

# THE IMPLICATIONS OF INVASIVE ALIEN SPECIES FOR WATERBORNE TRANSPORT INFRASTRUCTURE – ENVICOM WG 218 UPDATE

Safra Altman<sup>1</sup>, Nicki Stokes<sup>2</sup>

<sup>1</sup> U.S Army Corps of Engineers; [Safra.Altman@usace.army.mil](mailto:Safra.Altman@usace.army.mil)

<sup>2</sup> North Queensland Bulk Ports Corporation, Australia; [nstokes@nqbp.com.au](mailto:nstokes@nqbp.com.au)

## Summary

PIANC's EnviCom WG 218 has been preparing a technical report titled "The Implications of Invasive Alien Species for Waterborne Transport Infrastructure (WTI)". This technical report is now progressing to a draft stage with assistance of contributing authors from across the globe. The authors herein represent the Chair and joint-secretary of the working group, the latter of which is the PIANC Australia and New Zealand representative. This abstract provides an overview of the report progress in light of the terms of reference and highlights areas where additional contribution would be beneficial.

*Keywords: IAS, invasive alien species, biosecurity, waterborne infrastructure, risk management*

## Background

Globally, aquatic invasions have been conservatively recorded as costing US\$345 billion over the past 50 years, increasing exponentially as globalisation moves our economies to become more and more connected [1]. These costs relate to impacts triggered from displacement of native species, altering of marine ecosystems and water quality, and direct impact of engineered stability of marine infrastructure. Invasive Alien Species (IAS) can be introduced and transferred across environments through a number of pathways; all of which are facilitated through marine and inland ports and waterway infrastructure.

Globalisation coupled with a changing climate is exacerbating their establishment [2] by increasing pathways for IAS transfer and facilitating adaptation of non-native species as global climates respond to the effects of climate change. The importance of minimizing the risks of IAS is acknowledged both within the Aichi Biodiversity Target (#9) and the UN Sustainable Development Goal 15 (Life on Land)[3].

Port and waterway operators are increasingly recognising the capacity to prolong infrastructure life and minimize risk to operations through the incorporation of effective biosecurity planning.

## Introduction

PIANC's Environmental Commission (EnviCom) has established a Working Group (WG 218) to prepare a technical report providing practical guidance on managing the business, liability, health and safety risks associated with IAS.

This abstract provides an overview of the working group draft report progress and areas where the working group see potential benefit from additional contribution.

## Working Group Membership

The working group includes representatives from the PIANC members across the globe with backgrounds in:

- Consultants and researchers specialised in IAS;
- Port environmental and biosecurity representatives;
- Maritime authorities and regulatory bodies tasked with management of maritime infrastructure; and
- Professional organisations.

The countries represented include Australia, France, Germany, Iran, United Kingdom and United States of America. Leading membership includes:

- Chair – Safra Altman of U.S Army Corps of Engineers.
- Mentor – Jan Brook, Jan Brook Environmental Consultant Ltd.
- Joint Secretary –
  - Nicki Stokes, North Queensland Bulk Ports Corporation
  - Aaron Schad, U.S Army Corps of Engineers

After the initial meeting in Brussels, all remaining meetings were held through online platforms due to international travel restrictions imposed by the Covid19 pandemic. Difficulties coordinating contributions have been sustained since inception due to the various constraints imposed across the globe during this time.

## Scope of Report

The working group members have been investigating the key factors related to the spread and establishment of IAS and the availability and efficacy of measures to minimise this risk specific to maritime infrastructure.

Pursuant to the Terms of Reference, this work is focused on waterway infrastructure and therefore specifically excludes vessel related mitigation strategies as well as discussion of implications and mitigation measures related to broader biodiversity

implications; other than to provide context for risk attribution.

Below provides a brief outline of the report contents, with comment on areas where the working group consider opportunities for broader engagement and contribution would be of benefit.

### **1. Introductory Sections**

The document initially provides a summary of document intent, including an overview of scope and contents with respect to the defined Terms of Reference and a diagram of report flow to facilitate efficient referencing of contents. It also acknowledges the contributing authors and make-up of the working group.

### **2. Defining Risks and Influences**

The following three sections offer key definitions and exclusions specific to waterborne transport infrastructure risks and influences. This includes consideration of economic impacts and of key aspects affecting IAS distribution and spread.

An introduction is provided on the influence of a countries development index and framework for mitigation measures, be they voluntary, regulatory or industry led. Discussion is also included on the role of climate change within this risk landscape.

*Specific to the role of climate change on the IAS risk landscape, additional contributions are welcomed to improve the comprehensiveness of this section.*

### **3. Defining Impacts on Waterborne Infrastructure**

This section provides discussion on the types and extent of impacts likely on waterborne infrastructure from IAS. This includes operational, structural, business continuity and liability impacts. Where relevant this section also drills down to provide detail on how different IAS types have varying levels of impacts – such as IAS that primarily cause fouling, burrowing, reef building, clogging, and/or water chemistry changes.

### **4. Outlining Prevention Options**

This section focuses on proactive biosecurity tools targeting the first element of the invasion curve, when IAS are absent, pre-entry. Herein, methods used to prevent the introduction and establishment of IAS are discussed; including biosecurity and surveillance and monitoring programs which could be established and the use of risk-based management to focus such approaches.

### **5. Outlining Response and Ongoing Mitigation Options**

This section focuses on the second half of the invasion curve, after the introduction of an IAS. It reviews tools, strategies, challenges and key outcomes of IAS management to provide

practitioners with a range of options and scenarios where these can be applied. Strategies covered herein include physical (infrastructure modifications), chemical (treatment), biological, or integrated (multiple).

### **6. Economic Evaluation and Justification**

The objective of this section is to provide an analysis of the economics related to mitigation measures implemented either directly to or within the immediate environment of waterborne infrastructure as compared to the economic impacts evidenced in previous incursion and eradication efforts.

*The working group would welcome contributions to improve the comprehensiveness of this section.*

### **7. Species Risk Tables**

Drawing from available IAS databases, this section offers a global summary on which species may pose a risk to specific regions, alongside risk types posed (fouling, burrowing, etc), commercial entity most at risk (ie. port, marina, fishery), and treatment or mitigation measures that have shown efficacy. The purpose of this is to offer infrastructure owners a snapshot of key risks and mitigation options depending on their geographic location.

### **Progress**

At the timing of preparing this abstract it is anticipated the draft of the report will be ready for submission to PIANC early 2023.

### **How Can You Contribute**

As drafting of the report draws to an end a key area where we could use input from the broader research or industry community is in the area of climate change influence, infrastructure modifications, and economic evaluation of mitigation strategies. Please contact the author/s if you would like to be involved.

### **Acknowledgements**

The Author/s would like to acknowledge all members of the WG and their employers for their continued support and contributions.

### **References**

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