



# National Ballast Water Management Strategy 2016-2020

## Tuvalu

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*Supported by*



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1. *Cross section of a ship showing ballast water and the ballast water cycle. From GloBallast, IMO.*

## 1. Executive Summary

The importance of coastal and marine environments to every aspect of the lives of Pacific Islanders cannot be overstated. Pacific Island Countries (PICs) maintain resource rights and management responsibilities for over 30million square kilometres of ocean, equivalent to the total land area of Canada, China and the USA. The total population of coastal Pacific Islanders is only 2.6 million. There are 11 square kilometres of ocean for each Pacific Islander. Jurisdictionally, the ocean is 200 times more significant to the average Pacific Islander than it is to the average global citizen.

At this level of importance, the impacts of marine pollution are a major concern for PICs. Marine bio-invasions including via shipping vector such as Ballast Water and Hull Fouling is considered one of the greatest threats to the world's oceans today. Global economic impacts are considered at billions of dollars every year. Some of these impacts include the disruption to fisheries, fouling of coastal industry and infrastructure and interference with human amenity.

Invasions have already occurred in the Pacific region including the barnacle *Chthamalus proteus*, several macro-algae species, harmful planktonic algae species and the Black Striped Mussel *Mytilopsis salleri* from the Gulf of Mexico/Caribbean.

There have been a number of activities to assist the region in addressing the issue of invasive marine species. A regional strategy to address Shipping Related Invasive Marine Pests in the Pacific (SRIMP-Pac) was developed and endorsed in 2006. Guidelines for Invasive Species Management in the Pacific were developed jointly by the Secretariat of the Pacific Community and Secretariat of the Pacific Regional Environment Programme in 2009. These Guidelines included the objective to develop national invasive species strategies. In 2011, model legislation was developed by SPREP to assist PICTs in giving effect to the BWM Convention. The issue of Marine Invasives is one of the Work Plans included in the Pacific Ocean Pollution Prevention Programme (PACPOL) 2015-2020, with a focus on baseline surveys, adoption of the IMO Ballast Water Management Convention, capacity building and risk assessments.

A number of tools have also been developed by the GEF-UNDP-IMO GloBallast Partnerships Programme to assist developing countries to reduce the transfer of harmful aquatic organisms and pathogens in ships' ballast water and prepare for the implementation of the IMO Ballast Water Management Convention. In collaboration with the International Union for Conservation of Nature (IUCN) Global Marine Programme, the GloBallast Programme developed the *Guidelines for Development of National Ballast Water Management Strategies*. The Guidelines were developed in response to requests from countries for assistance in strengthening and developing national regulatory frameworks related to marine Invasive Alien Species (IAS) in particular with respect to the transfer of potentially harmful aquatic organisms and pathogens in ships' ballast water and sediments.

This National Ballast Water Management Strategy for Tuvalu has been developed in accordance with the GloBallast Guidelines, and was developed primarily during a National Consultation Workshop held in Fanafuti, Tuvalu on 18 November 2015. The strategy also applies the requirements of Article 2(5) of the Ballast Water Management Convention. Funding for the workshop was provided by IMO, with in-kind support from Secretariat of the Pacific Regional Environment Programme's PACPOL Strategy and the Tuvalu Ministry of Works, Communication and Transport. The strategic priorities for Tuvalu are set out in section 5, with specific action items for each if the strategic priorities set out in the action plan and implementation timetable in section 8.

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## 2. Glossary

**AMSA** – Australian Maritime Safety Authority

**APEC** – Asia-Pacific Economic Co-operation

**BWM Convention** - International Convention for the Control and Management of Ships' Ballast Water and Sediments

**CBD** – Convention on Biological Diversity

**GEF** – Global Environment Facility

**GISP** – Global Invasive Species Programme

**GloBallast** - Global Ballast Water Management Programme

**IAS** – Invasive Alien Species

**IMO** – International Maritime Organization

**ISPS** - International Ship and Port Facility Security Code

**MARPOL** – International Convention for the Prevention of Pollution from Ships

**MEPC** – Marine Environment Protection Committee of the International Maritime Organization

**PICT** – Pacific Island Countries and Territories

**PII** – Pacific Invasives Initiative

**PILN** - Pacific Invasives Learning Network

**SPREP** - Secretariat of the Pacific Regional Environment Programme

**SRIMP-PAC** – Shipping-related introduced marine pests in the Pacific Islands: A regional strategy

**STCW** - International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978

**TEU** – Twenty Foot Equivalent Units

**UNDP** – United Nations Development Programme

## 3. Introduction

### 3.1 Background to the issue of Invasive Alien Species

#### 3.1.1 Internationally

Shipping carries about 90% in volume of world trade (IMO 2008) and moves an estimated 10 billion tonnes of ballast water globally each year. This water frequently contains a multitude of living organisms; one study estimates that 7,000 species are carried around the world in ballast water every day (USGS, 2005, cited in GEF-UNDP-IMO 2009). The presence of these species has become a major environmental challenge and there is a growing body of research and documentation of the detrimental effects of aquatic IAS (GEF-UNDP-IMO 2009).

Over two-thirds of the world's surface is covered by water. Open oceans, semi-enclosed or enclosed seas, coastal areas, estuaries, rivers and lakes are host to highly diverse ecosystems that span all of earth's climatic zones. The productivity of these ecosystems has largely shaped development of human society and led to human settlement along coastal margins. Globally the number of people living within 100 km of the coast increased from 1 billion in 1990 to 2.2 billion in 1995, or 39 percent of the world's population (WRI 2006). The number continues to increase (Tamelander *et al.* 2010).

The movement of marine species over large distances has prevailed since the beginning of travel by ship; for example, a wooden sailing ship in 1750 could have carried 120 marine organisms fouling and boring into the hull, and another 30 associated with dry ballast (Carlton, 1999). The introduction of sea water ballast with the advent of metal-hulled ships led to a dramatic increase in the movement of organisms, and of the types of organisms that could be transported. With the current rates of increase in ocean transport the movement of species, a proportion of which may have potential as invasive alien species (IAS), the issue has become of great global importance (Bax *et al.* 2003).

Marine invasions are not just historical. At any given moment some 10,000 different species are being transported between bio-geographic regions in ballast tanks alone (Carlton 1999). And ballast water is just one of an ever expanding list of vectors that mirror the worldwide expansion in trade and tourism (Thresher 1999; 2000). Fortunately, most of these potential invaders die. Many species cannot survive the dark and often dirty conditions in ballast tanks over a long voyage; for others, the environmental conditions at the port of discharge are not suitable. Even when conditions are apparently suitable, most organisms fail to establish, and of those that do establish most fail to become invasive—although some may become invasive after decades (or centuries) of otherwise unremarkable existence (Crooks & Soulé, 1999). Nonetheless, as ballast water has become cleaner, ship's transit speeds have increased, and environmental management of ports has improved, marine organisms are likely to find commercial shipping and other vectors an increasingly hospitable means of transport worldwide.

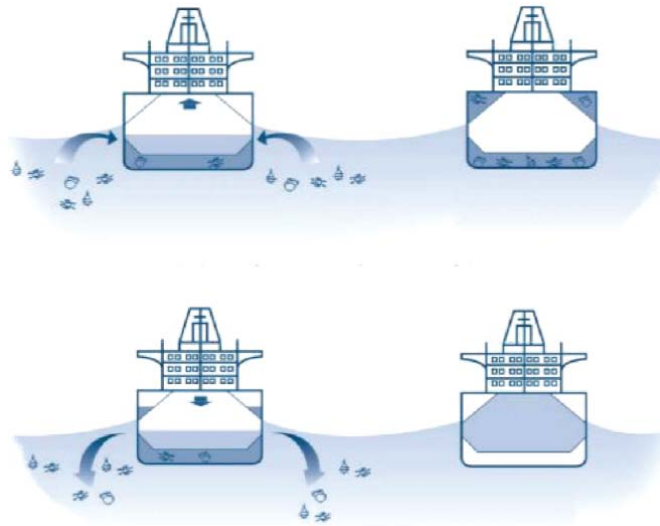


Figure 1: Cross section of a ship showing ballast water and the ballast water cycle.  
From GloBallast, IMO.

When a species is transported outside of its native range and introduced to areas where it does not normally occur, it may under suitable conditions become established and, in the absence of natural predators or parasites, drastically change the ecosystem, its functions and species composition (Molnar *et al.* 2008). Such species are called **invasive alien species (IAS)**: non-native to the ecosystem under consideration and causing or likely to cause economic and/or environmental harm (Clinton, 1999; Tamelander *et al.*, 2010). IAS is widely recognised as one of the most significant threats to global biodiversity (Wilcove *et al.* 1998). In a recent report McGeoch *et al.* (2010) state that invasive alien species alter ecosystem processes, decrease native species abundance and richness via competition, predation, hybridization and indirect effects, change community structure and alter genetic diversity. Island ecosystems are especially vulnerable due to their biological and physical features, and the fact that many are hosts to high levels of endemism. Human activities also contribute to the spread of IAS, such as through deliberate introductions as in aquaculture. Regardless, the main vectors for species transport and the majority of marine species introductions are shipping (Cohen & Carlton, 1998; Ruiz *et al.* 2000; Hewitt *et al.*, 2004).

The CBD Global Biodiversity Outlook 2 (CBD 2006) discusses trends in invasive alien species (headline indicator: p. 34). Invasive species are a global problem requiring responses at all levels. Many countries have established systems to prevent and control IAS and, as part of risk assessments, to predict the likelihood of alien species becoming invasive and the potential ecological and economic cost they may incur (CBD 2006). Invasive species can have devastating impacts on native biota, causing extinctions and affecting natural and cultivated ecosystems. Since the 17<sup>th</sup> century invasive alien species have contributed to nearly 40% of all animal extinctions for which the cause is known. While a major source of marine introductions of alien species is hull fouling and the release of ballast water from ships, other vectors such as aquaculture and aquarium releases are also important and less well-regulated than ballast water. In the marine ecosystem, the movement of non-native species has been well studied. For example, of the 150 species that have arrived in the Great Lakes, 75% originated in the Baltic Sea. Similarly, migration flow from the Red Sea to the Mediterranean through the Suez Canal continues unabated with nearly 300 species of these Lessepsian migrants,

including decapod crustaceans, molluscs and fishes having entered the Mediterranean since 1891 (CBD 2006).

The increases in global maritime traffic and aquaculture and the consequent increases in IAS are now widely acknowledged as a critical trans-boundary problem in marine waters globally (UNEP, 2006). IAS has caused environmental impacts in almost half of the regions considered by the Global International Waters Assessment. In marine habitats there are a greater number of introduced species, but many remain undetected. The impact of IAS in the Black Sea (below) is a powerful example of what can happen when IAS run rampant.

*The Black Sea:* The collapse of the fisheries of the Black Sea during the last 40 years is a *classic case of IAS being introduced when the environment was already severely stressed*. Overfishing had depleted the top predators leading to “fishing down” the food web. Since the 1970s urban and industrial expansion, intensive fertiliser use and atmospheric deposition led to eutrophication, hypoxia and bottom up impacts on the food web. Additional stressors in the 1980s included chemical pollution, the alteration of the inflowing rivers and continued overfishing. In the late 1980s ballast water introduced the combed jellyfish (*Mnemiopsis leidyi*), which by 1989 had spread throughout the Black Sea, reaching densities of 15.2 kg/m<sup>2</sup>. *Mnemiopsis* voraciously consumed anchovy eggs and larvae, while eutrophication and intensive fishing of anchovies and other small pelagic fish continued, resulting in the collapse of the pelagic fisheries of the Black Sea. The anchovy catch fell from 534,000 tonnes in 1986, to only 88,000 tonnes by 1991, with a loss of 150,000 jobs (UNEP 2006).

### 3.1.2 Regionally

*“The transboundary nature of shipping and the inter-connectedness of the seas and oceans dictate that no one port or country can effectively control the spread of (IAS) via shipping. In order to be effective, countries must work cooperatively with both their neighbours and the broader global community to implement harmonized measures. The SRIMP-PAC Strategy provides a regional framework for cooperation between Pacific Island countries and territories and also with Pacific-Rim countries, including through APEC.” (Anderson et al., 2003).*

Information about terrestrial invasive species in the Pacific is well documented: however, this cannot be said for marine invasives, where most of the existing research has been carried out in Hawaii and the American territories and very little in the other SPREP member countries. The difficulties with investigating marine invasives include:

- The cost of carrying out surveys;
- A lack of taxonomic expertise for the identification and recognition of invasives;
- A lack of historical information on when or how invasives arrived; and
- A lack of information on the impact of invasives on the local ecosystems, and the consequent economic impacts.

The importance of coastal and marine environments to every aspect of the lives of Pacific Islanders cannot be overstated. Pacific Island Countries (PICs) maintain resource rights and management



responsibilities for over 30 million square kilometres of ocean, equivalent to the combined land areas of Canada, China and the United States of America. The total population of Pacific islanders is only 6.7 million people and only 2.6 million if the largely inland population of Papua New Guinea is excluded. There are 11 square kilometres of ocean for each and every Pacific Islander. Jurisdictionally, the sea is nearly 200 times more significant to the average Pacific Islander than it is to the average global citizen. At this level of importance, the impacts of marine pollution are a major concern for Pacific island countries and territories (PICTs). For many PICTs the ocean is their only significant natural resource and the good governance and sustainable management of their ocean resources is the key to their economic and social well-being.

Marine bio-invasions including via shipping vectors such as Ballast Water and Hull Fouling is considered one of the greatest threats to the world's oceans today. Global economic impacts are considered at billions of dollars every year. Some of these impacts include the disruption to fisheries, fouling of coastal industry, impact on tourism, and infrastructure and interference with human amenities. Invasions have already occurred in our region including the barnacle *Chthamalus proteus*, several macro-algae species, harmful planktonic algae species and the Black Striped Mussel *Mytilopsis sallei* from the Gulf of Mexico/Caribbean.

There have been a number of activities to assist the region in addressing the issue of invasive marine species. A region-wide study on the management of ship's waste in Pacific Island Ports (Nawadra & Polglaze, 2002) described the capabilities of ports in the region for dealing with waste from shipping and provided a wide-ranging series of recommendations for improvements. It was noted that only a handful of ports within the region (Apra, Guam; Papeete, French Polynesia and Noumea, New Caledonia) had at that time the capability to properly deal with the entire spectrum of ship-generated waste. In May 2015 the Marine Environment Protection Committee of the International Maritime Organization endorsed a Regional Reception Facilities Plan (RRFP) for the Small Island Developing States (SIDS) in the Pacific Region. This plan was submitted by SPREP and co-sponsored by Australia, New Zealand and a number of Pacific island countries. The RRFP will take effect from May 2016 and will allow SIDS to satisfy their waste reception facility obligations under MARPOL through regional arrangements by identifying ports that will serve as Regional Waste Reception Centres.

A regional strategy to address shipping related invasive marine pests in the Pacific (SRIMP-Pac) was developed and endorsed in 2006. A number of tools have since been developed by the GloBallast Partnership UNDP/GEF Project being implemented by the Project Coordinating Unit (PCU) at IMO where SPREP is a Regional Coordinating Organisation (RCO). SPREP together with IMO GloBallast PCU have implemented many activities in the region including the model act development and regional training in various aspects of ballast water management.

The establishment of the Pacific Invasives Learning Network (PILN) through SPREP is coordinating a national, regional and international communications network and the establishment of national teams focussing on invasives: Marine invasives are within the general mandate of PILN.

A number of important initiatives focussed on invasives are also partners within the region, such as the Global Invasive Species Programme (GISP; [www.gisp.org](http://www.gisp.org)), and the Pacific Invasives Initiative (PII; [pacificinvasivesinitiative.org](http://pacificinvasivesinitiative.org)).

The regional invasive species strategy 2000 (see [www.sprep.org](http://www.sprep.org)) was the first regional strategy of its kind in the world, and provided a framework for efforts to increase country capacity to take the five steps in relation to invasive species. This strategy was a lead-in to the establishment of PILN. With

respect to marine invasives steps 1 and 2 may be possible, but the remainder are either extremely difficult and costly, or impossible to implement. There are very few examples where marine invasives have been eradicated, and only then at great cost.

1. Prevent invasives getting to each island;
2. Detect them quickly if they do;
3. Respond rapidly to the incursion;
4. Control the population; and
5. Eradicate the species from the island.

SPREP (Tye, 2009) published guidelines for invasive species management in the Pacific. While focussing mostly on the management of terrestrial IAS, the guidelines do provide a comprehensive framework for IAS management overall. There are nine thematic areas which apply equally to the management of all IAS. The Bio-security Management Action (C1: Bio-security) has direct value for any management strategy for marine IAS.

### 3.1.3 National (Tuvalu)

The nation of Tuvalu comprises nine atolls and island groups stretching from Nanumea in the north to Niulakita in the south. The islands are located between 5-10° south and 176- 179° east over a distance of 680 km, approximately in a NW-SE line. While the total land area is only 26 km<sup>2</sup> this is spread over a large sea area of 1.3 million km<sup>2</sup>. The furthest island, Nanumea is 455 km from the capital, Funafuti.

The marine environments of Tuvalu are comprised of six major ecosystem types (oceanic, outer reef, lagoonal backreef, lagoon floor, bommies or patch reefs and natural channels between the ocean and lagoon). These ecosystems produce the sediment required for island building and maintenance and support communities of corals, other invertebrates, algae, plankton, fishes and marine mammals and reptiles. For example, approximately 30 common species of corals and over 350 species of fishes characterise the marine ecosystems of the country.

Tuvalu has recently established a Tuvalu Invasive Species Committee (see below). Potential impacts of IAS include impacts on fish and other nearshore resources as well as coral bleaching.

Tuvalu is a signatory to the Ballast Water Convention, although the convention itself has yet to enter into force internationally (see below).

## 3.2 Ballast Water Management Convention

The International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM Convention) was adopted at an International Maritime Organization (IMO) Diplomatic Conference in 2004. The Convention will enter into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. The BWM Convention aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments. Samoa has not yet ratified the BWM Convention.

Under the Convention, all ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. All ships will also have to carry a ballast water record book and an international ballast water management certificate. The ballast water management standards will be phased in over a period of

time. As an intermediate solution, ships should exchange ballast water mid-ocean. However, eventually most ships will need to install an on-board ballast water treatment system.

A number of guidelines have been developed to facilitate the implementation of the Convention. The Convention will require all ships to implement a Ballast Water and Sediments Management Plan. All ships will have to carry a Ballast Water Record Book and will be required to carry out ballast water management procedures to a given standard. Existing ships will be required to do the same, but after a phase-in period of less than five years, depending on the scheduling of MARPOL surveys for the particular vessel.

Parties to the Convention are given the option to take additional measures which are subject to criteria set out in the Convention and to IMO guidelines. The Convention places obligations on Flag States, Port/Coastal States as well as ships. Flag state obligations include putting in place appropriate legislation and arrangements for the survey and inspections of registered vessels and issuing/inspecting the required documentation, as set out below. Port State obligations are primarily set out in the IMO Guidelines for Port State Control under the BWM Convention (Resolution MEPC.252(67) adopted in October 2014. These Guidelines include procedures for ship inspections, sampling, control actions and reporting requirements.

#### *International Ballast Water Management Certificate*

Ships of 400 gross tonnage and above are subject to the survey by the Administration or by an organization recognized by the Administration. After completion of a survey, an International Ballast Water Management Certificate has to be issued by the Administration or by an approved Classification Society.

#### *Ballast Water Management Plan*

Each ship is to have on board and implement a ballast water management plan that is approved by the Administration. Such a plan is to be developed taking into account BWM Convention requirements and relevant guidelines. The ballast water management plan should include:

- Ship's name, shipowner's name and address, flag, port of registry, gross tonnage, IMO number, length, beam, international call sign;
- The total ballast capacity of the ship in cubic metres;
- A brief description of the main ballast water management methods used on the ship; and
- Ballast tank arrangement etc.

Additionally, the ballast water management plan is to include designation of the officer in charge of reviewing the plan and ensuring that the plan is properly implemented. The plan is to be written in the working language of a ships' personnel and kept on board the ship and available for inspection by port/flag State authorities. The plans developed for each ship in accordance with the requirements of Ballast Water Management Convention are to be regularly reviewed by shipowner, ship operator and ship master. Any amendments to the plan should be approved by the Administration.

#### *Ballast Water Record Book*

Each ship is to have on board ballast water record book written in the working language of a ships' personnel and kept on board the ship and available for inspection by port/flag State authorities. Each operation concerning ballast water is to be fully recorded in the ballast water record book and

each entry signed by the officer in charge of the operation concerned. Officers duly authorized by the Administration may inspect ballast water record book on board any ship, and may make a copy of any entry.

Entries in the ballast record book are to be made on each following occasions:

- When ballast water is taken on board;
- Whenever ballast water is circulated or treated for ballast water management purposes;
- When ballast water is discharged into the sea;
- When ballast water is discharged to a reception facility; and
- Accidental or other exceptional uptake or discharge of ballast water.

### 3.3 Shipping Activity

Our Pacific leaders have stated that Pacific Countries are not Small Island Developing States but are in fact Large Ocean States. Our leaders have said – the Pacific Ocean is our lifeblood. The Pacific Ocean is vast, in fact comprising 98% water, 2% land.

As Large Ocean States, island members of SPREP such as Tuvalu are overwhelmingly dependant on shipping for economic survival. Shipping in the region can be grouped into the following broad categories:

- Transit shipping: Ships which pass through the region without stopping, en-route to other destinations;
- International shipping (as distinct from transit shipping): Ships calling at the major ports of the region from outside the region, either with incoming cargo or tourists (cruise ships) or exports;
- Regional shipping: Ships trading (both cargo and passengers) between the countries and territories within the region;
- Domestic shipping: Ships trading (both cargo and passengers) within each country in the region;
- Foreign fishing fleet: Fishing vessels from distant water fishing nations operating within the region;
- Domestic fishing fleet: Fishing vessels from the Pacific islands themselves; and
- Miscellaneous: Special purpose vessels such as Navy ships and research ships and smaller vessels such as tourist vessels, yachts and private pleasure and fishing craft.

The Government of Tuvalu has appointed the Tuvalu Ship Registry (TSR) as the Authority to issue all certificates necessary for a vessel to sail and trade under the Tuvalu flag. Its responsibilities include:

- The registration and licencing of ships
- The certification of seafarers
- The inspection of vessels to ensure compliance with safety and environmental standards.

Flag State inspections are conducted by Flag State Inspectors from the TSR or by maritime surveyors that have been appointed by TSR which may include reputable survey companies or classification societies.

Tuvalu has two seaports, one in Nukufetsu and the main port that is located in Funafuti which is governed by the Funafuti Port Authority. This is a small port which can support a maximum vessel length of 500 feet, and a maximum cargo pier depth of six metres. The port handles around 1000 TEUs each year, with a total of 265 ship visits between January and November 2015. Most of these are fishing vessels from Korea and Taiwan, with cruise ships from Kirribati and Fiji and container ships from Suva (Fiji). Whilst the port provides good shelter, there are limited repair facilities and no dry dock. Tuvalu relies on imports for much of its food as well as animals, mineral fuels, machinery and manufactured goods the value of which greatly outweighs revenue gained through the export of

fish, copra and handicraft goods. Exports are principally to Fiji, Australia and New Zealand and imports come from Australia, Fiji, New Zealand and Asia.

Shipping matters are the responsibility of the Marine and Port Services Department, which is a department of the Ministry of Communications and Transport. Due to resource issues, port State control is not currently carried out in Tuvalu. However, a review of the structure within the Marine and Port Services Department has commenced and it is hoped that port State control activity can be resumed in the future.

There are 58 operators working in Tuvalu of which 33 are foreign owned. They provide various different services such as cargo, bulk carriers, chemical tankers, containers, petroleum tankers, refrigerated cargo and passenger/cargo. There are a number of shipping companies in Tuvalu, such as Patiale Shipping Agents and Kolone Shipping Services, both based in Funafuti and shipping services to the smaller islands are limited.

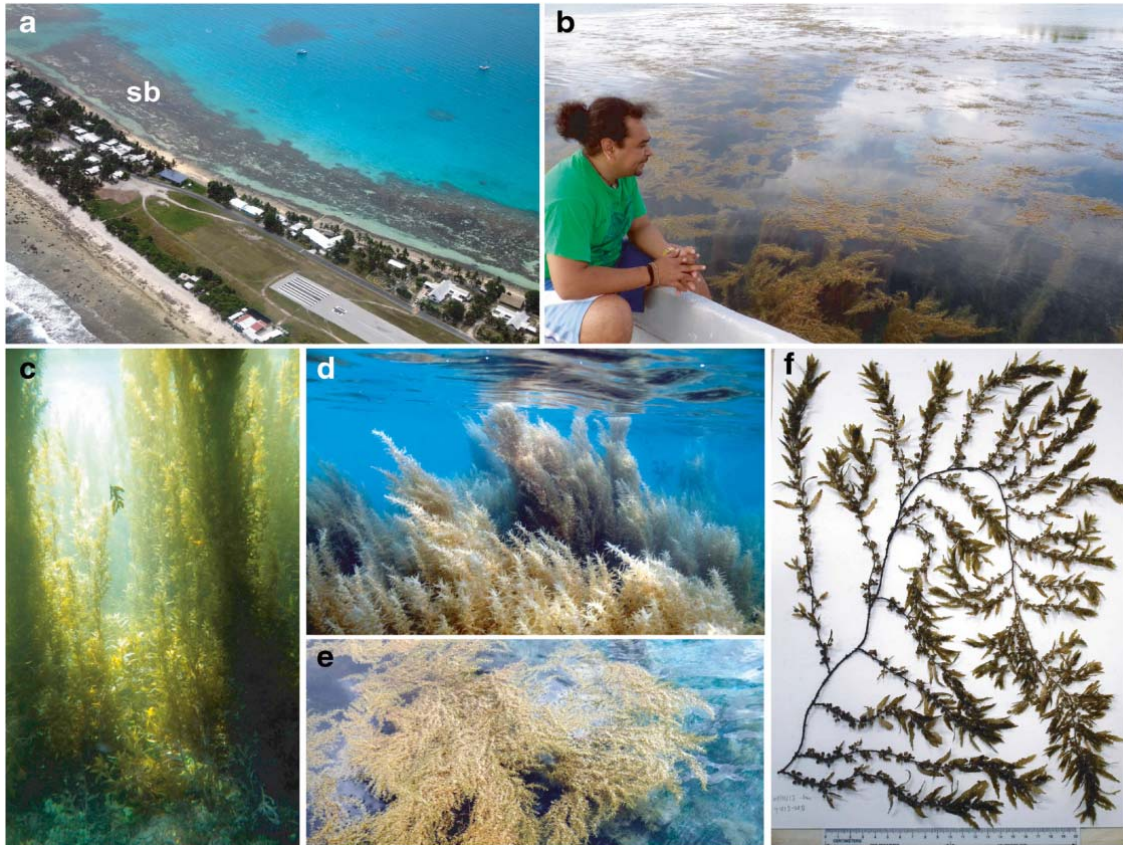
Tuvalu Shipping Services is a liner agent in the country and is also an agent for the international firm DHL. International shipping is provided on a monthly basis by Oceanlink and Pacific Direct. UPS also operates an import shipping service in Tuvalu out of the offices of Williams and Gosling Ltd in Fiji. Tuvalu's main exports are copra, fish and stamps with Belgium, Luxembourg, Fiji, Poland and Hungary being the main export destinations.

### 3.4 Existing Introductions

Since 2011, Tuvalu has been affected by algal blooms, in particular a large growth of the brown alga *Sargassum* on the main atoll of Funafuti (N'Yeurt and Iese 2014). The Tuvalu Government engaged experts from the University of the South Pacific to conduct an initial survey of the problem in November 2013. The bloom was seen to be localized on the lagoon side of the main populated island of Fongafale, distributed in a variably dense belt up to 100 m from the shoreline. A total of 19 species of macroalgae were found in the survey area, the dominant one being the phaeophyceae alga, *Sargassum polycystum* C. Agardh, with individual plants reaching up to 2 m in length with a cover ranging between 16 and 23 % of the substratum. For seven transects laid from the southern tip of the island to the end of the populated area, wet biomass ranged between 0.45 and 3.56 kg m<sup>-2</sup>, with an average of 1.68 kg m<sup>-2</sup>. There was a correlation noticed between the density of human population on the shore and algal biomass, with the highest biomass figures opposite a school and a hotel. Water quality tests also showed nutrient levels almost twice as high in front of populated areas than in unpopulated areas of the island. The algal belt was seen to be concentrated in water less than 1 m deep, becoming sparser as depth increased. The report of the survey suggests that, since there were no previous records of *Sargassum* in Tuvalu, it was an introduced invasive species "from a nearby regional source". While the report has no firm conclusions as to the method of transmission, shipping is identified as a possible vector through hull fouling, entanglement in propellers or chains or ballast water discharge, noting in particular that the *Sargassum* outbreak in Funafuti first occurred at the container berth within the port.

The Tuvalu Department of Environment reports that, while a number of suggestions have been made for the use of *Sargassum*, such as agricultural fertilisers, pesticides and renewable energy, there are currently no plans for commercial exploitation.





*Brown alga Sargassum on the main atoll of Funafuti (N'Yeurt and Iese 2014)*

### 3.5 Scope

This Strategy applies to all areas of Tuvalu.

## 4. Purpose of the Strategy

The purpose of this strategy is to minimise the risks of IAS by seeking to avoid adverse economic, environmental and public health impacts, whilst not unduly impeding trade; and taking a practical approach to ballast water management. This will be achieved by establishing a work plan and a system to monitor the implementation of a ballast water management strategy for Tuvalu and provide for future revision on the plan.

## 5. Strategic Priorities

- Provide appropriate forum to oversee and review implementation of this Strategy.
- Develop legislation to give full effect to the BWM Convention.
- Undertake additional baseline survey work and, based on survey results, consider the need for Risk and/or Economic Impact Assessment.
- Conduct awareness campaign on ballast water management issues.

- Undertake capacity building in Tuvalu to ensure effective implementation of the BWM Convention.

While these will be the strategic priorities for this strategy, the National Consultation Workshop noted that it would also be important to consider possible future measures to address introductions by hull fouling, garbage disposal and/or other potential vectors, taking into account SRIMP-PAC and applicable IMO guidelines.

## 6. Leading Agency

The Department of Environment and the Marine and Port Services Department are the joint Leading Agencies for the purposes of the National Ballast Water Management Strategy.

GloBallast defines the responsibilities of the Leading Agency for the purposes of a National Ballast Water Management Strategy as follows:

- Integration of the National Strategy into pertinent national policies/strategies and ensuring that necessary legislation is in place;
- Devising and ensuring implementation of necessary scientific, operational and administrative arrangements for all ships visiting the country's ports;
- Ensuring that all key stakeholders are fully conversant with the National Strategy, appropriately trained and properly authorized to act on its behalf, where required;
- Monitoring and reviewing on an ongoing basis how effectively the National Strategy is being implemented and introducing changes, as necessary;
- Ensuring effective enforcement of national laws and regulations;
- Administration of relevant international instruments related to ballast water management;
- Incorporating into the National Strategy improved measures that become possible due to experience gained in operating the National Strategy and/or through developments in research or technology, or changed international requirements or 'best practice';
- Ensuring the ongoing liaison and cooperation of all key stakeholders; and
- Participating in international, regional and national matters relating to BWM.

## 7. National "Task Force"

The GloBallast Guidelines provide for the establishment of a "Task Force" to oversee and review implementation of the strategy. For Tuvalu, this role is to be undertaken by the Invasive Species Committee which has only recently been established and is to be jointly co-ordinated by the Department of Environment and the Marine and Port Services Department.

Membership of the Committee should include:

Marine and Port Services Department - Ministry of Communications and Transport  
 Department of Environment - Ministry of Foreign Affairs, Trade, Tourism, Environment and Labour.  
 Agriculture Department – Ministry of Natural Resources  
 Fisheries Department - Ministry of Natural Resources  
 Tuvalu Association of NGO's – Ministry of Home Affairs  
 Funafuti Kaupule – Ministry of Home Affairs  
 Golden Tuna Shipping Agency  
 DMK Shipping (to be invited)

Ministry of Health (to be invited)  
Customs Department – Ministry of Finance  
Office of the Attorney General (to be invited)

Additional representation is to be invited from island communities as necessary.

Secretariat services, including organisation of venue and circulation of draft minutes/outcomes, for each meeting will alternate between Department of Environment and the Marine and Port Services Department. All meetings will be co-chaired by representatives of these two agencies. The Committee should meet three times each year – February/March, June/July, October/November.

Terms of Reference will need to be adopted as a matter of priority. The following is suggested for consideration by the Committee and modification as necessary:

- a) To raise awareness and educate the public, government agencies, and other land managers about invasive species and their impacts;
- b) To minimize the further introduction and spread of invasive species in Tuvalu through education and awareness, early detection and control, and other management efforts;
- c) To promote coordination and collaborative management of invasive species between agencies and land occupiers;
- d) To work towards the control/containment of highly invasive non-native species;
- e) To provide a conduit for information and a source of expertise on invasive species;
- f) To develop and maintain a comprehensive inventory of invasive species within the area of responsibility; and,
- g) To oversee and review implementation of the Tuvalu National Ballast Water Management Strategy.

GloBallast defines the responsibilities of the “Task Force” as being to work together after the development of the National Strategy to provide guidance, oversight, and advice on matters relating to harmful aquatic organisms and pathogens, while the Lead Agency is primarily responsible for administering the operational arrangements.



## 8. Action Plan and Implementation Timetable

Strategic Priority	Activities	Responsibility	Year				
			2016	2017	2018	2019	2020
<b>Provide appropriate forum to oversee and review implementation of this Strategy.</b>	Adopt Terms of Reference for the recently established Invasive Species Committee, including the mandate to oversee and review implementation of this Strategy.	Department of Environment /Marine and Port Services Department					
<b>Develop legislation to give full effect to the BWM Convention</b>	Using the 2015 SPREP Model Marine Pollution Prevention Act, amend the Tuvalu Marine Pollution Act 1991 to:*  (a) Include new provisions to give full effect to the Ballast Water Management Convention; (b) Include new provisions to give full effect to the other IMO instruments included in the SPREP Model – the AFS Convention and the Bunkers Convention; and (c) Update the existing provisions giving effect to the MARPOL Convention, as well as new provisions to give effect to MARPOL Annex VI (Air Pollution).	Marine and Port Services Department/SPREP					

<p><b>Undertake additional baseline survey work and, based on survey results, consider the need for Risk and/or Economic Impact Assessment.</b></p>	<p>Tuvalu officials to attend training course in Port Biological Survey</p>	<p>SPREP/Department of Environment /Marine and Port Services Department</p>					
	<p>Conduct additional baseline survey work to monitor dispersal of <i>Sargassum</i> and identify and more recent introductions</p>	<p>SPREP/Department of Environment /Marine and Port Services Department</p>					
	<p>Consider the need for a Risk and/or Economic Impact Assessment, taking into account the results of the additional baseline surveys and the Globallast Guidelines.</p>	<p>Department of Environment /Marine and Port Services Department</p>					
<p><b>Conduct awareness campaign on ballast water management issues.**</b></p>	<p>Conduct awareness campaign for all stakeholders to coincide with entry into force of the BWM Convention for Tuvalu.</p>	<p>Department of Environment /Marine and Port Services Department</p>					
<p><b>Undertake capacity building in Tuvalu to ensure effective implementation of the BWM Convention. **</b></p>	<p>Conduct training in implementation of the BWM Convention.</p>	<p>SPREP</p>					

	Consider possible future measures to address introductions by hull fouling, garbage disposal and/or other potential vectors, taking into account SRIMP-PAC and applicable IMO guidelines.	Department of Environment /Marine and Port Services Department					
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\*This process will need to be initiated by a formal request from the Marine and Port Services Department to the office of the Attorney-General. SPREP has indicated it is in a position to provide the Office of the Attorney General with assistance in drafting the new and amended provisions. It was noted that the updated MARPOL provisions will in any event be required prior to Tuvalu undergoing an audit as part of the IMO Instruments Implementation Code (III Code), which is tentatively scheduled for 2017. The MARPOL Convention is one of the Conventions included in the IMO audits.

\*\*Timing will be dependent on international entry into force of the BWM Convention.

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