBD	High
	Support the development of sanitation standards, targeting methods and diagnostic and identification tools for non-visible pests.	on-going	TBD	TBD	Low
	Ensure that appropriate biosecurity policies and procedures such as HACCP are in place and enforced.	2015	TBD	TBD	High
	Establish appropriate decontamination sites for cleaning both military and civilian equipment associated with military activities	2015	TBD	TBD	High
	Inspect and clean all incoming containers, conveyances and construction materials that arrive through DoD controlled ports of entry with soil and/or exotic plant pests including materials previously treated or cleaned if recontaminated after treatment.	On-going	TBD	TBD	High
	Create a multi service invasive species database to track the impelmentation efficacy of HACCP for military exercises and construction in Hawaii and Micronesia. Information tracked by unique project in such a database shall include: detailed inspection processes, intercept records, preservation and compiling of voucher specimens, detailed records on where shipments, etc. are arriving from and specifically what is known to have harbored IAS and where it come from and how it arrived.	On-going, for relocation projects	TBD	TBD	High
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	JRM	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of wood packaging material (WPM) (continued)	Require treatment of all WPM according to ISPM No. 15 under DoD MOU with APHIS-PPQ. All domestic and foreign WPM should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	APHIS-PPQ	TBD	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in a database to be available for analysis that may contribute to safeguarding improvements and quality control.	on-going	APHIS-PPQ	TBD	Medium
	Do not permit the unloading of noncompliant WPM.	on-going	APHIS-PPQ	TBD	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	on-going	APHIS-PPQ	TBD	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	on-going	APHIS-PPQ	TBD	High
Improve biosecurity elements in regards to garbage	Ensure that appropriate garbage disposal mechanisms are in place before any DoD activities within the region.	2015	TBD	TBD	Medium
Improve pre-departure biosecurity	All departing vehicles, equipment and materials should be properly inspected, cleaned, and washed at laydown area prior to departure. Subject to wash down and canine inspection requirements, vehicles should be loaded on to transport vessels for immediate transport.	2015	TBD	TBD	High
	On Guam, if staging of vehicles is required, cleared vehicles should be placed in a BTS barrier to prevent ingress of BTS after inspection and clearance, or canine inspections performed again prior to loading for transport.	2015	TBD	TBD	High
	Capacity training on sea container hygiene and the development of SOPs regarding container hygiene would support better compliance with acceptable standards such as where to place containers and preventing pests from entering or being stuck to the outside of containers prior to shipping.	2015	TBD	TBD	Medium
	Support the establishment of a biosecurity pre-clearance program in Okinawa, Japan for materials associated with the relocation departing Okinawa for Guam, Hawaii, and the CNMI	2015	TBD	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve pre-departure biosecurity (continued)	Develop and implement specifications for handling cargo, including packing, transport, cargo-staging, palletizing, and loading. Contamination can occur during the packing, handling, and staging processes prior to export. Optimally, packers should handle and pack cargo items individually, especially those of high risk. Develop and implement specifications for palletized cargo, including procedures for staging, labeling, packing, loading and transport. Personnel must be trained in identifying high-risk cargo and handling it to reduce contamination. The likelihood of visually detecting species in complexly combined cargo is lower than in cargo with few hiding places. Identify the appropriate agency tasked with the regulatory actions to be performed as well as the enforcement of any violations contrary to the law. In addition, staging areas need to be developed for safeguarding high and low risk cargo. Need to identify and include in the development process the appropriate office(s) that would be responsible for the planning, development, construction and maintenance of such facilities.	2015	TBD	TBD	Medium
Improve biosecurity elements on AAFB	Increase the foreign inspection area for passenger clearance in the main terminal at Andersen AFB to a sufficient size for physical inspections of passenger baggage. Ensure that it is compliant with Home Land Security and Guam CBP.	2015	DoD	DoD	Medium
	Provide space, lighting, and equipment (e.g., x-ray equipment, tables, and materials for collecting samples) sufficient to enable GCQA to complete all aspects of inspection. Amnesty bins are also need if not already in place.	2014	DoD	DoD	High
Improve specifics in regards to biosecurity and the proposed build-up in the Mariana islands	Extend outreach programs, such as the RARE project, to contract workforce involved in DoD construction to ensure private firms working on DoD projects are aware of the federal and territorial laws which are in place on Guam. Bi-lingual delivery of information is advised to ensure all labor personnel is aware of their on and off duty impacts as it pertains to invasive species.	2015	TBD	TBD	High
Improve pre-arrival biosecurity	Biosecurity emphasis should be directed towards audited off-shore hygiene systems such as those utilized very successfully in Australia and New Zealand. As an example, all large equipment such as construction and military items intended for importation should be cleaned and inspected for IAS prior to loading. Treat (clean) if necessary immediately prior to shipping.	2016 Support development	TBD	TBD	High
Improve ballast water standards and compliance	Conduct an initial comprehensive analysis of current ballast water discharge and management patterns by U.S. military vessels, including those operated under MSC and all branches of the DoD, for Micronesia and Hawaii.	2015	TBD	TBD	Medium
	Assess the extent of ballast water treatment (both in terms of percentage of vessel arrivals and discharge volumes) prior to discharge by U.S. Navy and other military vessels	2016	TBD	TBD	Medium
	Evaluate the locations and volumes of seawater operations (including both uptake and discharge) for compensating fuel tanks discharged	2016	TBD	TBD	Medium
	Establish a program that implements targeted outreach and administrative tools to increase compliance with ballast water treatment requirements for military and non-military vessels associated with the DoD.	2016	TBD	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve hull fouling standards and compliance	Evaluate the extent (including especially total abundance and species composition) of biofouling on all types of DoD and U.S. Navy vessels operating in the region, including amphibious vessels and vessels operated under MSC.	2016	TBD	TBD	Medium
	Implement (a) inspection of vessels operated under DoD with high biofouling potential, due to extended periods of lay ups or port residence times, and (b) cleaning for those that are heavily fouled prior to their movement into, out of, or within the region	2016	TBD	TBD	High
	Once developed, hull fouling regulations should be applied to all vessels operating under the various branches of the military, both military owned and civilian owned under contract.	2017	TBD	TBD	Medium
	Assess the extent to which vessels operating in the region under DoD achieve acceptable levels of biofouling, once regulations have been instituted.	2018	TBD	TBD	Medium
	Track and evaluate changes in vessel traffic patterns and operations (including vessel types, geographic regions visited, port residence times, and speed) for all types of DoD and U.S. Navy vessels operating in the region, including amphibious vessels and vessels operated under MSC.	2017	TBD	TBD	Medium
	Support USCG establishing specific biosecurity criteria (requirements) for acceptable levels of hull biofouling for all types of DoD and U.S. Navy vessels, including amphibious vessels and vessels operated under MSC.	2017	DoD, USCG	TBD	High
	Support USCG extending DoD biosecurity requirements for acceptable levels of hull biofouling to include vessels under contract to any branch of the U.S. military, such as barges, dredges, and other vessels.	2017	DoD, USCG	TBD	Medium
	Support USCG extending hull fouling requirements to all military vessels operating in Micronesia and Hawaii, including those operating under MSC and other branches of the military.	2017	DoD, USCG	TBD	Medium
	Ensure JRM/NRH Biosecurity Instruction includes guidance as it applies to hull fouling, ballast exchange, and the risks associated with the intentional and/or unintentional movement of marines IAPS.	2018	TBD	TBD	Medium
Management and eradication					
Improve facilities IAS management	Enhance training for military personnel and their dependents about phytosanitary and general sanitary regulations and the risks of sending or receiving agricultural and wildlife materials in the mail.	2016	TBD	TBD	Medium
	Develop and maintain current IAS management plans for each DoD facility within the region. A publication that reviews 12 case studies of invasive species on military bases and lays out some basic recommendations for the military was prepared for the DoD by the National Wildlife Federation (Westbrook et al. 2005). Among the recommendations is the inclusion of an invasive species management plan in a base's Integrated Natural Resource Management Plan. Recommend that DoD implements the recommendations established in Westbrook et al. (2005).	2016	JRM	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve facilities IAS management (continued)	Create GIS layers that delineate the current distribution of established IAS and utilize to improve management.	on-going	TBD	TBD	Low
	Utilize the Guam Landscaping Guidelines (June 2011). Revise facilities' landscape plans so that these dovetail with facilities' IAS management plans (this should be done throughout the region). New plantings should be locally sources, non-invasive, and preferably native species, with a minimum of 50% native species be planted for an individual project. Existing plant species, which are either known to be invasive or at least thought to have invasive potential, should be removed or managed.	on-going	TBD	TBD	Medium
	Develop best management practices for contractors and construction sites, working with the construction industry to gain support with preventing the introduction and spread of non-native plant pests. Implement “clean” practices at construction sites, including the minimization of land disturbance that may contribute to the spread of plant pests. This is part of the HACCP process already implemented on Guam. These practices should be considered for region wide implementation.	2015	TBD	TBD	High
	Ensure JRM/NVH Biosecurity Instruction addresses proper cleaning of equipment and materials prior to moving between sites within a jurisdiction (example: movement of vehicles between training sites and storage facilities within the state of Hawaii).	2014	TBD	TBD	High
	Increase efforts to eradicate targeted IAS. Improving this ability should be a long term commitment. Species targeted for eradication should be identified in each facilities IAS management plan.	2015	TBD	TBD	High
	Eradication is a biosecurity tool (removing incursion fate for a network of pathways users) and DoD should support the planning and execution of invasive species eradications on those installations where complete removal of a species is feasible or has been shown to be feasible elsewhere with similar target species.	2015	TBD	TBD	High
	Develop cleaning facilities (wash racks, etc.) at all DoD instillations where warranted and provide appropriate training for military personnel to utilize these facilities.	2016	TBD	TBD	High
Awareness					
Improve awareness of biosecurity and invasive species	Develop appropriate, comprehensive education and awareness programs within DoD for biosecurity including IAS prevention. This should cover military personnel and their families as well as contracted workers and their dependents. Such programs shall be extended into DoD schools.	on-going	JRM	O&M Appropriations	High
	Support coordination of existing outreach efforts in jurisdictions where DoD has facilities. Coordination should occur between each jurisdiction and DoD.	2015; on-going on Guam	TBD	TBD	High
	Support development of posters, brochures and other print media to support invasive species awareness campaigns.	On-going	TBD	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve awareness of biosecurity and invasive species (continued)	Implement a targeted outreach program for DoD installations in Micronesia and Hawaii. Ensure program addresses active duty and civilian workforce, and includes specific guidelines on the methods known to minimize species transfers associated with small boats, jet skis, other water sports gear, and diving gear. In addition to providing guidance on marine related actions, ensure the program also addresses guidelines to follow as it applies to terrestrial items of interest, such as the movement of household goods, cars, and other pack out items.	2015	JRM	O&M Appropriations	Medium
	Utilize local media sources such as newspapers and TV and radio programs to enhance invasive species awareness efforts	On-going	TBD	TBD	Medium
	Create two forms of video guidance and education. Video 1: Guidance on the implementation of the JRM and Navy Region Hawaii instruction (in regards to biosecurity and invasive species) for DoD civilians, active duty, and contractors. Video 2: Video providing guidance for families and off base recreation focusing and on what to be aware of, and how to protect the environemnt from invasives when not on duty. Video 2, could be shown on public stations as well, given its applicability to a wider audience.	On-going	TBD	TBD	Low
	Support regional coordination of invasive species awareness efforts to improve overall regional biosecurity	2015	TBD	TBD	Low
	Inform temporary workers about the consequences of carrying, mailing, or receiving restricted and prohibited agricultural and wildlife commodities or live organisms by working with contractors and other organizations hiring temporary foreign workers. Coordinate with contractors employing migrant workers and with overseas employment agencies for migrant workers. Communicate the reasons for prohibiting these materials, including the potential loss of business if invasive species are permitted to establish. Institute Contractor education program on installations in Hawaii and Micronesia. All DoN contracts shall, include invasive species contractor education as a task for the contractor to complete in each scope.	2015	TBD	TBD	High

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment N: United States Regional Biosecurity Recommendations*

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support					
Improve funding and funding support for biosecurity within the region	Increase availability of funding specific for biosecurity activities including pre-border, border, and post-border elements.	2015	TBD	USFWS/USDA/NOAA	High
Coordination and collaboration					
Ensure that the RBP remains relevant by updating recommendation components on a regular basis (add new recommendations and remove completed elements)	Update the US section of the RBP implementation strategy every 3 years and share updates regionally.	continuous, every 3rd year minimally	NISC	TBD	High
Improve regional communication on invasive species and biosecurity issues and support of jurisdictional and regional efforts	Support development of a regional communication plan for invasive species issues. This plan should be based on existing and proposed IAS infrastructure such as the RISC, jurisdictional ISC, and the regional ISC office.	2015	USFWS	TBD	Medium
	Support development of a regional net of thematic experts to support efforts with invasive species. This net should include (but not be limited to) experts in human health, food security, border security, education, planning, IAS management and control, IAS eradication, IAS detection and response, and resource development (funding, etc.).	2016	USFWS	TBD	Low
	Report (to the region) on a yearly basis progress on RBP recommendations via MCES, including a written report shared with the region and beyond.	continuous, yearly	NISC	TBD	High
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region.	Assist with and support regional efforts to develop, fund, and staff a regional invasive species coordination office.	ideally this office would be up and running before the end of 2015	NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office as the focal point for regional communication and dissemination of invasive species information.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to support efforts with engaging external resources to support invasive species efforts.	As soon as the office can be established	NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support capacity building, training, and advice.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting protocol and methods development.	As soon as the office can be established	NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting establishing ER &RR capacity.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to improve information sharing with trade partners outside the region in regards to biosecurity and IAS with respect to notification about species that will or might be problematic and which could originate from within the region.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with supporting the development of guidelines and regulations.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office with both seeking for and coordinating regional funding.	As soon as the office can be established	NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support management, response, and eradication efforts.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment of a regional invasive species coordination office. The regional IAS coordination office would serve as a focal point, coordinating body, communication and information center, and training resource for biosecurity activities throughout the region (continued).	Engage the regional invasive species coordination office to serve as a central data center for reporting, analysis, screening, and maintaining records for vector activities or non-native species information.	As soon as the office can be established	NISC and USDA	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
	Engage the regional invasive species coordination office to support outreach and education efforts.	As soon as the office can be established	NISC	initial support might come from the US and the region. Ultimately this office might be supported in part by grants from various donor partners	High
Improve local and federal coordination of biosecurity elements	Each jurisdiction should work with federal counterparts to clarify and establish biosecurity SOPs (this should include listing out clearly what offices/agencies are responsible for each biosecurity aspect whether federal or local) and information exchange programs which are functional and followed up on a regular basis.	2015	USDA-APHIS	TBD	High
	Federal law enforcement supporting local regulations (in regards to quarantine and biosecurity) might be a workable solution for the CNMI, Guam, and Hawaii. This should be supported by MOUs between the jurisdictions and federal counterparts.	2015	USFWS-LE	TBD	High
	Local agencies should develop a standard updating mechanisms for PPQ to improve PPQs ability to assist within each jurisdiction including navigation of regulations.	2015	PPQ	Jurisdictional biosecurity cost recovery systems	Medium
	Utilize the APHIS-PPQ port manuals and training as guidance in locations with APHIS cooperators as appropriate to support jurisdictional biosecurity. The manuals contain information on port operations and commodity regulatory decision making designed to enhance biosecurity at the ports of entry.	2015	PPQ	Jurisdictional biosecurity cost recovery systems	Medium
	Improve ability to conduct broad based risk assessments that address more than agricultural concerns.	on-going	USDA-APHIS	TBD	Medium
	Implementation of an electronic manifest system could be used to assign risk levels for containerized cargo based upon the declared commodity, origin of shipment, and name and address of shipper and importer.	2016	USDA-APHIS	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve local and federal coordination of biosecurity elements (continued)	The manifest system should be used to target random inspections that will provide assessment and control of containerized cargo via water transport.	2016	USDA-APHIS	TBD	Medium
	Manifest system should be sharable amongst federal and local biosecurity offices.	2016	USDA-APHIS	TBD	High
	Agencies responsible for enforcing USDA-APHIS regulations should have access to the APHIS permits system for assistance in clearance of restricted agricultural materials. APHIS import permits may be required, in conjunction with local import permits, for various agricultural commodities imported into Guam and CNMI. All officers acting under an MOU with APHIS inspecting for agricultural commodities need access to the permits system to validate APHIS import permits presented with incoming shipments.	2016	USDA-APHIS	TBD	High
	Local authorities should be able to develop their own pest watch lists and be able to react appropriately and federal agencies should be permitted to support these efforts including having federal inspectors inspect for pest of local concern during international inspection processes. Jurisdictions should not be tied to federal APHIS agricultural lists of known federal pests.	2015	USDA-APHIS	TBD	Medium
Support regional biosecurity and invasive species control efforts	Support the regional updating of the RBP every 3 to 5 years.	3-5 years	NISC	Regional ISC office	Medium
	Support the establishment of a regional DNA barcoding library so that DNA analysis can become a more useful tool in identifying non-native organisms.	on-going with possible establishment by 2018	USGS, NOAA, USDA and USFWS	TBD	Low
	Support the development of molecular assisted alpha taxonomy surveys with standardized protocols which can and are used throughout the region (this would be most useful with cryptic marine species).	on-going process	USDA, NOAA	TBD	Low
	Support the development of a algal risk assessment for the region.	2016	NOAA	TBD	Medium
	Support the development of a arthropod risk assessment for the region.	2016	USDA-PPQ	TBD	Medium
	Support national and regional biosecurity development by documenting and sharing success stories with pest species (significant interceptions, eradications, successful management strategies, impacts prevented or reduced, etc.).	2015 and on-going	NISC	Regional ISC office	Low
	Support national and regional biosecurity development by documenting and sharing information regarding actual IAS prevention costs and comparing these costs with the costs of IAS control and management.	2015 and on-going	NISC	Regional ISC office	Low
	Support the development of a weeds risk assessment for the region.	2016	USDA	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support regional agreements to limit the movement of known harmful species	There are no international conventions prohibiting or regulating trade that focus explicitly on non-native species and the region should consider developing such regulations for the region which would be supported by all jurisdictions and prohibit the movement of specific organisms between jurisdictions and possible between islands within jurisdictions. If the region could develop such agreements it might be a step towards developing broader Pacific agreements and even global recognized conventions.	Consultation regarding regional agreement 2015; Development of regional agreement 2017	NISC	TBD	Medium
Prevention					
Improve pre-border biosecurity	APHIS should increase its work with various jurisdictions (when feasible) to certify pre-clearance facilities (internationally).	2016	USDA-APHIS	Ultimately cost for such programs should be bore by the imports/shippers as part of cost recovery programs	High
	Local authorities should work with APHIS and international trade partners to develop pre-border programs.	2016	USDA-APHIS	Ultimately cost for such programs should be bore by the imports/shippers as part of cost recovery programs	High
	In regards to large shipments of potentially high risk materials (such as construction materials related to the build-up) PPQ officers can be on the ground at international.locations to ensure that items are clean prior to shipping.	2016	USDA-APHIS	Ultimately cost for such programs should be bore by the imports/shippers as part of cost recovery programs	Medium
	Extension agents (from land grant Universities) could work with international trade partner countries to improve pre-clearance sanitation. USDA should work with jurisdictions to facilitate this type of support from land grant institutions.	2016	USDA	Ultimately cost for such programs should be bore by the imports/shippers as part of cost recovery programs	Medium
Improve border biosecurity	Increase training.	2016	USDA-APHIS	TBD	High
	Increase resource availability.	2016	USDA-APHIS	TBD	High
	Increase oversight.	2016	USDA-APHIS	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve regulation and compliance of wood packaging material (WPM)	Support a regional effort to switch from WPM to recycled plastics. The technology exists, and new standards/compliance could be phased in with a multi-year approach to reach 100% replacement of WPM with recycled plastics.	on-going	USDA-APHIS	TBD	Low
	Require treatment of all WPM according to ISPM No. 15. All domestic and foreign WPM entering the region should be required to comply with ISPM No. 15. Even though these treatments do not fully mitigate pest risk, they help reduce the presence of wood-boring pests.	2015	USDA-APHIS	Biosecurity cost recovery systems	Medium
	Conduct sanitary inspection of WPM. Thoroughly inspect an adequate percentage of all domestic and foreign WPM accompanying agricultural and nonagricultural cargo for pests. WPM must not harbor organisms. SOPs should require consistent inspection methods. All inspections and interceptions should be documented. Pest interceptions should be recorded in an appropriate database to be available for analysis that may contribute to safeguarding improvements and quality control.	2015	USDA-APHIS	Biosecurity cost recovery systems	Medium
	Do not permit the unloading of noncompliant WPM.	2015	USDA-APHIS	Biosecurity cost recovery systems	Medium
	Treat or destroy any noncompliant WPM that is offloaded.	2015	USDA-APHIS	Biosecurity cost recovery systems	Medium
	Treat or destroy infested WPM. Infested WPM should be treated as regulated garbage and incinerated or sterilized.	2014	USDA-APHIS	Biosecurity cost recovery systems	High
Support improving biosecurity for DoD activities	Establish MOU between APHIS and DoD Pacific Command (similar MOUs already exist between APHIS and US Military in other regions of the world) to facilitate the role APHIS (and possibly APHIS's partners) can provide in supporting biosecurity for DoD related activities.	2015	USDA-APHIS	DoD	High
Improve capacity building and maintenance within biosecurity agencies	Develop jurisdiction wide (inclusive of all relevant agencies and offices both federal and local) capacity building and maintenance plans.	2016	USDA-APHIS	TBD	Medium
	There needs to be appropriate refresher training on general biosecurity procedures for front line offices of each jurisdiction so that important biosecurity issues can be reinforced.	2016	USDA-APHIS	TBD	High
	There needs to be advanced update training to support building capacity of biosecurity officers.	2016	USDA-APHIS	TBD	High
Improve biosecurity in regards to mail and private couriers	Develop secure procedures for opening international mail when warranted without customer witnesses and which are acceptable under US law.	2017	USDA-APHIS	TBD	Low
	Use canine teams to inspect mail and private courier items on arrival at each jurisdiction as feasible.	2018	USDA-APHIS	TBD	Low

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Improve biosecurity in regards to mail and private couriers (continued)	Record and analyze data on pest interceptions in mail. Analysis should improve targeting of phytosanitary and general sanitary hazards. Make information available on a regular basis to other offices that are involved in biosecurity.	2015	USDA-APHIS	TBD	High
	Mail and courier items should be inspected at arrival ports whenever feasible (rather than transported to a secondary location before inspection).	2016	USDA-APHIS	TBD	Medium
	Permit immediate detailed inspection of mail and private courier items if a canine team indicates on a specific item. This ability would assume that an indication would be sufficient probably cause to move forward with more detailed inspection.	2018	USDA-APHIS	TBD	Medium
Address climate change linkages to invasive pests		2018	TBD	TBD	Medium
Support improvements in regards to regulated garbage	Support development of jurisdictional SOPs on the handling and treatment of regulated garbage.	2016	USDA	TBD	High
	Support enforcement of regulations which apply to regulated garbage.	2016	USDA	TBD	High
	Unannounced monitoring of APHIS-regulated garbage compliance agreement holders should be conducted at least quarterly. Appropriate agency representatives must be trained to conduct enforcement visits to compliance agreement holders to monitor whether they follow required procedures.	2016	USDA	TBD	High
	Train appropriate agency representatives to conduct enforcement visits to APHIS Compliance Agreement holders handling regulated garbage. The number of personnel trained to monitor compliance agreement holders for functional equipment and appropriate procedures in handling regulated garbage is insufficient.	2016	USDA	TBD	High
	Enforce current swine health protection regulations requiring cooking of certain types of food waste (heating to an internal temperature of 212°F for 30 minutes) before feeding to pigs. The proper cooking of food waste will prevent the dissemination of foreign animal diseases of concern (9 CFR § 166).	2016	USDA	TBD	High
Support efforts to increase marine and aquatic biosecurity efforts in the region	Raise awareness of potential threats from marine and aquatic IAS.	2015 and on-going	TBD	TBD	Medium
	Support capacity building to establish marine and aquatic IAS programs in the region.	2015 and on-going	TBD	TBD	Medium
	Establish and support monitoring efforts for marine and aquatic IAS.	2015 and on-going	TBD	TBD	Medium
	Increase collaboration between local and federal agencies working on these issues.	2015 and on-going	TBD	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support efforts to increase marine and aquatic biosecurity efforts in the region (continued)	Seek funding support for marine and aquatic IAS prevention and response.	2015 and on-going	TBD	TBD	Medium
	Work with managers and advisory councils of the Pacific Marine National Monuments (including the Mariana Trench Marine National Monument) to collaboratively address marine biosecurity threats.	2015	NOAA / USFWS	TBD	Medium
Support the establishment and enforcement of biofouling standards	Address concern regarding the listing of marine species under the federal endangered species act. 66 species of coral have been proposed for listing under the US ESA. The listing of these species, may actually impede biosecurity efforts i.e. A fouled hull could potentially be protected under the ESA on entering US waters if these species were assumed to be present on the hull in question.	2016	USFWS/NOAA	TBD	High
	Support establishment of criteria for in-water cleaning methods for hull fouling that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2016	USCG/NOAA	TBD	High
	Support establishment of standards and regulations regarding biofouling, including inspection and certification for all vessels.	2016	USCG/NOAA	TBD	High
	Support establishment of additional regulations for vessels with long port residency periods. Long lay ups increase biofouling potential.	2016	USCG/NOAA	TBD	High
	Support the establishment of additional regulations for impounded vessels.	2016	USCG/NOAA	TBD	High
	Support development of capacity (personnel, training, and data management infrastructure) to conduct hull inspections (including diving as necessary). Consider establishing agreements with private industry to support hull inspection processes. For example, if a visual inspection determines that further hull examination is required, then the ship owner may need to hire local dive operators (that are government certified) to inspect the entire hull.	2016	USCG/NOAA	TBD	High
	Support establishment of regulations and facilities for hull cleaning including hull out facilities, associated waste disposal, and setting shoreline proximity limits for in-water cleaning.	2016	USCG/NOAA	TBD	High
	Support establishment of biosecurity practices and requirements for recreational vessels that operate within jurisdictional waters to reduce the transfer of biofouling organisms.	2016	USCG/NOAA	TBD	High
	Support establishment of the capacity to inspect and treat recreational vessels that operate within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	USCG/NOAA	TBD	High
	Support review and revision (as needed) of legal authority to implement a biofouling management programs throughout the region.	2016	USCG/NOAA	TBD	High

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support the establishment and enforcement of biofouling standards (continued)	Support the establishment of biosecurity practices and requirements for the movement of any in-water structure (including FADs, dry-docks, floating docks, fixed structures, mobile platforms and drilling rigs, buoys and channel markers) to reduce the transfer of biofouling organisms into or within jurisdictional waters.	2016	USCG/NOAA	TBD	High
	Support establishment of the capacity (personnel, training, and data management infrastructure) to inspect and treat (if necessary) in-water structures that are being moved into or within jurisdictional waters to reduce associated biofouling to an acceptable level.	2016	USCG/NOAA	TBD	High
	Support the development of regulations to address the need to levy and collect fines and/or require vessels to depart jurisdictional waters for repeat offenders and for non-compliance with treatment requirements.	2016	USCG/NOAA	TBD	High
	Review and establish criteria for in-water cleaning methods that do not pose a risk of spreading or releasing non-native organisms (which do not presently occur) in surrounding waters.	2016	USCG	TBD	Medium
	Address hull fouling concern with development of standards, regulations, and enforcement.	2016	USCG	TBD	High
	Support targeted outreach to inform the shipping industry, fishing industry, ports, and resource management agencies of biofouling management requirements for ships operating within jurisdictional waters.	2016	USCG/NOAA	TBD	High
Support improved ballast water standards and enforcement	Support targeted outreach to inform the shipping industry, ports, and resource management agencies of ballast water management requirements for ships operating within jurisdictional waters.	2016	USCG/NOAA	TBD	High
	Support establishment of ballast water management and reporting requirements for all vessels utilizing ballast water.	2016	USCG/NOAA	TBD	High
	Support development of the capacity (personnel, training, and data management infrastructure) to evaluate ballast water management reporting and compliance.	2016	USCG/NOAA	TBD	High
	Support review and revision (as needed) of legal authorities to implement ballast water management programs throughout the region.	2016	USCG/NOAA	TBD	High
	Support development of regulations to address programmatic needs, including the ability to levy and collect fines for non-compliance.	2016	USCG/NOAA	TBD	High
	Implement a system for U.S. Navy ships to report ballast water discharge per port arrival, modeled after that used by USCG, such that the data are compiled electronically at a centralized database.	2016	USCG	TBD	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Support improved ballast water standards and enforcement (continued)	propose a rule in the federal register to mandate compliance for all vessels with the 200nm ballast water exchange that is in place for civilian shipping. Attention should also be given to sea mounds and other near surface structures that may require further adjustment to the standardized 200nm limitation.	2016	UUSCG	TBD	High
	Support adoption of proposed USCG regulations to move to in hull ballast water treatment.	2016	USCG/NOAA	TBD	High
	Once developed, ballast water treatment regulations should be applied to all vessels operating under the various branches of the military, both military owned and civilian owned under contract.	2018	USCG	TBD	Medium
	Extend a ballast water reporting requirement and reporting system to all military vessels operating in Micronesia and Hawaii, including those operating under MSC and other branches of the military.	2015	USCG	TBD	Medium
	Develop standards for compensating fuel tank discharges which are equivalent to the ballast water requirements.	2016	TBD	TBD	Medium
Early detection and rapid response					
Support improved rapid response capabilities for both military and civilian lands for each jurisdiction. Improved rapid response measures could prevent the establishment of IAS. Rapid response takes place at and within the border at levels ranging from federal to local community involvement.	Review existing rapid response capacity for each jurisdiction.	2015	TBD	TBD	Medium
	Improve capacity as needed (which likely will involve better communications, increased training, improved resources, and ensuring that dedicated funding is available for field actions.	2016	TBD	TBD	Medium
Management and eradication					
Better support management and control of the Brown Treesnake (BTS) , one of the top invasive alien species (IAS) already established in the region (Guam) which threatens all other jurisdictions. The US has developed an extensive management and control program for the BTS which depends on interagency cooperation and which relies on the expired BTS control and eradication act as one of its underlying directives.	The BTS Control and Eradication Act (2004-2009) should be reauthorized to provide specific instructions and allow for additional efforts to prevent the spread of BTS from Guam. This 5-year BTS Control and Eradication Act expired in 2009. Renewal of this important regulatory driver has not yet been accomplished. Regulations pertaining to prevention, mitigation, and management of BTS that are contained in the Act are pertinent for protecting areas exposed to BTS from trade, travel, and tourism. Further, the act directs USDA and US DOI to establish rules structured to improve and expand BTS interdiction efforts. Once reauthorized, other federal agencies including the Departments of Defense, Homeland Security, and Transportation could better assist in preventing the further spread of BTS.	2015	USFWS	BTS Working Group	High
	Consideration should be given to the USDA pre-departure BTS inspections for Guam and if they are to be mandated as required and whether a fee could be associated with these inspections to cover their costs.	2015	USDA	BTS Working Group	Medium

Recommendation	Action Item	Time Line	Lead	Potential Funding/Resources	Priority
Better support management and control of the Brown Treesnake (BTS) , one of the top invasive alien species (IAS) already established in the region (Guam) which threatens all other jurisdictions. The US has developed an extensive management and control program for the BTS which depends on interagency cooperation and which relies on the expired BTS control and eradication act as one of its underlying directives (continued).	Currently USDA conducts voluntary pre-departure inspections on Guam in an attempt to intercept BTS before they are accidently transported from the island. This effort appears to be highly successful but is based on a voluntary inspection process. Consideration should be given to whether this effort should be mandated so as to better insure 100% coverage of pre-departure inspections for BTS for the island of Guam. DoD has military instructions that mandate BTS pre-departure inspections.	2015	USDA	BTS Working Group	Medium
	Consideration should be given to the USDA pre-departure BTS inspections on Guam in regards to whether items inspected could be effectively tagged/sealed after inspection to facilitate identification of what items have passed this inspection by front line inspectors at ports of arrival else where.	2015	USDA	BTS inspection cost recovery system	Medium
	Improve awareness of BTS and BTS related issues throughout the region at all levels. Specific focus should be directed to understanding both the historic context and the current situation on Guam and how the current situation on Guam has the potential to impact other locations if interdiction efforts are not maintained.	on-going	BTS Working Group	TBD	Medium
	Improve communications and partnering with Micronesian agencies or organizations not part of the BTS Working Group to increase BTS awareness, control and management efforts.	2015	BTS Working Group	TBD	Medium
Awareness					
Develop jurisdiction specific IAS education and awareness programs that are adequately funded and otherwise supported. These programs should reach all elements of society. This should be a long term and sustained efforts. Efforts should be coordinated amongst jurisdictions in order to achieve the best possible outcomes. Regional sharing of resources and ideas and using successful programs as frameworks to establish similar programs in other locations will facilitate the growth of awareness programs throughout the region.	Conducted surveys of current awareness levels.	2015	USFWS	TBD	High
	Utilize survey results to enhance and expand existing IAS awareness programs.	2016	USFWS	TBD	High
	Integrate IAS education into school curriculums and provide teach training.	2016	USFWS	TBD	Medium
	Develop school and community volunteer programs to support appropriate IAS management actions.	2016	USFWS	TBD	Medium

*These recommendations do not create any right, obligation or legal responsibility on the part of any of the jurisdictions to fund or execute the RBP.

Attachment O: Models

RARE: Awareness via Campaigns

Overview

A. Need

With ever increasing globalization and its associated increases in vectors and pathways as trade and visitation increase throughout the region, the need for improved biosecurity systems to protect islands, environments, communities, and economies, from invasive species increases. Biosecurity efforts within each jurisdiction can only be appropriately addressed with the support of local residents and communities. To support invasive species suppression efforts, residents need to recognize the benefits of biosecurity. To garner the public support necessary to implement jurisdictional biosecurity throughout the region, educational campaigns geared towards raising local awareness regarding the benefits of biosecurity systems, changing attitudes towards biosecurity actions and promoting behaviors that reduce the potential of transporting non-native species are necessary. The following outlines the objectives and methods for creating and implementing a Jurisdictional Invasive Species Public Awareness Campaign over a three-year period based on Rare Pride Methodology (www.rare.org/rare-pride-methodology).

B. Purpose

The purpose of the Jurisdictional Invasive Species Public Awareness Campaigns is to garner the support of local residents and communities in each jurisdiction for biosecurity as expressed in the strategic recommendations of the Micronesia Biosecurity Plan.

C. Objectives

1. Collect baseline public opinion data during FY15 and FY16 to support campaign development, implementation and evaluation.
    - Develop questions for pre-campaign survey.
    - Contract marketing firm or utilize volunteers to implement pre-campaign survey and analyze results.
    - Identify action items and prepare campaign project plan.
2. Direct a focused, public awareness campaign during the latter half of FY15 and FY16 that addresses core issues identified by the systematic baseline surveys.
    - Implement campaign.
    - Develop and design appropriate media. Contract vendors when necessary.
    - Conduct presentations and public events to identified target audiences.
    - Distribute collateral materials to identified target audiences.
3. Collect post-campaign public opinion data during FY17 and FY18 to support campaign development, implementation and evaluation.

- Contract marketing firm or utilize volunteers to implement post-campaign survey and analyze results.
- Identify action items for follow-up campaign project plan.

D. Approach

For a regional campaign to be successful, objectives, target audiences, messages, methods, threats and barrier removal strategies must be localized to the specific jurisdiction. Hence, a regional manager could coordinate various jurisdictional campaigns with similar objectives or goals but possibly influence different target audiences and utilize different messages and methods. For example, to improve biosecurity efforts, it has been suggested that a regional goal should be to incorporate IAS into school curriculums. This in fact may be an appropriate pathway for long term improvement in public awareness in regards to invasive species, but such a concept should be evaluated, including receipt of local public input in each jurisdiction before extensive planning and implementation occur. Implementation of this goal, if appropriate, will require following guidelines and restrictions specific to each of the implementing jurisdictions.

E. Expected results/benefits

The development and implementation of a focused Invasive Species Awareness Campaign within each jurisdiction will increase the public's support for regional invasive species suppression. The support of an informed public will allow biosecurity efforts throughout Micronesia to move forward as jurisdictional campaigns will complement one another. In the long term these efforts will help protect the natural resources within Micronesia for future generations. Increased public awareness and local pride in natural heritage will assist with guarding against accidental or intentional releases of unwanted species, supporting maintenance of quarantine procedures and preserving pest-free areas.

F. Timeline

Approximate Start date: TBD 2015

<u>Weeks 1 – 9</u>

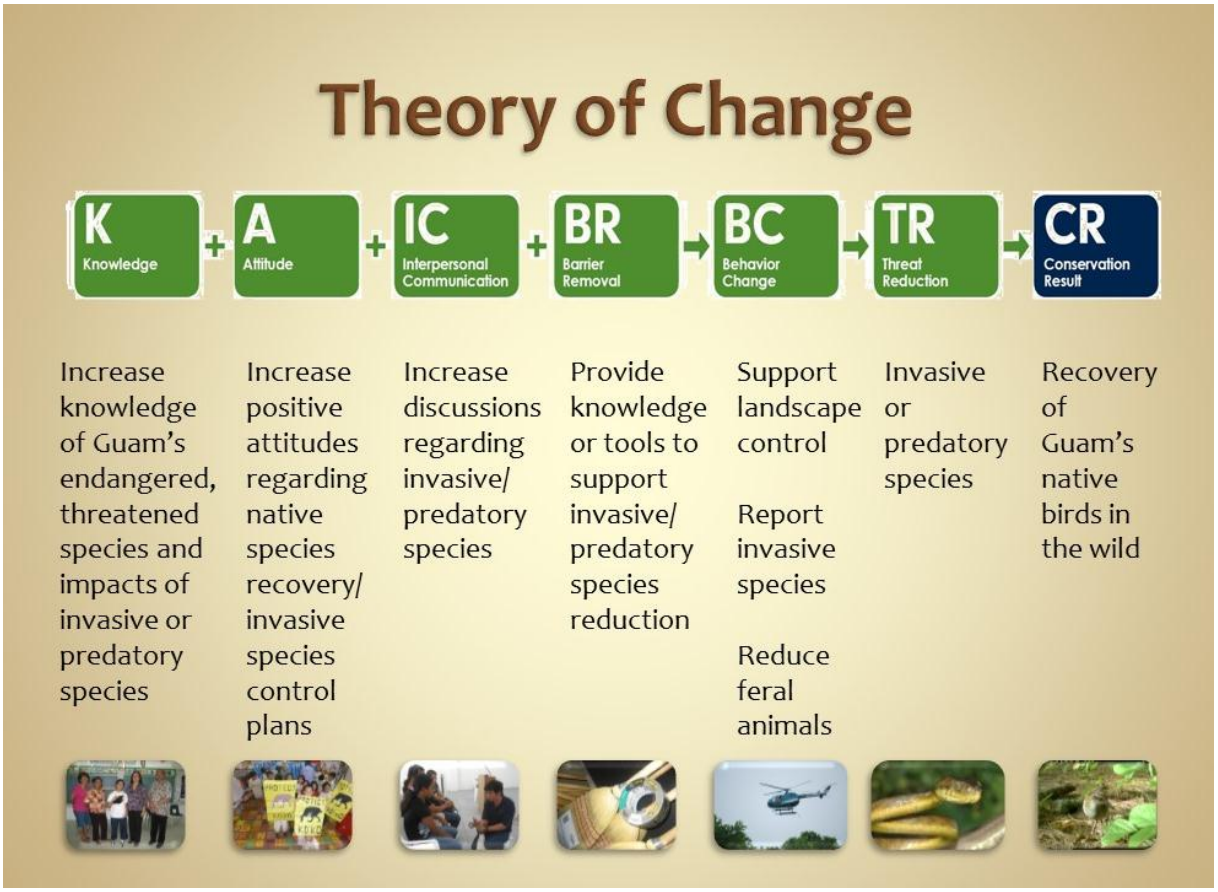
Build a comprehensive project plan, including ground truth concept models and threat ranking analysis, as well as identify potential solutions to barriers to invasive species suppression.

<u>Weeks 10 – 35</u>

Conduct pre-campaign survey, engage stakeholders, volunteers and technical experts, set objectives, build consensus, and finalize a draft campaign project plan for review and final approval.

Using the Go Native! Guam Social Marketing Campaigns as an example, the rationale or theory of change of a completed social marketing plan can be understood as follows:

"To protect and recover Guam's native bird species, the threat of invasive or predatory species must be decreased by increasing the support of landscape control, reporting of invasive species and reduction of feral animals. This will be accomplished by providing knowledge or tools to support invasive species reduction in addition to increasing the knowledge, positive attitudes and interpersonal communication of biosecurity efforts within target audiences."



(C. Calaustro, personal communication, April 7, 2014).

Weeks 36 – 40

Refine campaign plan and prepare for actual implementation, including marketing, media relations, design, advanced project management and measuring impact.

Weeks 41 – 148

Begin campaign implementation. With full technical support from agency partners, launch a multimedia public awareness campaign designed to change knowledge, attitudes and behaviors to increase support for broad-area invasive species prevention, control, and eradication.

For example, the Go Native! Guam Social Marketing Campaign utilizes a variety of mini and mass media as well as the Internet to engage target audiences:

(C. Calaustro, personal communication, April 7, 2014).

Weeks 148 – 152

Conduct post-campaign survey.

Weeks 152 – 156

Prepare analysis of campaign results; build a long-term plan for sustaining impact.

Week 157 and beyond - Sustaining Impact

Seek support in the form of follow-up grants, regional networks, workshops, and peer mentoring. Work to sustain social and behavioral change in the long term with partners.

Approximate End date: TBD 2018

G. Examples Communication Vehicles *(Final marketing mix determined by pre-campaign survey)*

- Print newsletters/magazines/flyers
- Posters, banners, murals
- Web site; other web-based media: blogs, webinars, links to existing website, etc.
- News conferences
- Electronic newsletters
- Amnesty bins
- Video for airplanes
- Kiosks at airports
- Multi-media presentation to interested parties – Mayor's Council, Village Chiefs
- Town/Village Meetings
- Lunch and learn events
- Face-to-face small meetings, workshops
- Field site events or trainings
- Special public events – concerts, free movies
- Digital advertising
- Radio spots
- General Swag: t-shirts, stickers, calendars etc.
- Use of a mascot

For more information regarding RARE visit: http://www.rare.org/

For more information on the Go Native! Guam Social Marketing Campaign visit: http://www.rareplanet.org/en/campaign/guam-terrestrial-campaign/details

Awareness via Mass Media (recent videos):

Other specific examples of how jurisdictions and/or the region could improve IAS awareness are demonstrated in the following two scenarios. The first is a short film produced by CAB International in 2014 to create awareness of specific invasive plants in Africa. The video can be found at: http://youtu.be/ggqseLRvlfY. This is a clear example of the types of awareness elements that Micronesia and Hawaii should be developing. Clear, direct informational formats using mass media outlets, including the internet but also local TV, radio, and news print to build IAS awareness in the citizenry throughout the region. The second example is again a video, this one produced in Hawaii to build awareness of Little Fire Ant impacts. This video is an excellent example of awareness development to support biosecurity within the region. This video can be viewed at: http://www.littlefireants.com/.

New Zealand Biosecurity:

New Zealand is considered by many to have one of the best (if not the best) biosecurity system to date. The New Zealand system should be reviewed by the various jurisdictions covered in the RBP and potentially usable elements of this system should be further investigated as to the feasibility of incorporating the same or similar elements into the various biosecurity systems within the region covered by the RBP. Knowledge of functioning biosecurity models from other areas can be extremely useful and the review of biosecurity programs such as that utilized in New Zealand is encouraged, but ultimately, each jurisdiction will need to build the system that functions best for them, given their unique set of parameters. The New Zealand's biosecurity strategy can be found at: http://www.biosecurity.govt.nz/files/biosec/sys/strategy/biosecurity-strategy.pdf.

Perhaps a good place to start is with an understanding of what makes the New Zealand biosecurity system functional in New Zealand. And perhaps a clue to understanding the functionality of the New Zealand system is found in the opening pages of their strategy, where the importance of biosecurity to the country is clearly acknowledged. This statement, the importance of biosecurity to the country and its economy, is not just a conceptual notion. The fact is that this underlying foundational belief is born out in the support that the government and the citizenry of New Zealand provide for the protection of their country via their highly supported biosecurity system.

While buy-in from government and citizens is a big part of why the New Zealand biosecurity system functions successfully, there are other elements that contribute greatly to the overall functionality of this system. Among these other elements is a well thought-out and documented cost recovery component. Elements of the New Zealand biosecurity cost recovery component are available online and can be accessed at: http://www.biosecurity.govt.nz/regs/fees-and-charges. It is recommended that all jurisdictions review the clearly laid out funding strategy utilized by New Zealand to support biosecurity and consider how elements from this funding strategy can be incorporated into the biosecurity systems of Micronesia and Hawaii.

Attachment P: Biosecurity Officer Qualifications

Qualifications for biosecurity officers will vary depending on specific job duties and duty station. For example, biosecurity officers who work with detector animals, such as canines, will need additional training beyond general inspectors. But, there are minimal qualifications that all biosecurity inspectors should poses.

Minimal staff competency requirements:

1. Staff carrying out sampling should demonstrable ability to follow written procedures.
2. Inspection staff should be competent in the following areas:
    a. Demonstrable ability to follow written procedures;
    b. Demonstrable ability to detect pests or symptoms; and
    c. Demonstrable ability to decide on the significance of the findings.

Along with the minimal qualifications, biosecurity inspectors should possess the following attributes: observant, tactful, reliable, and responsible. In addition, good communications skills and the ability to work with a wide variety of people from diverse cultures and backgrounds would seem highly beneficial.

While not strictly required for minimal qualification, professional experience and/or post-secondary training in an appropriate subject matter such as botany, ecology, agriculture, or marine science would be preferable.

Inspectors should have or should acquire with time in service both depth and breadth in the understanding of the basic concepts of biosecurity as well as detailed knowledge regarding specific elements of their position. Some of these skills which should be the focus of specific training for inspections follow (this list can obviously be expanded and should be for each jurisdiction):

- Taxonomic identification of specific high risk organisms
- Specimen collection and preservation
- Data collection and entry
- Professionalism
- Ability to interact appropriately and effectively with the public
- Ability to react appropriately and effectively to new situations as they arise
- A clear understanding of the critical nature of their position and how their specific duties fit into the larger biosecurity system framework

Attachment Q: Regional Biosecurity Plan Strategic Implementation Development Consultancy Visits*

26 – 30 November 2012, Majuro, Republic of the Marshall Islands (overlap with the Micronesia Chief Executives Summit and the Regional Invasive Species Council meeting)

21 – 28 May 2013, Republic of Palau

3 – 8 June 2013, Majuro, Republic of the Marshall Islands

17 – 22 June 2013, Kosrae, Federated States of Micronesia

22 – 29 June 2013, Pohnpei, Federated States of Micronesia

2 – 7 July 2013, Yap, Federated States of Micronesia

7 – 12 July 2013, Oahu, Hawaii

14 – 20 July 2013, Saipan, Tinian, and Rota, Northern Mariana Islands

24 – 27 July 2013, Chuuk, Federated States of Micronesia

2 – 6 September 2013, Majuro, Republic of the Marshall Islands (overlap with the Pacific Island Forum)

2 – 6 December 2013, Saipan, Northern Mariana Islands (overlap with the Micronesia Chief Executives Summit and Regional Invasive Species Council meeting)

9 – 15 December 2013, Oahu, Hawaii

15 – 17 January 2014, Washington D.C.

21 – 25 January 2014, Majuro, Republic of the Marshall Islands

25 – 28 January 2014, Kosrae, Federated States of Micronesia

28 – 30 January 2014, Pohnpei, Federated States of Micronesia

30 January – 1 February 2014, Chuuk, Federated States of Micronesia

4 – 9 February 2014, Republic of Palau

9 – 12 February 2014, Yap, Federated States of Micronesia

*Members of the Regional Biosecurity Plan development team reside within the Pacific Region many on the island of Guam and therefore no specific consultancy trips were made to Guam. Team members

have worked regionally with biosecurity and invasive species issues for many years and various additional site visits were made that are not listed as specific consultancy trips for this project. Additionally, much of the consultation work was conducted remotely via both email and phone conversation with stakeholders across the region.

Attachment R: Regional Biosecurity Plan for Micronesia and Hawaii Implementation Strategy Workshop Attendees List

19 - 21 May 2014

Office	Personnel
Chuuk State Chief of Staff, Office of the Governor	Wilfred S. Robert
Chuuk State Dept. of Agriculture Director, Office of the Governor	Kantito Kanas
CNMI Director of Agriculture, S\aipan	Manual A. Tenorio
CNMI Tinian Resident Department Head, Department of Lands & Natural Resources	Richard Farrell
Contractor	Else Demculinaek
Contractor	Lisa Chambers
Coordinator of the Hawaii Invasive Species Council	Joshua Atwood
Deputy Assistant Secretary of the Navy (DASN E)	Dan Cecchini
FAO	Viliami Fakava
Guam	Christine Camacho
Guam Customs and Quarantine	Jason Paulino
Guam Department of Agriculture	Brent Tibbatts
Guam Department of Agriculture	Russell Campbell
Guam DOA DAWR	Tino Aguon
Guam Legislature	Honorable Chris Duenas
Hawaii Department of Agriculture Acting Plant Quarantine Branch Chief	Darci Oishi
Hawaii Department of Agriculture Chairman	Scott Enright
Headquarters Marine Corps	Ryan Orndorff
Island Conservation	Raymond Nias
Kosrae Chief of Staff, Office of the Governor	Sweetyona Tulensru
Kosrae Island Resource Management Authority Executive Director	Robert H. Jackson
Kosrae State Department of Resources and Economic Affairs	Mutanel Tolenna
LandCare	Phil Cowan
LandCare	John Parkes
United States National Invasive Species Council (NISC)	Phil Andreozzi
Naval Facilities Engineering Command, Headquarters	Tammy Conkle
Naval Facilities Engineering Command, Marianas/Joint Region Marianas	Anne Brooke
Naval Facilities Engineering Command, Marianas/Joint Region Marianas	Steve Mosher
Naval Facilities Engineering Command, Pacific	Joel Helm
NAVFAC Marianas Commanding Officer/JRM J4 Regional Engineer	Captain Glenn Shephard
NOAA	VAL BROWN
Office of the Under Secretary of Defense - ATL	Gregory M. Beavers, CAPT USN OSD OUSD ATL (US)
Palau Chief of Staff, Office of the President	Secilil Eldebechel

Office	Personnel
Palau Minister of Natural Resources representative	King Malsol Sam
Palau National Invasive Species Coordinator, Bureau of Agriculture	Joel Miles
Pohnpei Agriculture Conservation Specialist, USDA-NRCS	Gibson Santos
Pohnpei Chief of Staff, Office of the Governor	Valerio Halens
Pohnpei Office of Economic Affairs Administrator	Kadalino Lorens
RMI Chief Fisheries Officer for the Coastal Fisheries, Marshall Islands Marine Resources Authority	Florence Edwards
RMI Chief of Agriculture & Quarantine, Ministry of Resources & Development	Henry Capelle
RMI Chief of Land, Coastal & Conservation Division, Environmental Protection Agency	Lani Milne
SPC	Josua Wainiqolo
SPC	Emil Adams
SPC	Radilaite Nawalowalo
SPC	Poasa Nauluvula
SPC	Ken Cokanasiga
The Nature Conservancy	Trina Leberer
UNDP	Johan Robinson
United States Department of Defense	Edward Lynch
United States Department of the Navy	Paul Wenninger
University of Guam	Tom Schils, Marine Lab
University of Guam	Ross Miller
University of Guam	Laura Biggs
University of Guam	President of the University of Guam Dr. Robert Underwood
University of Guam	Roland Quitigua
University of Guam	John Peterson
University of Guam	Ed Reyes
University of Guam	Frank Camacho
University of Guam	James Stanford
US Department of Navy	Coralie Cobb
US Department of Navy	Jennifer Farley
US NPS	Superintendent American Memorial Park
US NPS	Mike Gawel
USDA WS Guam	Craig Clark
USFWS ES Hawaii	Domingo Cravalho
USFWS ES Hawaii	Earl Campbell
USGS Guam	Adam Knox
Workshop Facilitator	Clifford Guzman
Yap Agriculture & Forestry Chief	Tamdad Sulog
Yap Hospital Head of Biosecurity Task Force	Jesse Haglelfeg
	Dot Harris
	John Santos
	Nicole Olmsted