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STRENGTHENING BIOSECURITY CAPACITY OF PALAU – FAO PROJECT TCP/PL/3601/C1

STRENGTHENING BIOSECURITY CAPACITY OF PALAU – FAO PROJECT TCP/PL/3601/C1

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Preparation of this document

This report was the outcome of desk-work and field activities related to the implementation of the FAO Project TCP/PL/3601/C1 – Strengthening Biosecurity Capacity of Palau, that was implemented in 2017. The project consisted of three consultancies and a national workshop. The project was under the technical oversight of Dr Melba B. Reantaso, Project Lead Technical Officer. The field mission to Koror, Palau was conducted from 8–31 March 2017 by Dr Melba Reantaso (FAO, Rome), Dr Glenn Aguilar (International Consultant on Hull Fouling, New Zealand), Rina-Joy Ambatang (International Consultant on Data Base Management, Philippines) and Dr Richard Arthur (International Consultant on Aquatic Animal Health, Canada), with in-country assistance provided by Dr Joel Miles (National Consultant, Invasive Species) and Isechal R. Remengesau (National Project Coordinator). A national consultation on Biosecurity Regulations for Aquatic Animals in support of the Biosecurity Act of 2014 was held in Koror, Palau on 28 March 2017 and a National Training Course on Database Management was held on 24 and 27 March 2017. Some of the annexes to this Circular are reproduced as submitted.

Abstract

This report documents the accomplishments of Project TCP/PLW/3601/C1 "Strengthening Biosecurity Capacity of Palau". These include: (i) preparation of the draft Aquatic Biosecurity Regulations for Aquatic Organisms (plus Annexures) and the draft Biofouling Management Regulations; (ii) the convening of a National Consultation, held 28 March 2017 in Koror, with some 30 participants representing government, the private sector and academe to discuss the draft regulations; (iii) the conduct of a Biosecurity Database Development Training Course, held 24/27 March 2017 at the National Capitol; and (iv) the preparation of a Framework for a Biosecurity Database. The report presents several lists of recommendations arising from the various project activities, the most urgent of which is that: "Recent introductions and transfers of live aquatic animals (both legal and illegal) are highly unsafe and have unnecessarily put future aquaculture development and local biodiversity at risk due to the possibility of introducing serious exotic pathogens and the possible genetic and ecological impacts of introduced and transferred species. The Government of Palau should take immediate steps to correct these practices. All introductions and transfers of live aquatic animals should be prohibited until such time as the draft Aquatic Biosecurity Regulations have been enacted and such species have been considered through the mechanisms contained therein."

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1. Background

1.1 Introduction

Species movement for farming can be one of the many sources of biological threats to the well-being of farmed aquatic animals as well as to humans and ecosystems, especially when done in a haphazard manner. With aquaculture intensification and diversification, the biological hazards and risks to farmed animals, people and ecosystems also increase in number and diversity, with potentially serious consequences. Infectious diseases, animal pests and invasive aquatic species, public health concerns on residues and resistance of antimicrobial agents, zoonoses, invasive alien species, release of genetically modified organisms and biosecurity risks posed by climate change are examples of these hazards. The growing number, complexity and seriousness of these risks have driven the development of the concept of biosecurity and its increasing application. Biosecurity is an integrated strategy to manage business, environmental and social risks in a comprehensive and systematic manner to protect the health and well-being of animals, plants and people, and to maintain the functions and services of ecosystems.

1.1.1 Biological invasions and aquatic invasive species

Biological invasions refer to the human-assisted introduction of exotic (non-native) species and their subsequent establishment and range expansion, with associated harmful impacts on a country's native species, environment and biodiversity. Biological invasions are often irreversible and are a major cause of global biodiversity loss and associated habitat degradation.

Aquaculture has been an important source of biological invasions, either because the organisms being raised are aquatic invasive species (AIS) such as tilapia (*Oreochromis* spp.), or because of contaminants (often referred to as "hitchhikers" or "fellow travellers") in imports. For example, shipments of milkfish fry (*Chanos chanos*) are often contaminated with tilapia fry, while several species of introduced frog have been reported from Guam, all or most of which are suspected to have arrived as contaminants in shipments of other organisms. All proposed introductions should be preceded by a scientific evaluation of the potential invasiveness of the species to be introduced (an ecological risk assessment, ERA), and should only be allowed if the assessment concludes that the proposed import will not become invasive in the receiving country.

In order to reduce pressures on stocks of wild marine fish and other economically important marine organisms, the government of the Republic of Palau has decided to increase aquaculture efforts, both in marine and freshwater. Ongoing efforts have focused on breeding native fish and shellfish, such as groupers, rabbit fish, milkfish, giant clams and mangrove crabs, but there is pressure to import exotic organisms, such as tilapia and whiteleg shrimp. Palau already imports fry of milkfish (a native species) for on-growing, both for use as baitfish and for raising to market size.

Shipping has become a major marine biosecurity concern in the last decade and is known to have caused the global spread of many harmful marine organisms. All groups of marine organisms may be transported through ship's ballast water, while encrusting organisms (e.g. macro-algae, bivalve molluscs, barnacles, bryozoans, sponges and tunicates) can be carried on the hulls of ships. Invasive species introduced by ships may foul ports, establishing in coastal

waters and on reefs, and invade aquaculture facilities, adding costs to the government and private sector for treatment and clearing, and weakening the economic viability of marine farms.

Palau is increasingly becoming a destination for recreational yachts and other vessels. Recreational vessels and slow-moving barges are a very high risk for transporting hull-fouling organisms to new areas, as they are slow moving and often lack the economic incentives of the shipping industry to keep their hulls immaculate. Palau urgently needs clear regulations on hull fouling which will be enforceable by current staff.

1.1.2 Transboundary aquatic animal diseases

Transboundary aquatic animal diseases (TAADs) are highly contagious diseases that can spread very rapidly anywhere and cause serious losses and long-lasting damage to aquaculture and wild stocks of fish, shellfish, molluscs and other aquatic organisms. Increases in global trade in live aquatic animals and plants have greatly increased the potential for pathogens and diseases to be introduced and spread to new areas along with the movement of their hosts. Domestic and international movements of infected broodstock and seed are proven pathways for the entry and spread of these pathogens. Infectious diseases are constraining the development and sustainability of the aquaculture sector through direct losses (in many cases, amounting to millions of US dollars), increased operating costs, closure of aquaculture operations, unemployment, restrictions on trade, and impacts on biodiversity. Once an aquatic species has been evaluated through environmental and genetic risk assessments and considered to be non-invasive, a further import risk analysis (IRA) should be conducted to determine the pathogen/disease risk that the introduction of an exotic aquatic species poses to the importing country, decide if the risk is acceptable, and if it is not, examine ways to manage the risk so that it becomes acceptable.

1.1.3 Request for FAO technical assistance

Aware of the lack of national capacity in the area of marine and freshwater aquatic biosecurity, the Bureau of Agriculture (BOA) has requested technical assistance to develop appropriate policies and regulations, as well as to define clearly the capacity development needs to be able to enforce the new regulations needed to implement the recently enacted *Biosecurity Act of 2014*. The Food and Agriculture Organization of the United Nation (FAO), through this Technical Cooperation Programme (TCP) facility will strengthen the biosecurity capacity of Palau's Division of Biosecurity through the development of several technical and legal documents that will assist the prevention and management of hazards and risks that may be brought about by haphazard and ill-planned movements of aquatic animals for aquaculture and through shipping movements. These technical and legal documents include: (i) Biosecurity Regulations for Live Aquatic Organisms and their Products; (ii) Hull-fouling Regulations; and (iii) Green/Red lists. These documents will support the implementation of the Republic of Palau's *Biosecurity Act of 2014.*

In this context, a two-day Training Course on Database Management was held on 24 and 27 March at the National Capitol and a one-day National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014 was organized on 28 March, in Koror, Republic of Palau, as part of project implementation.

1.2 Purpose

The purpose of the TCP facility was to assist the Government of Palau in improving national aquatic biosecurity. The project's goals were as follows:

- Conduct the National Training Course on Database Management
- Conduct a National Consultation to:
  - obtain stakeholder inputs to the development of the Regulations; and
  - provide participants with a better understanding of the need for improved national aquatic biosecurity through the presentation of technical information on the relevant topics.
- Develop the draft Biosecurity Regulations for Aquatic Organisms
- Develop the draft Biofouling Management Regulations

1.3 Process

The TCP facility comprised the following activities:

- Field mission to Koror, Republic of Palau, by Dr Melba Reantaso (FAO, Rome), Dr Glenn Aguilar (International Consultant on Hull Fouling, New Zealand), Rina-Joy Ambatang (International Consultant on Data Base Management, Philippines) and Dr Richard Arthur (International Consultant on Aquatic Animal Health, Canada), with in-country assistance provided by Dr Joel Miles (National Consultant, Invasive Species) and Isechal R. Remengesau (National Project Coordinator).
- National Training Course on Database Management (Dr Glenn Aguilar and Rina-Joy Ambatang) (Annex 1(A-D))
- Preparation of the draft Biofouling Management Regulations (Dr Glenn Aguilar) (Annex 1(E))
- National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014 (Annex 2(A-C))
- Preparation of the draft Aquatic Biosecurity Regulations for Aquatic Organisms (Dr Richard Arthur) (Annex 3 (A,B))
- Preparation of a Position Statement on the Proposed Introduction of Tilapia
- Preparation of an Information on ALOP for Senior-level Politicians (Annex 3(C))

2. National training course on database management

The National Training Course on Database Management was held 24 and 17 March, 2017 at the Republic of Palau Capitol Building, Melekeok. To support the regulations addressing biofouling, the training/workshop was conducted to enhance the biosecurity capacity of Palau in general and in particular, to provide decision support through readily accessible information for preventing the entry of aquatic invasive species through hull biofouling.

The Training Course covered the elements of a risk assessment-based workflow for border biosecurity officers implementing a system designed to minimize the risk associated with the entry of aquatic invasive species. Included in the training were topics on aquatic invasive species; hull biofouling and the importance of preventing the entry of invasive species; and the

development, maintenance and operation of a database supporting regulations for biofouling management and biosecurity.

2.1 Participants

The National Training Course on Database Management was attended by six participants, including staff from the Bureau of Agriculture, specifically from the Divisions of Biosecurity (4), Livestock (1) and Forestry (1). The training schedule and list of participants are found in Annex 1(A) and 1(B), respectively, while photographs taken during the Training Course are presented in Annex 1(C).

2.2 Products

The products of the National Training Course on Database Management are as follows:

1. An enhanced database based on the workflow for biosecurity based on risk assessment, biofouling thresholds and species-based risk assessment.
2. Participants trained in the skills necessary for the use, maintenance and continuing development of a database designed to provide relevant information needed for preventing the entry of aquatic invasive species through hull biofouling.
3. Participants trained in enhanced information searching skills on seacraft databases for the risk assessment required to minimize the entry of aquatic invasive species.
4. Participants given the skills required to maintain, update and enhance a biofouling species threshold and species database required for a species-based risk assessment required for decision-making regarding hull biofouling.
5. Recommendations from the participants of the National Consultation, the National Training Course on Database Management, and the International and National Consultants

Data tables and database interfaces are found in Annex 1(D).

3. The National Consultation

The National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014 was held at the Palacia Hotel, Koror, Republic of Palau on 28 March 2017. The National Consultation was organized as follows:

- Opening and Introductory Remarks
- Technical Presentations
- Working Group Session
- Conclusions and Way Forward
- Closing

The Programme for the National Consultation is presented as Annex 2(A).

3.1 Participants

A total of 30 participants attended the National Consultation, including representatives from the government (Ministry of Agriculture, Marine Resources and Tourism; Bureau of Agriculture; Division of Biosecurity; Office of the Attorney General; Bureau of Customs and Border Protection; Division of Fish and Wildlife Protection; Division of Biosecurity; Palau Environmental Quality Protection Board, Ngatpang State Government), the academia (Palau Community College) and the private sector (Biota Marine Life Nursery Inc.; Coral Reef Research Foundation; Palau Aquaculture Cooperative Association; Palau Conservation Society; Palau Coral Reef Research Foundation; The Environment Inc.), as well as staff and international and national consultants of the FAO.

The List of participants is given as Annex 2(B), while the group photograph and other photographs of National Consultation activities are presented in Annex 2(C).

3.2 Products

The products of the National Consultation are as follows:

- Updated knowledge and understanding of aquatic invasive species (AIS) and transboundary aquatic animal diseases (TAADs)
- Knowledge on the biosecurity risks posed by hull fouling of boats and the measures that can be taken to reduce risks
- Knowledge of the results of the Database Workshop
- Knowledge and discussion of the approach being taken in the development of the draft Aquatic Biosecurity Regulations for Aquatic Organisms
- Knowledge and discussion of the draft provisions to reduce the risks from hull fouling as contained in the draft Biofouling Management Regulations
- Recommendations from the participants, including recommended national appropriate level of protection (ALOP)
- Position statement on the proposed introduction on tilapia to Palau[1]
- Information sheet for senior government officials on the national ALOP for Palau (Annex 3(C))
- Report of the National Consultation (Annex 2)

3.3 Opening and introductory presentations

3.3.1 Opening

The National Consultation was opened by the Honourable Umiich Sengebau, Minister of Agriculture, Marine Resources and Tourism, who welcomed the participants. He thanked FAO and the government partners for supporting this important effort by the Bureau of Agriculture (BOA) to protect Palau's fledgling aquaculture industry and Palau's pristine marine environment. Minister Sengebau noted that business people often think of regulations as impediments to doing business, but he pointed out that the proposed aquaculture regulations

[1] A "position statement on the proposed introduction of tilapia" was subsequently prepared by the project team on behalf of the participants in the National Consultation on Biosecurity Regulations for Aquatic Animals. The statement, which has been submitted to the Senate, strongly encourages the Government of Palau to continue the ban on the importation of tilapias.

are intended to protect, not restrict, Palau's young and growing aquaculture sector. Without these protections, he said, our aquaculture industry could be destroyed by disease before it even gets properly started. Our pristine natural aquatic ecosystems will also benefit from these protections, he added. He told the group that "These protections should be adopted and implemented as quickly as possible, and I ask that all here today work together toward this end."

3.3.2 Introductory presentations

- ***Background and purpose of the National Consultation (Director Fernando Sengebau, Bureau of Agriculture)***

Species movement for aquaculture farming can be one of the many sources of biological threats to the well-being of farmed aquatic animals, as well as to humans and ecosystems, especially when done in a haphazard manner. With aquaculture intensification and diversification, the biological hazards and risks to farmed animals, people and ecosystems also increase in number and diversity, with potentially serious consequences. Infectious diseases, animal pests, public health concerns on residues and antimicrobial resistance, zoonoses, invasive alien species, release of genetically modified organisms (GMOs) and biosecurity risks posed by climate change are examples of these hazards. The growing number, complexity and seriousness of these risks have driven the development of the concept of biosecurity and its increasing application. Biosecurity is an integrated strategy to manage biological, business, environmental and social risks in a comprehensive and systematic manner to protect the health and well-being of animals, plants and people, and to maintain the functions and services of ecosystems. With the support of the Food and Agriculture Organization of the United Nations (FAO), the Bureau of Agriculture, together with other partners in the marine and aquaculture sectors has been working with a team of consultants with expertise in aquaculture, aquatic diseases, hull fouling and database development to develop new biosecurity regulations to protect Palau's aquaculture industry from exotic diseases and other threats. In addition, the team has drafted regulations to control the entry of hull-fouling organisms – marine organisms which grow on the hulls of ships, fishing boats and yachts – and which can invade Palau's lagoons and coral reefs. The National Consultation provides an opportunity to share these draft regulations with stakeholders, in order to get your suggestions for their improvement and to garner support for these important safeguards for our precious marine resources.

- ***The role of the Food and Agriculture Organization of the United Nations (FAO) and TCP/PLW/3601/C1 (Dr Melba B. Reantaso, FAO)***

Dr Melba Reantaso (FAO) first presented some background information on the Food and Agriculture Organization of the United Nations (FAO), including its purpose, goals, strategic objectives, composition, sources of funding, organization and structure. She noted that the Department of Fisheries and Aquaculture is one of six technical departments headed by an Assistant Director General and that the FAO has several relevant statutory bodies, including the Committee on Fisheries (COFI) and the Sub-Committee on Aquaculture (SCA), which meets on a regular basis. Biosecurity is an issue frequently raised during the sessions at both COFI and SCA. She then explained FAO's Technical Cooperation Programme (TCP), including its purpose and goals, types of projects that are funded, activities that are supported, procedures and justification for applying for TCP funding, and examples of several projects

currently funded or in the FAO pipeline. She then provided some background information on the current TCP facility TCP/PLW/3601/C1.

3.4 Technical presentations

The participants where then provided with a series of eight technical presentations on aquaculture development, transboundary aquatic animal diseases (TAADS), aquatic invasive species (AIS), aquatic biosecurity, hull fouling, database development, the *Biosecurity Act of 2014*, and the development of the proposed draft Aquatic Biosecurity Regulations for Aquatic Organisms. Summaries of the technical presentations follow:

- ***Aquaculture development in Palau: history, potential and issues (Theo Isamu, former Director, Bureau of Marine Resources)***

Former Director Isamu began by giving a brief overview of traditional methods of culturing fish, including the use of fish weirs ("beng") and other methods. He then provided an in-depth review of the development of aquaculture since World War II under the United States administration and since independence in 1994. The Micronesian Mariculture Demonstration Center was built in the 1960s to 1970s, mostly by hand labour, and the culture of giant clams was first developed here in the 1970s. He noted with pride that Palau was the first country in the world to perfect the culture of *Tridacna* clams, and continues to export clams to several countries. In 2003, a law was adopted designating three states in Palau for aquaculture development. This development is ongoing, and Mr Isamu expressed appreciation for the work of the Bureau of Marine Resources and Palau Community College, and for the support of the governments of Japan and Taiwan, POC. Mr Isamu noted that there are numerous native fish and shellfish species for which technologies have been developed for spawning and culture. He stressed that there is no need for the highly risky importation of live fish and/or shellfish from outside Palau, and urged that Palau's aquaculture development focus on production of local species from local stocks. He specifically mentioned his opposition to the proposal currently being considered by the national legislature to introduce tilapia to Palau, saying that he is "totally against aquaculture of tilapia in Palau."

- ***Aquaculture – a potential gateway for invasive aquatic species (Isechal Remengesau, National Focal Point and Dr Joel Miles, National Consultant)***

Mr Remengesau began by discussing the importance of sustainability, then gave some basic facts about invasive species, illustrating these with examples from Palau and other tropical island countries. He noted that aquaculture can be a gateway for invasive species, but it doesn't have to be: if we do things properly we can prevent invasions. He reminded the participants that Palau's economy is completely dependent on our natural resources. Aquaculture causes changes to natural ecosystems, so that they become "aqua-ecosytems." Because they have been simplified, they are less stable and less resilient than natural ecosystems, and need human inputs to keep functioning. We should also be aware that these altered ecosystems can have impacts on surrounding ecosystems, and should make efforts to ensure that these impacts are (i) minimal, and (ii) positive, not negative. Mr Remengesau emphasized that it is possible to protect our aquaculture farms from diseases and other invasive species. Private farmers working together, and with the support of the national government, can keep invasive species out of Palau. He also noted that there can be benefits from introductions of new species for

aquaculture, but he urged that each introduction should be evaluated both for its potential benefits and for its potential to cause problems (i.e. cost-benefit analysis and risk analysis), because prevention is much easier and less expensive than control. Some important principles of invasive species are as follows: (i) costs and benefits of new introductions are not evenly distributed; (ii) invasiveness in a similar environment elsewhere is a strong indicator of invasiveness here; (iii) most introductions are not reversible; and (iv) prevention is much easier and less expensive than control. Mr Remengesau went on to discuss how invasive species can be introduced, either intentionally or accidentally, and he gave some examples, including several species of frogs accidentally introduced to Guam through aquaculture. He then discussed the Precautionary Principle, using the case of the introduction of whiteleg shrimp (*Penaeus vannamei*) as an example: the potential impacts are not clear, but this species can definitely live in Palau's streams and mangrove ecosystems. It is therefore wise to be cautious and not introduce this species into Palau until we can be certain that it will not harm our native species. He summarized his presentation with four important points: (i) we can practice aquaculture sustainably; (ii) we can protect our aquaculture from invasive species; (iii) we should not take chances with our livelihood; and (iv) prevention is always much easier and less expensive than control. Following Mr Remengesau's talk, Dr Joel Miles briefly presented a series of eight "myths and facts" about tilapia, concluding that if tilapia are introduced into Palau, they will escape into Palau's waters with great negative – and irreversible – impacts.

- ***Transboundary aquatic animal pathogens (TAADS) and their potential to destroy national aquaculture development (Dr Melba B. Reantaso, FAO)***

Dr Reantaso began by stating that aquatic animals require more attention in order to monitor their health than terrestrial animals, as they are not readily visible except in tank-holding conditions and live in a complex environment, with feed consumption and mortalities hidden under water. Aquaculture, with a wide diversity in terms of species, systems, practices and environments, poses different types of risk. The range of diseases is also varied; some diseases have low or unknown specificity, while many display non-specific clinical signs. The complexity of aquatic systems makes distinction between health, suboptimal performance and disease obscure. Disease is thus one of the most important challenges in aquaculture. Diseases in aquaculture include those that are important to trade (i.e. those listed by the World Organisation for Animal Health, OIE). These are governed by international standards and have a set of criteria that must be met in order to be listed. They include serious diseases of important traded species (e.g. finfish, crustaceans, molluscs), and for which notification is recommended during an outbreak. There are also other diseases that consistently affect aquaculture species in hatchery, nursery and grow-out facilities (e.g. bacteria, parasites, fungi and viruses), as well as emerging diseases that may be of unknown cause. Dr Reantaso then examined some of the factors contributing to the current disease situation in aquaculture. These include: (i) intensification of aquaculture through translocation of broodstock, postlarvae, fry and fingerlings; (ii) the development of the ornamental fish trade; (iii) the enhancement of marine and coastal areas through stocking of aquatic animals reared in hatcheries; (iv) misunderstanding and misuse of specific pathogen free (SPF) stocks; (v) unanticipated interactions between cultured and wild fish populations; (vi) slow awareness about emerging diseases; and (vii) inadequate biosecurity. After presenting some information on the economic impacts of disease, Dr Reantaso then gave the participants detailed information on four important aquatic diseases: (i) koi herpesvirus (KHV), white spot syndrome virus (WSSV) of shrimp, (iii) acute hepatopancreatic necrosis disease (AHPND) of shrimp, and (iv) tilapia lake virus (TiLV). In conclusion, Dr Reantaso outlined some strategies that can be used to reduce

the risks posed by aquatic animal diseases. These include: implementing the recommendations of international standards and treaties through national strategies (including policies and regulatory frameworks); improving biosecurity awareness in aquaculture; establishing meaningful health certification and quarantine; implementing surveillance programmes and disease diagnostics; conducting risk analyses; improving border controls; improving farm-level biosecurity; promoting farmer education; and conducting scientific research. Transboundary aquatic animal diseases (TAADs) will continue to threaten the sector unless effective biosecurity measures are put in place. Government and the private sector will face more costs in terms of production losses and efforts to contain and eradicate diseases, funds which could be better spent in preventing the entry of pathogens into the system in the first place. Eradication is extremely difficult and costly, and may be impossible for many aquatic diseases. Focussing efforts on prevention, appropriate pre-border and border controls, good husbandry and biosecurity practices, and maintaining a healthy environment is still the key to managing risks from diseases. Improved biosecurity safeguards animal and human health, protects biodiversity, promotes environmental sustainability and enhances food safety. It also stimulates increased market supply and private investments, as it enables farmers to produce healthy products which can be highly competitive in the market, and it makes a country a responsible trading partner. Finally, it enables developing countries to grow more food efficiently, increase their incomes and thus improve their resilience, reduce their vulnerability and enhance their capacity to respond effectively to the impacts of higher food prices, as well as other food production risks.

- ***Aquatic biosecurity – protecting aquaculture and the aquatic environment from invasive aquatic species and TAADS (Dr Richard Arthur, FAO Consultant)***

Dr Arthur first provided a definition of "aquatic organisms" as defined under the draft Aquatic Biosecurity Regulations, as including fish, crustaceans, molluscs, amphibians, aquatic reptiles, other aquatic invertebrates and aquatic plants, and their products. He noted that under the *Biosecurity Act of 2014,* "biosecurity" means the control by legal and administrative means of invasive species, pests and diseases affecting animals, plants and their products, in order to avoid adverse effects from such pests and diseases on the economy and health of the Republic of Palau. In the past, “biosecurity” was termed “quarantine”, but they are not the same. Good biosecurity will protect against aquatic invasive species (AIS) and transboundary aquatic animal diseases (TAADs), while allowing international trade in live aquatic organisms at a level of risk that is acceptable to Palau. It is based on the assessment of risks using ecological risk assessment (ERA) (including assessment of invasiveness and genetic risks) and import risk analysis (IRA), which assesses disease and pathogen risks. He then noted that risk analysis is only one of a number of important areas that, together, contribute to effective national biosecurity. These include: surveillance programmes and diagnostic services to detect and identify the arrival and spread of pests and diseases; timely assessment of the threats from new or expanding species; rapid response to eradicate new pests and diseases before they establish and spread; science-based identification of all risk pathways and high-risk organisms; implementation of preborder, border and postborder measures to prevent pests and diseases from entering the country; and national policy and planning. Dr Arthur stated that risk analysis underpins all biosecurity actions, and that Palau needs the capacity in this area in order to safeguard national economic, social and biological well being from the negative impacts that can result from unregulated trade in aquatic animal commodities. In some situations, Palau’s membership in the World Trade Organization (WTO) may require the use of risk analysis. WTO’s primary purpose is to remove barriers to trade. For risks to human, animal and plant

health, the *Agreement on the Application of Sanitary and Phytosanitary Measures* (the SPS Agreement) states that the need for sanitary requirements beyond those specified in the applicable standard must be demonstrated by use of risk analysis. The applicable standards are, for animal health, those of the World Organisation for Animal Health (OIE); for plant health, those of the International Plant Protection Commission (IPPC); and for human health, those of the World Health Organization (WHO). He stated that a risk analysis answers four basic questions: (1) What can go wrong? (2) How likely is it to go wrong? (3) What would be the consequences of its going wrong? and (4) What can be done to reduce either the likelihood or the consequences of its going wrong? He then provided the participants with a simplified illustration of the risk analysis process, and the OIE risk analysis framework, which consists of (i) hazard identification, (ii) risk assessment, (iii) risk management and (iv) risk communication. He noted that risk management can take place preborder, border or post-border, and that risk management at each step in the importation process reduces the risk of bringing in an AIS or a TAAD. Some biosecurity measures apply to all consignments, while others will be selected based on the risk posed by an individual consignment. Together, they act to reduce the risk posed by a "commodity" to a level that is acceptable to Palau. He then posed the question "What level of risk is acceptable to Palau?", while noting that this is a political decision that should be made at the highest level of government. Dr Arthur then concluded by outlining some of the preborder, border and postborder risk management measures that could be implemented by the Division of Biosecurity.

- ***Supporting regulations for hull biofouling: a risk management based workflow, thresholds/species assessment and required knowledge bases (Dr Glenn Aguilar, FAO Consultant)***

Dr Aguilar began by introducing the importance of aquatic invasive species transported through hull biofouling, with notable invasions resulting in significant damage to marine environments, native species and economic cost throughout the world highlighted. The introduction of aquatic invasive species needs to be addressed with urgency because of the increasing amount of global shipping, the widespread distribution of harmful invasive species providing a source for transfer and the resulting significant damage to a country's marine environment in case of entry, spread and establishment. Biofouling management guidelines issued by the International Maritime Organisation (IMO) and several regulatory measures about to come into effect in New Zealand and California, as well as those underway in several other states were presented. A workflow based on risk management was introduced to assess the risk to Palau at different phases of a seacraft voyage into its territorial waters. Supported by a database on seacraft and invasive species, the workflow will allow Palau`s Division of Biosecurity to categorize seacraft prior to entry into low, medium and high-risk vessels. Based on this categorization, the seacraft will undergo inspection if determined to be at high risk. Inspection based on thresholds of biofouling organisms at different parts of the hull will further determine the final risk classification of the vessel. Only low-risk vessels will be allowed to stay, while high-risk vessels will undergo mitigation appropriate to their condition. Supported by appropriate databases, such a workflow is intended to provide a set of protective layers allowing Palau a practical and implementable approach that can be scaled up proportional to the willingness of the country to protect its pristine marine waters. Finally, a draft regulation that embodies this workflow was presented to the participants.

- ***Biosecurity database development (Rina-Joy Ambatang, FAO Consultant)***

A database was designed and developed to support the operations of the Division of Biosecurity in implementing measures designed to prevent the entry of aquatic invasive species to Palau. The database consists of seacraft data, biofouling thresholds and invasive species information and tools that result in the risk rating for a vessel. The risk rating automatically calculated by the database provides officers with decision support that may result in mitigation of biofouling on an incoming seacraft. The database was designed to suit conditions in Palau with minimal maintenance requirements by the users. The database also provides forms for customers, as well as report formats that the biosecurity personnel may use in the performance of their functions.

- ***The Biosecurity Act of 2014: protecting Palau from exotic pests and diseases (Director Fernando Sengebau, Bureau of Agriculture)***

Director Sengebau began by stating that in September 2007 a Palau version of the regionally harmonized Biosecurity Bill was sent to the President of the Republic. The Biosecurity Bill was developed with the support of the Secretariat of the Pacific Community (SPC), as part of a Pacific-wide project to update outdated biosecurity legislation in Pacific Island countries and to harmonize such legislation among these countries and with international standards. The main purpose the resulting legislation is to prevent the entry of animal and plant pests and diseases into The Republic of Palau, to control their establishment and spread in the Republic of Palau, to regulate the movement of animal and plant pests and diseases and of animals and plants and their products, to facilitate international cooperation with respect to animal and plant diseases, and to make ancillary and related provisions. The proposed bill, the *Biosecurity Act of 2014* was finally signed into law on February 26, 2016 by the President.

- ***Proposed draft Biosecurity Regulations for Aquatic Animals and their Products (Dr Richard Arthur, FAO Consultant)***

Dr Arthur began his presentation by noting some key aspects of the draft Aquatic Biosecurity Regulations. He stated that the regulations will cover "aquatic organisms" as including fish, amphibians, aquatic reptiles, crustaceans, molluscs, other aquatic invertebrates and aquatic plants. The primary purpose of the regulations is to protect the health and welfare of Palau's citizens, national economic wealth, aquaculture and the potential for its further development, capture fisheries, and Palau's pristine aquatic environment and its biodiversity. Palau's biosecurity programme should be based on relevant international standards and best practices, e.g. those of the World Organisation for Animal Health (OIE), the International Plant Protection Commission (IPPC), the World Health Organization (WHO), the Food and Agriculture Organization of the United Nations (FAO) and the Convention on Biological Diversity (CBD). He stated that international movements of live aquatic animals often involve significant risks due to aquatic invasive species (AIS) and transboundary aquatic animal diseases (TAADs). These risks can often be managed to an "acceptable" level, but they can't be entirely eliminated. The amount of risk management needed is directly related to the risk that a consignment poses to Palau. For TAADs, risk management measures cannot be determined before hand. Different consignments of the same aquatic organism can pose greatly different risks. End use in Palau is a very important factor in determining risk. Thus, separate import pathways are needed for: (i) ornamentals, (ii) introductions and transfers, and (iii) live

food aquatic organisms. For successful risk analysis, we need to know how much risk is acceptable to Palau. Determining the appropriate level of protection (ALOP) is a political decision and ideally, the President should make a formal statement. What should he say should be the national ALOP: "very high", "high", "medium", "low" or "very low? Setting the national ALOP has many implications. For example, a very high ALOP means a very high level of protection and a very low acceptable level or risk (ALOR), which will require stringent biosecurity measures and will involve high restrictions on trade. In contrast, a very low ALOP means a very high ALOR, much more relaxed biosecurity, few restrictions on trade and a very low level of protection. Dr Arthur then stated that the risk posed by a "commodity" is a function of many factors, among these being the species being moved, its health status, the end use and the number of animals involved. Sometimes the risks posed by a commodity can't be made acceptable, and the request to import must be refused. Meeting all biosecurity requirements is the importer's responsibility. These can be considerable, particularly for first time requests to introduce a species, which can include the costs of a ecological risk assessment (ERA) and an import risk analysis (IRA), and the costs of any required risk management measures, such as quarantine, diagnostics tests and health certification. An importer can be held legally responsible for the damages caused by his illegal or careless importation of an aquatic organism that turns out to be invasive or is the source of a serious disease. The National Invasive Species Committee (NISC) will play a key role in implementing the regulations. For ornamentals, the NISC will make decisions about invasiveness and the placing of names on the List of Approved Species (the red list) or the List of Prohibited Species (the green list). For introductions and transfers, it will plan and supervise ERAs and IRAs. The NISC will also provide advice and recommended actions to the Chief, Director and Minister. Turning to the contents of the regulations, Dr Arthur noted that they will support implementation of the *Biosecurity Act of 2014* and are based on the use of risk analysis to decide if an importation should be approved. The regulations will involve the use of standard operating procedures (SOPs), which will give consistency and transparency. As drafted, the regulations will deal with imports and exports of: (i) live aquatic organisms, (ii) live aquatic organism products (eggs, gametes, etc.) and (iii) biological products (sera, vaccines, etc.). The regulations do not deal with non-viable products – however, as some of these products can be infected with viable viruses and bacteria, they can regulate such products as the need arises. Dr Arthur then described the importation pathway as:

1. Importer registers with Division of Biosecurity and obtains a Licence to Import
2. Importer submits an application to import containing information on the proposed consignment (at least 6 weeks prior)
3. Chief screens application and determines if the aquatic species for import is:
    i. On the List of Approved Species
        a. An ornamental aquatic organism, or
        b. An introduction or transfer
    ii. On the List of Prohibited Species (reject request)
    iii. Is an unlisted species

    For Ornamental Aquatic Organisms:
    If an unlisted ornamental species, the request is passed to the NISC, who decides, based on consideration of potential invasiveness that the species should be:
    1. Placed on the List of Approved Species (if yes, importation follows procedures for approved Ornamentals)
    2. Placed on the List of Prohibited Species (request is rejected)
    3. The subject of an ecological risk assessment (exceptional cases) (decision on listing will be based on expert opinion)

If an Introduction of Transfer

(a) If listed on the List of Approved Species (which indicates that an ERA has already been completed): The NISC will commission and IRA to determine if the pathogen/disease risks are acceptable.

i. If the level of risk is acceptable, the importation is approved subject to any risk management measures outlined by the Importer.

ii. If the IRA shows that the level of risk is unacceptable, the risk analyst will examine possible risk management measures that will reduce the risk to an acceptable level.

If additional risk management measures can be found:

i. And the Importer agrees to them, the importation can proceed

ii. If the Importer does not agree,

a. He/she can propose alternate risk management measures

b. Will not be granted permission to import the consignment

(b) If the species is not listed on the List of Approved Species, the NICS will commission an ERA:

1. If the risk of invasiveness is acceptable, the species will be placed on the List of Approved Species and the process moves on to IRA, as previously presented
2. If the risk is unacceptable, the species is placed on the List of Prohibited Species (and the request to import is refused).

For dealing with risks posed by live food aquatic organisms, Dr Arthur reported that these importations often involve species that are likely to be infected with TAADs. These risks can be minimized if importers/restaurants will follow some simple procedures (SOPs) such as:

- Proper disposal of all uncooked wastes (dead animals, heads, shells, etc.)
- No disposal of shipping or aquarium/tank waters or ice into storm drainage
- Incineration or disinfection of all packing materials in contact with alive animals (plastic bags, saw dust, Styrofoam containers, boxes, etc.)

Procedures for the importation of live aquatic organisms and their products will remain essentially the same as under the Quarantine Regulations of 1999.

The draft Aquatic Biosecurity Regulations are supported by a 16 Annexures (Annexures A to P), the most important of which are:

- Standards of construction and SOPs for:
  - Quarantine facilities for Ornamentals (Annexure H)
  - Quarantine facilities for Introductions & Transfers (Annexure I)
- A Draft National Aquatic Pathogen List (Annexure O)

Dr Arthur then remarked that there are a number of past and current import practices that are highly risky and which are likely to introduce TAADS or AIS. These include importation of (i) exotic penaeid shrimp for aquaculture; (ii) mangrove crabs for fattening/grow out; (iii) giant freshwater prawn for aquaculture; (iv) milkfish fry for grow out for tuna bait and human consumption and in the holding tanks of foreign fishing vessels (for bait); and (v) grouper fry for grow out. Such risky and unsafe practices need to stop now. These species need to be evaluated for ecological and disease risks so that, if possible, safer pathways of importation can be found. In closing, Dr Arthur asked "How can Palau develop essential expertise and capacity within the Division of Biosecurity to implement the Biosecurity Act 2014?" Good

biosecurity requires expertise to conduct risk analyses, identify/verify the species contained in consignments, recognize the gross signs of disease in aquatic animals, conduct basic disease diagnostics at aquaculture facilities and implement biosecurity SOPs. Good biosecurity requires an excellent knowledge of the international disease situation, including good international contacts; good policy, including a National Aquatic Animal Health Strategy; and adequate manpower, facilities and operating budget. It will involve strong commitment from the private sector (aquaculturists, importers and exporters, non-governmental organizations), academia (Palau Community College), the National Invasive Species Committee, and the government (Bureau of Agriculture, the Division of Biosecurity (as the lead agency), the Bureau of Customs and Border Protection, and the Bureau of Marine Resources).

3.5 Working group discussions

The participants were then randomly divided into three Working Groups and asked to select a rapporteur and a presenter. The composition of the Working Groups was as follows:

- Working Group 1: Glenn D. Aguilar, J.B. Nagata, Ehrlick Termeteet
- Working Group 2: Beverley Subris, Isechal Remengesau, Ray Skilang, Thomas Taro
- Working Group 3: Tom Bowling, Theo Isamu, Akemi Kaleb, Ann Kitalong, Bola Majekobaje

The Working Groups were asked to consider four questions:

1. What should the appropriate level of protection (ALOP) for the Republic of Palau?
2. What recommendations do you have for the draft biosecurity regulations for live aquatic organisms and their products?
3. What recommendations do you have for implementation of the Aquatic Biosecurity Act?
4. What are the highest priorities/urgent actions needed for sustainable aquaculture?

As the results of the Working Group deliberations were similar for all three groups, they are summarized together as follows:

1. All three Working Groups independently recommended that the ALOP for Palau should be "very high";

2. For implementation of the Aquatic Biosecurity Act, the Working Groups recommended that:
    - Unless a species is already on the red list, all actions should require the approval of the NISC;
    - Feedback from stakeholders is needed;
    - Appointment of the Chief, Division of Biosecurity is needed;
    - Hiring of additional biosecurity personnel is needed;
    - To implement measures to deal with hull fouling, spot citations are needed, along with a boat, scuba gear, an incinerator, fumigation equipment and safety equipment.

3. With regard to implementation of the Biosecurity Act, the Working Groups recommended that:
    - Government needs to give higher priority to biosecurity;

- Further support is needed in terms of expertise; a technical expert should be hired to analyze risks;
- Networked systems are needed that allow the rapid transfer of data from collection stations to the central database;
- A guide to notable and harmful invasive aquatic species should be prepared;
- Educational community outreach programmes are needed;
- Appropriate funding is needed; 5 percent of green fees, and all fines and fees should go towards improving biosecurity;
- Importation of high-risk species should stop;
- A position paper to government on tilapia should be drafted.

4. With regard to achieving sustainable aquaculture, the Working Groups recommended that:

- Cage aquaculture should be developed;
- Training in the financial aspects of aquaculture should be provided;
- Appropriate hatchery technology should be developed;
- Different marine species should be trialed;
- Technical knowledge to monitor follow up, financial aspects and resources should be provided;
- Market outlets need to be explored.

3.6 Conclusions and way forward

Dr Melba Reantaso (FAO) highlighted the accomplishments of Project TCP/PLW/3601/C1 "Strengthening Biosecurity Capacity of Palau" as being:

- the National Consultation, held 28 March 2017, with some 20 participants representing government, the private sector and academe;
- the Biosecurity Database Development Training Course:, held 24/27 March 2017;
- the draft Aquatic Biosecurity Regulations (plus Annexures), including:
  - the regulations for live aquatic organisms and their products and
  - the draft Biofouling Management Regulations; and
- the Framework for a Biosecurity Database.

3.7 Closing of the National Consultation

The National Consultation was closed by Director Fernando Sengebau, who thanked the participants for their attendance and their enthusiastic support to developing the draft Aquatic Biosecurity Regulations.

4. Draft Aquatic Biosecurity Regulations

4.1 Introduction

The Draft Biosecuriy Regulations for Aquatic Organisms (the Aquatic Biosecurity Regulations) (see Annex 3 (A,B)) have been prepared by Dr J. Richard Arthur (FAO International Consultant on Aquatic Animal Health) to provide the Division of Biosecurity with

new procedures aimed at protecting Palau's aquaculture sector, natural marine and freshwater ecosystems, tourism sector and the socio-economic well-being of those who depend on these systems and activities from the risks posed by aquatic invasive species (AIS) and the serious transboundary aquatic animal diseases (TAADs) that may be carried by exotic aquatic organisms that may be introduced for aquaculture development, the aquarium trade (ornamental aquatic organisms) and other activities proposing the international movement of live aquatic organisms.

Under the draft Aquatic Biosecurity Regulations, it is proposed that "aquatic organism" include fish, crustaceans, molluscs and amphibians (groups covered by the World Organisation for Animal Health's *Aquatic Animal Health Code* and *Manual of Diagnostic Tests for Aquatic Animal Diseases*) as well as other aquatic invertebrates (echinoderms, corals, etc.) aquatic reptiles and aquatic plants, including their products (all of these aquatic organisms, with the exception of aquatic plants, were included, inter alia, under the definition of "fish" used in the 1999 Plant and Animal Quarantines Regulations).

The preparation of this document was discussed at the National Consultation held in Koror on 28 March. A more formal version will be prepared by the Bureau of Agriculture for further review. This will form the basis for the drafting by legal staff of the Aquatic Biosecurity Regulations in a format suitable for presentation to the government for official adoption and implementation, either as part of a broader Biosecurity Regulations covering plants, terrestrial animals and aquatic animals, or separately, so as to initiate implementation of biosecurity measures for aquatic organisms as soon as possible.

4.2 Summary of approach

The approach taken in drafting the regulations is based on the premise that Palau's procedures for dealing with requests to import or export live aquatic animals and their products should fully meet the relevant international standards and guidelines (most notably, those of the World Organisation for Animal Health (OIE) and of the Food and Agriculture Organization of the United Nations (FAO)). It is based on the use of risk analysis, an internationally accepted method for determining if the level of risk posed by a request to import a live aquatic organism or its product is acceptable to Palau. Following an initial screening to determine if the aquatic organism is already listed on the List of Prohibited Species (the "red list") (in which case the request will be immediately rejected), two distinct importation pathways can be followed, one for the importation of ornamental aquatic organisms and another for introductions and transfers (i.e. the importation of species destined for use in aquaculture development or other activities likely to have a high probability of release or escape of organisms into the natural environment).

- Requests for the importation of ornamental aquatic organisms will be referred to the National Invasive Species Committee (NISC), which will provide an initial assessment to determine if the species under consideration should be placed on (i) the List of Approved Species (the "green list") or (ii) on the List of Prohibited Species. Upon arrival in Palau, consignments of approved species of ornamental aquatic organisms will go directly into a short-term Approved Quarantine Facility for Ornamental Aquatic Organisms.
- First-time requests involving introductions and transfers may generate two risk analyses. Initially an ecological risk assessment (ERA) (which will include assessment of the species potential for invasiveness) will be commissioned. If the results of the ERA are favourable, the request to import will be subjected to an

import risk analysis (IRA) to determine (i) if the specific consignment could be carrying serious pathogens or diseases that pose an unacceptable risk to Palau and (ii) if so, are there risk management methods that can be applied to reduce the risk to an acceptable level? If the IRA indicates an acceptable level of risk, the importation can be approved without additional risk management measures. However, if the risk is unacceptable, the risk analysis will examine possible (additional) risk management measures that would reduce the risk to an acceptable level. All costs associated with the conducting of an ERA, an IRA and any risk management measures required (i.e. quarantine, health certification, diagnostics testing, use of specific pathogen free (SPF) stocks, etc.) will be the responsibility of the importer.

Protocols have been developed for two types of quarantine, based on the risk associated with these different activities:

- Approved Quarantine Facilities for Ornamental Aquatic Organisms (see Annexure H)
- Approved Quarantine Facilities for Introductions and Transfers of Aquatic Organisms (see Annexure I)

The cost of constructing or leasing an approved quarantine facility and its operation will be borne by the importer.

The importation of live aquatic organisms (particularly live crustaceans: penaeid shrimp, mangrove crabs, etc.) for use by restaurants ("live food aquatic organisms") poses the potential risk of introducing aquatic invasive species and transboundary aquatic animals diseases. A set of simple standard operating procedures (SOPs) have been included that will allow this practice to continue while reducing the chance that these live aquatic organisms may introduce a serious disease to Palau (see Annexure P).

Working protocols, standards and other documents that will require regular updating or revisions (e.g. standard operating procedures, standards of construction, national pathogen list, application forms and approval certificates) have been referenced in the Aquatic Biosecurity Regulations as Annexures A to P, but are not part of the regulations proper. This will allow for rapid amendment or changes to be made by the Division of Biosecurity under the signature of the Director, BOA.

The procedures for export of live aquatic organisms and their produces will remain basically unchanged from those currently in place.
Inter-island movement of live aquatic organisms for aquaculture development will require the written approval of the Director, who may seek the advice of the National Invasive Species Committee.

4.3 Further actions required

In preparing the final version of the Aquatic Biosecurity Regulations, Palau's legal staff will need to harmonize terminology between the regulations and the *Biosecurity Act of 2014*, to the extent possible. The terminology used in the draft regulations follows that used in the Act, as far as possible; however, the generally accepted terminology for regulation of aquatic animal diseases is that of the World Organisation for Animal Health's *Aquatic Animal Health Code*, which differs somewhat from that used in the Act.

Once a formal version of the Aquatic Biosecurity Regulations has been prepared by legal officers, the BOA should circulate this to all potential stakeholders for comment.

5. Draft Biofouling Management Regulations

5.1 Aquatic invasive species

Under the Convention for Biological Diversity (CDB), biofouling is recognized as a major issue for ocean environments and the United Nations agency the International Maritime Organization (IMO) was mandated to address this concern. In recognition of the threat of invasive species spread through biofouling, IMO issued in 2011 the "Guidelines for the Control and Management of Ship's Biofouling to Minimize the Transfer of Invasive Aquatic Species in Resolution MEPC.207(62) (IMO, 2011)". Underpinned by studies showing biofouling of marine vessels to be a major pathway for the movement of invasive species, the resolution provides guidelines for states, ship owners, operators and other entities to establish a rational and consistent approach to biofouling management.

Invasive alien species in general have caused significant damage to ecologically sensitive areas all over the world, contributing even to the extinction of endemic species. In many cases, IAS become pests in the area that they are invade, with some serving as hosts to a wide variety of other detrimental organisms and diseases. The effects of IAS on the environment, culture, socio-economic well-being and even human health have been recognized and are the major reason for states and international organizations to establish guidelines, policies and various instruments addressing the transfer of invasive species through biofouling. Modern transport systems, increased passengers and trade, as well as globalization in general have contributed to the rapid movement of species from their native range to other areas (Molnar *et al.,* 2006).

Commercial vessels are the major pathway for the transfer of marine invasive species through ballast water discharges and the release of vessel biofouling. Ballast water and vessel biofouling have been shown to contribute 79.5 percent of the established invasive species in North America (Fofonoff *et al.,* 2003), and 81 percent in California (Ruiz *et al.,* 2011). In the terms of breakdown of invasive species, the majority is due to biofouling, with estimates as high as 78 vs. 20 percent for ballast water (Australia), 69 vs. 3 percent (New Zealand), 36 vs. 20 percent (United States of America) and 57 vs. 38 percent (North Sea; Firth, 2017). Increased shipping traffic is positively correlated to biofouling invasion success, further supporting the argument that regulations urgently need to be put in place (Lacoursière-Roussel *et al.,* 2016).

5.2 Status of implementation of biofouling management worldwide

Based on the IMO guidelines, some states are in the process of implementing rules and regulations specifically addressing hull biofouling of marine vessels entering their territorial waters. New Zealand regulations (referred to as Standards) specifically addressing biofouling were announced in 2014 and will come into effect in May of 2018, requiring all vessels arriving in the country to have a clean hull (Ministry for Primary Industries, 2014). The State of California regulations addressing biofouling are undergoing consultation, with the intended effectivity date of October 2017 (State Lands Commission, 2016). Australia has an ongoing

Regulation Impact Statement consultation scheduled in 2017 (Department of Agriculture, Fisheries and Forestry, 2011) on proposed biofouling management regulations. The New Zealand Standard is based on level of biofouling with acceptability thresholds set for different areas of the hull. The proposed Australian regulation follows a risk assessment process that includes a species-based approach or the finding of a species of concern (SOC) to be a central element in the mitigation of biofouling.

5.3 Palau background on biosecurity and invasive species

Palau is an isolated archipelago considered to be a hotspot of biodiversity (Yukihira *et al*., 2007) with a significant tourism industry that can be seriously affected by pest incursions, diseases, competition, predation and other threats posed by invasive species (Campbell, Hewitt and Miles, 2016). The Government of Palau is proven to be proactive, having passed the *Biosecurity Act of 2014 t*o provide the regulatory framework enabling the state to protect itself from invasive species. In line with the provisions of the *Biosecurity Act of 2014* to provide protection against the entry, establishment and spread of animal and plant pests and diseases and the definition of pests in the Act as: "A. Cause diseases or B. is detrimental to or capable of harming or adversely affecting animals or animal products, plants or products, human beings or the environment" (Biosecurity Act, 2014 § sec 2(47)) and consistent with the definition and scientific studies of invasive species, a biofouling regulation specifically addressing the transfer of pests and diseases through hulls of marine vessels entering the territorial waters of the country is being developed. In support of this regulation, it is necessary to establish adequate, accurate and relevant support information delivered through databases together with an effective workflow for implementing elements of the regulation.

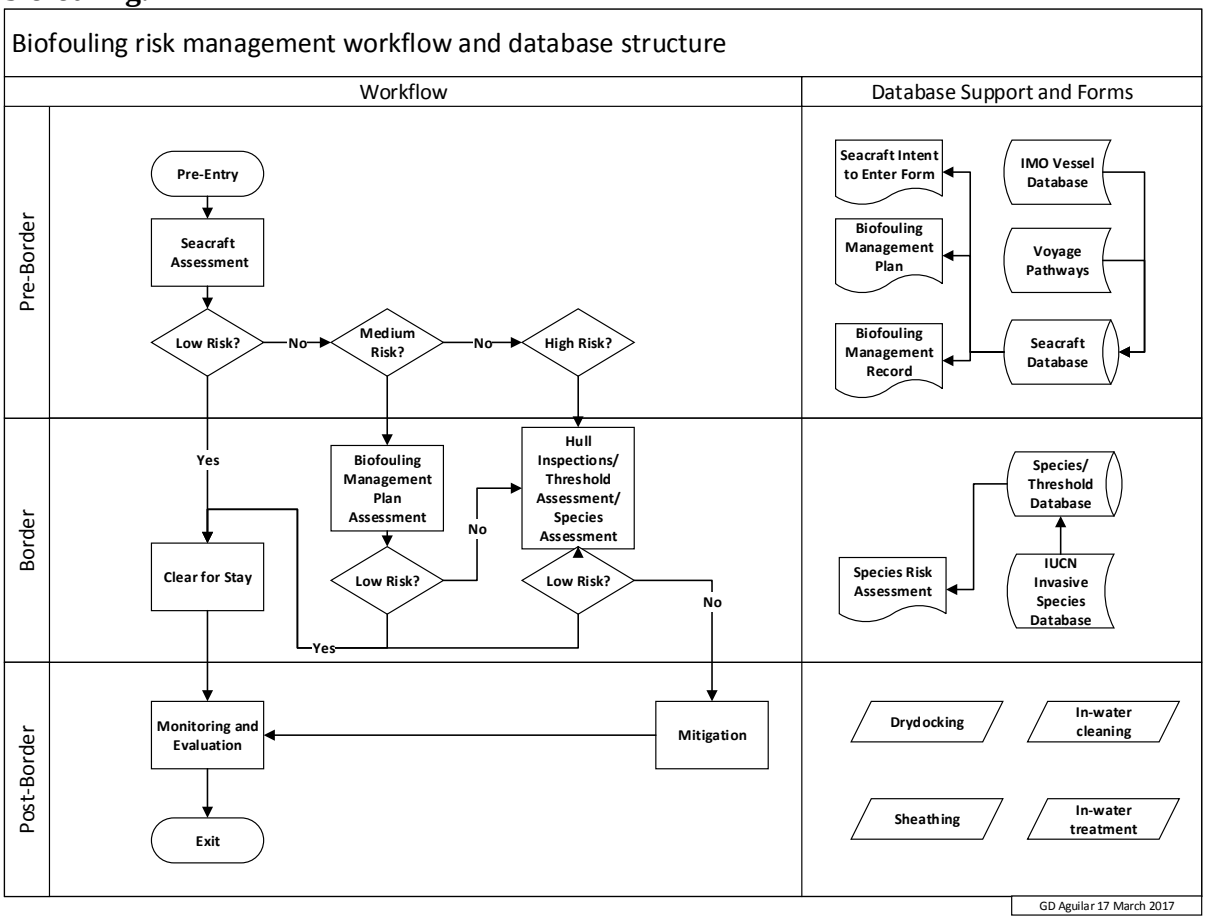
Using risk management as a framework for addressing invasive species, the proposed regulation mandates a set of measures designed to minimize the entry, establishment and spread of marine invasive species transported by seacraft into the territory of the Republic of Palau. Based on ISO31000:2009 (Risk management — Principles and guidelines) as a guiding document, the proposed regulation incorporates the IMO Guidelines MEPC.207(62), including updates and revisions with reference to reported best practice while considering practical elements of enforcement and management.

Given the large number of species that can be invasive and the difficulty of determining which species may be harmful, risk assessment protocols have also been developed by European countries that identify low, medium and high-risk species for various stages of the invasion process (entry, establishment, spread and impact) (Verbrugge *et al.,* 2012). Also, based on the experience, science and commissioned research behind the New Zealand (Ministry of Primary Industries, 2014) and Australian (Department of Agriculture, Fisheries and Forestry, 2011) regulatory approaches and elements of the State of California policy (State Lands Commission, 2016) that are under consultation, a workflow for addressing biofouling is proposed (Figure 1) to provide a basic framework for biofouling. Figure 1 also includes the databases supporting each phase stage or the framework. While the Australian proposal relies on reporting of a Species of Concern (SOC) as a basis for risk classification, the New Zealand and California regulations are based on biofouling thresholds requiring essentially "clean hulls" for the seacraft. The threshold approach is deemed more implementation friendly and practical, given the significant training requirements, investment in species surveillance and research, as well as the inspection mandated to discover invasive species. A threshold-based invasive species

risk assessment is also simpler to comply for operators, seacraft crew and hull-cleaning industries given the multispecies nature of biofouling.

The urgency of imposing regulations is another factor to consider, given the number of potentially invasive species in the marine environment, the increase in marine transportation traffic and the considerable resources required to conduct scientific studies. This concern was articulated in a related article on aquatic invasive species) as: "we lack the luxury of waiting for a knowledge base to be acquired before the window of opportunity closes for feasible management" (Ojaveer *et al.,* 2015).

Figure 1. Overall workflow and databases supporting the minimization of risk to biofouling.



5.4 The biofouling assessment workflow

The draft regulation is based on a workflow consisting of three phases inherent in the implementation of border-based biosecurity. It represents a series of layers of protection addressing the different phases of a seacraft's voyage into territorial waters and clearly delineates a feasible risk-based set of measures necessary for decision making about the seacraft status. While marine waters present a much more difficult border to protect, the framework provides a logical division of the tasks and is supported by databases that allow the Division of Biosecurity to utilize a series of barriers protecting against the spread of invasive species. These phases include:

- Pre-border phase – includes all pretravel processes and information requirements required for assessing the risk that the seacraft poses in terms of biofouling.

- Border phase – upon reaching the territorial waters, these are processes and information necessary to implement the assessment of seacraft biofouling conditions for decision making.
- Post-border phase – processes when the vessel has already been processed through entry protocols and is within territorial waters, including monitoring, evaluation and mitigation if deemed a high risk seacraft.

Risk assessment processes required:

- Seacraft hull and voyage assessment – includes documentation well in advance of arrival and determination of risks associated with the nature of the hull and niche areas where biofouling is greater, speed of travel, anti-fouling systems presence and other factors associated with the structural and operational characteristics of the craft.
- Hull biofouling and species assessment – includes inspections and determining if the seacraft has met specified species threshold or has presence of aquatic invasive species that results in risk categorization and supports subsequent decisions. Taxonomic groups identified to be of high risk and used to determine the presence thresholds in hulls include amphipods and isopods, barnacles, bivalves, bristleworms, bryozoans, crabs, echinoderms, flatworms, gastropods, hydroids, macroalgae and sea squirts for the New Zealand regulation, and thresholds of these organisms are used to categorize the risk ratings.
- Biofouling mitigation – measures required for vessels with established high risk and may include in-water cleaning or treatment, shrouding or drydocking.

Details of the draft of Biofouling Management Regulations are found in Annex 11.

6. Summary of recommendations arising from the Project

6.1 Recommendations of the National Consultation

The following recommendations were made by the participants of the National Consultation:

- The national appropriate level of protection (ALOP) for Palau should be "very high".

- For implementation of the Aquatic Biosecurity Act:
  - unless a species is already on the red list, all actions should require the approval of the NISC;
  - feedback from stakeholders is needed;
  - appointment of the Chief, Division of Biosecurity is needed;
  - hiring of additional biosecurity personnel is needed; and
  - to implement measures to deal with hull fouling, spot citations are needed, along with a boat, scuba gear, an incinerator, fumigation equipment and safety equipment.

- For implementation of the Aquatic Biosecurity Act, the government needs to give higher priority to biosecurity:
  - further support is needed in terms of expertise; a technical expert should be hired to analyze risks;
  - networked systems are needed that allow the rapid transfer of data from collection stations to the central database;
  - a guide to notable and harmful invasive aquatic species should be prepared;

  - educational community outreach programmes are needed;
  - appropriate funding is needed; 5 percent of green fees, and all fines and fees should go towards improving biosecurity;
  - importation of high-risk species should stop; and
  - a position paper to government on tilapia should be drafted.

- With regard to achieving sustainable aquaculture:
  - cage aquaculture should be developed;
  - training in the financial aspects of aquaculture should be provided;
  - appropriate hatchery technology should be developed;
  - different marine species should be trialed;
  - technical knowledge to monitor follow up, financial aspects and resources should be provided; and
  - market outlets need to be explored.

6.2 Recommendations of the National Training Course on Database Management

The following recommendations were made by the participants at the National Training Course on Database Management:

- In order to support the efficient and effective provision of relevant information, an information system must be put in place. This should consist of a networked system that will allow biosecurity staff to access, enter and update databases from the ports of entry, thereby providing efficient implementation of protocols and regulations on hull biofouling and the entry of information on harmful aquatic organisms or diseases.

- Capability building is essential to any information system to be implemented and must include training, additional staff and other required systems.

- A guide or further information and training on notable and harmful invasive species, pests and diseases is also essential for effectively carrying out the roles for ensuring effective biosecurity for Palau.

6.3 Recommendations of the international consultants

6.3.1 Recommendations of the international consultant on biofouling and the international database consultant

- The capability of the Division of Biosecurity should be enhanced by hiring more personnel with appropriate background and training.

- Information materials about biosecurity in general and the need to prevent biofouling should be developed for the general public, agents of ships, yacht owners, ship/boat owners, fishing boat masters and other seacraft operators.

- The database developed for biosecurity and seacraft assessment requires a refinement of the built-in risk scoring system at all stages (preborder, border, postborder).

- A support network for the Division of Biosecurity is needed to provide advice and expert knowledge in case of relatively unknown species found on incoming hulls.

- The computers and communications network need to be enhanced by installing more capable computers and connecting all computers at remote locations to the central office to enable efficient access to the supporting databases and Internet.

- For better biosecurity coverage, an aquatic invasive species surveillance and reporting system for use by the public is recommended.

- Facilities to mitigate or treat biofouling on hulls are recommended for hulls determined to be high risk.

6.3.2 Recommendations of the international aquatic animal health consultant and the national consultant on invasive species

Urgent recommendations

- Recent introductions and transfers of live aquatic animals (both legal and illegal) are highly unsafe and have unnecessarily put future aquaculture development and local biodiversity at risk due to the possibility of introducing serious exotic pathogens and the possible genetic and ecological impacts of introduced and transferred species. The Government of Palau should take immediate steps to correct these practices. **All introductions and transfers of live aquatic animals should be prohibited until such time as the draft Aquatic Biosecurity Regulations have been enacted and such species have been considered through the mechanisms contained therein.**

- **In relation to the above, this should specifically apply to imports of:**
    - live penaeid shrimp (Penaeidae) of all species and of all live stages
    - live milkfish (*Chanos chanos*) of all live stages
    - live mangrove crabs (*Scylla* spp.) of any species or stage
    - live groupers (Epinephelinae) of any species or stage
    - live giant river prawn (*Macrobrachium rosenbergii* and other *Macrobrachium* spp.) of any stage
    - live tilapia (*Oreochromis* spp.) of any stage[2]

General recommendations

- The Bureau of Agriculture should seek assistance from international and/or regional agencies (e.g., FAO, Secretariat of the Pacific Community (SPC), Australian Council for International Agricultural Research (ACIAR), United States Agency for International Development (USAID), etc.) to conduct risk analyses for the above commodities. Given the many environmental and social commonalities of SPC member countries, such risk analyses could be conducted on a regional or subregional basis.

[2] The importation of tilapias (*Oreochromis* spp.) into the Republic of Palau is currently prohibited.

- Given the highly inadequate state of knowledge on both the disease status of the stocks of aquatic animals being imported, on aquatic organism populations present in Palau, and on the potential that many exotic species have for invasiveness, a precautionary approach to the introduction and transfer of live aquatic species is essential.

- The National Invasive Species Committee (NISC) should be strengthened to be able to fulfil its mandate as specified in the draft Aquatic Biosecurity Regulations. Its terms of reference (TOR) and membership should be reviewed, and modified as necessary.

- A separate Introductions and Transfers Subcommittee of the NISC comprised of 3-4 members with relevant ecological, pathogen and genetic expertise should be established to review all requests to introduce or import live aquatic animals into the territory of Palau. TORs and standard operating procedures (SOPs) should be developed for the Subcommittee.

- Procedures should be urgently adopted and implemented to prevent the introduction of invasive species via vessels captured fishing illegally in Palau's waters and brought into port for legal action. These should include, at a minimum: (i) immediate inspection of hulls for biofouling, to be followed if necessary by actions to prevent biofouling organisms from infesting Palau's waters; and (ii) immediate destruction of any living organisms inside the vessels, and sterilization of all holding tanks, etc. which could potentially release harmful organisms into Palau's waters. The above should be at the vessel owner's/operator's expense.

- As wild-collected giant clams (Tridacnidae) are reportedly being illegally sold for food in Palau along with legally marketed cultured clams, the Government of Palau should take action to stop this any illegal collection and marketing. A system of registration of sellers of legally produced clams should be implemented.

- Decisions made by the NISC should be made legally binding and should not be altered by political interventions.

- A subsequent FAO project to support development of biosecurity regulations for the terrestrial animal and plant sectors, and their integration into a single Biosecurity Regulations covering all sectors should be sought.

Recommendations for capacity building

The capacity and expertise of the Division of Biosecurity should be strengthened to enable staff to implement the Aquatic Biosecurity Regulations.

- The Chief, Division of Biosecurity will be a key person in determining the success or failure of all biosecurity initiatives. The BOA is strongly urged to staff this position with a person with in-depth technical expertise (i.e. at minimum with a DVM or M.Sc. degree in a relevant field of animal health, and experience in biosecurity and a detailed knowledge of international activities, agreements, and procedures and guidance related to animal health and invasive species). If necessary, a foreign expert

should be engaged to fill this post until such a time as a Palauan national can be trained.

- The Government should consider elevating the Division of Biosecurity to the Bureau level within the Ministry of Natural Resources, Environment and Tourism. This change will reflect and recognize the responsibility of Biosecurity to protect both terrestrial and aquatic/marine resources.

- The BOA should request FAO assistance to organize a training workshop for Division of Biosecurity and BMR staff on level 1 disease diagnostics, including the collection, preparation and shipping of samples to international diagnostics laboratories for further identification.

- The National Invasive Species Coordinator, and key Division of Biosecurity and BMR staff should attend the Training Workshop on the Use of Risk Analysis for Movements of Live Aquatic Organisms, which is being organized by FAO for the Federated States of Micronesia during the coming year. Palau Community College should also be invited and encouraged to send at least one aquaculture staff member to this training workshop.

- Mechanisms need to be found to improve coordination and cooperation among the BOA, BMR, DFWP, the Environmental Quality Protection Board (EQPB) and the Bureau of Customs and Border Protection. It is essential that the competent authority (the Division of Biosecurity) be fully engaged in all of the activities related to safe movement of live aquatic animals that are discussed in this report.

- The Division of Biosecurity should be provided sufficient office space at both the airport and seaport, with telephone and Internet connection. Both offices should be equipped with a computer capable of housing the invasive species database.

Recommendations related to TAADs

- The Government of Palau needs to establish a mechanism whereby permits, licenses, standards of construction and standard operating procedures (SOPs), lists of prohibited and approved species ("Red" and "Green" lists), and other operational documents that must be frequently updated or amended can be easily modified. This includes the documents given in the Annexures to the draft Aquatic Biosecurity Regulations.

- A decision and formal statement by the Government of Palau setting the appropriate level of protection (ALOP) is desirable. A similar level of risk tolerance (acceptable level of risk) should be consistently applied across plant, terrestrial animal and aquatic animal importations. In this regard, the participants at the National Consultation strongly recommended that Palau adopt a "very high" level of protection.

- The Ministry of Natural Resources, Environment and Tourism should establish a working group to develop a National Strategy for Aquatic Animal Health. This working group should be carefully chosen based on the expertise and experience required, and it should have a clearly defined mandate, deliverable products and a

time schedule. Given the present lack of technical expertise in aquatic animal health within the country, initial participation of regional and/or international experts may be required. Once the National Strategy has been developed and accepted by the Government, the working group should develop a master plan for its implementation.

- The Division of Biosecurity should continue to develop the national aquatic pathogen list (NAPL). Recognizing that the national aquatic animal health status of Palau is unknown, a precautionary approach dictates that the government should assume that all serious diseases affecting aquatic species are currently absent from the country.

- In order to support the shrimp culture industry in Palau, which is initiating the production of native shrimp (giant tiger prawn, *Penaeus monodon*), the Division of Biosecurity, with the assistance of the BMR should collect samples of *P. monodon* from the wild and from aquaculture, as well as samples of whiteleg shrimp (*P. vannamei*) that have been illegally imported and cultured, and send these to a recognized international diagnostics laboratory for testing for the important diseases of penaeid shrimp, as listed in the draft NAPL. Should wild populations be uninfected with all or most of these diseases, their high value to the aquaculture industry, both domestically and internationally should be recognized and their health status should be protected.

- As effective national aquatic biosecurity requires a knowledge of the disease status of the country, the BOA, in collaboration with the Bureau of Marine Resources, should begin to take steps to conduct targeted surveys of the pathogens and diseases of key aquaculture species (e.g. giant tiger prawn, mangrove crab, groupers, rabbitfish, milkfish). Such studies could be done in collaboration with international universities and research centers, Palau Community College, Palau Coral Reef Research Foundation, Palau International Coral Reef Center, Palau Conservation Society and other interested parties.

- As international collaboration and awareness are essential to good national biosecurity, the BOA should strengthen ties with the World Organisation for Animal Health (OIE), and should re-examine the possibility of Palau becoming an OIE member country. Division of Biosecurity staff should become familiar with the OIE`s World Animal Health Information System (WAHIS) and have an in-depth familiarity with the OIE`s *Aquatic Animal Health Code*. If OIE membership is not possible, increased communication with the Secretariat of the Pacific Community (SPC) regarding national aquatic animal health concerns should occur, so that SPC, as an OIE Observer, can communicate these concerns to the OIE.

- The ability and determination of Palau to enforce the Biosecurity Act of 2014 and the associated regulations fully and uniformly must be strengthened, as even the best laws and regulations are of little value if they are not effectively enforced.

- With the goal of eliminating the need for importations by setting up collection programmes, the BMR should conduct in-depth assessments of the local availability and abundance of:
    - milkfish fry (*Chanos chanos*) and
    - juvenile mangrove crabs (*Scylla serrata*).

- The BMR should investigate the feasibility of setting up a small-scale hatchery for giant tiger prawn (*Penaeus monodon*) using broodstock collected in local waters, or if necessary imported from an internationally recognized source producing specific pathogen free (SPF) stocks.

- The BMR and the PCC should continue to support and improve techniques for the hatchery production of grouper (*Epinephelus* spp.) fry using locally obtained broodstock, as a way to avoid requests for transfers from foreign hatcheries having poorly known health status.

- The BMR should take appropriate measures to ensure that only aquatic animals that are healthy and free of serious pathogens are distributed by government and any private-sector hatcheries.

- Should imports of live ornamental fishes be permitted, to complement the List of Approved Species, the Division of Biosecurity should also develop a list of approved sources (i.e. countries and suppliers).

- The Ministry of Natural Resources, Environment and Tourism should seek ways to develop better communication and cooperation among all parties concerned with the safe movement of live aquatic animals. This should include an effort to better educate aquaculturists and the general public of the dangers posed by the importation of aquatic organisms of uncertain health status.

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ANNEXES

ANNEX 1: Outcomes of the National Training on Database Management

Annex 1(A)

Training schedule

National Training on Database Management

24 and 27 March 2017

Day	Tme	Topic	In Charge
24 March	09:00-10:30	Introduction to Hull Biofouling Risk Assessment, Workflow and Databases	Dr Glenn Aguilar
	10:30-11:00	Break	
	11:00-12:00	Overview of Database Development	Ms Rina Joy Ambatang
		Database Design using MS Access (Exercise 1)	
		Lunch	
	13:30-14:30	Database Tables and Relationships (Exercise 2)	Ms Rina Joy Ambatang
	14:30-15:30	Palau Biofouling Database (PBdb)	
	15:30-16:00	Break	
	16:00-17:00	PBdb Forms Design (Exercise 3)	Ms Rina Joy Ambatang
27 March	09:00-10:30	Seacraft Risk Assessment (Exercise 4)	Dr Glenn Aguilar & Ms Rina Joy Ambatang
	10:30-11:00	Break	
	11:00-12:00	Hull Biofouling Risk Assessment (Exercise 5)	Dr Glenn Aguilar & Ms Rina Joy Ambatang
	12:00-13:30	Lunch	
	13:30-15:30	Workflow and Database Testing (Working Group)	Dr Glenn Aguilar & Ms Rina Joy Ambatang
	15:30-16:00	Break	
	16:00-17:00	Presentation of Draft Regulation	Dr Glenn Aguilar & Ms Rina Joy Ambatang

Annex 1(B)

List of participants

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Annex 1(C)

Photographs of the Training Workshop

Annex 1(D)

Data tables and database interface

The Palau Hull Biofouling Database structure is described with the data structure in Table 1, reference vessels for all recognized seacraft categories used by the International Maritime Organization (IMO) (Table 2), Elements of the Biofouling Management Plan (Table 3) and Biofouling Management Record (Table 4). The relationship between tables is shown in Figure 1, while the different database components servings as an interface to risk assessment are shown in Figures 2-4. Printable reports for seacraft and biofouling assessment are shown in Figures 5 and 6, while the invasive species database record and report are shown in Figures 7 and 8.

Table 1. Design of Data Tables (*denotes data that will be used for risk assessment)

Table No	Name	Fields	Type
1	Vessel information	Vessel name	String
		Vessel classification (Vessel classification link)*	String
		Master	
		IMO number	String
		Flag	Integer
		Arrival date	String
		Arrival port	Date
		Biofouling Management (BM Link)*	String
		Ballast water protocol	Boolean Boolean
		Date of construction	Date
		Biofouling treatment*	Date
		Biofouling effectivity (no of days)*	Integer

		Days moored in last location (no of days)*	**Integer**
		Last Drydock*	**Date**
2	**Vessel classification**	**Vessel type (Lloyds Register Classification)**	**String**
		Vessel construction	**String**
		Age of vessel*	**Integer**
		Cruising speed*	**Integer**
		Ballast tanks present	**(Yes/No)**
		Ports of call*	**String**
3	**Hull condition risk assessment**	**Biofouling Record (BMR Link)**	**(Yes/No)**
		Length of algae growth (<5mm)*	**(Yes No)**
		Area of algae coverage patch <50mm*	**Boolean Boolean**
		Single attached species other than algae < 5% (barnacles, bryzoans, tubeworms, fanworms)*	
4	**Invasive species risk assessment**	**Common name***	**String**
		Family	**String**
		Scientific name	**String**
		Native range	**String**
		Risk rating (Risk assessment link)	**Integer**
		Presence	**Boolean image**

		Image	
5	**Ballast water management**	**Ballast water management plan***	**Boolean**
		Ballast water log	**Boolean**
		Ballast status on arrival (volume m3)	**Float**
		Maximum ballast capacity	**Float**
		Intent to discharge in territorial waters	**Boolean**
6	**Species risk assessment**	**Species name***	**String**
		Likelihood of establishment	**Float**
		Ecophysiology	**Integer**
		Pathway	**Integer**
		Invasiveness	**Integer**
		Impact of establishment	**Float**
		Economic impact	**Integer**
		Health impact	**Integer**
		Biological diversity impact	**Integer**
		Ecosystem impact	**Integer**
		Risk rating*	**Float**

7	**Biofouling management plan (IMO requirement to be supplied by vessel)**	**Vessel name**	**String**
		IMO number	**Integer**
		Flag	**String**
		Port of registry	**String**
		Gross tonnage	**Float**
		length	**Float**
		Breadth	**Float**
		Depth	**Float**
		Ship type (IMO class)	**String**
		Call sign	**String**
		Anti-fouling system*	**String**
		Date of application*	**Date**
		Manufacturer	**String**
		AFS (Anti-Fouling System) certificate no*	**Integer**
8	**Biofouling management record**	**Seacraft name**	**String**
		Date	**Date**
		Management action	**String**
		Responsible officer	**String**

Table 2. Lloyds register class of ships and marine vessels

Anchor handling fire fighting tug/supply	**Icebreaker**
Anchor handling tug	**Landing craft**
Anchor handling tug/supply	**Lighthouse/tender**
Asphalt tanker	**Liquid natural gas carrier**
Barge	**Liquid Petroleum gascarrier**
Bulk carrier	**Meteorological research**
Bulk carrier with container capacity	**Naval auxiliary tankersupply**
Bulk cement carrier	**Naval vessel support**
Bulk ore carrier	**Oceanographic research**
Bunkering tanker	**Off**
Cable ship	**Offshore safety tanker (unspecified)**
Chemical tanker	**Oil carrier**
Combined bulk and	**Passenger (cruise)**
Combined chemical and oil tanker	**Passenger roll on roll**
Combined LNG and LPG Gas Carrier	**Patrol ship trawler (all types)**
Combined ore and oil carrier	**Pipe layer**
Crane barge	**Pollution control vessel tug/supply**
Crane ship	**Pontoon**
Crude oil tanker	**Product tanker**
Diving support	**Production**

Dredger	**Pusher tug**
Dredger	**Reefer**
Drill platform	**Research cutter**
Drill ship	**Research/supply ship**
Ferry livestock	**Roll on roll off**
Fire fighting tug	**Roll on roll off with container capacity**
Fire fighting tug/supply	**Salvage tug**
Fish carrier	**Seismographic research**
Fish factory	**Semi-sub heavy lift vessel**
Fishery protection	**Suction dredger**
Fishing (general)	**Suction dredger**
Floating gas	**Tank barge**
Floating production	**Tanker**
Floating storage	**Tanker**
Fully cellular containership	**Trailing suction**
General cargo	**Training**
General cargo with container capacity	**Tug**
Grab dredger	**Vehicle carrier**
Hopper	**Whaler**
Hopper barge	**Wood-chip carrier**

Hopper dredger	Yacht

Table 3. Elements that need to be included in a vessel biofouling management plan

Antifouling system supplier	
Date of installation	
Date of effectivity	
Treatment of areas of hull particularly susceptible to biofouling:	**Management actions required (e.g., inspections, cleaning, repairs and maintenance)**
External hull surfaces:	
- Vertical sides	
- Flats	
- Boottop	
- Bow dome	
- Transom	
Hull appendages and fittings:	
- Bilge keels	
- A-brackets	
- Stabilizer fins	
- CP anodes	

Steering and propulsion:	
- Propeller	
- Propeller shaft	
- Stern tube seal	
- Anchor chain	
- Chain locker	
- Rope guard	
- Rudder	
- Bow/stern thrusters	
- Propeller	
- Thruster body	
- Tunnel	
- Tunnel grates	
Seawater intakes and internal seawater cooling systems:	
- Engine cooling system	
- Sea chests (identify number and position)	
- Sea chest grate	
- Internal pipework and heat exchanger	
- Fire-fighting system	
- Ballast uptake system	

- Auxiliary services system	

Table 4. Contents of the biofouling record book

Name of vessel		
Registration number (IMO)		
Date	**Biofouling management action**	**Signature of Officer in Charge**

Figure 1. Relationships of tables in the database prototype

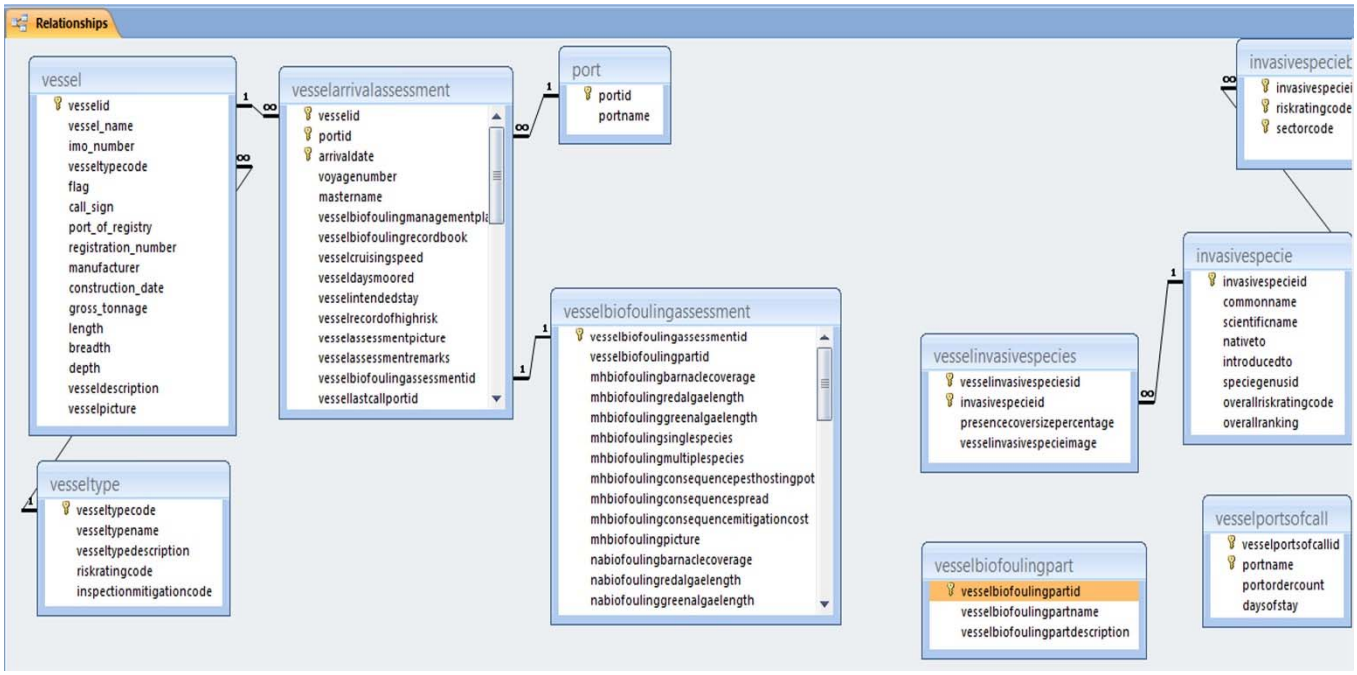


Figure 2. Home page of the database prototype

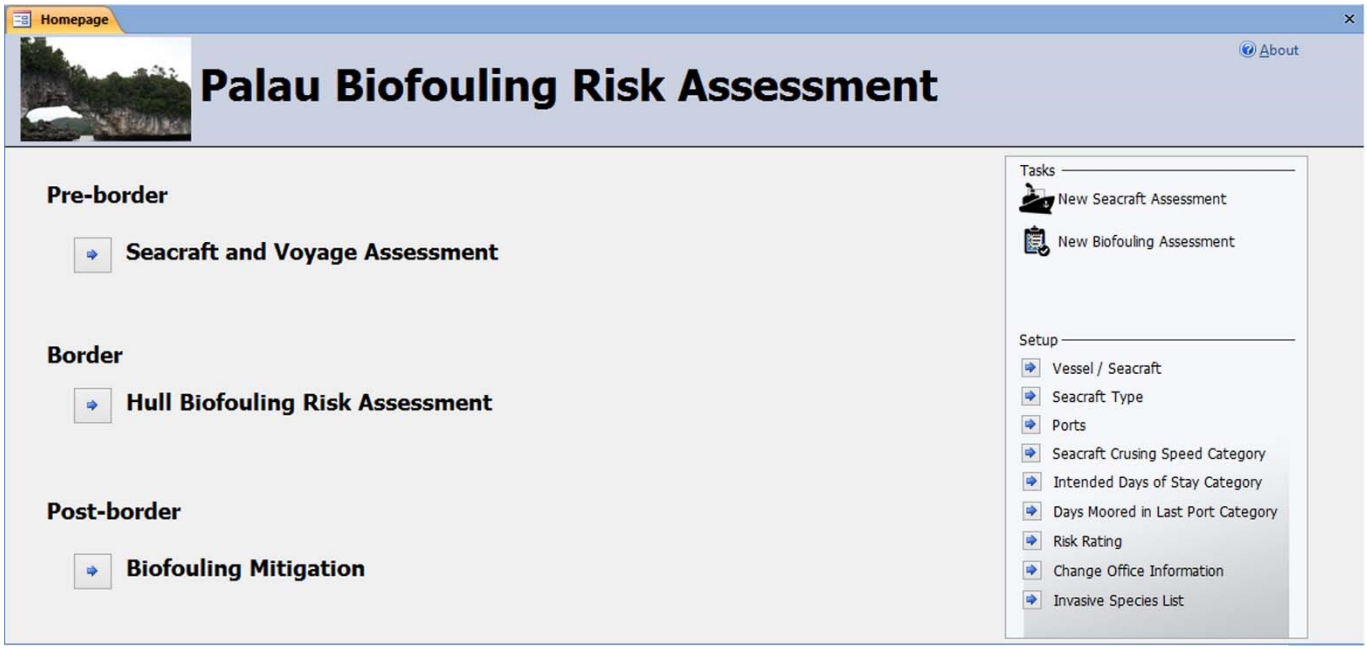


Figure 3. Seacraft risk assessment page

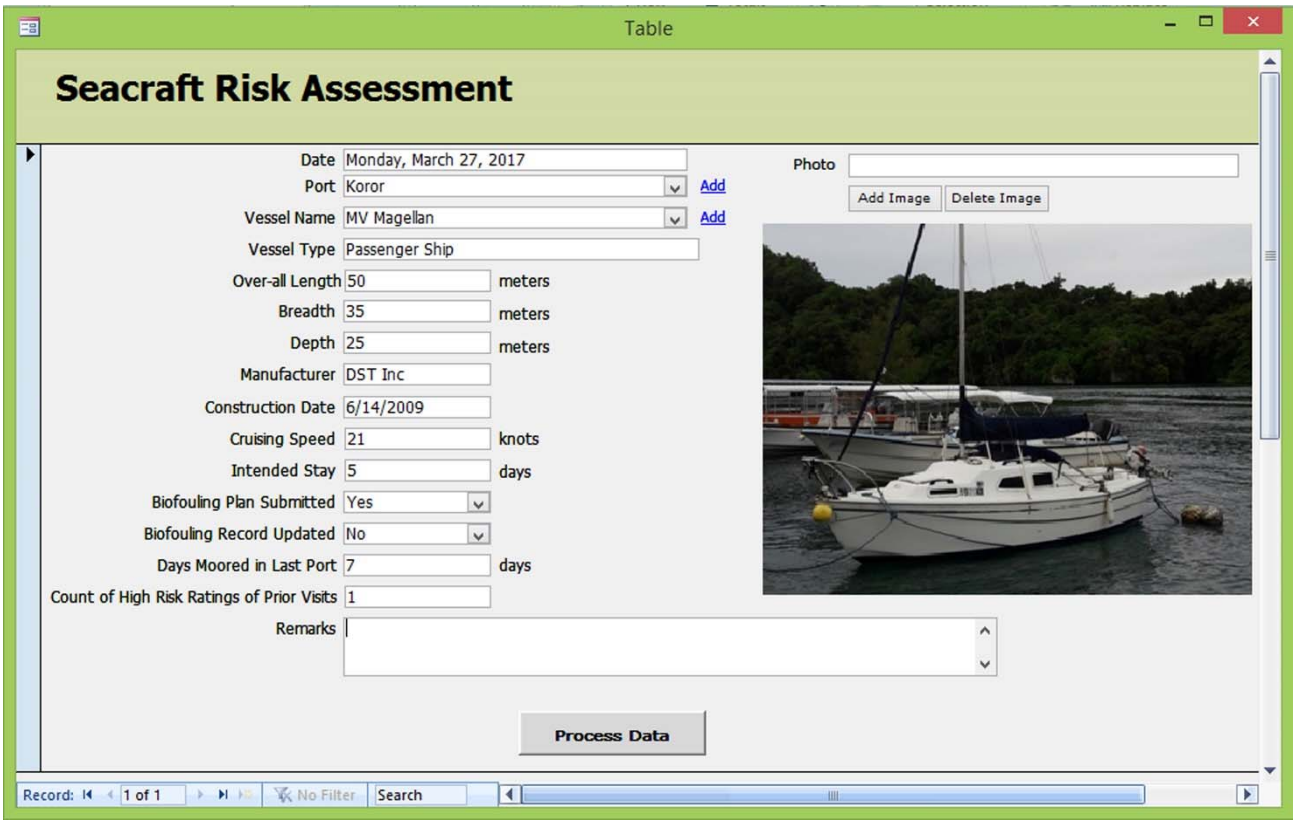


Figure 4. Result of the seacraft risk assessment

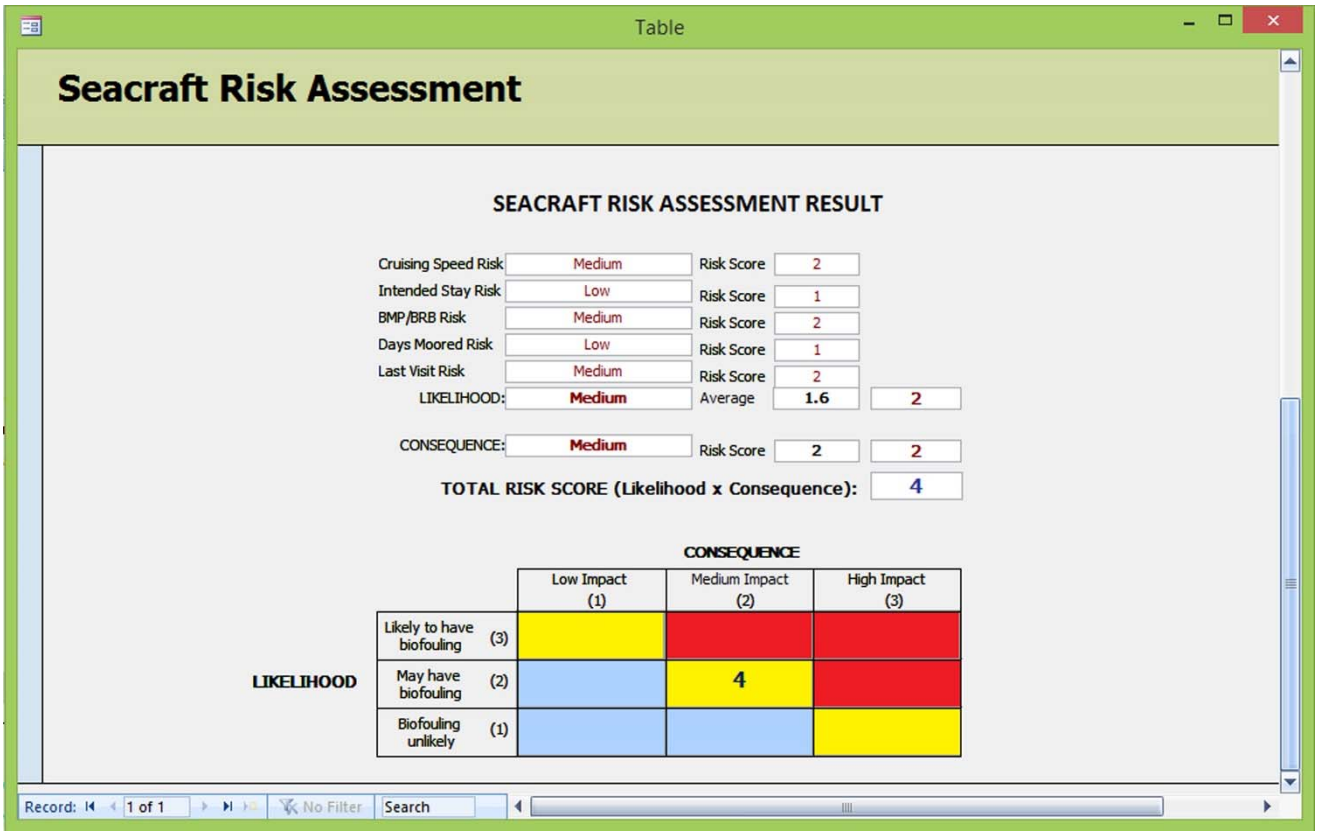


Figure 5. Seacraft biofouling assessment page

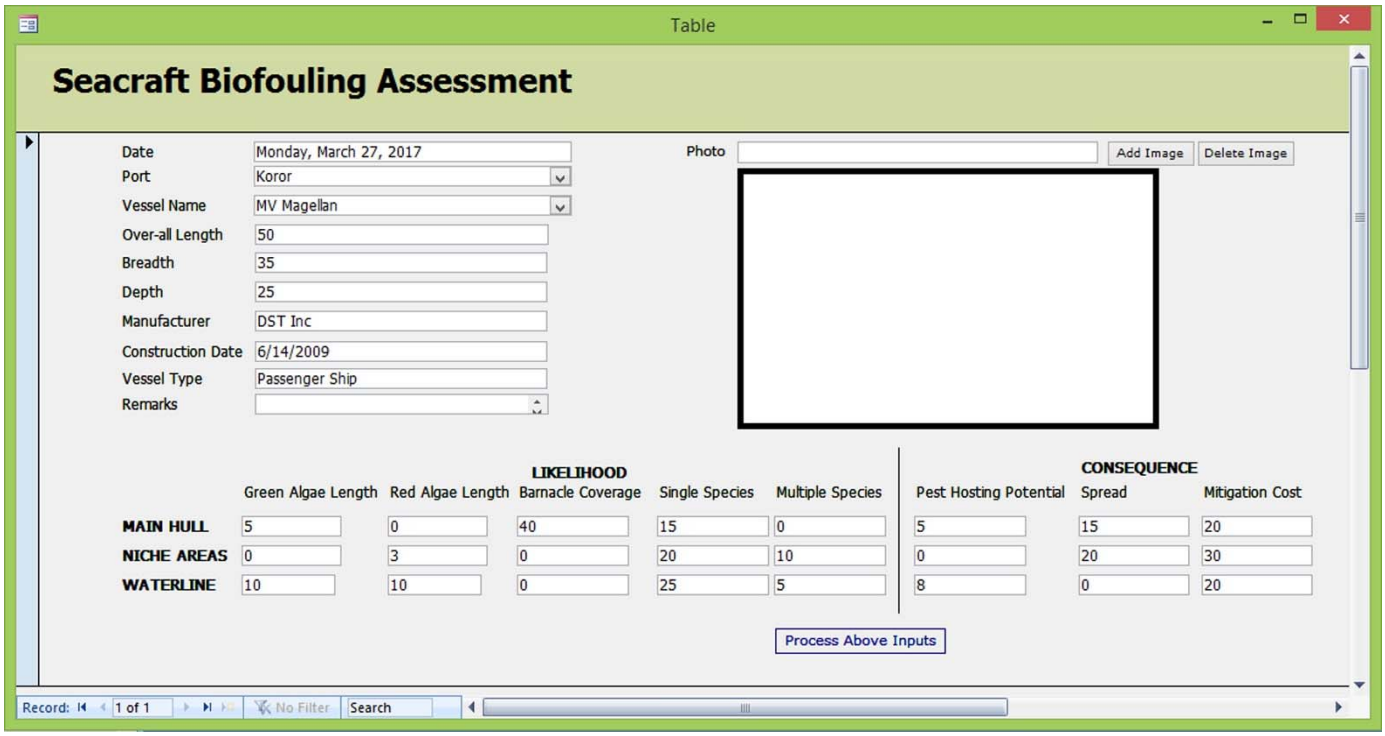


Figure 6. Result of the Seacraft Biofouling Assessment

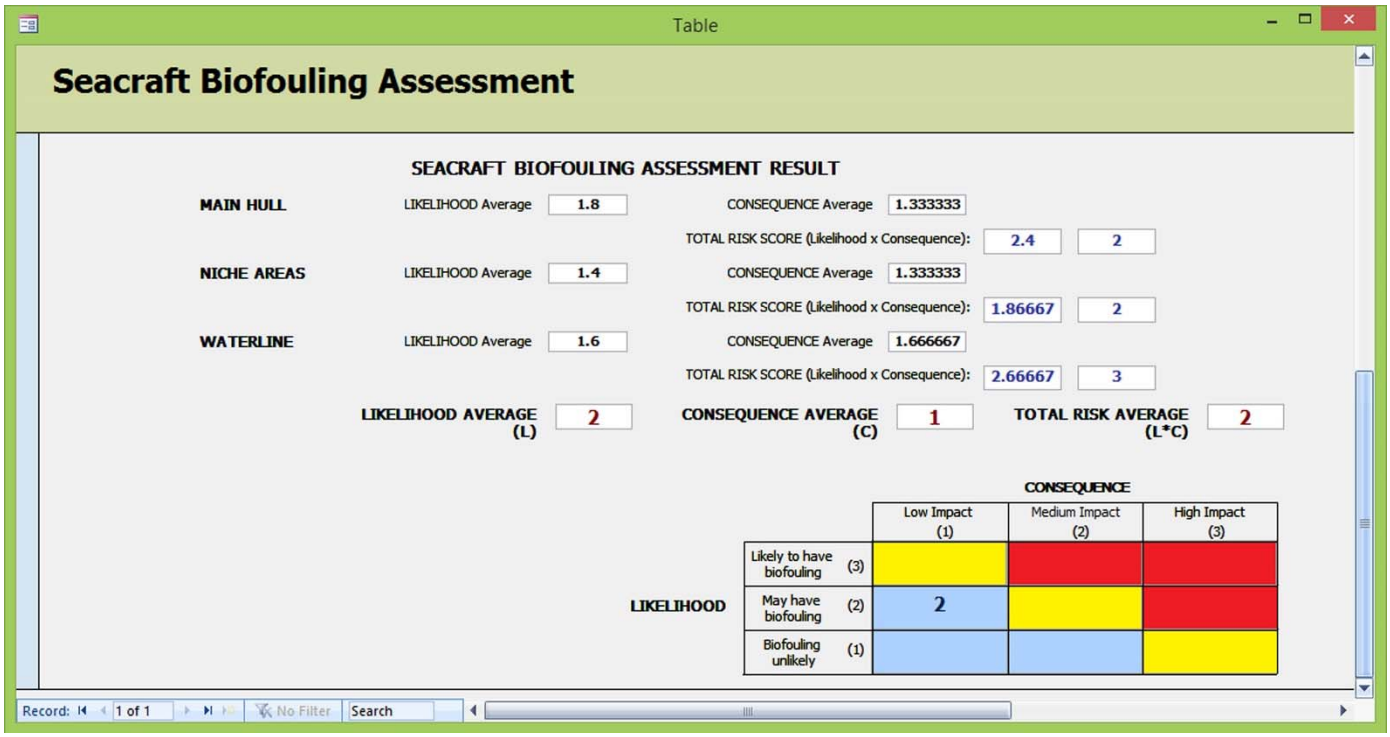


Figure 7. Printable Seacraft Assessment Report

Palau Vessel Risk Assessment

Tuesday, March 28, 2017
1:55:16 PM

Bureau of Agriculture
Biosecurity Office
Koror, Republic of Palau 96940
Phone: (680) 587-2504 Email: biosecurity@palau.net

Arrival Date	3/27/2017		**Port**	Koror	
Vessel	MV Magellan		**Type**	Passenger Ship	
Manufacturer	DST Inc		**Date Constructed**	6/14/2009	
Gross Tonnage	40	tons	**Length**	50	meters
Breadth	35	meters	**Depth**	25	meters

Assessment Data:

Cruising Speed 20

Intended Stay 5

Has Biofouling Management Plan? ☑ Yes

Is the Biofouling Record Updated? ☐ Yes

Days Moored in Last Port 5

Count of High Risk Ratings of Prior Visits 0

Assessment Result:

Cruising Speed Risk	Medium	Risk Score	2	
Intended Stay Risk	Low	Risk Score	1	
BMP/BRB Risk	Medium	Risk Score	2	
Days Moored Risk	Low	Risk Score	1	
Last Visit Risk	Low	Risk Score	1	
LIKELIHOOD	**Low**	Average	**1**	**1**
CONSEQUENCE	**Medium**	Risk Score	**2**	**2**

TOTAL RISK SCORE (Likelihood x Consequence): **2**

		CONSEQUENCE		
		Low Impact (1)	Medium Impact (2)	High Impact (3)
LIKELIHOOD	Likely to have biofouling (3)			
	May have biofouling (2)			
	Biofouling unlikely (1)		**2**	

Figure 8. Printable Seacraft Biofouling Assessment Report

Palau Vessel Biofouling Risk Assessment

Tuesday, March 28, 2017
1:50:26 PM

Bureau of Agriculture
Biosecurity Office
Koror, Republic of Palau 96940
Phone: (680) 587-2504 Email: biosecurity@palau.net

Arrival Date	3/28/2017		**Port**	Koror	
Vessel	MV Magellan		**Type**	Passenger Ship	
Manufacturer	DST Inc		**Date Constructed**	6/14/2009	
Gross Tonnage	40	tons	**Length**	50	meters
Breadth	35	meters	**Depth**	25	meters

Assessment Data:

	LIKELIHOOD					CONSEQUENCE		
	Green Algae Length	Red Algae Length	Barnacle Coverage	Single Species	Multiple Species	Pest Hosting Potential	Spread	Mitigation Cost
MAIN HULL	100	0	50	0	100	35	50	100
NICHE AREAS	0	100	50	100	0	0	100	0
WATERLINE	20	50	100	50	20	100	50	35

Assessment Result:

MAIN HULL	LIKELIHOOD Average	2	CONSEQUENCE Average	3	TOTAL RISK SCORE (Likelihood x Consequence):	5	5
NICHE AREAS	LIKELIHOOD Average	2	CONSEQUENCE Average	2	TOTAL RISK SCORE (Likelihood x Consequence):	4	4
WATER-LINE	LIKELIHOOD Average	3	CONSEQUENCE Average	2	TOTAL RISK SCORE (Likelihood x Consequence):	6	6
LIKELIHOOD AVERAGE (L)		2	**CONSEQUENCE AVERAGE (C)**	2			

TOTAL RISK SCORE (Likelihood x Consequence): 4

PHOTO

CONSEQUENCE

LIKELIHOOD		Low Impact (1)	Medium Impact (2)	High Impact (3)
Likely to have biofouling	(3)			
May have biofouling	(2)		4	
Biofouling unlikely	(1)			

Figure 9. Vessel record page

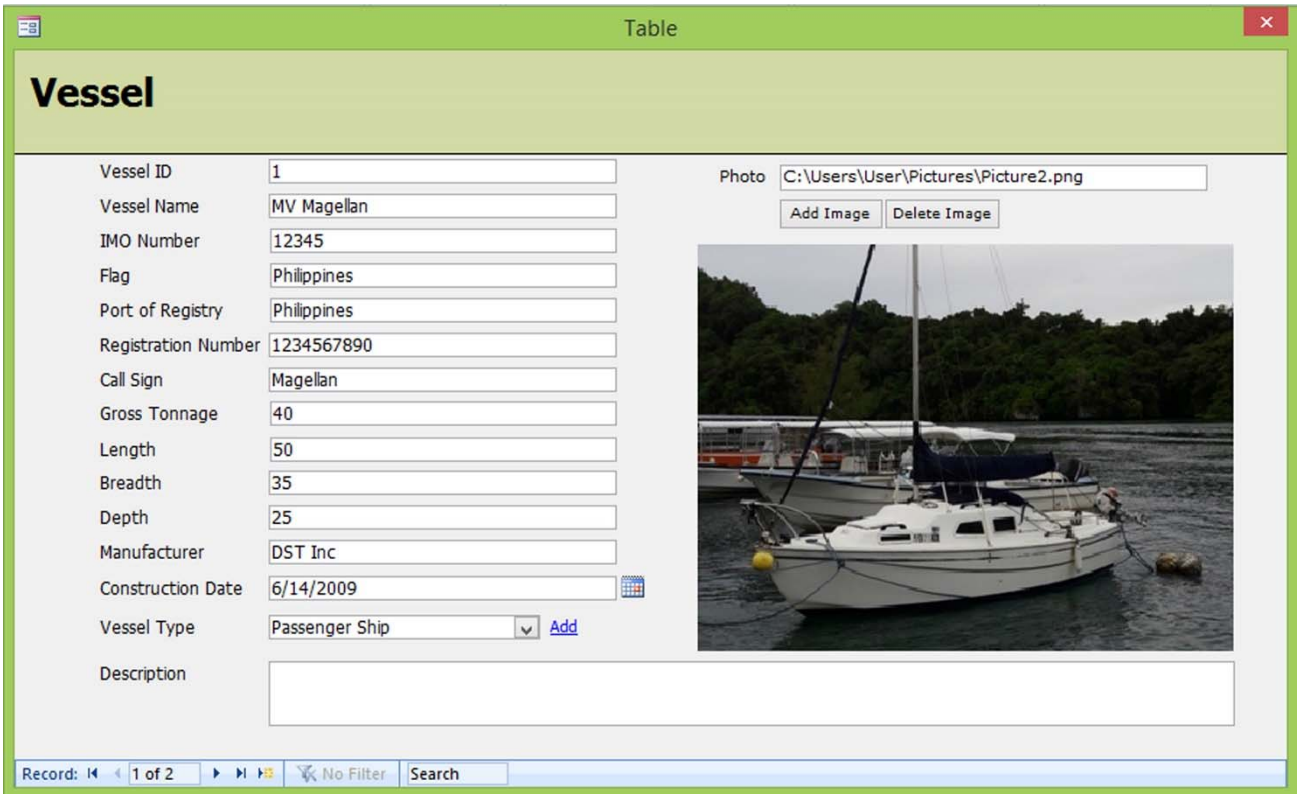


Figure 10. Invasive species record page

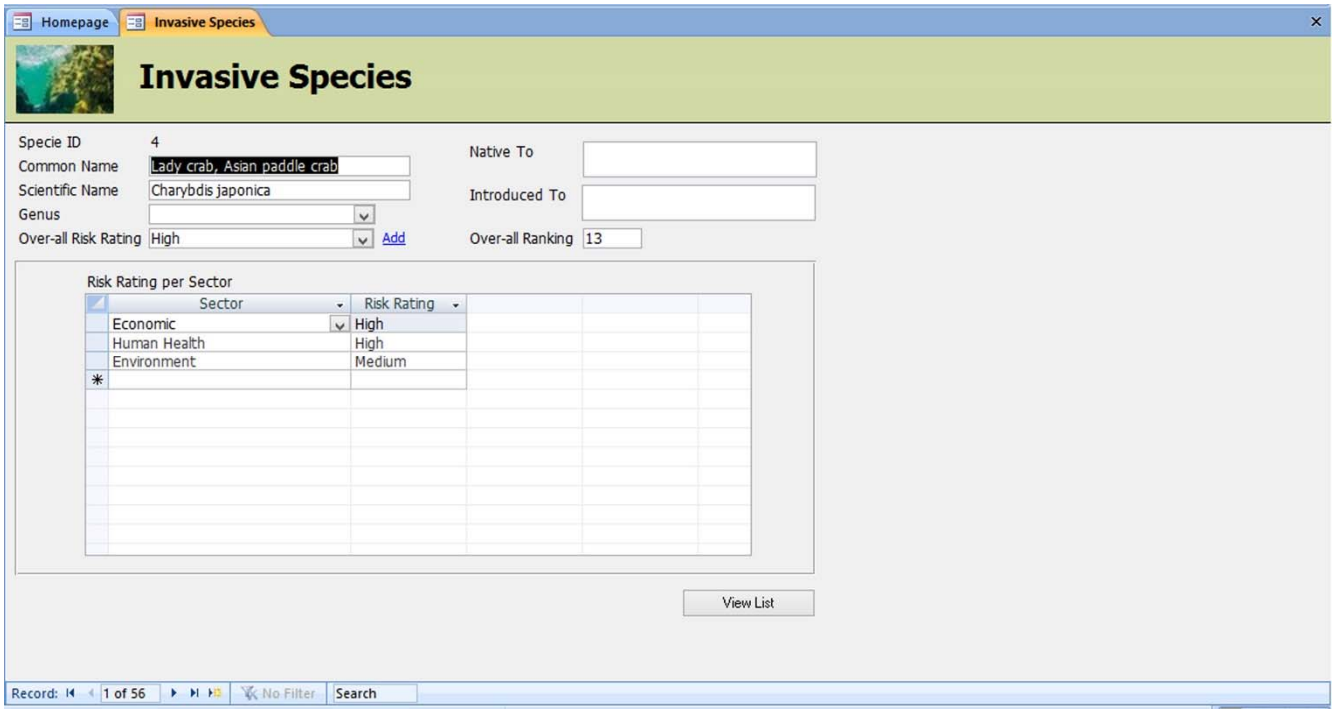
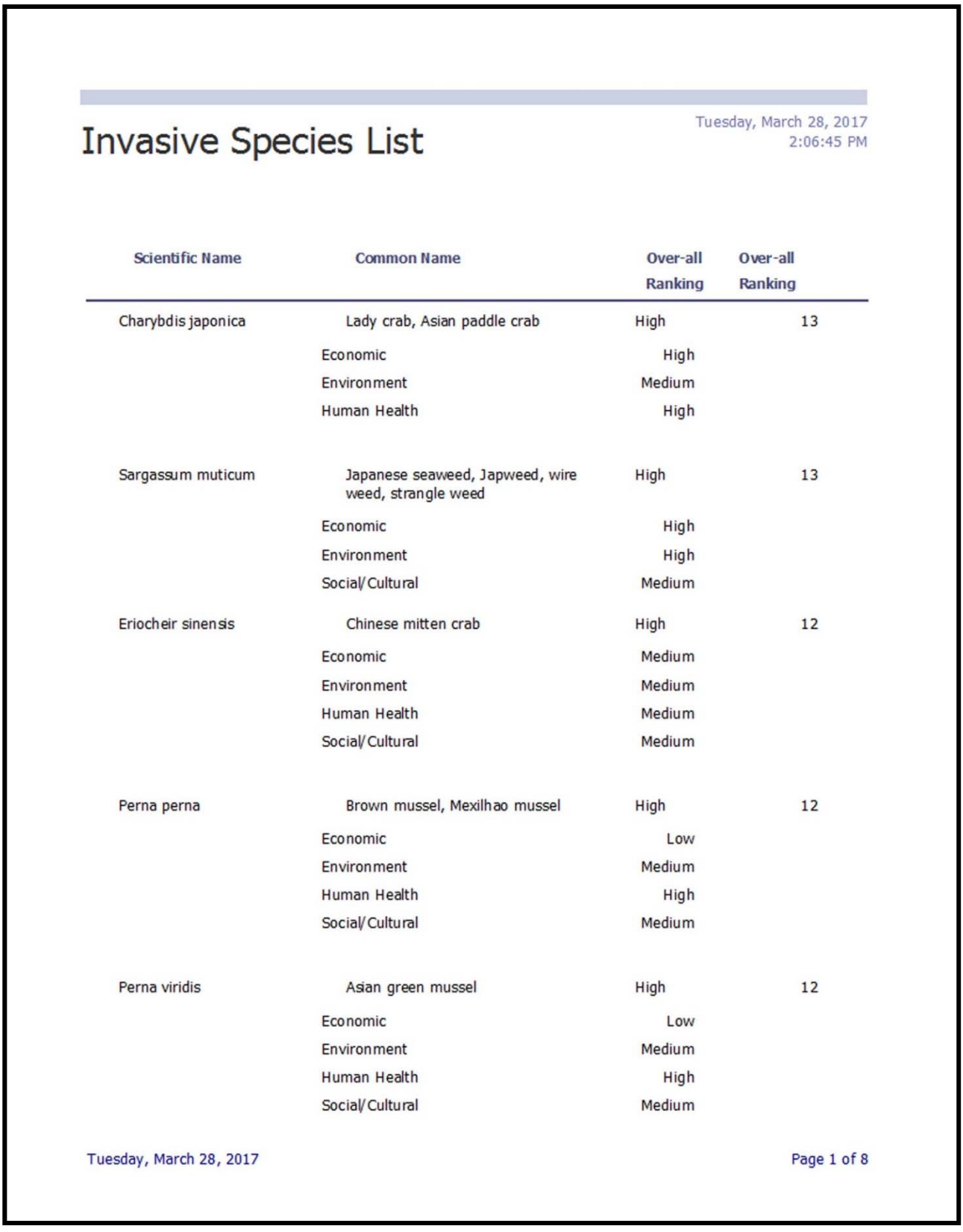


Figure 11. List of Invasive Species Report



Invasive Species List

Tuesday, March 28, 2017
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Scientific Name	Common Name	Over-all Ranking	Over-all Ranking
Charybdis japonica	Lady crab, Asian paddle crab	High	13
	Economic	High	
	Environment	Medium	
	Human Health	High	
Sargassum muticum	Japanese seaweed, Japweed, wire weed, strangle weed	High	13
	Economic	High	
	Environment	High	
	Social/Cultural	Medium	
Eriocheir sinensis	Chinese mitten crab	High	12
	Economic	Medium	
	Environment	Medium	
	Human Health	Medium	
	Social/Cultural	Medium	
Perna perna	Brown mussel, Mexilhao mussel	High	12
	Economic	Low	
	Environment	Medium	
	Human Health	High	
	Social/Cultural	Medium	
Perna viridis	Asian green mussel	High	12
	Economic	Low	
	Environment	Medium	
	Human Health	High	
	Social/Cultural	Medium	

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Annex 1(E)

THE REPUBLIC OF PALAU
MINISTRY OF NATURAL RESOURCES, ENVIRONMENT AND TOURISM
BIOFOULING MANAGEMENT REGULATIONS

In accordance with Administrative Procedure Act, 6 PNC Sections 101-161, the Ministry of Natural Resources, Environment and Tourism hereby promulgates the following regulations

Section 1. Title

These regulations may be cited as the "Biofouling Management Regulations"

Section 2. Authority

The following Rules and Regulations are promulgated pursuant to the Biosecurity Act of 2014, RPPL 9-58 and shall have the full force and effect of law and shall come into effect on _____.

Section 3. Purpose and Scope

3.1 Purpose: These regulations addresses the entry invasive aquatic species that constitute biofouling or are carried in biofouling transported by seacraft entering territorial waters in order to minimize risks to the environment, biodiversity, socio-cultural values and human health associated with the spread and establishment of invasive aquatic species.

3.2 Definitions: In these regulations, the following definitions shall apply, all other terms used are as defined in the Biosecurity Act of 2014.

a) "Anti-fouling coating system" - combination of all component coatings, (includes the primer, sealer, binder, anti-corrosive and anti-fouling coatings) or other surface treatments, applied on seacraft to control biofouling and prevent attachment of unwanted aquatic organisms.
b) "Anti-fouling system" - surface treatment, paint, coating or multiple coatings, surface, or device used on seacraft to control or prevent biofouling and attachment of unwanted organisms.
c) "Barnacles" – ever present biofouling organisms of tropical, subtropical and temperate seas mainly attached to seacraft hulls or to drift wood, floating plant debris as well as turtles and whales.
d) "Biofouling threshold" – a set of measurements consisting of defined size, area hull coverage and composition of predetermined biofouling organisms used in determining the risk rating of a seacraft to be inspected
e) "Biofouling" – collection of attached aquatic organisms on seacraft hull surface or structures submerged in or exposed to the aquatic environment including microfouling and macrofouling.
f) "Dry-docking strips" – areas of the hull supported during dry-docking and are not usually treated with fresh anti-fouling paint, hence susceptible to biofouling.

g) “Dry-docking” – removal of the seacraft from the water for inspection and maintenance purposes.
h) “High risk hull” - hulls with characteristics favourable to the existence of biofouling or expected to have a greater probability of conditions leading to biofouling quantities greater than set biofouling thresholds and coverage or presence of high risk species representing an unacceptable level of risk to the environment, biodiversity, socio-cultural values and human health
i) “High risk species” – harmful invasive species carried through biofouling and proven to cause significant detrimental effects to the environment, habitats, native species or human health
j) “Hull algae” – algal growth that is visible and recognizable upon inspection and consist of single species seaweed, multiple species seaweeds including coralline algae as well as single celled filamentous forms.
k) “Hull” - The immersed (including occasionally immersed) surfaces of a vessel. Pontoons and outriggers are considered part of the hull. Three parts of the hull are recognized for this regulation: the main hull, waterline and niche areas.
l) “IMO Guidelines for Biofouling” – refers to the IMO Guidelines for the Control and Management of Ship’s Biofouling to Minimize the Transfer of Aquatic Invasive Species
m) “IMO” - International Maritime Organisation
n) “In-water cleaning” – the physical removal of biofouling from a hull while it remains in the water
o) “In-water inspection” – the underwater survey or inspection by divers or cameras on remotely operated systems for evaluating the extent of biofouling
p) “In-water treatment” – processes or methods to kill or render sterile or inactive biofouling organisms from the hull will the seacraft remains in the water
q) “Invasive aquatic species” – an organism that may cause harm to human, animal and plant life, economic and cultural activities and the aquatic environment.
r) “Low risk hull” – hulls with minimal biofouling or levels of biofouling below a set threshold and hulls without indications or presence of high risk species representing a tolerable level of risk to the environment, biodiversity, socio-cultural values and human health
s) “Low risk species” – organisms associated with biofouling with minimal or insignificant reported harmful impact to the environment, habitats, native species or human health
t) “Macrofouling” - biofouling of organisms visible to the human eye including barnacles, tubeworms, or fronds of algae
u) “Main hull” – the immersed surfaces of a vessel including the waterline (indicated as waterlines or loadlines marked at different levels of a large vessel). The main hull excludes niche areas.
v) “Marine Growth Prevention System (MGPS)” - an anti-fouling system used for the prevention of biofouling in niche areas, internal seawater

cooling systems and sea chests include the use of anodes, injection systems, electrolysis and others.

w) "Medium risk hull" – hulls of seacraft that are inherently low risk but has not provided proof of a biofouling management plan or a hull with biofouling species thresholds that can be mitigated in-water to set thresholds until the hull is deemed low risk and with no high risk list species present.

x) "Microfouling" - biofouling of organisms that are not visible to the naked eye caused by bacteria, micro-algae or diatoms and the slime layer that results, this is sometimes referred to as biofilm or the slime layer (used in this document

y) "Niche areas" – submerged structures or areas on a vessel hull that are more vulnerable to biofouling due complex surfaces and/or exposure to a wider range of hydrodynamic forces, increased risk of damage to anti-fouling coating integrity including areas such as rudders, rudder posts, bow and stern thrusters, sea chests, sea chest gratings, docking strips, dry-dock support strips, appendages and other similar structures.

z) "Risk assessment" – identification, analysis and evaluation of risk

aa) "Risk" – effect of uncertainty on objectives, measured by multiplying likelihood with the consequence of the event or hazard or in this case the entry, establishment and spread of invasive aquatic species

bb) "Seacraft or vessel" - every description of marine vehicles, ships, boat or other craft used in water navigation or operating in the aquatic environment, whether or not it has any means of propulsion; also includes: a barge, lighter, hydrofoil, hovercraft or floating drilling rig and other class types listed in Lloyds Register of Shipping. It does not include aircraft.

cc) "Slime layer" - a layer of microscopic organisms, such as bacteria, diatoms, algae, and the slimy substances that they produce.

dd) "Territorial waters" - The territorial sea and the internal waters which together comprise the sea surrounding the Republic of Palau out to 12 nautical miles from the traditional baseline.

ee) "Treatment" – use of mechanical, physical, chemical or biological processes and methods to remove or sterilize invasive aquatic species involved in vessel biofouling and can included in-water and out of water cleaning.

Section 4. Seacraft requirements and biosecurity implementation workflow

4.1 In principle, all seacraft entering Territorial waters of the Republic of Palau must be determined to be low risk as determined prior to arrival or after inspection and meet set thresholds representing acceptable level of biofouling or must not have the presence of high risk organisms attached to its hull or carried in structures that make possible the transport of invasive aquatic organisms throughout its voyage.

4.2 This regulation implements a series of measures at different stages of seacraft voyage, entry and stay into the country and defines a workflow consisting of a set of multiple layers of protection based on determining levels of risk for each seacraft. Assignment of low, medium and high risk levels on the seacraft and

its hull determine appropriate actions for preventing the entry of invasive aquatic species.

Section 5. Pre-border seacraft risk assessment

5.1 Prior to arrival, the operator, master, owner or responsible officer shall submit or provide reference for details about the seacraft and relevant information required to undertake risk assessment based on its basic characteristics, hull type and voyage undertaken. If these documents are not provided, the vessel is treated as medium or high risk and shall be covered under the response for this risk category.

5.2 Seacraft characteristics used in risk assessment include:

a) Intended Stay
b) Classification
c) Cruising Speed
d) Biofouling Management Plan/Record/AFS
e) Days moored in last Port
f) Record of Prior Visits and risk rating

5.3 Biofouling Management Plan, Biofouling Management Record and Anti-Fouling Certificate if present, need to be filed prior to entry or shown to Biosecurity officials if craft is classified as medium or high risk.

5.4 Risk Assessment

a) The entering seacraft will be classified into low, medium and high risk based on the following risk scoring calculation table:

Risk Score	1	2	3
Likelihood of Seacraft Biofouling			
Intended Stay	**0-20**	**20-30**	**30-40**
Cruising Speed	**<25**	**20-25**	**15-20**
Biofouling Management Plan and Record (Updated)	**Both Present**	**One is missing**	**None Present**
Days moored in Last Port	**0-5**	**5-10**	**>10**
Record of prior visit with high risk rating	**0**	**1**	**> 1**
Consequence of Seacraft Biofouling			

Impact (based on vessel length (LOA) in meters)	**<24**	**24-80**	**>80**
Risk Score = average of Likelihood x Consequence	**1-3 (Low)**	**4-6 (Medium)**	**7-9 (High)**

b) Low risk vessels with scores of 3 or less shall be permitted entry and approved for its intended of stay

c) Medium risk seacraft with risk scores between 4-6 are informed to provide the updated Biofouling Management Plan and Biofouling management record for reclassification into either a high risk or low risk vessel; Based on the assessment of these, the vessel may be reclassified into low or high risk categories

d) High risk seacraft with risk scores greater than 7 are informed of inspection processes or if reassessed to still be high risk, the mitigation required for reclassification into a low risk vessel.

Section 6. Seacraft Risk Assessment on Arrival

a) Low risk seacraft are allowed to stay for the duration as stated in the pre-arrival form

b) Medium risk seacraft shall submit the Biofouling Management Plan and Biofouling management record for reclassification into either a high risk or low risk vessel; Based on the assessment of these, the vessel may be reclassified into low or high risk categories

c) High risk vessels are inspected and risk levels based on biofouling threshold or presence of identified high risk species is determined

Section 7. Risk assessment for biofouling levels and presence of red list species

7.1 For high risk seacraft, inspections shall be conducted at the waterline, submerged main hull and niche areas and the risk score calculated according to the table below:

Risk Score	**1**	**2**	**3**
Likelihood of Hull Biofouling			
Green Algae Length (mm)	**0-50**	**50-100**	**>100**
Red or Brown Algae Length (mm)	**<5**	**5-10**	**>10**

Barnacle Coverage (% of hull)	**<5**	**10-15**	**>15**
Single Species (% of hull)	**<5**	**10-15**	**>15**
Multiple Species (% of hull)	**<5**	**10-15**	**>15**
Consequence of Hull Biofouling			
Pest Hosting (Number of Species)	**1-3**	**3-5**	**>5**
Spread (Size of Hull in meters)	**<24**	**24-80**	**>80**
Mitigation Costs (Size of Hull in meters)	**<24**	**24-80**	**>80**
Risk Score = average of Likelihood x Consequence	**1-3 (Low)**	**4-6 (Medium)**	**7-9 (High)**

7.2 If a species in the High Risk list is identified during inspection, the seacraft shall be automatically categorised as High Risk

7.3 For a species to be considered in the Low Risk List or allowed into the country, a risk assessment process must be followed using the following risk factors:

Risk Score	**1**	**2**	**3**
Likelihood of Species Spread and Establishment			
Taxon			
Pathways			
Bioclimate origin similarity with Palau waters			
Invasive record			

Life stages viability during transport			
Consequence of Species Spread and Establishment			
Niche Competition			
Environmental Impact			
Mitigation Costs			
Socio-cultural and Human Health Impacts			
Risk Score = average of Likelihood x Consequence	**1-3 (Low)**	**4-6 (Medium)**	**7-9 (High)**

7.4 Currently the biofouling species allowed or are included in the Low Risk List and subject to threshold limits include:

a) Green algae
b) Red algae
c) Brown algae
d) Barnacles

7.5 High Risk listed species are those aquatic species listed among the world's worst invaders and included in the Biosecurity Division species database.

Section 8. The biofouling management plan and record

8.1 The Biofouling Management Plan shall be submitted electronically or sent as a hardcopy to the Biosecurity Directorate and must be:

a) Regularly reviewed and current with regard to the last drydocking or in-water maintenance or delivery if a new seacraft which has not yet undergone drydocking
b) Consistent with the records defined in the IMO Guidelines for Biofouling
c) Provide details of the Antifouling system, Antifouling coating system or Marine Growth Prevention System to include:
    a. Manufacturer/supplier name
    b. Date of installation/application
    c. Effectivity of the Certificates
d) Provide management actions planned for susceptible areas of the hull

8.3 The Biofouling Record Book with information to include
a) Date
b) Management Action
c) Responsible Officer

Section 9. Mitigation measures

9.1 In cases of high risk vessels, mitigation measures appropriate to the hull condition are mandated to minimize the risk associated with the entry of invasive species into the open marine waters of the country to include:
a) In-water cleaning within 24 hours of arrival at approved facilities

b) In-water treatment within 24 hours of arrival by approved contractors

c) Drydocking or lifting out of the water within 24 hours of arrival

d) Sheathing or wrapping the submerged portion of the hull with an impermeable membrane within 24 hours of arrival

9.2 Where the vessel is not in a position to undertake mitigation measures, it is given 12 hours from arrival to remove itself from the country's territorial waters

Section 10. Emergency exemptions

A vessel may be exempt from the requirements of this regulation provided the following conditions are met:

10.1 The vessel makes an unscheduled stop due to an emergency involving safety of vessel or crew

10.2 The master or operator of the vessel notifies the Biosecurity Division of the nature of emergency no later than 12 hours after arrival

10.3 The vessel involved in the emergency does not stay more than 21 days in territorial waters

10.4 Mitigation measurements may be undertaken should Biosecurity officers determine the vessel biofouling threshold to be of high risk.

ANNEX 2: Outcomes of the National Consultation

Annex 2(A)

Programme

FAO Project TCP/PLW/3601/C1
Strengthening Biosecurity Capacity of Palau

National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014
28th March 2017

Timing	Activity
Opening Session	
08:30-09:00	**Opening & Welcome: Minister Umiich Sengebau** Self-introduction of participants Group photo
09:00-09:10	Coffee break
Technical Session	
09:10-09:30	**Background and purpose of the National Consultation** Director Fernando Sengebau, Bureau of Agriculture
09:30-09:50	**The Role of the Food and Agriculture Organization of the United Nations (FAO) and TCP/PLW/3601/C1** Dr Melba Reantaso, Project Lead Technical Officer, FAO, Rome
09:50-10:20	**Aquaculture Development in Palau: history, potential and issues** Mr Theo Isamu, former Director, Bureau of Marine Resources (retired)
10:20-10:50	**Aquaculture – a Potential Gateway for Invasive Aquatic Species** Mr Isechal Remengesau, National Invasive Species Coordinator & National Project Coordinator, and Dr Joel Miles, FAO National Consultant
10:50-11:10	**Transboundary Aquatic Animal Pathogens (TAADS) and Their Potential to Destroy National Aquaculture Development** Dr Melba Reantaso, Project Lead Technical Officer, FAO, Rome
11:10-11:45	**Aquatic Biosecurity - Protecting Aquaculture and the Aquatic Environment from Invasive Aquatic Species and TAADS** Dr Richard Arthur, FAO Consultant, Canada
11:45-12:00	Discussions
12:00-13:00	Lunch break
13:00-13:30	**Supporting Regulations for Hull Biofouling: a Risk Management Based Workflow, Thresholds/Species Assessment and Required Knowledge Bases** Dr Glenn Aguilar, FAO Consultant, New Zealand
13:30-14:00	**Biosecurity Database Development** Ms Rina-Joy Ambatang, FAO Consultant, Philippines
14:00-14:20	**The Biosecurity Act of 2014: Protecting Palau from Exotic Pest and Diseases** Director Fernando Sengebau, Bureau of Agriculture
14:20-15:00	**Proposed draft Biosecurity Regulations for Aquatic Animals and their Products** Dr Richard Arthur, FAO Consultant, Canada
15:00-15:20	Coffee break
15:20-16:45	**Working Group discussions and presentations**
16:45-17:15	**Conclusions and the Way Forward** Dr Melba Reantaso, Project Lead Technical Officer, FAO, Rome
17:15-17:20	Closing

Annex 2(B)

List of participants

NATIONAL CONSULTATION ON BIOSECURITY REGULATIONS FOR AQUATIC ANIMALS IN SUPPORT OF THE BIOSECURITY ACT OF 2014

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Annex 2(C)

National Consultation photograph

Honorable Minister Umiich Sengebau, Minister of Natural Resources, Environment and Tourism (first row, 4th from left) and officers representing the government (Attorney-General's Office, Bureau of Agriculture/Biosecurity Division, Customs, Enviromental Quality Protection Board, Ngatpang State, Quarantine, Department of Fish and Wildlife Protection), private sector/producer (BIOTA, Inc., Coral Reef Research Foundation, The Environment, Inc., Palau Aquaculture Association, Palau Conservation Society, private consultants) and the academe (Palau Community College) met for a 1-day National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014 held at Palasia Hotel, Koror on 28 March 2017 and deliberated on the draft regulations on Biosecurity for live aquatic organisms and their products and Biofouling Management.

ANNEX 3: Outcomes of the consultancy of the International Consultant on Aquatic Animal Health

Annex 3(A)

INFORMATION SHEET

Developing Draft Biosecurity Regulations for Live Aquatic Organisms and their Products

Introduction

The Draft Biosecuriy Regulations for Aquatic Organisms (the "Draft Aquatic Regulations) are been prepared by the FAO Consultant for the Bureau of Agriculture under FAO project TCP/PLW/3601/C1 "Strengthening Biosecurity Capacity of Palau". Their purpose is to initiate stakeholder discussion on suggested new procedures aimed at protecting Palau's aquaculture sector, natural marine and freshwater ecosystems, tourism sector and the socio-economic well-being of those who depend on these systems and activities from the risks posed by aquatic invasive species (AIS) and the serious transboundary aquatic animal diseases (TAADs) that may be carried by exotic aquatic organisms that may be introduced for aquaculture development, the aquarium trade (ornamental aquatic organisms) and other activities proposing the international movement of live aquatic organisms. When fully developed, these draft Aquatic Biosecurity Regulations will also include procedures for the importation of products derived from aquatic organisms (as described in the Biosecurity Act of 2014 as "regulated articles" and procedures for the exportation of live aquatic organisms and their products from the Republic of Palau.

Scope

Under the draft Aquatic Regulations, it is proposed that "aquatic organism" include fish, crustaceans, molluscs and amphibians (groups covered by the World Organisation for Animal Health's *Aquatic Animal Health Code* and *Manual of Diagnostic Tests for Aquatic Animal Diseases*) as well as other aquatic invertebrates (echinoderms, corals, etc.) aquatic reptiles and aquatic plants, including their products (all of these aquatic organisms, with the exception of aquatic plants) were included, inter alia, under the definition of "fish" used in the 1999 Plant and Animal Quarantines Regulations.

It is expected that following the National Consultation (to be held on 28 March 2017), this document will be revised to incorporate stakeholder input, and following this, a more formal version of the draft Aquatic Regulations will be prepared by the Bureau of Agriculture for further review. This will form the basis for the drafting by legal staff of the Aquatic Biosecurity Regulations in a format suitable for presentation to the government for official adoption and implementation, either as part of a broader Biosecurity Regulations covering plants, terrestrial animals and aquatic animals, or separately, so as to initiate implementation of biosecurity measures for aquatic organisms as soon as possible.

Summary of approach

The approach recommended is based on the premise that Palau's procedures for dealing with requests to import or export live aquatic animals and their products should fully meet the relevant international standards and guidelines (most notably, those of the World Organisation for Animal Health (OIE) and of the Food and Agriculture Organization of the United Nations (FAO)). It is based on the use of risk analysis, an internationally accepted method for determining if the level of risk posed by a request to import a live aquatic organism or its product is acceptable to Palau. Following an initial screening to determine if the aquatic organism is already listed on the List of Prohibited Species (in which case the request will be immediately rejected), two distinct importation pathways will be established, one for the importation of ornamental aquatic organisms and another for introductions and transfers (i.e. the importation of species destined for use in aquaculture development or other activities likely to have a high probability of release or escape of organisms into the natural environment)

- Requests for the importation of ornamental aquatic organisms will be referred to the National Invasive Species Committee (NISC), which will provide an initial assessment to determine if the species under consideration should be placed on (i) the List of Approved Species or (ii) on the List of Prohibited Species. Upon arrival in Palau, consignments of approved species of ornamental aquatic organisms will go directly into a short-term Approved Quarantine Facility for Ornamental Aquatic Organisms.

- First-time requests involving introductions and transfers may generate two risk analyses. Initially an ecological risk assessment (ERA) (which will include assessment of the species potential for invasiveness) will be commissioned. If the results of the ERA are favorable, the request to import will be subjected to an import risk analysis (IRA) to determine (i) if the specific consignment could be carrying serious pathogens or diseases that pose an unacceptable risk to Palau and (ii) if so, are there risk management methods that can be applied to reduce the risk to an acceptable level? If the IRA indicates an acceptable level of risk, the importation can be approved without additional risk management measures. However, if the risk is unacceptable, the risk analysis will examine possible (additional) risk management measures that would reduce the risk to an acceptable level. All costs associated with the conducting of an ERA, and IRA and any risk management measures required (e.g. quarantine, health certification, diagnostics testing, use of SPF stocks, etc.) will be the responsibility of the importer.

Protocols will be developed for two types of quarantine, based on the risk associated with these different activities:

- Approved Quarantine Facilities for Ornamental Aquatic Organisms
- Approved Quarantine Facilities for Introductions and Transfers of Aquatic Organisms

The cost of constructing or leasing an approved quarantine facility and its operation will be borne by the importer.

The importation of live aquatic organisms (particularly live crustaceans: penaeid shrimp, mangrove crabs, etc.) for use by restaurants ("live food aquatic organisms") poses the potential risk of introducing aquatic invasive species and transboundary aquatic animals diseases. A set of simple standard operating procedures (SOPs) will be included that will allow this practice to continue while reducing the chance that these live aquatic organisms may introduce a serious disease to Palau.

Working protocols, standards and other documents that will require regular updating or revisions (e.g. standard operating procedures, standards of construction, national pathogen list, application forms and approval certificates) will be referenced in the Aquatic Biosecurity Regulations as Annexures, but will not be part of the Regulations proper. This will allow for rapid amendment or changes to be made under the signature of the Director, BOA.

The procedures of export of live aquatic organisms and their produces will remain basically unchanged from those currently in place.

Inter-island movement of live aquatic organisms for aquaculture development will require the written approval of the Director, who may seek the advice of the National Invasive Species Committee.

Summary of Palau's current situation

Palau is extremely fortunate with regard to its aquatic biosecurity status, a fact that will allow rapid and effective implementation of protective measures to improve aquatic biosecurity. In particular:

- Palau has few introduced aquatic species, and only one of these, tilapia (*Oreochromis* spp.) has proved invasive (and was successfully eradicated).
- The keeping of ornamental marine and freshwater fish by aquarium hobbyists is not practiced in Palau. Thus there is no importation of live ornamental animals and plants, and no commercial dealers of imported ornamentals.
- The aquaculture sector is very small in Palau and is focussed mainly on the rearing of giant clams (Tridacnidae) and marine reef fishes for export for the ornamental trade. Major aquaculture companies (e.g. Biota, Indigo Seafood Palau, Ngerdubech Corporation of Ngatpang State) are committed to the use of local stocks of fish, shrimp and other aquatic invertebrates and appear to have no desire to import or culture exotic species.

- There have been only a few importations (legal and illegal) of live aquatic animals for use in aquaculture. A number of earlier attempts involving exotic species failed and the imported animals did not escape and establish feral populations.
- There have been no reports of mass mortalities of aquacultured or wild populations of aquatic organisms caused by disease.
- There is strong support from government and the citizens of Palau for protection of the country's pristine marine habitats.
- The Biosecurity Act of 2014 is now in place, allowing for the development of regulations that will meet international standards for aquatic animal health.
- The BOA has established the Division of Biosecurity (but lacks the specialized expertise needed to implement an aquatic biosecurity programme).

Urgent issues

(A) The following activities were identified in a 2006 report of an FAO consultancy to Palau as likely to involve a high risk of pathogen introduction and thus ways are urgently needed to address the risk of introducing transboundary aquatic animal diseases (TAADs) through these actions:

- Shrimp (Penaeidae)
  - Introduced, exotic shrimp juveniles (e.g. whiteleg shrimp, *Penaeus vannamei*) imported for grow out in shrimp ponds
  - Importation of live giant tiger shrimp by restaurants
  - Importation of "green shrimp" (i.e. raw fresh or frozen penaeid shrimp or their products)
- Mangrove crab (*Scylla* spp.)
  - Importation of juvenile crabs for grow out/crab fattening
- Giant river prawn (*Macrobranchium rosenbergi*)
  - Importation of broodstock or larval stages for aquaculture development
- Milkfish (*Chanos chanos*)
  - fry and/or juveniles imported for pond culture (for production of table-size fish and of juveniles for use as tuna bait).
  - juveniles contained in holding tanks on foreign tuna fishing vessels and used for bait in the waters of Palau.
- Groupers (*Epinephelus* spp.)
  - fry imported for grow-out in marine cages

The BOA should commission ERAs/IRAs on these species and in the meantime prohibit further importations until such time as risk analyses have been completed and, assuming the risk can be managed, appropriate biosecurity measures are in place. Funding to conduct these risk analyses should be sought from FAO or bilateral donors.

(B) Registration and Licensing of Aquaculture Facilities

The BOA, in collaboration with the Bureau of Marine Resources (BMR) should implement a system of registration and licensing for aquaculture facilities. Such a system is essential for:

- Development of a database of aquaculture facilities operating in Palau, including basic information on their geographic location, ownership, manager, area under culture (by species), species cultured, annual production volume by species, export volumes and values, etc.
- Communication between the Division of Biosecurity and aquaculture producers.
- Implementation of emergency actions by the Division of Biosecurity should a serious disease outbreak occur.

General Procedure for the Importation of Live Aquatic Organisms into Palau - Biosecurity Act of 2014

This section outlines the recommended general procedure for the importation of live aquatic organisms into the Republic of Palau. The draft Aquatic Biosecurity Regulations should incorporate

the necessary provisions to ensure that the recommended procedures can be easily implemented and the necessary standardized forms are available:

(1) Importer must be: (a) registered with the Division of Biosecurity
(b) holder of a Licence to Import Live Aquatic Organisms[1]

(2) Importer submits an Application to Import Live Aquatic Organisms (at least 6 weeks before the proposed date of importation)

(3) Division of Biosecurity will determine if the request involves:
(i) importation of an ornamental organism(s) (aquarium species), or
(ii) an introduction or transfer (importation of an aquatic organism for use in aquaculture or another activity involving release or potential for release or escape into the natural environment)

For importation of ornamental organisms:

- Must involve a species listed on the List of Approved Species (only those species having no potential for use in commercial foodfish aquaculture will be listed)
- A non-listed ornamental species will require an assessment of potential for invasiveness by the National Invasive Species Committee (NISC) to determine if the species under consideration will be:
  (a) added to the List of Approved Species or
  (b) placed on the List of Prohibited Species
- The consignment:
  (i) must be from a pre-approved country and supplier (criteria for approval to be developed by the Division of Biosecurity)
  (ii) must be accompanied by a general health certificate (specifics to be developed by the Division of Biosecurity)
- In exceptional cases, the NISC may also require that an ecological risk assessment (ERA) be conducted at the importer's expense.
- The importer must have access to an Approved Quarantine Facility for Ornamental Aquatic Organisms (which must meet minimum standards of construction and use standard operating procedures, SOPs)
- Following a quarantine period of six weeks (in the case of freshwater species) or three weeks (in the case of marine species) with no unusual mortalities or gross signs of disease, a Biosecurity Clearance may be issued allowing the consignment of aquatic organisms to be released from quarantine

For Introductions and Transfers (importation of species for aquaculture development or other activities involving potential release or escape of aquatic organisms into natural waters):

- Each importation request will be considered separately
  - If the request involves a species that is not on the List of Approved Species, completion of an ecological risk assessment (ERA) will be required (at the importers expense) to determine the potential invasiveness of the species. Based on the results, the species will be:
    (a) added to the List of Approved Species, or
    (b) placed on the List of Prohibited Species
- If approved and the importer agrees to cover all associated costs, the individual importation request will then generate an import risk analysis (IRA), to determine if the risk of pathogen introduction posed by the individual consignment (life cycle stage, source, health guarantees, number of organisms, etc.) is acceptable to the Government (note that the President must set the national appropriate level of protection, ALOP)

[1] This refers to a general lenience to operate, while each individual consignment will require a permit to import.

- If the level of risk posed by the consignment is unacceptably high, the risk analysis team will look at risk management options that would reduce the risk to an acceptable level. The may include requirements such as:
    - use of specific pathogen free (SPF) stocks (for penaeid shrimp species)
    - pre-border quarantine and diagnostics testing in exporting country
    - international health certificate certifying testing for specified diseases using diagnostic tests as specified by the World Organisation for Animal Health (OIE)
    - Quarantine in an Approved Quarantine Facility for Introductions and Transfers of Aquatic Organisms with repeated diagnostics testing for specified diseases, at the importer's expense.
    - Application of International Council for the Exploration of the Sea (ICES) protocols for introductions and transfers of marine organisms
    - Restrictions on initial use and movements
    - Monitoring programme
    - Emergency preparedness plan (e.g. stock treatment; stock destruction, sanitary disposal and disinfection of facilities).
- If the risk management measures are acceptable to the importer (who must pay for them), and upon recommendation of the Chief, Division of Biosecurity and the Director, Bureau of Agriculture, and with the final approval by the Minister, the importation can proceed (i.e. a Permit to Import will be issued).

ANNEX 3(B)

TCP/PLW/360/C1

TECHNICAL COOPERATION PROGRAMME

Republic of Palau

Draft Biosecurity Regulations for Aquatic Organisms

prepared

by

J. Richard Arthur
International Consultant on Aquatic Animal Health

Rome – March 2017

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Annexures

The Minister of Natural Resources, Environment and Tourism has under section 83 of the *Biosecurity Act of 2014* (RPPL No. 9-58), made the regulations set out in the Schedule which shall come into effect on _____, 2017

PART I

GENERAL PROVISIONS

1.1 Short Title

These regulations may be cited as the Aquatic Biosecurity Regulations.

1.2 Authority and Repealer

[to be added]

1.3 Effective Date

[to be added]

1.4 Purpose

The purpose of the Biosecurity Regulations for Aquatic Organisms (hereafter referred to as the "Aquatic Biosecurity Regulations" is to protect existing and future aquaculture development, the natural freshwater and marine aquatic environments and the people of Palau from the ecological and socio-economic harms caused by aquatic invasive species (AIS) and serious transboundary aquatic animal diseases (TAADs), including diseases of aquatic plants. These regulations are promulgated as a method of preventing the introduction or transfer and further spread of harmful and invasive fishes, aquatic reptiles, amphibians, crustaceans, molluscs, other aquatic invertebrates and aquatic plants into and within the Republic of Palau. They are based on internationally accepted procedures and best practices to ensure that the risks associated with the importation of these living aquatic organisms and their products are fully evaluated and are within the national appropriate level of protection (ALOP)/acceptable level of risk (ALOR). Additionally, they will assist the Republic of Palau in meeting both international obligations and domestic needs to prevent the movement of AIS and TAADs both into and out of the Republic of Palau and their spread throughout the country.

These Aquatic Biosecurity Regulations are primarily directed at the regulation of import, export and domestic movements of regulated articles (as defined in the *Biosecurity Act of 2014*) considered to be of high risk of introducing AIS and serious TAADs into the Republic of Palau: (i) live aquatic organisms, (ii) live aquatic organism products and (iii) biological products. The Division of Biosecurity recognizes that the importation of some other regulated articles (e.g. fresh and fresh-frozen product, non-heat treated feedstuffs, etc.) may occasionally pose a significant risk of introducing serious diseases of aquatic organisms and thus reserves the right to introduce regulations to reduce these risks on a case by case basis.

1.5 Definitions

1. In these Aquatic Biosecurity Regulations and their associated Annexures, any expression to which a meaning has been assigned in the *Biosecurity Act of 2014* bears that meaning unless the context given below indicates otherwise:

(1) "Act" means the *Biosecurity Act of 2014*;

(2) "Audit" means an evaluation to determine the degree of conformity with prescribed criteria and provide a basis for ongoing improvement;

(3) "Appropriate level of protection (ALOP)" means the level of protection deemed appropriate by the Government in establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within the boundaries and territorial waters of the Republic of Palau;

(4) "Approved port of entry/exit" means an international airport or international seaport open to international trade and whose use is approved by the Minister for the import and/or export of live aquatic organisms and/or their products (i.e. Airai International Airport and Malakal Commercial Port);

(5) "Approved quarantine facility" means a facility for the holding of live aquatic organisms and/or their products that has been officially licensed by the Minister as meeting the requirements and the standards of construction, security and operation. For an Ornamental Aquatic Organisms Quarantine Facility, these are set out in Annexure H, while for an Introductions and Transfers Quarantine Facility, they can be found in Annexure I;

(6) "Aquatic organism" means any fish, amphibian, shellfish, crustacean, other aquatic invertebrate or aquatic plant, whether freshwater, brackishwater or marine, alive or dead and includes the embryo, seed, ova or semen and any tissue of an aquatic organism from which another aquatic organism could be produced, and the skin, viscera or any other part or portion of the body of an aquatic organism;

(7) "Aquatic organism product" means any article or substance derived from an aquatic organism, whether or not in combination with any other article or substance, and includes:

a) meat, fat, eggs and other foodstuffs derived from an aquatic organism;
b) urine, faeces, bone or blood of an aquatic organism, or any article or substance derived from the urine, feces, bone or blood of an aquatic organism;
c) the secretions of any aquatic organism; and
d) any product or biological preparation derived from any aquatic organism tissue or aquatic organism secretion;

(8) "Appropriate level of protection (ALOP)" means the level of protection deemed appropriate by the Republic of Palau in establishing a sanitary or phytosanitary measure to protect human, animal or plant life or health within its territory (also see "Acceptable level of risk");

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(9) "Aquatic invasive species (AIS)" mean an aquatic organism that invades ecosystems beyond its natural, historic range, where it establishes a self-sustaining population that causes or has the potential to cause harm to native ecosystems or commercial, agricultural or recreational activities dependent on these ecosystems;

(10) "Article" means a single unit of any goods;

(11) "Biological products" means a subset of regulated articles of concern to aquatic biosecurity regulation that includes biological reagents for use in disease diagnosis, sera, inactivated or modified vaccines, genetic material of infectious agents; endocrine tissues from fish or used in fish, etc.

(12) "Biosecurity" means the control by legal and administrative means of invasive species, pests and diseases affecting animals, plants and their products, in order to avoid adverse effects from such pests and diseases on the economy and health of the Republic of Palau;

(13) "Biosecurity authority" means the authority in a country that administers its biosecurity laws (cf Competent authority);

(14) "Biosecurity clearance" means a letter signed by the Chief of the Division of Biosecurity or his authorized officer releasing a consignment of aquatic organisms from quarantine detention and, in the case of organisms released from an Approved Introductions and Transfers Quarantine Facility, specifying any additional biosecurity risk management measures that must be followed;

(15) "Biosecurity officer" means the Chief and his or her deputy, if any, and any person designated a biosecurity officer in accordance with the Biosecurity Act of 2014, or Executive Order;

(16) "Certifying official" means a person authorized by the Biosecurity Authority of the Republic of Palau or of an exporting country to sign and issue health certificates for aquatic organisms;

(17) "Chain of custody" means documentation showing all persons/agencies who have had legal responsibility for assuring the conditions of importation (including quarantine) as specified by the Division of Biosecurity in an aquatic organism import health standard for a consignment of live aquatic organisms or products during its movement from the exporter or facility of origin until biosecurity clearance is granted by a supervising Biosecurity Officer and release to the importer.

(18) "Chief" means the Chief of the Division of Biosecurity;

(19) “Commodity” means aquatic organisms, aquatic organism products, aquatic organism genetic material, feedstuffs, biological products and pathological material (cf regulated article);

(20) “Competent Authority” means the national veterinary services, or other authority of a country, having the responsibility and competence for ensuring or supervising the implementation of the aquatic animal health measures recommended in the World Organisation for Animal Health's (OIE) *Aquatic Animal Health Code*. At present, the Republic of Palau is not a member of the OIE, thus its equivalent services, the Division of Biosecurity, is termed the "Biosecurity Authority";

(21) "Consignment" (also termed "shipment") means a quantity of goods which arrive in the same vessel or aircraft and which in accordance with the Biosecurity Act of 2014 can be covered by a single import permit or sanitary or phytosanitary certificate;

(22) "Contamination" means the presence in any item of a pest, not constituting an infestation;

(23) "Contingency plan" means a documented work plan designed to ensure that all needed actions, requirements and resources are provided in order to eradicate or bring under control outbreaks of specified diseases of aquatic organisms;

(24) "Conveyance" means a ship, aircraft, vehicle or other means of transporting people, goods or animals from one location to another, while it is being used or prepared for such transport;

(25) "Director" means the Director of the Bureau of Agriculture;

(25) "Disease" means any unhealthy condition in an animal or plant which is known or suspected to be caused by an organism, and includes a disease transmissible from animals to humans and a disease capable of harming the environment;

(26) "Division" means the Republic of Palau Division of Biosecurity constituted by Section 69 of the *Biosecurity Act of 2014*;

(27) "Ecological risk assessment (ERA)" means a structured process for examining the ecological risks posed by the introduction or transfer of a live aquatic organism. It includes evaluation of a species' potential invasiveness and likely nature and magnitude of harms caused to native biota and to society;

(28) "Establishment" in relation to an invasive species, pest or disease, means the perpetuation in an area of the invasive species, pest or disease for the foreseeable future after its entry into a country or area;

(29) "Exporter" means a person who exports or seeks to export goods, other than as the master of the vessel or captain of the aircraft in which the goods are carried, and includes a biosecurity clearance agent;

(30) “Exporting country” means a country from which a consignment is sent to a destination in another country;

(31) "Feed" means any commercially or non-commercially produced foodstuff (including pelleted, non-pelleted and moist feeds) and any live or dead whole organisms, portions thereof, or their products destined use in the culture or maintenance of aquatic organisms.

(32) "Fittings" means any box, tank, enclosure, aquarium, plastic bag other material used for confining or containing any aquatic organism, and includes any utensil, implement or other fomite used in the handling or keeping of aquatic organisms or their products (cf host materials, packing materials);

(33) "Garbage" means any waste material derived in whole or in part from aquatic organisms or their products, or other refuse of any kind that has been associated with any aquatic organisms or their products;

(34) "Genetic material" means any material of plant, animal, microbial or other origin containing functional units of heredity;

(35) "Goods" means any kind of moveable property or thing;

(36) “Health certificate” means a certificate issued by an exporting country’s Biosecurity Authority (typically the Competent Authority) attesting to the health status of a consignment of aquatic organisms. It includes the international aquatic health certificate for aquatic animals (i.e. for fish (including eggs and gametes), amphibians, crustaceans and molluscs). In the case of other aquatic organisms (i.e. aquatic reptiles, other aquatic invertebrates and aquatic plants), the "health certificate" shall be of a similar format to that recognized by the OIE, and the issuing procedure must be accomplished using a comparable level of rigor with regards to ascertaining disease status for those pathogens and diseases appearing on the National Aquatic Pathogen List;

(37) "Host material" means any packing material, container, fittings, faeces, water, feeds or similar goods that might have had contact with aquatic organisms or their products;

(38) "ICES Code of Practice" means the International Council for the Exploration of the Sea's *ICES Code of Practice (CoP) on the Introductions and Transfers of Marine Organisms (2005)* and the *Appendices to the ICES Code of Practice (CoP) on the Introductions and Transfers of Marine Organisms (2005*). Revised by the ICES Working Group on Introductions and Transfers of Marine Organisms (WGITMO) in March 2012;

(39) "Import risk analysis (IRA)" means the process of analyzing the risks posed to the potential importing country by a consignment of live aquatic organisms or their products as outlined in the OIE's *Aquatic Animal Health Code,* and consisting of the processes of hazard identification, risk assessment, risk management and risk communication;

(40) "Importer" means a person who imports or seeks to import goods, other than as the master of a vessel or captain of the aircraft in which the goods are carried; and includes a biosecurity clearance agent;

(41) “Importing country” means a country that is the final destination to which a consignment is sent;

(42) "In transit," in relations to goods, means the goods are not imported into an area but pass through it to another area, whether by the same or another conveyance, during which time they remain enclosed, are not split up, are not combined with other goods and do not have their packaging changed;

(43) "Infected," in relation to an aquatic organism, means that the aquatic organism is diseased, harbors a non-clinical infection by a pathogen, is a carrier of a pathogen or may have been exposed to the risk of infection during the preceding 6 months;

(44) "Infested" in relation to an item or area, means that there is present in the item or area a living pest or disease;

(45) “International aquatic animal health certificate” means a certificate issued by a member of the personnel of the Biosecurity Authority (typically the Competent Authority) of the exporting country, certifying the status of health of the aquatic animals and a declaration that the aquatic animals originate from a source subjected to official health surveillance according to the procedures described in the World Organisation for Animal Health's (OIE) *Manual for the Diagnosis of Aquatic Animal Diseases*;

(46) “International trade” means import, export or transit of a consignment;

(47) "Introduction" means the human-assisted movement of an aquatic organism to an area outside its natural range;

(48) “Laboratory” means a laboratory of high technical competence under direct supervision of a veterinarian or other person with competent biological training. Through quality controls and monitoring performance, the Biosecurity Authority (Competent Authority) approves such a laboratory in regard to testing requirements for export.

(49) "List of Approved Species (i.e. the Green List)" means those species of aquatic organisms whose names appear in Annexure D. List of Live Aquatic Organisms Approved for Importation, (A) Approved Ornamental Species or (B) Species Approved for Introductions and Transfers;
(49) "List of Prohibited Species (i.e. the Red List)" means those species of aquatic organisms whose names appear in Annexure C. List of Aquatic Organisms Whose Importation is Expressly Prohibited or Restricted, (A) List of Prohibited Species;
(50) "Live aquatic organism" means any aquatic organism capable of transferring or replicating genetic material, including sterile organisms, viruses, viroids, plasmids, bacteriophages and prions (cf "aquatic organism");

(51) "Live aquatic organism product" means live eggs, gametes, larvae, etc. of an aquatic organism (cf "aquatic organism product")

(52) "Live food aquatic organisms" means aquatic organisms that are of a size suitable and intended for immediate human consumption. Such animals will not be grown further but may be fed for short-term maintenance at the end-users’ premises. They shall not be diverted to other purposes (e.g. broodstock, research, recreation, restocking) or to other facilities holding other aquatic organisms.

(53) "Minister": means the Minister of Natural Resources, Environment and Tourism;

(54) "National Aquatic Pathogen List" means the list of serious diseases affecting aquatic organisms that are known or thought to be absent from the waters of the Republic of Palau, or for which the government has established an active programme of control and/or eradication (see Annexure O);

(55) “Non-indigenous aquatic organism” means an aquatic organism not naturally occurring in the marine or freshwaters of the Republic of Palau (including an “exotic,” “non-native” or “introduced” species);

(56) "OIE" means the World Organisation for Animal Health (formerly the Office International des Epizooties);

(57) “Operator” means a person holding a license to operate an (i) Approved Quarantine Facility for Ornamental Aquatic Organisms or (ii) an approved Quarantine Facility for Introductions and Transfers of Aquatic Organisms;

(58) "Ornamental aquatic organism" means a living aquatic organism that is used solely for ornamental purposes and is contained at all times within an aquarium, tank or other secure holding facility with no possibility of escape into the natural environment. Such organisms have no potential for use in aquaculture for the production of organisms destined for human consumption.

(59) “Quarantine” means the holding or rearing of aquatic organisms under conditions that prevent their escape, and the escape of any pathogens they may be carrying, into the surrounding environment;

(60) “Quarantine facility” (see approved quarantine facility);

(61) "Packing material" means any fabric, paper, cardboard, plastic, wood, straw, grass or leaves used in packing any goods, and any other type of material in which goods are covered, enclosed contained or wrapped;

(62) "Person" means a public or private institution, corporation, partnership, joint venture, association, firm or company organized or existing under the laws of the Republic of Palau or of any state or country, or an individual;

(63) "Pest" means any species, strain or biotype or a plant, animal, microbe or pathogenic agent, or any organism which causes disease or is detrimental to or capable of harming or adversely affecting animals or animal products, plants or plant products, human beings or the environment;

(64) "President" means the President of the Republic of Palau;

(65) "Reconsign," in relation to a regulated article or consignment which has been refused biosecurity import clearance, means to send the article or consignment out of the Republic of Palau, either by the vessel or aircraft on which it was imported or by another vessel or aircraft;

(66) "Regulated article", in relation to live aquatic organisms and their products means:

any living aquatic organism;
any genetic material;
any host material or packing material;
any regulated pest or disease;
any associated garbage;
any other article, substance, goods or thing declared by the Minister by order to be a regulated article for the purposes of the *Biosecurity Act of 2014*;

(67) "Regulated pest or disease" means a pest or disease the importation of which into the Republic of Palau is prohibited or restricted under section 4 of the *Biosecurity Act of 2014*;

(68) "Sanitary certificate" (cf health certificate, international aquatic animal health certificate) means a certificate relating to a living aquatic organism or its product which:
is issued by the Biosecurity Authority (Competent Authority) of the country of origin or re-exporting country;
certifies that the animal or animal produce is substantially free from animal pests and diseases and in other respects meets the animal health import requirements of the receiving country; and
complies with relevant requirements of the SPS Agreement;

(69) "Specific pathogen free (SPF)" means aquatic animals that have been produced and are tested and held under rigorous conditions of biosecurity that provide assurances that they are free of certain specified pathogens. Once animals leave an SPF facility, they are no longer considered to have an SPF status;

(70) "Standard operating procedures (SOPs)" means a set of instructions having the force of a directive, covering those features of operations that lend themselves to a definite or standardized procedure without loss of effectiveness;

(71) “Surveillance” means a systematic series of investigations of a given population of aquatic organisms to detect the occurrence of disease for control purposes, and which may involve testing samples of a population;

(72) “Transfer” means the movement an aquatic organism to an area within the established or historical range of the species;

(73) "SPS Agreement" means the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures;

(74) "Transboundary Aquatic Animal Diseases (TAADs)" means those epizootic diseases of aquatic animals that are highly contagious or transmissible, with the potential for very rapid spread irrespective of national borders and that cause serious socio-economic and possibly public health consequences;

(75) "Treatment" means an authorized procedure for the killing, removal, modification or rendering infertile or non-viable of a pest or disease by way of cleansing, fumigation, inoculation, disinfection, disinfection, decontamination, or otherwise.

PART II

REQUIREMENTS FOR IMPORTATION OF LIVE AQUATIC ORGANISMS, AQUATIC ORGANISM PRODUCTS AND BIOLOGICAL PRODUCTS

Registration of Importers and Issuance of License to Importer

1. Any person wishing to import live aquatic organisms, aquatic organism products or biological products into the territory of the Republic of Palau must be on the Division of Biosecurity's List of Registered Importers and a holder of a License to Import as given in Annexure A.

Application to Import

2. No person shall import live aquatic organisms, aquatic organism products or biological products without written permission granted by the Chief of the Division of Biosecurity. An Application to Import Live Aquatic Organisms, Aquatic Organism Products or Biological Products shall be submitted to the Chief at least six weeks prior to the proposed date of importation of a consignment in the form and manner set out in Annexure B.

Special Requirements for Introductions and Transfers

3. Importation procedures for introductions and transfers of live aquatic organisms can only be initiated upon written approval of an Application for a Permit to Introduce or Transfer Live Aquatic Organisms (see Annexure B) by the Minister.

Enhanced Responsibilities of the National Invasive Species Committee

4. (1) The Coordinator, National Invasive Species Committee (NISC) will be charged with chairing a permanent subcommittee of national experts having the responsibility to evaluate the potential invasiveness of species named in first-time requests to import ornamental aquatic organisms.

(2) With the assistance of the Chief and the Director, he/she shall be responsible for coordination and planning of ecological risk assessments (ERA) and import risk analyses (IRA) as specified by these regulations, including their scoping, budget preparation and supervision, selection of the risk analysis team, communication of results (including organization of stakeholder meetings), periodic reporting to the Chief and Director, and ensuring independent expert review.

(3) Upon completion and full documentation of the risk analysis, he/she will deliver the final report as prepared by the risk analysis team to the Chief along with the actions recommended.

(4) Detailed terms of reference (TOR) and standard operating procedures (SOPs) for the NISC with regard to the above responsibilities will be developed by the Director.

Aquatic Pathogen Lists

A. The National Aquatic Pathogen List

5. (1) The Division of Biosecurity, as Palau's Biosecurity Authority, shall maintain and periodically update a National Aquatic Pathogen List (NAPL) listing the serious transboundary aquatic animal diseases (TAADS) that are of concern to the Republic of Palau. The NAPL shall include the relevant diseases listed in the World Organisation of Animal Health`s`(OIE) *Aquatic Animal Health Code*, as well as any other diseases of national concern that are not known to be present in Palau or are under an official control programme conducted by the Bureau of Agriculture. The NAPL shall be the primary basis for the drafting of international health certification requirements for introductions and transfers.

(2) The criteria for the placing of a pathogen or disease on the NAPL shall be the following:

The pathogen or disease causes significant losses to aquaculture at a national or multinational level, is known or likely to cause significant morbidity or mortality in wild aquatic animal populations, or is caused by a pathogen of public health concern.
The infectious aetiology of the disease is proven or an infectious agent (pathogen) is strongly associated with the disease, but the aetiology is not yet known.
There is likelihood of the disease being spread to the Republic of Palau via the importation of live aquatic animals, aquatic animal products or biological products.
A repeatable and robust means of detection/diagnosis exists.

(3) Importantly, a disease or pathogen should not be included in the NAPL if it:

has a broad geographic range, making control of entry/spread difficult to impossible (i.e. it is ubiquitous or widely spread);
is an opportunistic pathogen whose pathogenicity is reduced by improved husbandry or handling; or
is difficult or impossible to distinguish from related established pathogens, using available diagnostic screening techniques.

(4) It should be noted that at present there is no information on the pathogens and diseases of aquatic organisms present in Palau, thus for purposes of disease listing and for risk analysis purposes, until demonstrated otherwise, all pathogens and diseases should be considered as potentially absent from the country.

(5) A draft NAPL can be found in Annexure O of these Aquatic Biosecurity Regulations.

B. List of Aquatic Pathogens and Diseases of Domestic Concern

As the aquatic pathogens and diseases present in Palau and affecting aquaculture become better known, the Division of Biosecurity may establish an additional list of pathogens of importance to aquaculture, so that actions can be taken so that such pathogens and diseases will not be spread intra-nationally between islands or between aquaculture facilities on any island where the disease or pathogen is known to be present.

Preborder Requirements

A. For Importations of Live Ornamental Aquatic Organisms

(a) Invasiveness Assessment

6. (1) The Chief shall consider each application on a case by case basis and before granting an authorization he/she shall be satisfied that an initial assessment of the species potential for invasiveness been made by the relevant subcommittee of the National Invasive Species Committee (NISC) and that the NISC has recommended that the species be placed on the List of Live Aquatic Organisms Approved for Importation (hereafter referred to as the List of Approved Species), Annexure D, Part A, Approved Ornamental Species).

(2) In exceptional cases, the NISC may require that an ecological risk assessment (ERA) be conducted at the importer's expense prior to making its decision regarding listing of a species of ornamental aquatic organism.

(3) Based on the above, the Chief may:

(i) permit entry of the consignment (for those ornamental aquatic organisms appearing on the List of Approved Species, Annexure D, Part A); or

(ii) prohibit entry of all of part (if the consignment is found to contain more than a single species of ornamental aquatic organism) of the consignment (for those ornamental aquatic organisms appearing on the List of Aquatic Organisms Whose Importation is Expressly Prohibited (the List of Prohibited Species) (Annexure C, Part A).

B. For Importation of a Introduction or Transfer

(a) Approved and Prohibited Species

6. The Chief shall consider each application on a case by case basis and will initially determine if the species to be introduced or transferred is listed on the List of Live Aquatic Organisms Approved for Importation (the List of Approved Species), Annexure D, Part B, Species Approved for Introductions and Transfers. Based on his/her findings, the Chief will:

(i) In the case that the application involves a request to import a species already listed on the List of Approved Species or if the request involves an unlisted species (i.e. a species whose name does not appear of the List of Approved Species or on the List of Prohibited Species), refer the application to the Coordinator of the NISC for further evaluation.

(ii) If the application involves a request to import a species that is on the List of Prohibited Species, refuse the application.

(b) Requirement for Ecological Risk Assessment (ERA)

7. Upon receipt of a request from the Chief, and with the agreement of the importer, who must cover all associated costs, the NISC will initially commission an ecological risk assessment (ERA), which will determine the potential invasiveness of the species to be imported and evaluate the likely consequences in terms of potential harms to aquatic ecosystems, existing aquaculture and social and economic wellbeing of the citizens of Palau. Based on the results of ERA, the NISC will recommend that:

(i) the risk of invasiveness is acceptable, in which case the species will be added to the List of Approved Species and the NISC will proceed to the commissioning of an import risk analysis (IRA) for the specific consignment to be imported; or

(ii) the risk is unacceptable, in which case the request to import will be refused and the name of the species under consideration will be added to the List of Prohibited Species.

(c) Requirement for Import Risk Analysis (IRA)

8. (1) If the findings of the ERA are that the species under consideration poses an acceptable ecological risk, and with the agreement of the importer, who will bear all associated costs, the NISC will then commission an IRA, which will determine if the risk of disease/pathogen introduction posed by the individual consignment (as proposed by the importer, taking into consideration the life cycle stage, source, health history, number of organisms to be imported, and any proposed risk management measures) is acceptable (i.e. within the national appropriate level of protection (ALOP)/acceptable level of risk (ALOR)). The IRA will determine whether:

(i) the risk posed by the consignment is acceptable, in which case the application to import can be approved, or

ii) the risk is unacceptable, in which case the IRA will examine possible additional risk management measures that will lower the risk to an acceptable level. The outcomes of this attempt at risk management are either:

(a) the risk management measures proposed by the IRA will lower the risk to an acceptable level, in which case, the request to import can be approved if the importer agrees to the additional conditions for importation recommended by the IRA, and to covering all costs associated with their implementation; or

(b) no risk management measures are available to reduce the risk to an acceptable level, in which case the application to import will be refused.

(2) The Coordinator of the NISC will communicate the results and recommendations of any completed ERA or IRA to the Chief for his/her action and official communication to the Director and Minister.

(3) Upon review of the recommendations of the NISC, the Chief and the Director, the Minister will approve or reject the application to import.

(d) President to Officially Declare the National Appropriate Level of Protection

9. The President of the Republic of Palau, in consultation with the Minister, the relevant Directors, the Chief, Division of Biosecurity and other stakeholders, shall formally declare the appropriate level of protection (ALOP) to be used in import risk analysis, taking into consideration that a single ALOP must be applied to the importation of plants, terrestrial animals and aquatic animals into the Republic of Palau.

(e) Responsibilities of the Importer

Agreement to cover costs

10. (1) Before the NISC commissions an ERA and/or an IRA, the importer must:
(i) agree, in writing, to pay all expenses associated with the conduct of the ERA and/or IRA; and
(ii) agree to provide, to the best of his/her ability, all information requested by the NICS regarding the particulars of the consignment;

(2) Importers should be aware that applications to import or transfer a live aquatic organism that generate an ERA and/or IRA may have a lengthy approval process that will require from 6 months to more that 1 year for completion and which can be expected to involve extensive stakeholder consultation. The costs of such risk analyses and stakeholder consultations, which must be borne by the importer, can be considerable, as it may be necessary for the NISC to engage national and international experts to conduct and/or review such risk analyses.

(f) Demonstration of Access to an Approved Quarantine Facility

11. Where the commodity is a live aquatic organism, the importer must show that:

(a) in the case where the importation involves a species of ornamental aquatic organism listed on Annexure D (the List of Approved Species), Part A. Approved Ornamental Species, that he/she is either (i) the operator of an Approved Quarantine Facility for Ornamental Aquatic Organisms or (ii) that he/she has a contractual arrangement with an operator of a such an approved quarantine facility for the holding of the consignments(s) in question.

or

(b) in the case where the importation involves a species of aquatic organism approved for introduction or transfer by the Minister, and where the use of quarantine is a requirement for importation, that the importer has either direct ownership of, or contractual access to, an Approved Quarantine Facility for Introductions and Transfers of Aquatic Organisms to contain the consignment.

(g) Duty of Importer to Meet Additional Entry Requirements

12. The importer shall meet any additional entry requirements provided for under other laws of the Government of the Republic of Palau.

(h) Ministry Activities to Facilitate Meeting Pre-border Requirements

13. To facilitate this procedure, the Ministry shall develop and maintain:

a list of Registered Importers;

a list of Registered Restaurants;

a list of species of aquatic organisms whose importation into the Republic of Palau is expressly prohibited or restricted (Annexure C);

a list of approved quarantine facilities for (i) ornamental aquatic organisms and ((ii) introductions and transfers

a list of those species of aquatic organisms that are approved for importation (Annexure D);

a list of Biosecurity Authorities (Competent Authorities) for those countries that are the main trading partners of the Republic of Palau with regard to the import and export of live aquatic organisms and their products and their current contact information (Annexure E);

requirements concerning the health certificate for importation of live ornamental aquatic organisms into Republic of Palau;

a list of approved Ports of Entry (frontier posts) of live aquatic organisms into the Republic of Palau (Annexure G);

a National Aquatic Pathogen List (Annexure O) of those serious transboundary aquatic animal diseases (TAADs) that live aquatic organisms falling under the category of introductions and transfers must be certified as free from by the competent authority of the exporting country.

Approval and Notification of Consignment Particulars

14. Upon satisfactory completion of all pre-border requirements including any required pre-border risk management measures, the Minister will grant approval to import for the specific consignment. Upon receipt of the approval, the importer will notify the Chief of the expected time, date and means of arrival (flight or vessel number) and Port of Entry (frontier post), and will provide a copy of the Bill of Lading.

Part II (B) - Border Requirements

Documents to Accompany Shipment

15. Each consignment must be accompanied by a copy of the Bill of Lading, the approved Application to Import Live Aquatic Organisms, Aquatic Organism Products or Other Biological Produces (Annexure B) in accordance with these Aquatic Biosecurity Regulations, and the completed health certificate (in the format and as specified for the individual consignment), as required by the Application to Import.

Arrival Inspection and Clearance

16. (1) The inspecting Biosecurity Officer will ensure that all importation requirements have been met prior to transfer of custody of the consignment to the importer or his agent.

(2) The inspecting officer shall verify the accuracy and completeness of information provided on the Bill of Lading as to the nature of the commodity and the quantity (number of organisms, amount of product, etc.) comprising the consignment.

(3) In the case where the commodity is live aquatic organism(s), the inspecting officer shall verify the identity of the species, note the presence of any mortalities or clinical signs of disease present in the shipment and may, at his/her discretion or at the request of the

Ministry, collect samples of the commodity for laboratory analysis or to confirm species identity.

Maintaining Chain of Custody

17. (1) In the case where the consignment involves is a species of live ornamental aquatic organism, the consignment will be transferred to the custody of the operator, who must guarantee its secure transport, under quarantine conditions, to the Approved Ornamental Aquatic Organisms Quarantine Facility.

(2) In the case where the commodity involves a living aquatic organism approved by the Minister for introduction or transfer, the consignment will be resealed by the supervising Biosecurity Officer or his representative with an approved tamperproof seal (e.g., Tyden seal, lead seal or padlock) and will be transferred to the custody of the operator, who must guarantee the secure transport of the consignment, under quarantine conditions, to the Approved Introductions and Transfers Quarantine Facility.

Part II(C) - Post-border Requirements

Criteria for Approved Quarantine Facilities

18. (1) Detailed criteria for the quarantine of ornamental aquatic organisms appearing on the List of Approved Species (i.e. Annexure D, Part A. Approved Ornamental Species) are given in Annexure H - Standards of Construction, Security and Operation for Approved Quarantine Facilities for Ornamental Aquatic Organisms.

(2) Detailed criteria for the quarantine of species of live aquatic organisms approved by the Minister for introduction or transfer are given in Annexure I - Standards of Construction, Security and Operation for Licensed Quarantine Facilities for Introductions and Transfers of Aquatic Organisms.

Application to Establish a Registered Quarantine Facility

19. (1) A person may not establish a quarantine facility without the approval of the Minister.

(2) In the case of an Ornamental Aquatic Organisms Quarantine Facility, this will be by submission and approval of an Application for a License to Operate an Approved Quarantine Facility for Ornamental Aquatic Organisms (Annexure J).

(3) In the case of an Introductions and Transfers Quarantine Facility, ministerial approval to import live aquatic organisms will be contingent on, among others, prearranged access to such a facility, either by construction or lease.

(4) Details of the standards of construction, operation and maintenance of approved quarantine facilities are given in Annexures H and I.

(5) The Minister shall, prior to granting a license or approval, ensure that the facilities for which a license or approval is requested have been inspected by the Chief, who will

confirm that all standards of construction and operation specified in the relevant Annexure are met.

(6) The Chief shall establish and maintain a registry of licensed and approved quarantine facilities for the secure holding of live aquatic organisms and their products.

Financial Responsibility of Importer

20. All costs associated with the inspection and quarantine of an imported consignment, including any required diagnostics tests, treatments, and, if necessary, the destruction and disposal of infected live aquatic organisms will be borne by the importer.

Special Requirements for the Importation of Live Crustaceans by Restaurants

21. (1) The importation of live food aquatic organisms destined for direct consumption at restaurants is of concern in that such live animals are of unknown health status and are likely to be infected with serious transboundary aquatic animal diseases (TAADs) that may pose risks to aquacultured and wild aquatic species in Palau. Of particular concern is the importation of live crustaceans (penaeid shrimp, mangrove crabs, etc.). Importers of live crustaceans for direct use in restaurants are thus required to follow the standard operating procedures (SOPs) outlined in Annexure P.

(2) Restaurants importing imported live aquatic organisms or holding such imported organisms in aquaria or tanks for use as live food aquatic organisms must register with the Division of Biosecurity.

PART III

REQUIREMENTS FOR THE EXPORTATION OF LIVE AQUATIC ORGANISMS, AQUATIC ORGANISM PRODUCTS AND BIOLOGICAL PRODUCTS

Registration and Licensing of Exporters

22. Any person wishing to export live aquatic organisms, aquatic organism products or other biological produces from the territory of Republic of Palau must be a Registered Exporter and holder of a License to Export as given in Annexure L.

Application to Export

23. All exports of living aquatic animals or their products from the Republic of Palau shall require prior approval by the Chief through completion of an Application to Export Live Aquatic Organisms or their Products made in the form set out in Annexure M.

Prohibited Species

24. No person shall export those species of aquatic organisms or their products that are listed on Annexure K, List of Aquatic Organisms and their Products whose Export is Prohibited, except upon special written clearance by the Minister.

Requirements of Importing Countries

25. To assist international trading partners in protecting their aquatic organism health status and to facilitate international trade, the Minister may require that exporters demonstrate that shipments of live aquatic organisms or their products have met the health certification requirements and/or other applicable standards of the importing country and of any transit countries.

26. It is the responsibility of the exporter to comply with all requirements, including those related to disease status of consignments, as laid down by the importing country and any transit countries. The Division of Biosecurity may assist exporters in determining export requirements set by importing countries.

Health Certificates for Export

27. At the request of an exporter, the Division of Biosecurity may assist exporters in identifying international laboratories that are competent to perform necessary diagnostic tests that will allow the Chief, Division of Biosecurity to issue an international health certificate for freedom from specific disease(s) of aquatic animals (fish, crustaceans and molluscs) or for other species-groups of aquatic organisms, to the standards specified by the Competent Authority of an importing country. The costs of such diagnostic tests shall the responsibility of the exporter.

Fees for Services

28. The Ministry may set fees for the issuance of health certificates and other services performed to assist exporters.

Exporter's Responsibility for other Clearances

29. It is the responsibility of the exporter to obtain any clearances or authorizations for export of living aquatic organisms or their products required by other ministries or departments of the Government of the Republic of Palau. The Division of Biosecurity may assist exporters in identifying such requirements.

PART IV

INTRA-NATIONAL MOVEMENTS OF LIVE AQUATIC ORGANISMS AND AQUATIC ORGANISM PRODUCTS

Requirement of Authorization Prior to Movement

30. Any inter-island transport of live aquatic organisms or live aquatic organism products shall require the authorization of the Director, Bureau of Agriculture or his designated personnel as per Annexure N, Application for Inter-island Transport of Live Aquatic Organisms within the Republic of Palau.

Annexure A

Republic of Palau

Application for a Licence to Import Live Aquatic Organisms, Aquatic Organism Products and Biological Products; and Licence Form

Part (A) - Application Form

Name of the Applicant:

2. Telephone, fax, e-mail:

Address:

Name and address of business (if different):

Type of commodity to be imported:

_____ live aquatic organisms

_____ live aquatic organism products (e.g., live eggs, gametes, larvae, etc.)

_____ biological products (e.g., biological reagents for use in disease diagnosis, sera, inactivated or modified vaccines, genetic material of infectious agents; endocrine tissues from fish or used in fish, etc.

Estimated annual volume(s) (specify each type of commodity and volume):

Any other relevant information:

I certify that the particulars furnished above are true and correct. I agree that if any particulars are found to be false or incorrect my application will be rejected and if a permit has been issued such permit will be cancelled.

Date: _____ Signature: _____

Part (B) - License to Import Live Aquatic Organisms, Aquatic Organism Products and Biological Products

License No.:

…….of…….is hereby authorized to import live aquatic organisms, aquatic organism products and biological products subject to the following terms and conditions:

1. this License, unless cancelled, shall be valid for ……. from the date of issue.

2.

3.

_____ _____

Chief, Division of Biosecurity Date

Annexure B

Republic of Palau

Application to Import Live Aquatic Organisms, Aquatic Organism Products or Biological Products

Name of the applicant:

Telephone, fax, e-mail:

Mailing address:

Importer license no. _____

5. Particulars with respect to the aquatic organisms proposed for importation:

a. This application involves, as defined by the Aquatic Biosecurity Regulations:
_____ an **ornamental aquatic organism**
_____ the **introduction** of an aquatic species exotic to Palau, or
_____ the **transfer** of a strain or variety of an aquatic organism native to Palau
_____ the importation of an **aquatic organism product** or other **biological product**

b. Species of aquatic organism(s) for which a permit is requested (give full scientific name and common name; e.g. *Penaeus monodon*, giant tiger prawn):

c. Proposed source of organisms to be moved (provide name and address of exporter, hatchery, aquaculture facility or other source):

d. Proposed final destination in Palau:

e. Proposed life cycle stage to be imported (e.g. broodstock, adults, juveniles, fry, postlarvae, larvae, fertilized eggs, etc.):

f. Quantity to be imported (for each species):

g. Reason for request:

h. Supporting information required for the importation of ornamental aquatic organisms:

Does the applicant have access to an Approved Ornamental Aquatic Organisms Quarantine Facility, or if not, is he/her is prepared to establish or lease such a facility to contain the consignment?

i. Supporting information required for introductions and transfers:
For introductions, provide evidence that no suitable native species can be used for the intended propose
For transfers, provide evidence that no local sources for the intended species are available within the Republic of Palau
For all requests, provide supporting evidence that the proposed introduction or transfer is likely to result in significant socio-economic benefit to the Republic of Palau
Is the health status of the stock to be imported known? (If so, provide supporting documentation)
Is the applicant prepared to cover all costs associated with an ecological risk assessment and/or import risk analysis?
Is the applicant have access to, or is prepared to establish or lease an Approved Introductions and Transfers Quarantine Facility to contain the consignment?

h. Proposed date of importation, method of shipment of consignment and port of entry. Note that:
a. for ornamental aquatic organisms, that proposed arrival date of the consignment must be at least six weeks prior to the date of submission of this application
b. for introductions and transfers, the arrival date of the consignment will be set only after an acceptable level of risk as been demonstrated by the ERA and/or IRA.

6. Each consignment of live aquatic organisms, aquatic organism products or biological products must be approved individually. A copy of the signed entry permit will be sent to the requesting party and a copy must accompany the consignment.

Date:_____ Signature of applicant: _____

Annexure C

Republic of Palau

List of Aquatic Organisms Whose Importation is Expressly Prohibited or Restricted

A. List of Prohibited Species

Process for Listing: This list will be compiled as requests to import live aquatic organisms are received and following the results of examination of the potential invasiveness of individual species as determined by members of the National Invasive Species Committee (NISC). The NISC, which may seek the advice of international experts, will determine if an individual species should be: (a) placed on the List Of Aquatic Species Approved for Importation (Annexure D) or (b) placed on the List of Prohibited Species (this Annexure) The listing should take a form similar to that given below:

Prohibited Freshwater Fishes

Scientific Name	***Common name***	***Family***
Oreochromis sp. and hybrids	Tilapias	Cichlidae

B. List of Restricted Species: Species listed by the Convention on International Trade in Endangered Species (CITES)

Trade in these species of aquatic organisms and their products requires an appropriate CITES permit, as well as approval by the Minister and of other concerned government departments (e.g., Bureau of Marine Resources).

As the CITES Appendices are frequently updated, the Division of Biosecurity should consult the CITES Website (https://www.cites.org/eng/app/appendices.php) at regular intervals to determine the species currently listed in Appendices I, II and III.

Appendix I includes species threatened with extinction. Trade in specimens of these species is permitted only in exceptional circumstances.

Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival.

Appendix III contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

Annexure D

Republic of Palau

List of Live Aquatic Organisms Approved for Importation

General Procedure: This list will be compiled as requests to import live aquatic organisms are received and following the results of examination of the potential invasiveness of individual species as determined by members of the National Invasive Species Committee (NISC). The NISC, which may seek the advice of international experts, will determine if individual species should be:

(a) placed on the List of Freshwater and Marine Ornamental Aquatic Organisms Approved for Importation (Annexure D, Part A), or the List of Freshwater and Marine Aquatic Organisms Approved for Introduction or Transfer (Annexure D, Part B) or

(b) placed on the list of Prohibited Aquatic Species (Annexure C).

A. Approved Ornamental Species

The listing should take a form similar to that given below:

A. Approved Freshwater Aquarium Species

Scientific Name	*Common name*	*Family*

B. Approved Marine Aquarium Species

Scientific Name	*Common name*	*Family*

B. Species Approved for Introductions and Transfers

The listing should take a form similar to that given below:

A. Approved Freshwater Species

Scientific Name	*Common name*	*Family*

B. Approved Marine Species

Scientific Name	*Common name*	*Family*

Annexure E

Republic of Palau

List of Competent Authorities for Republic of Palau's Main Trading Partners[2]

Main Countries exporting live aquatic animals to the Republic of Palau:

Taiwan POC

OIE Delegate: Taiwan POC is not a member of the OIE

Competent Authority for Aquatic Animals

Bureau of Animal and Plant Health Inspection (BAPHIQ)
[Animal end use only, e.g. baitfish, aquaculture, stockfeed and pet food]
Website: https://www.baphiq.gov.tw/en/

Bureau of Standards, Meteorology and Inspection (BSMI) [Human consumption only]

Species known to be exported by Taiwan POC to Palau:

Penaeid shrimp juveniles (species not known, but likely to be *Penaeus vannamei* (whiteleg shrimp) for pond grow out
Chanos chanos fry (milkfish) for pond grow out, also for tuna bait
others: possibly *Epinephelus* spp. fry (groupers) for cage grow out

The Philippines

OIE Delegate:
Dr Enrico P. Jr. Garzon
Assistant Secretary for Livestock
Bureau of Animal Industry
Department of Agriculture
Elliptical Road, Diliman,
Quezon City, Philippines
PHILIPPINES

Competent Authority for Aquatic Animals

Bureau of Fisheries and Aquatic Resources (BFAR)
PCA Building, Eliptical road, Diliman
Quezon City
Website: www.bfar.da.gov.ph/

Species known to be exported to Palau:

[2] Information is mainly taken from: http://www.agriculture.gov.au/biosecurity/legislation/new-biosecurity-legislation/bio-legislation/list-os-authorities-aquatic

Scylla spp. (mangrove crab) juveniles (for fattening)
others: possibly *P. monodon* (giant tiger prawn) adults (for restaurant consumption)

Annexure F

Model Health Certificates for International Trade in Live Aquatic Organisms, Aquatic Organism Products and Biological Products

(source: OIE. 2016. *Aquatic Animal Health Code*)

Notes for guidance on the health certificates for international trade in live aquatic animals and products of aquatic animal origin

General

Please complete the certificate on paper in capital letters. To confirm an option, mark the box with a cross (X). Ensure that no portion of certificate is left blank in a manner that would allow it to be amended. Non-applicable fields may be crossed out.

Part I. Details of dispatched consignment

Country:	Name of the country that issues the certificate
Box I.1.	Name and full address of the natural or legal entity dispatching the consignment. Information on telephone and fax numbers or e-mail address is recommended.
Box I.2.	The certificate reference number is the number used by the Competent Authority of the country to identify the certificate.
Box I.3.	Name of the Competent Authority.
Box I.4.	Name and full address of the natural or legal entity to whom the consignment is destined at the time the certificate is issued.
Box I.5.	Name of the country from which the live aquatic animals or gametes are being exported. For aquatic animal products, name the country(ies) where the finished products were produced, manufactured or packed.
	"ISO code" refers to the international standard two-letter code (ISO 3166-1 Alpha-2 Code) for a country produced by the International Organization for Standardization.
Box I.6.	Name of the zone or compartment of origin, if relevant, in part II of the certificate.
Box I.7.	Name of the country of destination. "ISO code" refers to the international standard two-letter code (ISO 3166-1 Alpha-2 Code) for a country produced by the International Organization for Standardization.
Box I.8.	Name of the zone or compartment of destination, if relevant, in part II of the certificate.
Box I.9.	Name and full address of the place(s) from which the live aquatic animals, gametes or aquatic animal products are being exported; and official approval or registration number when required.
	For live aquatic animals and gametes: the establishment(s) or place of capture.
	For products of aquatic animal origin: the premises from which the products are to be dispatched.
Box I.10.	Name of the place from which the live aquatic animals, gametes or aquatic animal products are being shipped (this will be a land, sea or airport).
Box I.11.	Date of departure. For live aquatic animals and gametes include the expected time of departure.
Box I.12.	Details of the means of transport.

	Identification of the means of transport at the time the certificate is issued: for air transport, the flight number; for maritime transport, the name of the vessel; for rail transport, the number of the train and the wagon and for road transport, the registration number of the road vehicle and the number of the trailer where used.
Box I.13.	Name of expected border post and, if available, its UN/LOCODE (refer to the United Nations Code for Trade and Transport Locations).
Box I.14.	CITES permit number(s) if the commodity concerns species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora.
Box I.15.	Describe the commodity or use the titles as they appear in the Harmonised System of the World Customs Organization.
Box I.16.	Heading or HS Code of the Harmonized System set up by the World Customs Organization.
Box I.17.	Total quantity or weight of the commodity.
	For live aquatic animals and gametes give the total count or weight.
	For aquatic animal products give the gross weight and the net weight in kg of the whole consignment.
Box I.18.	Temperature of products for transport and storage.
Box I.19.	For live aquatic animals and gametes give the total number of containers in which they are being transported. For aquatic animal products give the total number of packages.
Box I.20.	Identify the containers/seal numbers where required.
Box I.21.	Identify the type of packaging of products as defined in Recommendation No. 21 – Code of Passengers, Type of Cargo, Package and Packaging Materials of UN/CEFACT (United Nation Centre for Trade Facilitation and Electronic Business).
Box I.22.	Intended use of the imported live aquatic animals or aquatic animal products.
	Breeding: applies to gametes and broodstock.
	Grow out: applies to live aquatic animals, aquatic eggs and aquatic larvae requiring time in culture.
	Slaughter: applies to live aquatic animals for slaughter.
	Restocking: applies to live aquatic animals for the purpose of rebuilding stocks.
	Ornamental: applies to live aquatic animals kept for companionship or enjoyment.
	Competition/display: applies to live aquatic animals used for competition or display purposes.
	Human consumption: applies to live aquatic animals (without further aquaculture involved) or aquatic animals products intended for human consumption.
	Aquatic animal feed: means any product of animal origin (single or multiple), whether processed, semi-processed or raw, that is intended to be fed to aquatic animals.
	Further processing: applies to products of aquatic animal origin that have to be further processed before being suitable for end use.

	Other technical use: applies to aquatic animal products not intended for human or aquatic animal consumption. These include aquatic animal products that are intended for use in the pharmaceutical, medical, cosmetic and other industries. Such products may be subjected to extensive further processing.
	Technical use in live aquatic animals: applies to aquatic animal products used in live aquatic animals, e.g. to stimulate ovulation.
Box I.23.	Mark, if appropriate.
Box I.24.	Details on the nature of the commodity sufficient to identify it.
	For live aquatic animals and gametes: Category (i.e. amphibian, crustacean, fish or mollusc); Wild stocks or cultured stocks; Species (scientific name); and if required, Identification system; Batch number or other identification details; Age; Sex.
	For products of aquatic animal origin: Category (i.e. amphibian, crustacean, fish or mollusc); Wild stocks or cultured stocks; Species (Scientific name); Approval number of establishment(s) (e.g. processing plant; cold store); Lot identification/date code; Number of packages.

Part II. Zoosanitary information

Box II.	Complete this part in accordance with the requirements agreed between the Competent Authorities of the importing and exporting countries in accordance with the recommendations in the Aquatic Code.
Box II.a.	Reference number: see box I.2.
Certifying Official	Name, address, official position, date of signature and official stamp of the Competent Authority.

Model Health Certificate for International Trade in Live Aquatic Animals and Gametes
COUNTRY:

Part I: Details of dispatched consignment	I.1. Consignor: Name: Address:	I.2. Certificate reference number: I.3. Competent Authority:
	I.4. Consignee: Name: Address:	
	I.5. Country of origin: ISO Code*:	I.6. Zone or compartment of origin**:
	I.7. Country of destination: ISO Code*:	I.8. Zone or compartment of destination**:
	I.9. Place of origin: Name: Address:	
	I.10. Place of shipment:	I.11. Date of departure:
	I.12. Means of transport:	I.13. Expected border post:
	Aeroplane □ Ship □ Railway wagon □ Road vehicle □ Other □ Identification:	I.14. CITES permit No(s)**:
	I.15. Description of commodity:	I.16. Commodity code (ISO code):
		I.17. Total quantity:
	I.18.	I.19. Total number of packages:
	I.20. Identification of container/seal number:	I.21. Type of packaging:
	I.22. Commodities intended for use as:	
	Breeding □	Grow out □
	Slaughter □	Restocking □
	Ornamental □	Competition/exhibition □
	Other □ If other, specify.	
	I.23. For import or admission: Definitive import □ Re-entry □ Temporary admission □	
	I.24. Identification of commodities:	
	Amphibian □	Crustacean □
	Fish □	Mollusc □

	Wild stock □	Cultured stock □
	Species (scientific name):	Age*:
	Identification system*:	Batch number*:
	Sex*:	

* Optional. ** If referenced in Part II.
COUNTRY:

Part II: Zoosanitary information		II.a. Certificate reference number:
	The undersigned Certifying Official certifies that the animal(s)/gametes described above satisfy(ies) the following requirements:	
	Certifying Official:	
	Name and address (in capital letters):	Official position:
	Date:	Signature:
	Stamp:	

Model Health Certificate for International Trade in Products of Aquatic Animal Origin
COUNTRY:

<table>
<tr><td rowspan="8">Part I: Details of dispatched consignment</td><td colspan="2">I.1. Consignor:
Name:
Address:</td><td>I.2. Certificate reference number:
I.3. Competent Authority:</td></tr>
<tr><td colspan="3">I.4. Consignee:
Name:
Address:</td></tr>
<tr><td colspan="2">I.5. Country of origin:
ISO Code*:</td><td>I.6. Zone or compartment of origin**:</td></tr>
<tr><td colspan="2">I.7. Country of destination:
ISO Code*:</td><td>I.8. Zone or compartment of destination**:</td></tr>
<tr><td colspan="3">I.9. Place of origin:
Name:
Address:</td></tr>
<tr><td colspan="2">I.10. Place of shipment:</td><td>I.11. Date of departure:</td></tr>
<tr><td></td><td colspan="2">I.12. Means of transport:</td><td>I.13. Expected border post:</td></tr>
<tr><td></td><td colspan="2">Aeroplane □ Ship □
Railway wagon □

Road vehicle □ Other □

Identification:</td><td>I.14. CITES permit No(s)**:</td></tr>
<tr><td></td><td colspan="2" rowspan="2">I.15. Description of commodity:</td><td>I.16. Commodity code (ISO code):</td></tr>
<tr><td></td><td>I.17. Total quantity/weight:</td></tr>
<tr><td></td><td colspan="2">I.18. Temperature of the product:
Ambient □
Chilled □ Frozen □</td><td>I.19. Total number of packages:</td></tr>
<tr><td></td><td colspan="2">I.20. Identification of container/seal number:</td><td>I.21. Type of packages:</td></tr>
<tr><td></td><td colspan="3">I.22. Commodities intended for use as:</td></tr>
<tr><td></td><td colspan="2">Human consumption □</td><td>Aquatic animal feed □</td></tr>
<tr><td></td><td colspan="2">Further processing □</td><td>Other technical use □</td></tr>
<tr><td></td><td colspan="2">Other □ If other, specify.</td><td>Technical use in aquatic animals □ If technical use, specify:</td></tr>
<tr><td></td><td colspan="3">I.23.</td></tr>
<tr><td></td><td colspan="3">I.24. Identification of commodities:</td></tr>
<tr><td></td><td colspan="2">Amphibian □</td><td>Crustacean □</td></tr>
<tr><td></td><td colspan="2">Fish □</td><td>Mollusc □</td></tr>
</table>

	Wild stock □	Cultured stock □
	Species (scientific name):	Approval number of establishments:
	Lot ID/date code:	

* Optional.
** If referenced in Part II.

COUNTRY:

Part II: Zoosanitary information		II.a. Certificate reference number:
	The undersigned Certifying Official certifies that the product(s) of aquatic animal origin described above satisfy(ies) the following requirements:	
	Certifying Official:	
	Name and address (in capital letters):	Official position:
	Date:	Signature:
	Stamp:	

Annexure G

Republic of Palau

List of Approved Ports of Entry (Frontier Posts) for Importation of Live Aquatic Organisms, Aquatic Organism Products and Biological Products

Airports
Airai International Airport (all commodities)
Sea Ports
Makalal Commercial Port (all commodities)
Post Offices
Koror Post Office (non-viable commodities only; not to be used for importation of live aquatic organisms or live aquatic organism products as defined in Section 1.5 of these Aquatic Biosecurity Regulations

Annexure H

Republic of Palau

Standards of Construction, Security and Operation for Approved Quarantine Facilities for Ornamental Aquatic Organisms

1.0 General

The primary purpose of quarantine is to minimize the risk of introducing infectious agents (pathogens) into the territory of the Republic of Palau and their transmission to susceptible species. The secondary purpose is to prevent the introduction of aquatic invasive species (AIS) and other potentially harmful aquatic organisms that have not been approved for introduction.

The standards outlined in this Annexure shall apply to the quarantine of all consignments of freshwater and marine ornamental organisms imported into the Republic of Palau.

Standards for facilities for the quarantine of aquatic species approved for possible introduction or transfer into the Republic of Palau's natural waters are given in Annexure I of the Aquatic Biosecurity Regulations – "Standards of Construction, Security and Operation for Approved Quarantine Facilities for Introductions and Transfers of Aquatic Organisms".

The Application to Operate an Approved Quarantine Facility For Ornamental Aquatic Organisms (hereafter, a **"**Quarantine Facility**".**) is given as Annexure J of the Aquatic Biosecurity Regulations and is subject to approval by the Director, Bureau of Agriculture. An application to establish a Quarantine Facility will be considered on its individual merits with consideration being given to the quarantine risk and serviceability associated with each proposed establishment's location and construction, and on the capability of the applicant to successfully operate such a facility.

It is the responsibility of the operator (i.e., the holder of a license to operate a Quarantine Facility) to ensure that the premises and all operations comply with all local, state and national regulations.

The Division of Biosecurity must be notified in writing, at least 30 days prior to any intended change in ownership, senior management, quarantine operating procedures/arrangements or contemplated modifications to the Quarantine Facility.

Non-compliance of the criteria outlined in these Aquatic Biosecurity Regulations or any breach of "The Biosecurity Act 2014" may result in approval of the Quarantine Facility being withdrawn or suspended and legal action instigated.

The Quarantine Facility shall be constructed and operated in a manner that shall assure the isolation the imported ornamental aquatic organisms, such that the organisms, any pathogens they may carry, and any pests or other living aquatic organisms contained in their transport waters will not be released from the facility.

During the quarantine period, the operator shall ensure that no living aquatic organisms, equipment or materials (i.e. host material and packing material) are removed from the Quarantine Facility without the approval of the supervising Biosecurity Officer or without adequate disinfection using approved methods.

2.0 Period of Quarantine

The normal minimum period of quarantine shall be six weeks for consignments of freshwater ornamental aquatic organisms and three weeks for consignments of marine ornamental aquatic organisms.

If, at the end of the specified quarantine period, the supervising Biosecurity Officer has reason to believe that a consignment of aquatic organisms still presents an unacceptable risk of disease or pest introduction, the consignment may be held in quarantine for further investigation, observation, treatment, testing or for any other purpose appropriate to the circumstances. If the risk cannot be effectively managed, destruction of the consignment will be ordered.

Standards of Construction

3.1 Location of Quarantine Facilities

The Quarantine Facility must be located within a reasonable road distance from Koror so as to be readily accessible to the supervising Biosecurity Officer.

Premises will not be approved in the vicinity of private or government hatcheries, aquaculture facilities (other than closed facilities used for the breeding and culture of ornamental aquatic organisms), watercourses or areas subject to frequent flooding.

Specifications of Quarantine Facilities

3.2.1 General Requirements

Access to the Quarantine Facility must be through property owned, rented or leased by the operator and must be available to Biosecurity Officers during normal business hours and at such time that consignments are entering or leaving the premises. The operator must notify the supervising Biosecurity Officer of the times when the premises will be attended and any alterations to the regular hours.

The Quarantine Facility must be located within a single operational entity, and as such be structurally separated from any other operations. It may share a building with other areas that are used for different purposes (including wholesale or retail activities involving live aquatic organisms or their products); however, the Quarantine Facility must not used as an access way to other parts of the building.

The Quarantine Facility must be weatherproof and maintained in a state of good repair.

The Quarantine Facility must be located within a secure, lockable building, or within a building that is located in an area surrounded by a lockable person-proof security fence.

The Quarantine Facility shall not to be used for any purpose, what-so-ever, other than as a place for the performance of quarantine.

The holding capacity of the Quarantine Facility must be commensurate with the proposed quantities and number of species of aquatic organisms to be handled.

The Quarantine Facility must have facilities for the sterilization of all equipment that comes in contact with aquatic organisms or tank water during the quarantine period.

3.2.2 Specific Construction and Equipment Requirements

The Quarantine Facility must comply with the following specific construction and equipment requirements:
Windows must be screened to prevent the entry of insects.
The floor and walls must be constructed of concrete, tiles or other impervious material to enable hose down and disinfection with retention of all water. The floor must be sufficiently smooth and with sufficient grade to drain to an approved septic tank, municipal sewerage or enclosed holding tank.
Floor to wall junctions and all gaps and cracks in the walls, floor and ceiling must be effectively sealed.
Lighting must be of sufficient intensity to allow proper inspection of all aquatic organisms.
A floor drainage with an insertable plug or other mechanism to prevent the accidental escape of aquatic organisms or uncontrolled release of water must be installed. Drainage must be to an approved septic tank, municipal sewer or an enclosed holding tank.
Doors must have a self-closer to ensure that they remain shut after entry, or there must be a self-closing insect-proof screen door installed.
Facilities must be provided for staff and Biosecurity Officers to wash their hands prior to leaving the Quarantine Facility.
All holding tanks for aquatic organisms must:
be identified with permanent numbers so that individual tank records can be correlated with them;
be fitted with lids or other approved equivalents so as to prevent transmission of pathogens between adjacent tanks due to splash from the aeration/filter system, and to prevent the escape of aquatic organisms;
have water intake lines equipped with automatic shutoff valves;
be arranged in a manner that permits ready access for inspection purposes, including a minimum width of 75 cm for corridors between rows of tanks or tanks and walls;
other than the aquatic organisms, contain only sterilizable materials (e.g., plastic) that do not interfere with inspection;
have at least the front transparent to provide good visibility of their contents, and be stacked for adequate viewing.
The use of shared water recirculation systems should be avoided. If consignments of aquatic organisms share a common water recirculation system, then no aquatic organisms may be approved for release from quarantine until the last consignment to enter the system has satisfactorily completed its quarantine requirements. In the event that diseases or pests of quarantine concern are known or suspected, all aquatic organisms sharing the same water recirculation system may be subject to quarantine risk management measures, including their destruction, treatment or detention beyond the normal quarantine period.
All entry and exit points to the Quarantine Facility must prominently display a permanently affixed, professionally made sign that states “Quarantine Area - Authorized Persons Only”.

Such signs must be highly visible (e.g. black lettering of about 5 cm in height on a yellow background).
A suitable wash-up trough must be located in the quarantine area for the cleaning and disinfecting of equipment. An approved disinfectant must be available at the wash-up trough.
A suitable draining rack must be provided for air drying of equipment.
A designated refrigerator or freezer must be provided solely for the storage and preservation of dead aquatic organisms. The refrigerator or freezer must be clearly identified as being for quarantine use only and located within or close to the quarantine area. If outside the quarantine area, it must be lockable.
Equipment necessary to carry out the disinfection all wastewater (both overseas water and domestic water) used in the Quarantine Facility must be supplied.
Secure storage facilities for food for aquatic organisms must be provided such that contamination or infestation by pests is prevented.
A fully stocked first aid cabinet must be provided and maintained.
Amenities to be provided for use by Biosecurity Officers include access to a desk and chair, a telephone with a direct outside line, toilet facilities, hand washing facilities (within the quarantine area) and a hygienic means of drying hands, and suitable arrangements for daily cleaning of amenities.

Standards of Operation

4.1 Wastewater Disposal

4.1.1 Freshwater Organisms

All wastewater of domestic origin to be discharged from the Quarantine Facility that has not been used for the transport or holding of aquatic organisms must enter directly to an approved septic tank or municipal sewerage system, or may be sterilized as described below under Section 4.1.3. Where wastewater is sterilized, it may be discharged elsewhere, provided that it does not flow directly into natural waterways.

All wastewater, whether of overseas or domestic origin, that has been used for the transport or holding of live freshwater organisms or for the cleaning of tanks and associated equipment, must be disinfected using an approved method prior to disposal.

Disposal of wastewater must also conform to any state and local government requirements.

Marine Organisms

All wastewater (including overseas water), discharged from the Quarantine Facility must enter directly to an approved septic tank, municipal sewerage system or may be sterilized as described below under Section 4.1.3. Sterilized wastewater must not be discharged directly into natural waterways.

4.1.3 Sterilization of Wastewater

Where sterilization of wastewater is required before disposal, it shall be sterilized in accordance with one of the following methods:

(a) Chlorination

All water must pass through an approved filter capable of removing suspended organic material prior to hypochlorite treatment.
All water must pass to a retention vessel where sufficient hypochlorite (bleach) must be added to achieve a minimum concentration of 200 parts per million (ppm) (200 mg per liter) at 1 hour post-treatment. Sodium hypochlorite (bleach) should be used at 1.6 milliliters (ml) of hypochlorite solution (12.5 percent available chlorine) per liter of water, while calcium hypochlorite powder (e.g., Pool Chlor®, 65–70 percent available chlorine) should be used at 0.3 grams (g) of powder per liter of water.
Before the treatment period commences, the chlorinated effluent shall be brought to a pH between 5.0 and 7.0.
Following addition of hypochlorite, wastewater must be agitated for at least 10 minutes to ensure thorough mixing of hypochlorite.
After a retention period of not less than 1 hour, the chlorine concentration is measured using an approved method. Tanks not achieving a minimum chlorine concentration of 200 ppm (200 mg per liter) at the allotted time shall be re-treated until the requirement is met.
The chlorine in the wastewater may be neutralized by adding sodium thiosulphate at a rate of 1.25 g (2.5 ml of 50 percent sodium thiosulphate solution) per liter of treated wastewater, then agitated for not less than 10 minutes before discharge.
Chlorination records shall be maintained noting: the amount of compound added, the volume of effluent, the time that treatment period commenced, the pH at commencement of the treatment period, and the 1 hour post-treatment concentration.
Chlorinated water shall not be discharged directly into adjacent waterways.

Heat treatment
Prior to discharge, wastewater shall be heated to at least 85 degrees Celsius for a minimum of 30 minutes. Water heating units must be approved by the Chief, Division of Biosecurity and be fitted with temperature and flow recorders.

(c) Ultraviolet (UV) light radiation
All water to be treated must pass through a filter capable of removing suspended organic material prior to irradiation.

Commercial UV water treatment units operating in the spectral range of 190-280 nm (254 nm recommended) delivering doses of at least 130 mWs/cm^2 are required. As UV bulbs will burn long after their effectiveness has waned, the burning time of the UV lamp should be monitored, and the lamp replaced according to manufacturer's specifications.

4.2 Disinfection of Equipment

Before removal from the quarantine area, and before restocking with a new consignment of aquatic organisms, all tanks and tank equipment must be thoroughly cleaned and disinfected with (i) hypochlorite solution at 200 ppm concentration for 5 minutes or with (ii) an approved iodophore solution containing iodine at 0.5 percent available iodine for 5 minutes or (iii) by another disinfection procedure approved by the supervising Biosecurity Officer.

Filter material must be disposed of by incineration, by autoclaving and deep burial, or by another approved method.

4.3 Disposal of Dead Aquatic Organisms

Dead aquatic organisms may only be disposed of as directed by the supervising Biosecurity Officer. Aquatic organisms that have died while under quarantine must be held in an approved freezer, an approved refrigerator, or preserved using another method as specified by the Division of Biosecurity until removed for laboratory examination or released for disposal by the supervising Biosecurity Officer. Upon approval, dead aquatic organisms must be disposed of by incineration or by autoclaving and deep burial.

4.4 Disposal of Packing Materials

Handling of all packaging material used to transport live aquatic organisms must comply with the following procedures:

(a) Damaged bags, damaged polystyrene boxes and cartons that are wet or contaminated with overseas water must be either incinerated or disinfected by an method approved by the supervising Biosecurity Officer prior to disposal (see Section 4.2).

Imported bags and polystyrene boxes containing leaked oversea water that are in good condition may be reused provided they are first disinfected by an approved method.

Boxes and cartons that are free of overseas water may be reused without disinfection.

5.0 Work Practices

5.1 Cleanliness and Sanitation

The Quarantine Facility and holding tanks must be kept clean at all times. Adequate cleaning facilities (e.g., pressurized water supplies, brooms, shovels etc.) must be provided to enable maintenance of appropriate standards of hygiene.

No animals or plants other than aquatic organisms and their live food are permitted in the quarantine area.

The use of dedicated equipment (nets, cleaning equipment, etc.) for each individual tank (or tanks connected by a shared water recirculation system) is recommended. At minimum. all nets and other equipment should be disinfected by an approved method of disinfection before being moved between tanks housing different consignments and before removal from the quarantine area.

All equipment, footwear and protective clothing used in the quarantine area must be restricted to this site. Equipment can only be removed from the quarantine area after disinfection in an approved manner.

The operator shall provide protective clothing (waterproof apron and footwear) to staff and visitors to use in the facility. Protective footwear (e.g., gumboots) and aprons must be kept inside the quarantine area (street footwear left outside the quarantine area). Prior to protective footwear or clothing being removed from the quarantine area, they must be cleaned using an approved disinfectant such as Betadine (5 percent solution). Disposable overshoes may used provided they are destroyed after use by incineration or by autoclaving followed by deep burial.

All wastewater disposal must meet any state and local government requirements, followed the specifications for disposal given in Section 4.1, and must not flow directly into natural waterways.

All filter material must be disinfected prior to removal from the quarantine area or disposed of by incineration or by autoclaving and deep burial.

Staff and visitors who have had contact with water or aquatic organisms must wash their hands and forearms with soap and water prior to exiting the Quarantine Facility.

5.2 Handling of Aquatic Organisms

Upon arrival of a consignment of aquatic organisms at the approved port of entry, and following verification of the accuracy of details of the consignment and its preliminary inspection by Biosecurity Officers, the consignment will be transferred to the custody of the operator, who must guarantee the secure transport of the shipment, under quarantine conditions, to the Quarantine Facility.

Upon their arrival at the Quarantine Facility, freshwater organisms must be transferred by net to new water and the overseas water must be subjected to an approved disinfection treatment (see Section 4.1.3). Each tank used to contain freshwater aquatic organisms must only contain a single species of organism, and must be kept separate and isolated from organisms from other consignments.

Each tank used to contain marine organisms may contain different species but only from the same consignment.

In the event that all or part of a consignment of imported aquatic organisms is incorrectly identified or listed by the exporter and includes species not on the list of ornamental aquatic organisms approved for importation, the operator shall notify the supervising Biosecurity Officer within 7 days of importation. The operator shall reconsign the unapproved species or have them humanely destroyed under supervision of the Biosecurity Officer.

The progeny of imported aquatic organisms that breed during the quarantine period may be removed to another tank in the facility but are subject to all quarantine conditions that applied to the parents.

A standard Tank Record Sheet must be maintained for each tank (see Section 7.2).

Periodically throughout the day, the operator shall observe all aquatic organisms held in the Quarantine Facility for signs of illness and abnormal behavior.

All dead aquatic organisms must be held for inspection by a Biosecurity Officer. All organisms from a given consignment that are found dead on arrival or that die during the quarantine period must be placed in a labeled plastic bag as soon as possible and kept under refrigeration or preserved as specified by the Biosecurity Officer until diagnostic examination can be completed. Information on labels must identify the consignment, species, tank number and day of death.

Any equipment that has been in contact with dead aquatic organisms must be disinfected before re-use.

Any sudden of unusual levels of mortality or changes in behavior (levels of mortality or illness above 20 percent of a tank over a five-day period) or unusual signs of disease, parasites or pests must be immediately reported to the supervising Biosecurity Officer.

The use of any drug or chemical to treat aquatic organisms must have the prior approval of the supervising Biosecurity Officer and be recorded on tank record sheets. The use of any treatments may result in the extension of quarantine detention or other measures as deemed necessary by the supervising Biosecurity Officer.

The operator must ensure that no aquatic organisms leave the quarantine area under any circumstances without the approval of the supervising Biosecurity Officer (i.e., the granting of a Biosecurity Clearance), excepting dead organisms moved to a nearby lockable refrigerator or freezer.

On completion of quarantine, freshwater aquatic organisms are to be transferred by net into clean water prior to release from the Quarantine Facility.

Aquatic organisms must be removed from the Quarantine Facility following their satisfactory completion of the quarantine period.

6.0 Occurrence of an Outbreak of a Serious Exotic Disease

If a serious exotic disease is diagnosed by the Division of Biosecurity, the operator shall be immediately notified. In such cases, the supervising Biosecurity Officer or other representative of the Division of Biosecurity may direct the management of disease control. Disease control measures may include the extension of quarantine and/or the destruction of stock.

Measures to be taken are likely to include:
destruction of infected consignments, or of all aquatic organisms present in the facility at the time of the outbreak, and their sanitary removal and incineration.
decontamination of the interior of the facility, and all tanks and equipment, and all waters present in the facility at the time of the outbreak.
approval of the Chief, Division of Biosecurity prior to the reuse of the facility.

7.0 Record Keeping Requirements

7.1 Summary Records

Summary records (electronic or manual) of all consignments of aquatic organisms entering the Quarantine Facility must be maintained (these can include commercial documents, e.g., airway bill). The operator shall, for auditing purposes, maintain such records for a minimum period of 36 months after release of the aquatic organisms from quarantine, during which time they will, upon request, be readily made available to a Biosecurity Officer. The following summary information shall be recorded for each consignment:
Overseas supplier and country of origin
Dates of arrival

Number of each aquatic species, in total and by tank
Details of any accompanying health certificates
Details of any clinical signs of disease, and number of affected aquatic organisms, by species and tank
Details of any mortalities, by species and tank
Details of any treatments approved/applied
Date of release from quarantine

Tank Record Sheets

A corresponding approved Tank Record Sheet shall be maintained for each holding tank and must be kept up to date at all times. Tank Record Sheets should be retained for a minimum of 36 months following release of consignments from quarantine. This sheet will display the following information:
Tank number
Number and species of aquatic organisms in tank
Exporter identification details including country of export
Importer's name
Date of arrival
Consignment or airway bill number
Number/species of aquatic organisms dead on arrival
Details of any observed disease conditions and number of sick aquatic organisms
Daily record of number of aquatic organism deaths in tank
Details of any prophylactic or therapeutic treatments given
Disposal details
Disinfection details
Signature of authorizing Biosecurity Officer and date released
Number of aquatic organisms released.

7.3 Logbook

Details of wastewater treatment (including chlorination records, if applicable), filter disposal, general maintenance and auditing must be recorded in a logbook.

8.0 Auditing

It is the responsibility of the operator to undertake systematic periodic internal audits at least on semi-annual basis, to ensure that the standards for the operation of the Quarantine Facility as outlined in this Annexure are maintained and to identify and correct any deficiencies. The operator shall record in the logbook, any variations from the prescribed criteria encountered and the corrective measures taken.

Periodic external audits of the Quarantine Facility may be conducted by the supervising Biosecurity Officer or other approved personnel to verify the security and proper functioning of the Quarantine Facility.

9.0 Security

Control and security of the Quarantine Facility are the responsibility of the operator. The Quarantine Facility must be securely locked when not in active use or when unattended.

Procedures shall be adopted to ensure that access to the premises is limited to authorized persons only. A prominent sign shall be displayed at the entrance to the facility to show that it is a Quarantine Facility and that unauthorized entry is prohibited.

The unnecessary entry of staff and visitors into the Quarantine Facility should be avoided. The operator shall record the name and address of any visitors and the visit date in a logbook near the entrance.

Annexure I

Republic of Palau

Standards of Construction, Security and Operation for approved Quarantine Facilities for Introductions and Transfers of Aquatic Organisms

1.0 General

The primary purpose of quarantine is to minimize the risk of introducing infectious agents (pathogens) into the territory of Republic of Palau and their transmission to susceptible species. The secondary purpose is to prevent the introduction of aquatic invasive species (SIA) and other potentially harmful aquatic organisms that have not been approved for introduction.

The standards outlined in this Annexure (Annexure I) apply only to the quarantine of those aquatic species that have been approved for introduction or transfer into the Republic of Palau (see Annexure B – "Application to Import Live Aquatic Organisms, Aquatic Organism Products or Biological Products. Standards for facilities for the quarantine of e ornamental organisms are given in Annexure H.

The criteria set out in this Annexure are the minimum quarantine standards applicable to imported live aquatic organisms approved by the Minister that are destined for use in aquaculture development, fisheries enhancement or other activities that involve release or likely escape into natural waters (i.e., introduced or transferred species), and whose individual health status and/or the health status of the population from which they originate is partially or completely unknown. In such cases, the protocols outlined in the International Council for the Exploration of the Sea (ICES) *Code of Practice on the Introductions and Transfers of Marine Organisms* will apply. Such organisms of uncertain health status will normally to be held in strict quarantine throughout their lives, during which repeated observation, sampling and testing for disease agents will be conducted. Progeny reared from the imported parent stock (F1 generation), following additional observation and testing, may be approved for limited release under controlled conditions, during which further monitoring of their health status will be conducted. If no pathogens are detected during this initial period (which can be expected to last several years), subsequent generations may be approved for wider use in aquaculture or for release into the wild. In all cases, the original parent stock will not be released from quarantine and must be destroyed.

It is expected that each application to introduce or transfer an aquatic species into Republic of Palau will be unique, and that in certain cases, the possibility of pre-border risk management measures may exist. The specific risk management measures to be applied (e.g., use of specific pathogen free (SPF) stocks, origin from stocks whose health status is well documented, use of surface disinfected eggs, availability and use of specific diagnostics tests for health certification of individual broodstock, etc.) will vary by species of aquatic organism, life cycle stage, origin, etc. and thus will be determined by the Division of Biosecurity on a case-by-case basis following careful evaluation of the proposed introduction or transfer.

In the case of some established practices, such as the importation of penaeid shrimp, the Ministry may consider the feasibility of certification of certain foreign hatcheries, until national self sufficiency in seed can be achieved.

The approval of an application to introduce or transfer an aquatic organism will, among others, be contingent upon the use (construction, establishment or lease) of an approved quarantine facility meeting the specifications outlined in this Annexure. Each application will be considered on its individual merits with consideration being given to the quarantine risk and serviceability associated with each establishment's location and construction, and on the capability of the applicant to successfully operate such a facility.

It is the responsibility of the operator of an approved Introductions and Transfers Quarantine Facility to ensure that the premises and all operations comply with all local, state and national regulations. Documented evidence of compliance with these requirements must be produced to the supervising Biosecurity Officer on request.

The operator shall ensure that all staff entering the Quarantine Facility are adequately trained in the husbandry of the species being held in quarantine, and are familiar with the standards of performance set out in this Annexure.

The Chief, Division of Biosecurity must be notified in writing, at least 30 days prior to any intended change in ownership, senior management, quarantine operating procedures/ arrangements or contemplated modifications to the Quarantine Facility.

Non-compliance of the criteria outlined in this Annexure or any breach of "The Biosecurity Act of 2014" may result in approval of the Quarantine Facility being withdrawn or suspended, possible destruction of stock, and legal action instigated.

The importation of aquatic organisms destined for introduction or transfer into aquaculture facilities or natural waters often entails a significant risk that serious pathogens accompanying them may escape and become established in natural or cultured populations. Thus, an extremely high level of biosecurity must be maintained at all times. The Quarantine Facility shall be constructed and operated in a manner that shall assure a high level of security, guaranteeing the isolation the imported aquatic organisms, such that the organisms, any pathogens they may carry, and any pests or other living organisms contained in their transport waters will not be released from the facility. The possible entry of pathogens of domestic origin that might infect the stock held under quarantine, thorough contaminated influent water, or their entry along with personnel, feeds and fomites must also be prevented.

During the quarantine period, the operator shall ensure that no living aquatic organisms, equipment or materials are removed from the Quarantine Facility.

2.0 Period of Quarantine

No set period of quarantine shall be established. The period of holding in the Quarantine Facility will depend on the results of observation and testing of the imported stock and the resulting F1 generation. In all cases, once the Competent Authority is satisfied that the F1 or a subsequent generation is safe for limited release, the parent stock shall be destroyed and the Quarantine Facility thoroughly disinfected. It can be expected that an application to introduce

or transfer an aquatic organism will entail a commitment to maintain the organisms under conditions of strict quarantine for a number of years.

If a pathogen or infectious disease is detected at any point while the imported aquatic animals and their progeny are under quarantine, the supervising Biosecurity Officer may require treatment and further testing. If the disease is of a serious and/or untreatable nature, destruction of all aquatic organisms held in the facility will be ordered and complete disinfection of the building, water and all equipment will be necessary before permission to restock will be granted.

3.0 Standards of Construction

3.1 Location of Quarantine Facilities

The location of an Approved Introductions and Transfers Quarantine Facility (a Quarantine Facility) will be determined on a case by case basis. Premises will not be approved in the vicinity of private or government hatcheries, aquaculture facilities, watercourses or areas subject to frequent flooding.

Specifications of Quarantine Facilities

3.2.1 General Requirements

Access to the Quarantine Facility must be through property owned or leased on a long-term basis by the operator and must be available to Biosecurity Officers during normal business hours and at such time that aquatic organisms are entering or leaving the premises. The operator must notify the supervising Biosecurity Officer of the times when the premises will be attended and any alterations to the regular hours.

The Quarantine Facility must be located within a single operational entity that is structurally separated from all other operations and is dedicated solely to the holding of the consignment(s). It may not share a building having areas that are used for different purposes and must not serve as an access way to other buildings or activities. The Quarantine Facility shall not to be used for any purpose, what-so-ever, other than as a place for the performance of quarantine.

The Quarantine Facility must be weatherproof and maintained in a state of good repair.

The Quarantine Facility must be a secure, lockable building that is surrounded by a lockable person-proof security fence.

The holding capacity of the Quarantine Facility must be commensurate with the proposed quantities of the species of aquatic organism for which a permit is granted. Provision must be made for the growth and maturation of the original parent stock and the holding of all F1 and subsequent generations.

The Quarantine Facility must be equipped for the sterilization of all equipment that comes in contact with aquatic organisms or tank water during the quarantine period.

The Quarantine Facility must be equipped with back-up systems for essential components (e.g. electricity, water circulation, aeration, temperature control, filtration, etc.) to maintain biosecurity and the health of stocks in the case of electrical or mechanical failures.

3.2.2 Specific Construction and Equipment Requirements

The Quarantine Facility must comply with the following specific construction and equipment requirements:
Windows must be screened to prevent the entry of insects.
Floor and walls must be constructed of concrete, tiles, or other impervious material to enable hose down and disinfection with retention of all wastewater. The floor must be sufficiently smooth and with sufficient grade to drain to an enclosed holding tank.
Floor to wall junctions and all gaps and cracks in the walls, floor and ceiling must be effectively sealed such that the quarantine area is capable of containing all leaks and floods that might occur.
Lighting must be of sufficient intensity to allow proper inspection of all aquatic organisms.
A floor drainage with an insertable plug or other mechanism to prevent the accidental escape of aquatic organisms or uncontrolled release of water must be installed. Drainage must be to an approved holding tank. The holding tank must be of suitable size to contain the total volume of all tanks used for the holding of aquatic organisms.
Doors must have a self-closer to ensure that they remain shut after entry, or there must be a self-closing insect-proof screen door installed.
Access to the Quarantine Facility will only be through a personnel entrance leading to a separate outer change room provided with facilities for staff and Biosecurity Officers to wash their hands and change outer clothing prior to entering or leaving the quarantine area.
A footbath containing disinfectant must be placed at the entrance door to the quarantine facility.
All holding tanks for aquatic organisms must:
be identified with permanent numbers so that individual tank records can be correlated with them;
be fitted with lids or other approved equivalents so as to prevent transmission of pathogens between adjacent tanks due to splash from the aeration/filter system, and to prevent the escape of aquatic organisms;
have water intake lines equipped with automatic shutoff valves;
be arranged in a manner that permits ready access for inspection purposes, including a minimum width of 75 cm for corridors between rows of tanks or tanks and walls;
other than the aquatic organisms, contain only sterilizable materials (e.g., plastic) that do not interfere with inspection;
have at least the front transparent to provide good visibility of their contents, and be stacked for adequate viewing.
As all aquatic organisms within the facility will be considered to have the same quarantine status, the use of a shared water recirculation system is permissible.
All entry and exit points to the Quarantine Facility must prominently display a permanently affixed, professionally made, quarantine sign that states “Quarantine Area - Authorized Persons Only”. Such signs must be highly visible (e.g. black lettering of about 5 cm in height on a yellow background).
A suitable wash-up trough must be located in the quarantine area for the cleaning and disinfecting of equipment. An approved disinfectant must be available at the wash-up trough.
A suitable draining rack must be provided for air drying of equipment.

A designated refrigerator or freezer must be provided solely for the storage and preservation of dead aquatic organisms. The refrigerator or freezer must be clearly identified as being for quarantine use only, be lockable, and located within the quarantine area.
Equipment necessary to carry out the disinfection of all wastewater (both the overseas transport water and all domestic waters used in the Quarantine Facility) must be supplied.
Secure storage facilities for food used for aquatic organisms must be provided such that contamination or infestation by pests is prevented.
A fully stocked first aid cabinet must be provided and maintained.
Amenities to be provided for use by Biosecurity Officers include access to a desk and chair, a telephone with a direct outside line, toilet facilities, hand washing facilities (within the quarantine area) and a hygienic means of drying hands, and suitable arrangements for daily cleaning of amenities.

Standards of Operation

4.1 Influent Water

All influent water entering the Quarantine Facility must be from an approved groundwater source certified to be free from biological material, including any possible infective agents. Alternatively, water from other sources may be used, however, it must be filtered to remove suspended matter and then sterilized using a method approved by the supervising Biosecurity Officer before being used in the Quarantine Facility.

4.2 Wastewater Disposal

All wastewater to be discharged from the Quarantine Facility must be sterilized as described below under Section 4.2.1. Sterilized wastewater must not be discharged directly into natural waterways. Disposal of wastewater must also conform to any state and local government requirements.

4.2.1 Sterilization of Wastewater

Wastewater shall be sterilized in accordance with one of the following methods:

(a) Chlorination
All water must pass through an approved filter capable of removing suspended organic material prior to hypochlorite treatment.
All water must pass to a retention vessel where sufficient hypochlorite (bleach) must be added to achieve a minimum concentration of 200 parts per million (ppm) (200 mg per liter) at 1 hour post-treatment. Sodium hypochlorite (bleach) should be used at 1.6 milliliters (ml) of hypochlorite solution (12.5 percent available chlorine) per liter of water, while calcium hypochlorite powder (e.g., Pool Chlor®, 65–70 percent available chlorine) should be used at 0.3 grams (g) of powder per liter of water.
Before the treatment period commences, the chlorinated effluent shall be brought to a pH between 5.0 and 7.0.
Following addition of hypochlorite, wastewater must be agitated for at least 10 minutes to ensure thorough mixing of hypochlorite.
After a retention period of not less than 1 hour, the chlorine concentration is measured using an approved method (e.g. a commercially available chlorine test kit). Tanks not achieving a

minimum chlorine concentration of 200 ppm (200 mg per liter) at the allotted time shall be re-treated until the requirement is met.
The chlorine in the wastewater may be neutralized by adding sodium thiosulphate at a rate of 1.25 g (2.5 ml of 50 percent sodium thiosulphate solution) per liter of treated wastewater, then agitated for not less than 10 minutes before discharge.
Chlorination records shall be maintained noting: the amount of compound added, the volume of effluent, the time that the treatment period commenced, the pH at commencement of the treatment period, and the 1 hour post-treatment concentration.
Chlorinated water shall not be discharged directly into adjacent waterways.

Heat treatment
Prior to discharge, wastewater shall be heated to at least 85 degrees Celsius for a minimum of 30 minutes. Water heating units must be approved by Chief, Division of Biosecurity and be fitted with temperature and flow recorders.

(c) Ultraviolet (UV) light radiation
All water to be treated must pass through a filter capable of removing suspended organic material prior to irradiation.

Commercial UV water treatment units operating in the spectral range of 190-280 nm (254 nm recommended) delivering doses of at least 130 mWs/cm^2 are required. As UV bulbs will burn long after their effectiveness has waned, the burning time of the UV lamp should be monitored, and the lamp replaced according to manufacturer's specifications.

4.3 Disinfection of Equipment

Before removal from the quarantine area, and before any restocking, all tanks and tank equipment must be thoroughly cleaned and disinfected with (i) hypochlorite solution at 200 ppm concentration for 5 minutes or with (ii) an approved iodophore solution containing iodine at 0.5 percent available iodine for 5 minutes or (iii) by another disinfection procedure approved by the supervising Biosecurity Officer.

Filter material must be disposed of by autoclaving followed by incineration or deep burial.

4.4 Disposal of Dead Aquatic Organisms

Dead aquatic organisms may only be disposed of as directed by the supervising Biosecurity Officer. Aquatic organisms that have died while under quarantine must held in an approved freezer, an approved refrigerator, or preserved using another method as specified by the supervising Biosecurity Officer until removed for laboratory examination or released for disposal by the supervising Biosecurity Officer. Upon approval, dead aquatic organisms must be disposed of by sterilization using of an approved autoclave, followed by incineration or deep burial.

4.5 Disposal of Packing Materials

All containers (bags, boxes and cartons) used to hold aquatic organisms during transit must be disinfected using the methods of disinfection specified under "Disinfection of Equipment" (Section 4.3) and then disposed of by incineration, deep burial or another method approved by the supervising Biosecurity Officer.

5.0 Work Practices

5.1 Cleanliness and Sanitation

The quarantine facility and holding tanks must be kept clean at all times. Adequate cleaning facilities (e.g., pressurized water supplies, brooms, shovels, etc.) must be provided to enable maintenance of appropriate standards of hygiene.

No animals other than aquatic organisms and live food for aquatic organisms are permitted in the quarantine area. All feeds used within the Quarantine Facility must have prior approval of the supervising Biosecurity Officer and be of assured sanitary condition. Live foods should not be used unless no other alternative food is acceptable to the organisms under quarantine. Live foods must be certified to the specifications set by the Division of Biosecurity to ensure their freedom from potential disease agents.

Equipment used in the handling of aquatic organisms and tank cleaning and maintenance should not be shared between tanks. A separate set of equipment (nets, cleaning equipment, etc.) must be kept for each tank operated on an individual water filtration system. In the case where several tanks are linked by a shared water recirculation system, a single set of equipment can be used for all tanks within the shared system.

All nets and other equipment must be regularly disinfected by an approved method of disinfection. Equipment or other material is not to be removed from the quarantine area during the period that the consignment is under quarantine conditions. In exceptional circumstances, and with the written approval of the supervising Biosecurity Officer and his verification that proper disinfection has been accomplished, a request to remove specific items of equipment may be granted.

All footwear and protective clothing used in the quarantine area must be restricted to this site.

The operator shall provide protective clothing (jumpsuits, waterproof apron or outer-wear and rubberized footwear) to staff and visitors to use in the facility. Protective clothing must be kept inside the quarantine area (street footwear must left outside the quarantine area and within the changing area). Cloth protective clothing that must be routinely washed may be removed from the quarantine area after washing for the purpose of drying. During the period in which aquatic organisms are under quarantine, protective clothing (with the exception of washed clothes removed for drying) should be removed only for destruction. Should removal of unusable protective clothing become necessary, it must first be sterilized by autoclaving or use of an approved disinfectant such as Betadine (5 percent solution) and then removed and destroyed by incineration under the supervision of the Biosecurity Officer.

A footbath containing hypochlorite, Betadine or another approved disinfectant shall be maintained at the entrance of the quarantine area proper. The bath must be routinely replenished for adequate disinfection and a record of bath maintenance maintained. A sign stating “Footwear must be Immersed in Footbath On Exit/Entry from Quarantine Area” must be appropriately displayed.

All wastewater disposals must meet any state and local government requirements, be by a approved method (Section 4.2), and must not flow directly into natural waterways.

All filter material must be disinfected by autoclaving on another method approved by the supervising Biosecurity Officer prior to removal from the Quarantine Facility and then disposed of by incineration or deep burial.

Staff and visitors who have had contact with water or aquatic organisms must wash their hands and forearms with soap and water prior to exiting the Quarantine Facility.

5.2 Handling of Aquatic Organisms

Upon arrival of a consignment of aquatic organisms at the approved port of entry, and following verification of the accuracy of details of the consignment and its preliminary inspection and clearance by customs officers and the supervising Biosecurity Officer, the consignment will be resealed by the supervising Biosecurity Officer with an approved tamperproof seal (e.g., Tyden seal, lead seal or padlock) and will be transferred to the custody of the operator, who must guarantee the secure transport of the aquatic organisms, under quarantine conditions, to the Quarantine Facility.

Upon their arrival at the Quarantine Facility, the integrity of the seal will be verified by the supervising Biosecurity Officer, the seal removed, and the organisms transferred by net to new water. The overseas water must be subjected to an approved disinfection treatment (see Section 4.2).

In the event that a consignment of imported aquatic organisms is incorrectly represented in any manner, the consignment may be destroyed under supervision of the Biosecurity Officer.

The progeny of any aquatic organisms that breed during the quarantine period may be removed to another tank or room in the facility but are subject to all quarantine conditions.

A standard Tank Record Sheet must be maintained for each tank (see Section 7.2).

Periodically throughout the day, the operator shall observe all aquatic organisms for signs of illness and abnormal behavior.

All dead aquatic organisms must be held for inspection by a Biosecurity Officer. All organisms found dead on arrival or that die during the quarantine period must be placed in a labeled plastic bag as soon as possible and kept under refrigeration or preserved as specified by the Biosecurity Officer until examination can be completed. Information on labels must identify the consignment, species, tank number, number of mortalities and date of death.

Any equipment that has been in contact with dead aquatic organisms must be disinfected before re-use.

Any unusual levels of mortality, changes in behavior or unusual signs of disease, parasites or pests must be immediately reported to the supervising Biosecurity Officer.

The use of any drug or chemical to treat aquatic organisms must have the prior approval of the Division of Biosecurity and be recorded on tank record sheets.

The operator must ensure that no aquatic organisms leave the quarantine area under any circumstances without the approval of the supervising Biosecurity Officer (i.e., the granting of a Biosecurity Clearance).

On approval by the Chief, Division of Biosecurity, F1 or subsequent generation aquatic organisms may be released from the Introductions and Transfers Quarantine Facility for limited trials in aquaculture facilities or for stocking in enclosed water bodies. The Chief, Division of Biosecurity may specify the precise conditions, period and any further risk management measures under which the aquatic organisms are to be maintained. On completion of quarantine, aquatic organisms are to be transferred by net into clean water prior to removal from the Quarantine Facility.

All original stock and any F1 or subsequent generation aquatic organisms not approved for release from quarantine will remain under quarantine conditions.

When determined by the Chief, Division of Biosecurity or at the request of the operator, the operation of the Quarantine Facility may be terminated under the direct supervision of the supervising Biosecurity Officer. In which case, all remaining aquatic organisms, including all original parent stock, will be humanely killed by a method approved by the supervising Biosecurity Officer, sterilized in an approved autoclave, and then and disposed of by incineration or deep burial. The facility and all tanks and equipment will be thoroughly cleaned and disinfected using approved disinfectants, and all filters, clothing and other similar materials autoclaved or disinfected and then destroyed by incineration or deep burial. Upon written sanitary certification by the supervising Biosecurity Officer, the premises may then be disposed of as seen fit by the operator, or may be used as the basis for a new application for an Approved Quarantine Facility.

6.0 Occurrence of an Outbreak of a Serious Exotic Disease

If a serious exotic disease is diagnosed by the Division of Biosecurity, the operator shall be immediately notified. In such cases, the supervising Biosecurity Officer or other representative of the Division of Biosecurity may direct the management of disease control. Disease control measures may include the extension of quarantine and/or the destruction of stock. Measures to be taken are likely to include:
destruction of infected consignments, or of all aquatic organisms present in the facility at the time of the outbreak, and their sanitary treatment, removal and incineration;
decontamination of the interior of the facility, all tanks and equipment, and all waters present in the facility at the time of the outbreak; and
approval of the Chief, Division of Biosecurity prior to the reuse of the facility.

7.0 Record Keeping Requirements

7.1 Summary Records

A complete history of all consignments of aquatic organisms entering the Quarantine Facility must be maintained. The operator shall, for auditing purposes, maintain such records for a minimum period of 36 months after closure of the Quarantine Facility, during which time they will, upon request, be readily made available to a Biosecurity Officer. The following summary information concerning the quarantined stock(s) shall be recorded:
overseas supplier, country of origin and waybill;

date of arrival of parent stock;
date(s) of release of F1 or subsequent generation from quarantine;
total number of organisms in original consignment(s) and total mortalities in each consignment upon arrival;
original number of organisms stocked in each tank;
details of any clinical signs of disease, number of affected individuals, by tank;
details of any mortalities, by tank,
details of any health certificates;
details of any F1 progeny produced (date and number) and their corresponding transfer tank number;
for parent stock, and for any F1 or subsequent generation aquatic organisms that for any reason have not been approved for release from quarantine upon termination of the quarantine license: number and size of aquatic organisms destroyed, date and method of destruction and disposal, and signature of the supervising Biosecurity Officer; and
for F1 or subsequent generation aquatic organisms, if approved for limited release from quarantine: number and size of aquatic organisms released, date of release, destination, summary of any risk management measures or restrictions to be employed, and signature of the supervising Biosecurity Officer.

Tank Record Sheets

A corresponding approved Tank Record Sheet shall be maintained for each holding tank and must be kept up to date at all times. Tank Record Sheets should be retained for a minimum of 36 months following release from quarantine of the portion of the consignment held in the specific tank, or its destruction. This sheet will display the following information:
Tank number
Number of aquatic organisms in tank
Exporter identification details including country of export
Importer's name
Date of arrival
Consignment or airway bill number
Number of aquatic organisms dead on arrival
Details of any observed disease conditions and number of sick aquatic organisms
Daily record of number of aquatic organisms deaths in tank
Details of any prophylactic or therapeutic treatments given
Disposal details
Disinfection details
Details of any F1 progeny produced (date and number) and their corresponding transfer tank number.

7.3 Operations and Entry Logbooks

Details of wastewater treatment (including chlorination records, if applicable), filter disposal, internal audit, and general maintenance must be recorded in an operations logbook.

A separate entry logbook shall be used to record details of the entry and exit of authorized personnel into the Quarantine Facility.

8.0 Auditing

It is the responsibility of the operator to undertake systematic periodic internal audits at least on a quarterly basis, to ensure that the standards for the operation of the Introductions and Transfers Quarantine Facility as outlined in this Annexure are maintained and to identify and correct any deficiencies. The operator shall record in the operations logbook, any variations from the prescribed criteria encountered and the corrective measures taken.

Periodic external audits of the Quarantine Facility may be conducted by the supervising Biosecurity Officer or other approved personnel to verify the security and proper functioning of the Quarantine Facility.

9.0 Security

Control and security of the Quarantine Facility is of the up-most importance, and is the responsibility of the operator. The Quarantine Facility and it perimeter fencing must be securely locked when the facility is not in active use or when unattended.

Procedures shall be adopted to ensure that access to the premises is limited to authorized persons only. Signs shall be prominently displayed on all sides of the external perimeter fencing and on all entrances to the facility to show that it is an Introductions and Transfers Quarantine Facility and that unauthorized entry is prohibited.

The entry of staff into the Quarantine Facility should restricted to the minimum required to perform necessary maintenance and observation of the quarantined organisms. A list of authorized staff shall be provided to the supervising Biosecurity Officer by the operator. Except in an emergency situation, no other persons shall enter the Quarantine Facility unless written prior approval has been granted from the supervising Biosecurity Officer.

A logbook of all entry and exit into and out of the Quarantine Facility shall be maintained. All personnel entering the facility will be required to enter the following information:
Name of Authorized Person
Date of Entry/Exit
Time of Entry
Reason for Entry
Time of Exit
Signature at Exit
Notation of any Irregularities

Signature at Exit indicates that the Exiting Staff has confirmed that the Quarantine Area was in proper order at the time of his/her exit and that the premises have been left in a secure manner. The operator will ensure that all staff conform with these requirements and will verify the accuracy of record keeping on a weekly basis. The logbook shall be made available for examination by the supervising Biosecurity Officer upon request.

10 Contingency Plans

The operator shall develop a contingency plan addressing actions to be taken in the event of a vehicle breakdown during transport of aquatic organisms from customs arrival to the Quarantine Facility, and due to on-site emergencies that may arise, such as fire, flood,

electrical failure or breakdown of essential equipment (aerators, pumps, etc.). In the case of emergency, the supervising Biosecurity Officer shall be notified as soon as possible.

Annexure J

Republic of Palau

Application for a License to Operate an Approved Quarantine Facility for Ornamental Aquatic Organisms

Part A - Application

Name of the applicant:

2. Telephone, fax, e-mail:

Address:

Location of the Ornamental Aquatic Organisms Quarantine Facility:

Name and address of owner of premises (if leased):

Proposed date for start up of facility (entrance of first consignment):

Requested date for initial inspection.

Date:_____ Signature of applicant: _____

Part B

License to Operate an Approved Quarantine Facility for Ornamental Aquatic Organisms

License No.:

…….of…….is hereby authorized to operate an approved quarantine facility for ornamental aquatic organisms, subject to following terms and conditions:

1. the License unless cancelled shall be valid for ……. from the date of issue.

2.

3.

_____ _____

Authorizing Officer Date

Annexure K

Republic of Palau

List of Live Aquatic Organisms and their Products whose Export is Prohibited

Live Aquatic Organisms Originating from Natural Waters

a. No species of living aquatic organism taken from the natural waters of the Republic of Palau shall be exported without the specific approval of the Minister.

b. Exportation of the following aquatic organisms of conservation concern is expressly prohibited:

Scientific name	Common name	Distribution within Palau
Freshwater species		
Marine/Brackishwater species		

Annexure L

Republic of Palau

Application for a License to Export Live Aquatic Organisms, Aquatic Organism Products and Biological Products

Part (A) - Application Form

Name of the applicant:

Telephone, fax, e-mail:

Address:

Name and address of business (if different):

Type of commodity to be exported:

_____ live aquatic organisms

_____ live aquatic organism product (e.g., live eggs, gametes, larvae, etc.)

_____ biological products (e.g., biological reagents for use in disease diagnosis, sera, inactivated or modified vaccines, genetic material of infectious agents; endocrine tissues from fish or used in fish, etc.

Estimated annual volume(s) (specify each type of commodity and volume):

Any other relevant information:

I certify that the particulars furnished above are true and correct. I agree that if any particulars are found to be false or incorrect my application will be rejected and if a license has been issued such license will be cancelled.

Date: _____ Signature: _____

Part (B) - License to Export Live Aquatic Organisms, Aquatic Organism Products and Biological Products

License No.:

…….of…….is hereby authorized under to export live aquatic organisms, aquatic organism products and biological products subject to following terms and conditions:

1. the License unless cancelled shall be valid for ……. from the date of issue.

2.

3.

_____ _____

Authorizing Officer Date

Annexure M

Republic of Palau

Application to Export Live Aquatic Organisms, Aquatic Organism Products and Biological Products

Name of the applicant:

Telephone, fax, e-mail;

Address (mailing address):

Name of address of supplier (if different):

Type of commodity to be exported (as applicable, indicate: species, life cycle stage, size and number of aquatic organisms to be exported):

Country of destination:
Country (ies) of transshipment (if any):
Name and address of importer:

If application involves living aquatic organisms, do you require assistance to meet the health certification requirements of the importing country? (attach health certification requirements, if known).
Proposed date, method of shipment and port of exit:
If commodity is a live aquatic organism, indicate source of origin as:
( ) cultured – indicate hatchery or other production facility
or
( ) wild caught – indicate precise source
Each consignment of live aquatic organisms, aquatic organism products or biological products commodity must be approved individually. A copy of the signed export permit will be sent to the requesting party and a copy must accompany the consignment.

Date:_____ Signature of applicant: _____

Annexure N

Republic of Palau

Application for Inter-island Transfer of Live Aquatic Organisms Within the Republic of Palau for Purposes of Aquaculture Development

1. Name of the applicant:

2. Telephone, fax, e-mail:

3. Address (mailing address):

4. Name of address of supplier (if different):

5. Type of live aquatic animal to be moved (indicate: species, life cycle stage, size and number of aquatic organisms to be relocated, number of shipments):

6. Destination (indicate island and aquaculture facility or waterbody, precise geographical location for cage stocking, etc., as appropriate):

7. Indicate if this species of aquatic organism is already present in the waters of the receiving island:

( ) Yes ( ) No

8. Provide a detailed justification for this request:

9. Proposed date and method of shipment:

Date:_____ Signature of applicant: _____

Annexure O

Republic of Palau

Draft National Aquatic Pathogen List

Description: A national aquatic pathogen list (NAPL) is essential for health certification, disease surveillance and monitoring, emergency response planning, prevention and control of diseases in aquaculture facilities, etc. Clearly established criteria for listing/delisting of diseases (based on internationally accepted methods) should be established. OIE-listed diseases that are relevant to national conditions form a good starting point; however, the OIE-listed diseases are those of internationally traded commodities, while the NAPL must also consider other serious diseases of national concern. The NAPL needs to be founded on a thorough knowledge of a country's disease status, which can only be obtained through passive and active disease surveillance programmes, generalized disease/pathogen surveys, adequate disease record keeping and reporting, and a national disease database.

Criteria for Listing/Delisting of a Disease

The criteria for the placing of a pathogen or disease on the NAPL shall be the following:
The pathogen or disease causes significant losses to aquaculture at a national or multinational level, is known or likely to cause significant morbidity or mortality in wild aquatic animal populations, or is caused by a pathogen of public health concern.
The infectious aetiology of the disease is proven or an infectious agent (pathogen) is strongly associated with the disease, but the aetiology is not yet known.
There is likelihood of the disease being spread to the Republic of Palau via the importation of live aquatic animals, aquatic animal products or biological products.
A repeatable and robust means of detection/diagnosis exists.

Importantly, a disease or pathogen should not be included in the NAPL if it:
has a broad geographic range, making control of entry/spread difficult to impossible (i.e. it is ubiquitous or widely spread);
is an opportunistic pathogen whose pathogenicity is reduced by improved husbandry or handling; or
is difficult or impossible to distinguish from related established pathogens, using available diagnostic screening techniques.

The following diseases are suggested for inclusion on Palau's National Aquatic Pathogen List:

Diseases of Fish
OIE-listed Diseases of Marine Fish
Red seabream iridoviral disease
Viral encephalopathy and retinopathy
OIE-listed Diseases of Freshwater Fish
Infection with *Aphanomyces invadans* (Epizootic ulcerative syndrome)
Koi herpesvirus disease
Spring viraemia of carp

Diseases of Crustaceans
OIE-listed Diseases of Marine and Brackishwater Crustaceans
Infection with yellow head virus genotype 1
Infectious hypodermal and haematopoietic necrosis
Infectious myonecrosis
Necrotising hepatopancreatitis
Taura syndrome
White spot disease
White tail disease
Acute hepatopancreatic necrosis disease
Spherical baculovirosis (*Penaeus monodon*-type baculovirus)
Tetrahedral baculovirosis (*Baculovirus penaei*)
Other Important Diseases of Marine and Brackishwater Crustaceans
Enterocytozoon hepatopenaei (EHP)
OIE-listed Diseases of Freshwater Crustaceans
Crayfish plague (*Aphanomyces astaci*)

Diseases of Molluscs
OIE-listed Diseases of Marine Molluscs
Infection with abalone herpesvirus
Infection with *Bonamia exitiosa*
Infection with *Bonamia ostreae*
Infection with *Marteilia refringens*
Infection with *Perkinsus marinus*
Infection with *Perkinsus olseni*
Infection with *Xenohaliotis californiensis*

Diseases of Amphibians
Infection with *Batrachochytrium dendrobatidis*
Infection with ranavirus

Annexure P

Standard Operating Procedures for Importers of Live Food Aquatic Organisms

The following procedures shall apply to the handling of consignments of live crustaceans imported by restaurants for direct consumption:

Upon inspection, and issuance of a Biosecurity Clearance at the port of entry, the consignment must be transported directly to the restaurant.
Upon arrival the restaurant, the live crustaceans will be transferred directly to aquaria or holding tanks.
Any shipping water or ice shall be disposed of in a safe manner, such as directly into a septic system, and must not be released into a storm drain or disposed of in any other manner that could allow entry into the natural environment.
All shipping and packing materials (boxes, plastic bags, sawdust, etc.), as well as any dead animals present in the consignment must be disposed of in a safe manner, such as by incineration.
All raw (uncooked) waste materials (e.g. heads, shells) of crustaceans must be disposed of in a safe manner, e.g. by incineration.
The manager of the restaurant will maintain a logbook in which information on all consignments of imported live aquatic organisms will be noted (i.e. species, supplier, number of organisms, date of arrival, number of dead animals in consignment, date of use of last organism) and will make the logbook available to a Biosecurity Officer upon request.
Under no circumstances will live imported crustaceans or other live aquatic organisms be placed in cages or otherwise held directly in the natural environment or by any other means whereby the animals, there wastes or any waters having contact with them can reach the natural environment.

Annex 3(C)

INFORMATION SHEET

Palau's Appropriate Level of Protection (ALOP)

On 28 March, the Bureau of Agriculture, with the support of the Food and Agriculture Organization of the United Nations, held a National Consultation on Biosecurity Regulations for Aquatic Animals in Support of the Biosecurity Act of 2014. The National Consultation, which was attended by some 30 participants representing the government, academia and the private sector, was organized to inform the stakeholders on the approach being taken to develop the draft Aquatic Biosecurity Regulations and to obtain their comments and suggestions for its improvement.

The Regulations will be based on the use of risk analysis to determine if the risks posed by a request to introduce (import) a live aquatic animal (often, an exotic species) into the territory of the Republic of Palau poses a significant risk of introducing an invasive aquatic species or a serious disease of aquatic animals that could severely impact the aquaculture industry, natural ecosystems and the economic and social well being of Palau's citizens.

The use of risk analysis in biosecurity is an internationally accepted practice, as is stated in the Sanitary and Phytosantary Agreement of the World Trade Organization (WTO) and in the *Aquatic Animal Health Code* of the World Organsation for Animal Health (OIE). Essential to conducting risk analyses is knowing the national appropriate level of protection (ALOP). The ALOP for Palau should be consistent across the aquatic, terrestrial and plant biosecurity sectors. It can be determined from examining past practices regarding importations of live animals and plants, but it is much better if the country has a clear statement of its national ALOP. Determining national ALOP is a political decision that should be made at the highest level of government (typically by the President or Minister), and should take into consideration both the country's need to protect its existing animal and plant production systems, natural biodiversity, tourism, etc. against invasive species and exotic diseases, and the need to import living animals and plants for development of aquaculture and agriculture.

A national ALOP is often stated as being either: "very high", "high", "medium", "low" or "very low". For example, Australia’s ALOP and its articulation (as agreed by state, territory and Commonwealth governments in 2002) has been included in Australia's Biosecurity Act of 2015. Australia's ALOP is expressed as providing a high level of sanitary and phytosanitary protection aimed at reducing risk to a very low level, but not to zero. At the recent National Consultation on the draft biosecurity regulations, three Working Groups, when asked to consider what Palau's ALOP should be, all independently concluded that the ALOP should be "very high", indicating that the acceptable level of risk (ALOR) should be "very low".

In practice, a "very high" ALOP for Palau would mean a high level of protection against invasive species and exotic disease agents, but also much greater restrictions on importations of live animals and plants, as well as a significant cost to the government in developing the capacity and expertise of the Division of Biosecurity. On the other hand, a "very low" ALOP

would mean relaxed biosecurity and a much greater risk of introducing invasive species and exotic diseases, but less restrictive measures for importers.

Determining the national ALOP is an important decision with far ranging consequences to national biosecurity and trade, and it would be very useful if the government were carefully consider this question and then issue a formal statement as to the level of ALOP that is appropriate for the Republic of Palau.

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