



# Ballast Water Compliance is Possible: The Last Steps

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Pacific Ballast Working Group  
Portland, Oregon, USA

SAFER  
GREENER  
SMARTER

SGS







# OUTLINE



- Takeaway message
- Biological efficacy testing and next steps at the International Maritime Organization (IMO)
- Barriers to testing
- A bit of history
- Framework for compliance monitoring and enforcement

# Globally Consistent Compliance Monitoring and Enforcement—Elements



- 1 Testing framework**—annually for biological efficacy
  - Must include the  $\geq 50 \mu\text{m}$  size class

- 2 Accuracy and precision of sampling and analysis methods**

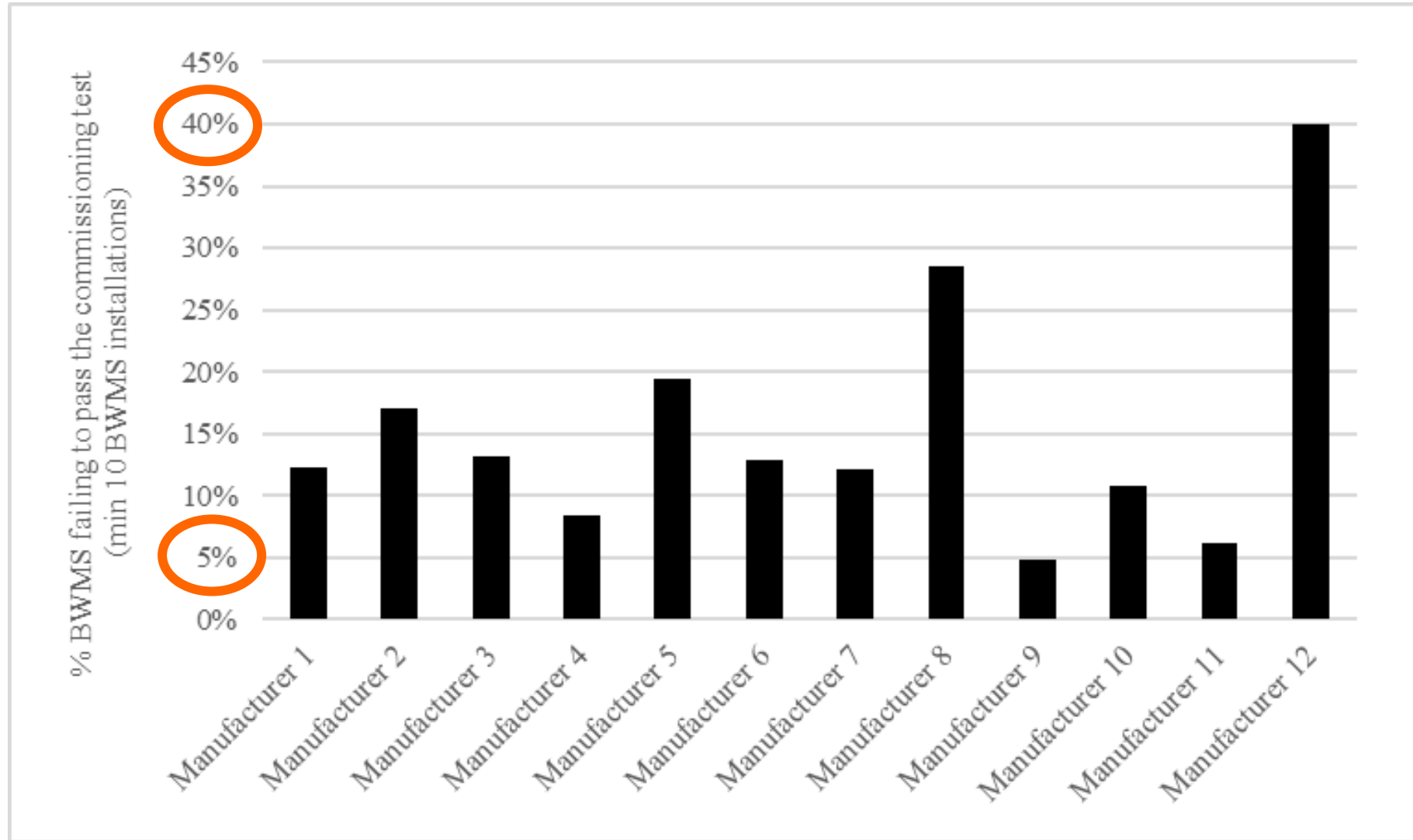
- 3 Standardized document check**

# Biological Efficacy Testing



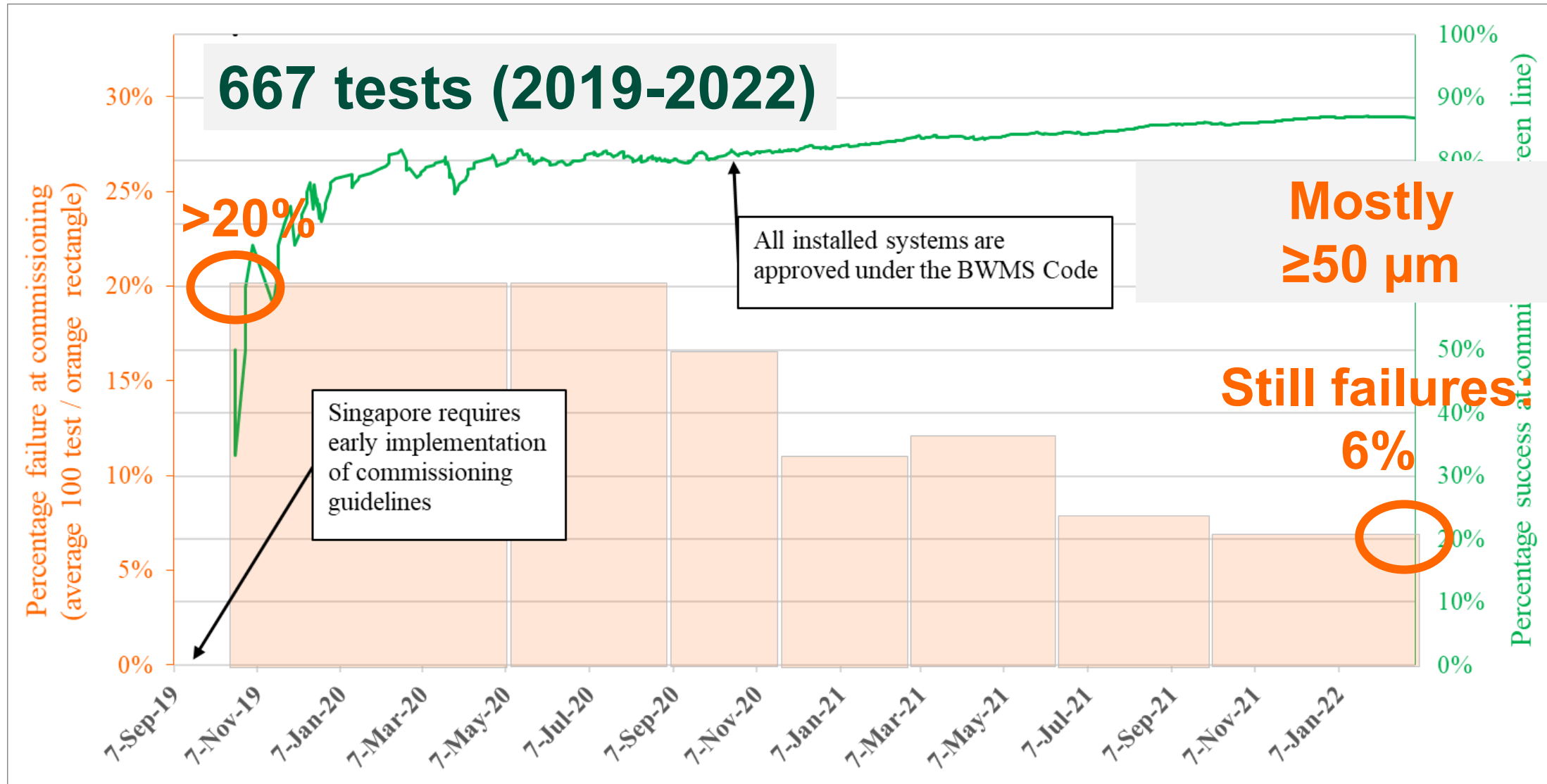
- **Commissioning testing** represents optimum conditions:
  - BWMS is new
  - BWMS has undergone type approval (but not installation-specific testing)
  - Seafarers are freshly trained in the use and maintenance of BWMS
  - Often, the BWMS vendor is onsite to troubleshoot
  - Even so...failures are found

# The Need for Biological Efficacy Testing—Commissioning



Drillet et al. 2023

# The Need for Biological Efficacy Testing—Commissioning



# The Need for Biological Efficacy Testing—1° Compliance

49% failures  
( $\geq 50 \mu\text{m}$ )

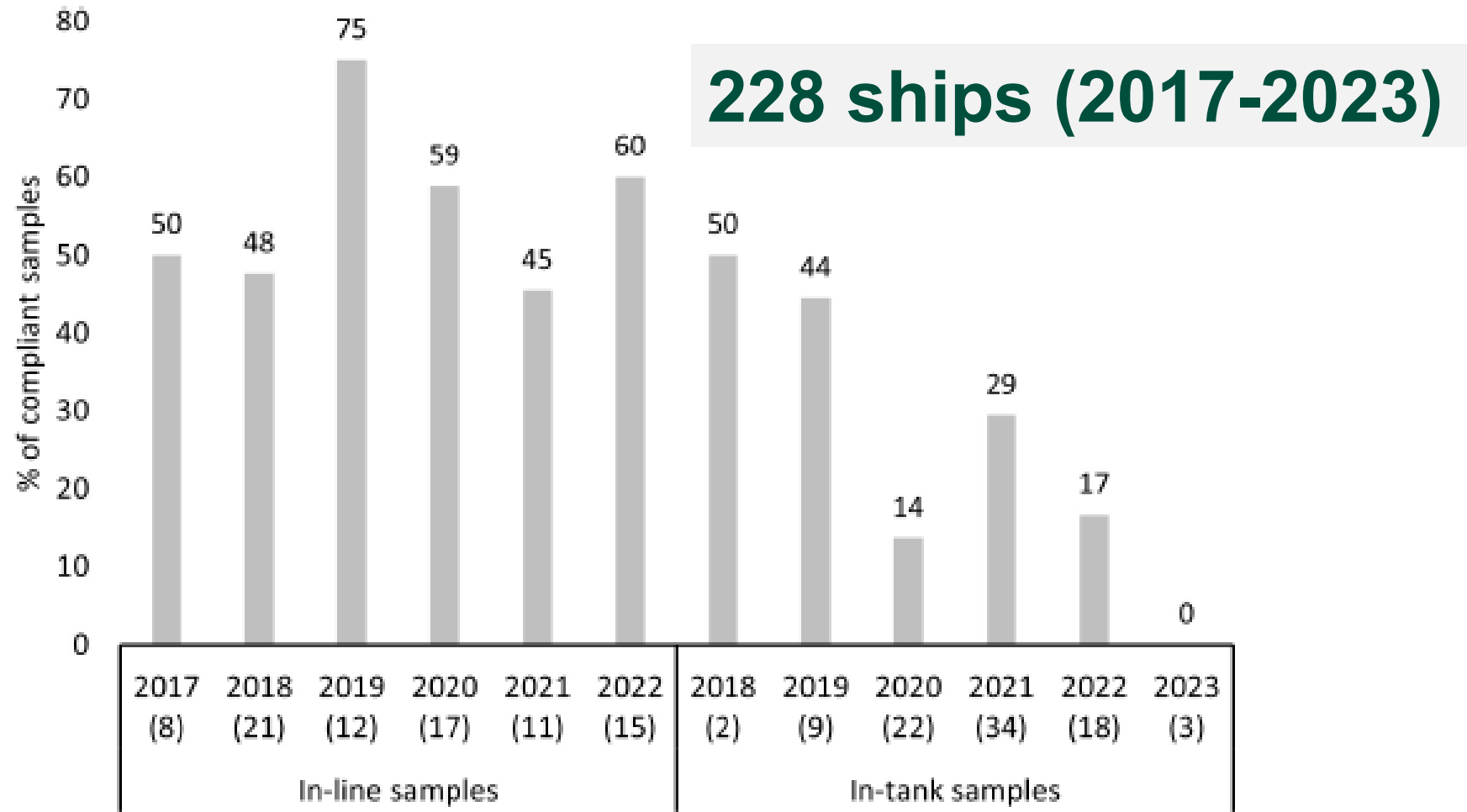


FIGURE 3

Percentage of compliant in-tank and in-line samples during compliance testing by year (D-2 standard,  $\geq 50\mu\text{m}$  -sized organisms). Number of samples each year is provided in brackets.



# Next Steps at IMO (following MEPC 81 in March 2024)

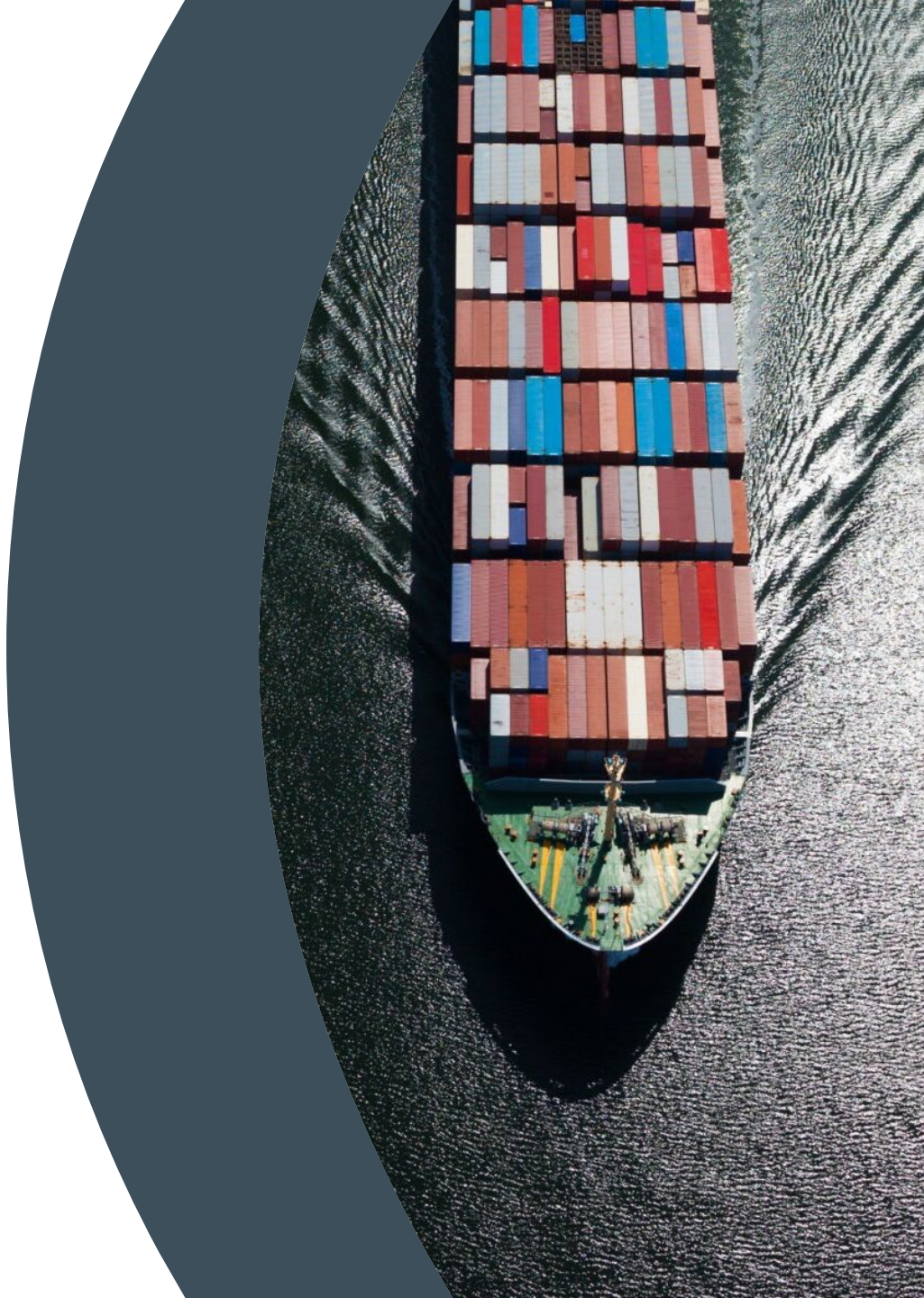
Amend Regulation E-1 (Surveys) to include:  
“requirement for a **biological efficacy test** (sampling and analysis) to be undertaken as part of intermediate and renewal surveys” (MEPC 81/WP.9)

nominally **2x per 5 years**; details will be worked out during the Convention Review Stage



# Barriers to Testing?

- IMO 80<sup>th</sup> meeting of the Marine Environment Protection Committee (**MEPC 80**):
  - lack of “approved sampling and analysis methods useable in a PSC [port State control] context”
- However:
  - Many years of **type approval** sampling and analysis (G2 Guidelines, BWM.2/Circ.61/Rev.1)
  - IMO methods for **commissioning and compliance** (BWM.2/Circ.70/Rev.1, BWM.2/Circ.42/Rev.2)
    - “no more stringent requirements” for enforcement vs. type approval
  - Ongoing work on **compliance monitoring devices** (BWM.2/Circ.78, BWM Convention Review—potentially integrate into G2 Guidelines)
  - **ISO 11711-2** provides guidance on sampling



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# A Bit of History







# THE 2010s



# A Bit of History

- US research and regulatory communities were hopeful compliance could assess *only* the  $\geq 10$  and  $< 50 \mu\text{m}$  size class
    - Small sample size ( $\sim 10$  L)
    - Organisms seemed to react the same to treatment
    - Oceanographers had measured phytoplankton for decades
- BUT**
- Failure is overwhelmingly in the  $\geq 50 \mu\text{m}$  size class

Biol Invasions (2016) 18:647–660  
DOI 10.1007/s10530-015-1036-7



ORIGINAL PAPER

## Towards minimizing transport of aquatic nuisance species in ballast water: Do organisms in different size classes respond uniformly to biocidal treatment?

Matthew R. First · Stephanie H. Robbins-Wamsley  
Scott C. Riley · Lisa A. Drake

Tools to Monitor Ballast Water:  
A Validation Framework

MARINE ENVIRONMENT PROTECTION  
COMMITTEE  
71st session  
Agenda item 4

MEPC 71/4/14  
19 April 2017  
Original: ENGLISH

### HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Analytical methods for determining viability of organisms in the 10 to 50  $\mu\text{m}$  size class

Submitted by the Netherlands

Proof-of-concept  
Pilot Study

Validation and  
Verification

Final Decision

Tools Chosen

Marine Pollution Bulletin 86 (2014) 122



Contents lists available at ScienceDirect

Marine Pollution Bulletin

journal homepage: [www.elsevier.com/locate/marpolbul](http://www.elsevier.com/locate/marpolbul)



How many organisms are in ballast water discharge? A framework for validating and selecting compliance monitoring tools



Lisa A. Drake <sup>a,\*</sup>, Mario N. Tamburri <sup>b</sup>, Matthew R. First <sup>c</sup>, G. Jason Smith <sup>d</sup>, Thomas H. Johengen <sup>e</sup>

# Globally Consistent Compliance Monitoring and Enforcement

- Existing programs can be models, e.g., IMO scrubber requirements, or the US Environmental Protection Agency (EPA) Vessel General Permit (VGP)
- IMO has provided direction on the frequency of testing—**suggest annually**
- The **following elements are needed:**

- 1 Testing** (for biological efficacy) is necessary; recall that methods are defined as
  - “indicative” (generally quick and may be an indirect measure)
  - or
  - “detailed” (generally more complex and a direct measurement of the organisms)
  - Must evaluate the  $\geq 50 \mu\text{m}$  size class to get a full picture of compliance
    - **sampling and analysis methods are available and being used onboard**
  - Reporting, sensor calibration, maintenance checks, enforcement needed **SGS**

# Globally Consistent Compliance Monitoring and Enforcement



## 2 Accuracy and precision of sampling and analysis methods

- *A lot* of data are in hand to inform these questions
- The IMO Convention Review Stage should add more information
  - For example, when Compliance Monitoring Devices are vetted

## 3 Standardized document check

- Electronic records of BWMS and BWMS certificate should be easily available and quickly reviewable
- The operational history and maintenance history can be queried



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# Summary

- Our view of compliance has evolved as data have been collected over >10 years, and a clear picture has emerged
- A framework for globally consistent compliance monitoring and enforcement has emerged





# Thank you!

Do you have any questions?

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# Fighting Climate Change – Carbon Neutrality Strategy

**Carbon-neutral** since **2014**

## Step I Reduce consumption at source



## Step II Use green energy



## Step III Compensate residual CO<sub>2</sub>



2 main sources of consumption:

- Energy Efficiency In Buildings
- Sustainable Mobility



- **97%** of the electricity we use comes from **renewable sources**



- Tree-planting projects
- Renewable Energy Projects Sponsorship

**SA30**

Science-Based Target of reducing our CO<sub>2</sub> emissions per revenue by 55% against a 2014 baseline



2022 “integrated” annual report—combining financial and non-financial reporting



Dow Jones Sustainability Indexes

**10 years!**