The adoption of

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF BIOFOULING ON SHIPS

Contents

01

Background

What is biofouling?
Damage from biofouling on ships

Biofouling

PROBLEMS OF BIOFOULING

Infringes biodiversity

Increases fuel consumption rate

Increaes greenhouse gas emissions

02

PROBLEM ANALYSIS

Urgency to regulate biofouling
Relationship between other conventions

INVASIVE AQUATIC SPECIES (IAS)

Influence of IAS

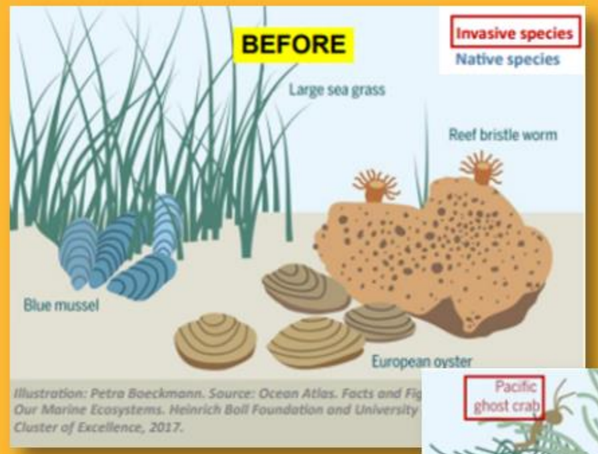
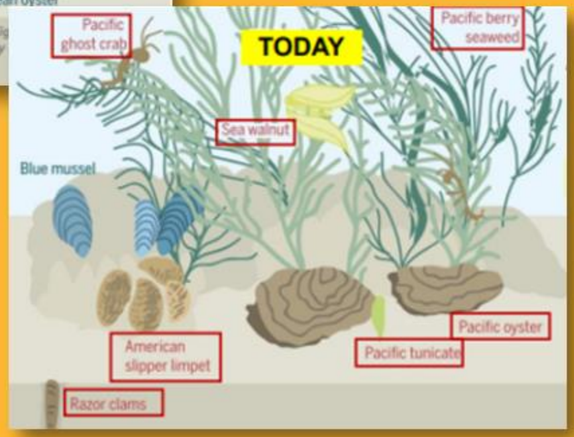


Illustration: Petra Boeckmann. Source: Ocean Atlas. Facts and Fig
Our Marine Ecosystems. Heinrich Boll Foundation and University
Cluster of Excellence, 2017.



The blue mussel and its neighbours in the Wadden Sea face more competition from invasive aquatic species, in some instances leading to extinction.

MAIN ROUTES OF IAS

BALLAST WATER

BIOFOULING

MAIN ROUTES OF IAS

BALLAST WATER

→BWM Convention: Regulatory

INTERNATIONAL MARITIME ORGANIZATION

IMO

E

INTERNATIONAL CONFERENCE ON BALLAST WATER MANAGEMENT FOR SHIPS
Agenda item 8

BWM/CONF/36
16 February 2004
Original: ENGLISH

ADOPTION OF THE FINAL ACT AND ANY INSTRUMENTS, RECOMMENDATIONS AND RESOLUTIONS RESULTING FROM THE WORK OF THE CONFERENCE

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

Text adopted by the Conference

1 As a result of its deliberations, as recorded in the Record of Decisions of the Plenary (BWM/CONF/RD/2/Rev.1) and the Final Act of the Conference (BWM/CONF/37), the Conference adopted the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004.

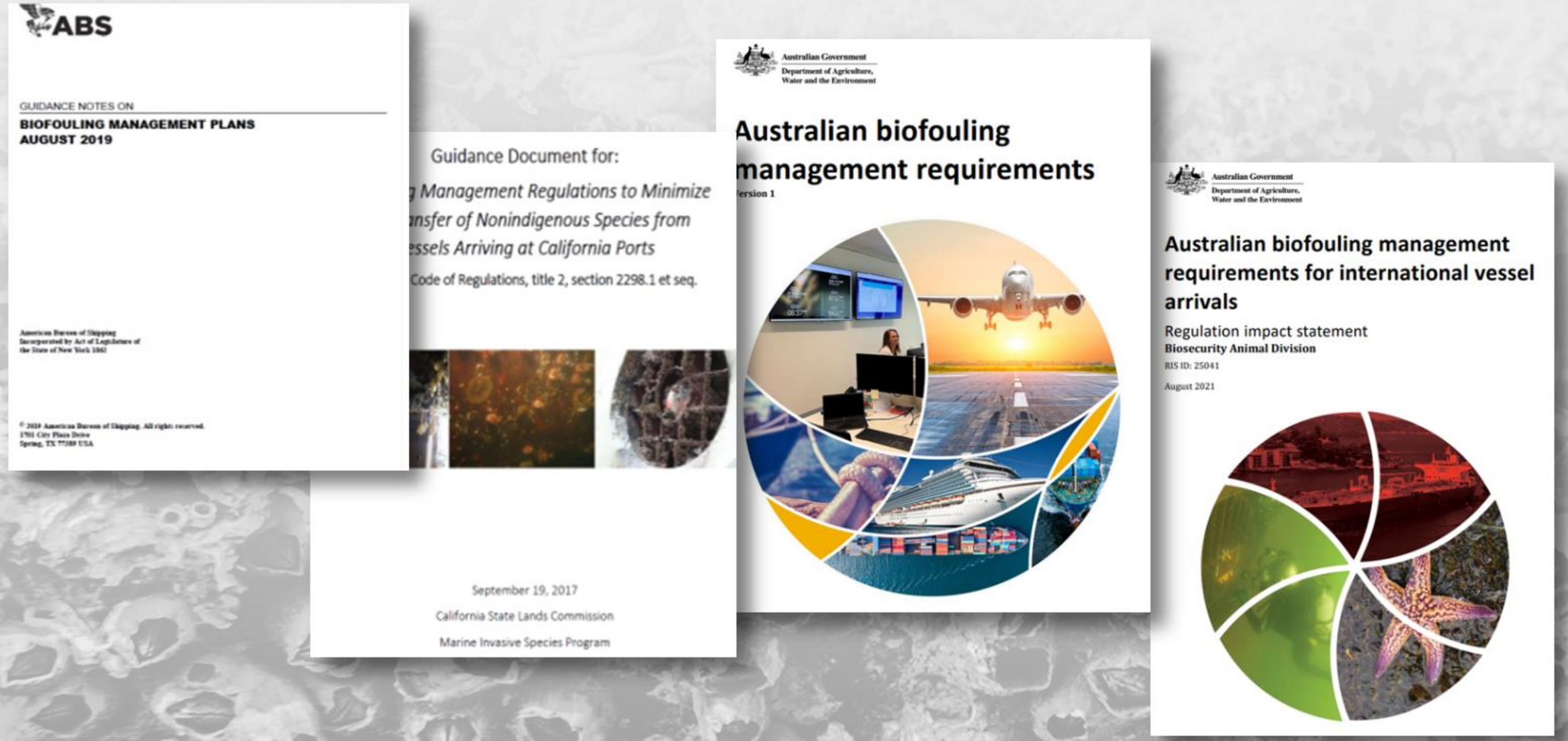
2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

***

BIOFOULING

→X : Voluntary

REGULATIONS IN FORCE IN OTHER COUNTRIES



In New zealand

Biofouling (69%)

Ballast water(3%)

Way IAS introduced

Port Phillip Bay, Australia

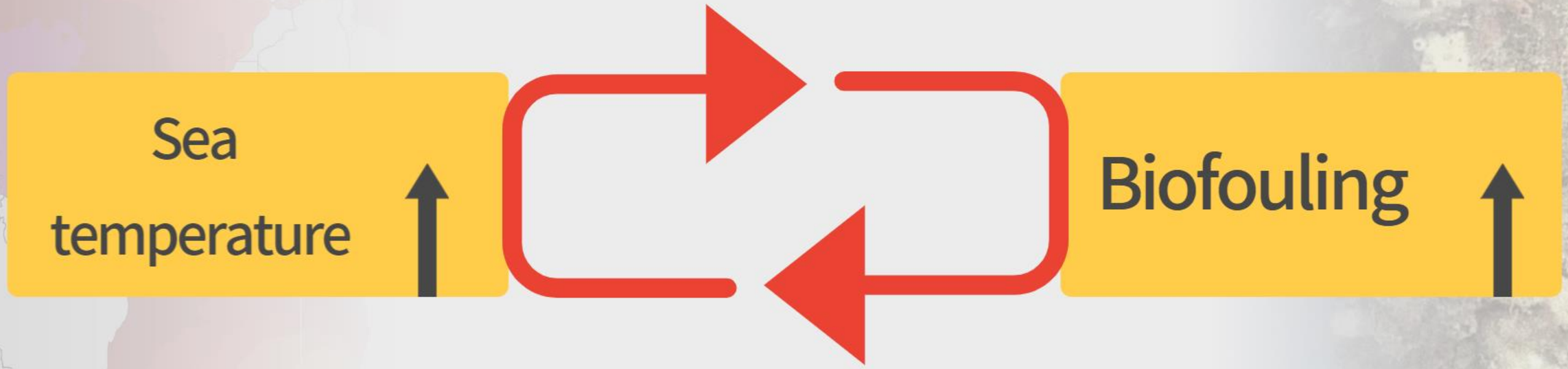
Biofouling (78%)

Ballast water(20%)

Way IAS introduced

VICIOUS CYCLE

Environment prone to occur biofouling



Accelerating climiate change

THE SHIP HULL BIOFOULING PENALTY

Biofouling → Hull Roughness → Increased fuel consumption → Increased GHG emissions

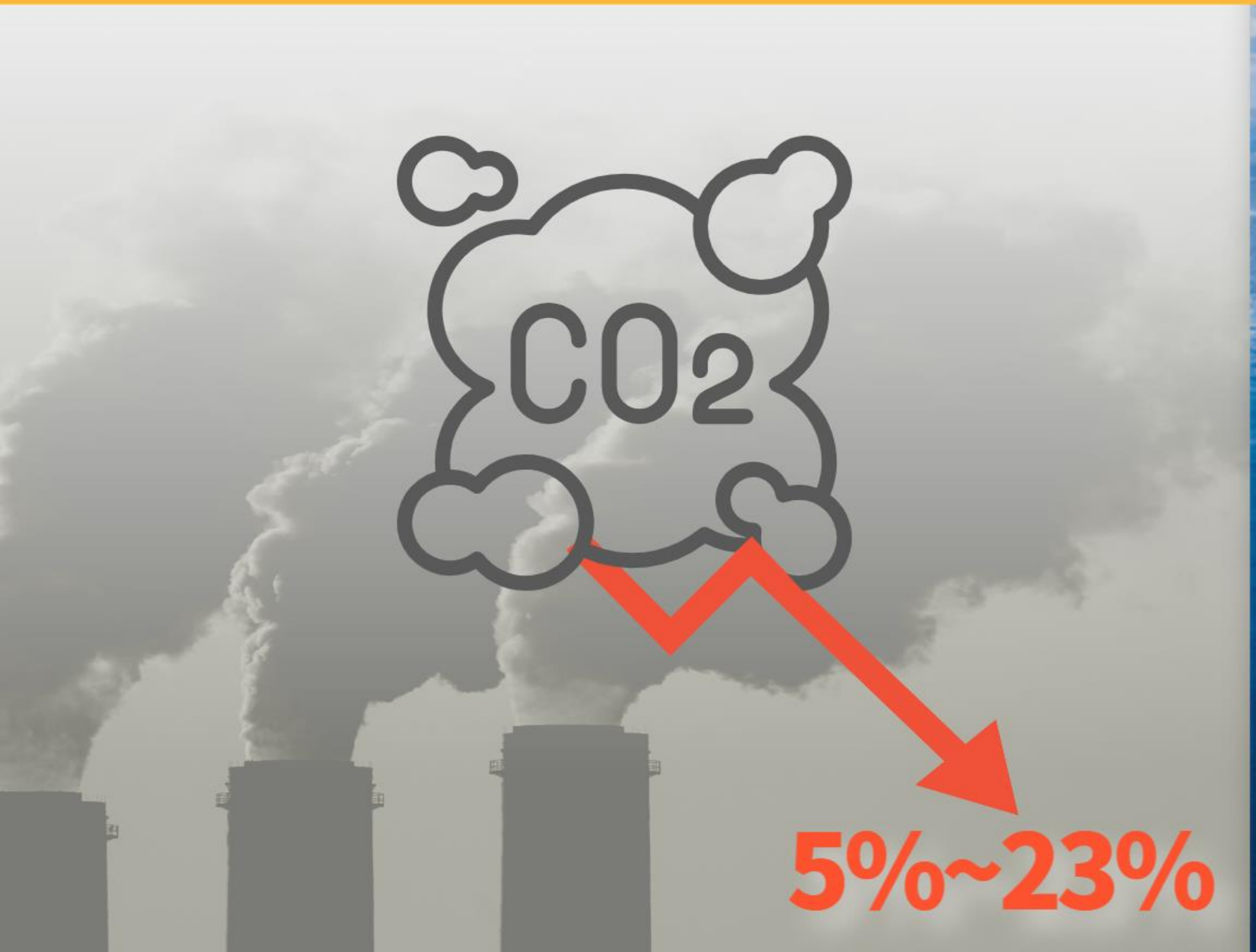
Growth on the ship's hull

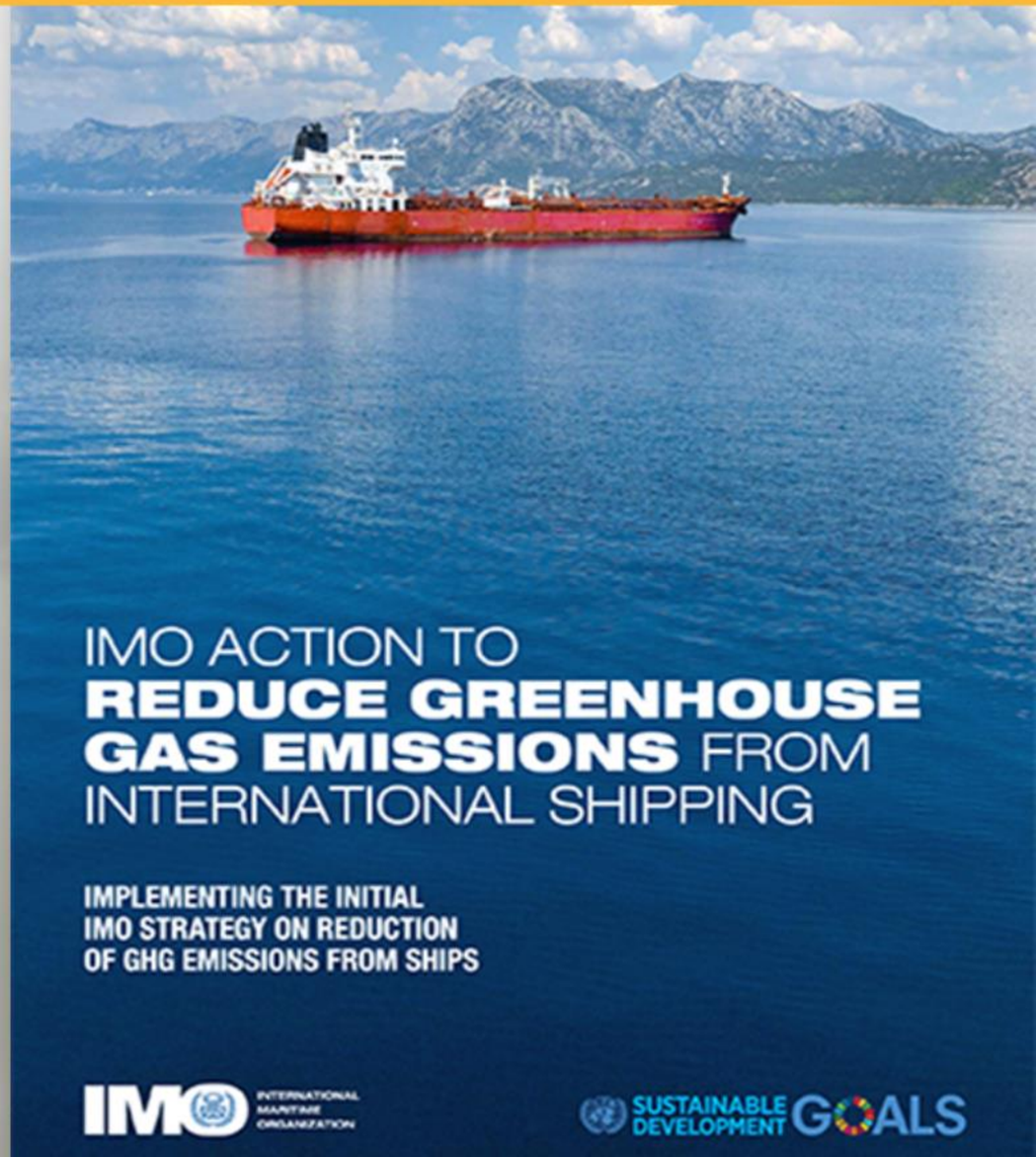
Increases hydrodynamic friction of the ship

More fuel is needed to move the ship

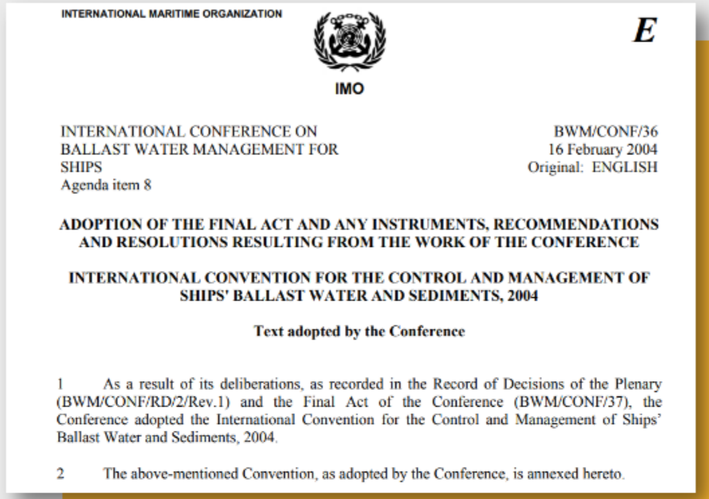
Environmental impact from increased fuel

THE SUM OF ENERGY REDUCTION





BORROWED IDEAS FROM



INTERNATIONAL MARITIME ORGANIZATION

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IMO

INTERNATIONAL CONFERENCE ON BALLAST WATER MANAGEMENT FOR SHIPS
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2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

BWMC

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

INTERNATIONAL MARITIME ORGANIZATION

E

IMO

INTERNATIONAL CONFERENCE ON THE CONTROL OF HARMFUL ANTI-FOULING SYSTEMS FOR SHIPS
Agenda item 8

AFS/CONF/26
18 October 2001
Original: ENGLISH

ADOPTION OF THE FINAL ACT OF THE CONFERENCE AND ANY INSTRUMENTS, RECOMMENDATIONS AND RESOLUTIONS RESULTING FROM THE WORK OF THE CONFERENCE

INTERNATIONAL CONVENTION ON THE CONTROL OF HARMFUL ANTI-FOULING SYSTEMS ON SHIPS, 2001

Text adopted by the Conference

1 As a result of its deliberations, as recorded in the Record of Decisions of the Plenary (AFS/CONF/RD/2) and in the Final Act of the Conference (AFS/CONF/25), the Conference adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001.

2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

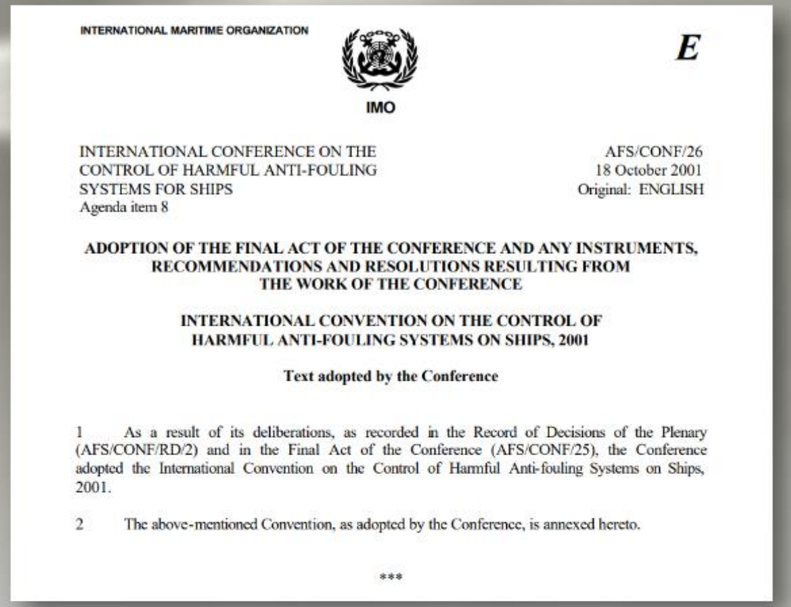
***

AFS CONVENTION

International Convention on the Control of Harmful Anti-fouling Systems on Ships

AFS convention

To prevent adverse impacts from the use of anti-fouling systems and the biocides



INTERNATIONAL MARITIME ORGANIZATION

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BFM convention

To prevent the transfer of IAS through hull fouling.

ANNEX 26

RESOLUTION MEPC.207(62)

Adopted on 15 July 2011

2011 GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38 of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee relating to any matter within the scope of the Organization concerned with the prevention and control of marine pollution from ships,

RECALLING ALSO that Member States of the International Maritime Org made a clear commitment to minimizing the transfer of invasive aquatic spec ping in adopting the International Convention for the Control and Manageme allast Water and Sediments, 2004,

→ Remains non-mandatory

→ Not provide specific international rules or standards for the regulation of biofouling management.

03

PROPOSAL

Proposal for adopting BFM convention

Main contents of BFM convention

INTERNATIONAL MARITIME ORGANIZATION

IMO

E

INTERNATIONAL CONFERENCE ON THE CONTROL OF BIOFOULING ON SHIPS
Agenda item

BFM/CONF
October 2022
Original: ENGLISH

ADOPTION OF THE FINAL ACT OF THE CONFERENCE AND ANY INSTRUMENTS, RECOMMENDATIONS AND RESOLUTIONS RESULTING FROM THE WORK OF THE CONFERENCE

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF BIOFOULING ON SHIPS, 2022

Text adopted by the Conference

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2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

***

IMO'S STRATEGIC PLAN & ORGAN(S)

SD	Description
SD 4	Identification and protection of environmental pollution by Biofouling and associated protective measures

INTERNATIONAL MARITIME ORGANIZATION

IMO

E

INTERNATIONAL CONFERENCE ON THE CONTROL OF BIOFOULING ON SHIPS
Agenda item

BFM/CONF
October 2022
Original: ENGLISH

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2 The above-mentioned Convention, as adopted by the Conference, is annexed hereto.

INTRODUCTION OF BFM CONVENTION

01.

What is BFM CONVENTION?

→ International Convention for the Control and Management of Biofouling on Ships.

02.

What is the purpose of BFM CONVENTION?

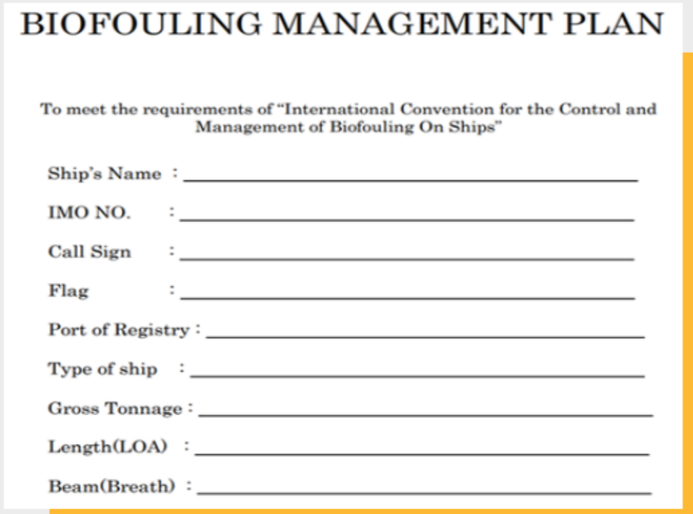
→ Help prevent the spread of potentially harmful aquatic organisms and pathogens of Biofouling on Ships.

03.

03. What is Point of BFM CONVNETION?

→ Internationally Mandatory and Unified Convention on the management regulation of Biofouling.

1. MAIN DOCUMENT



BIOFOULING MANAGEMENT PLAN

To meet the requirements of "International Convention for the Control and Management of Biofouling On Ships"

Ship's Name : _____

IMO NO. : _____

Call Sign : _____

Flag : _____

Port of Registry : _____

Type of ship : _____

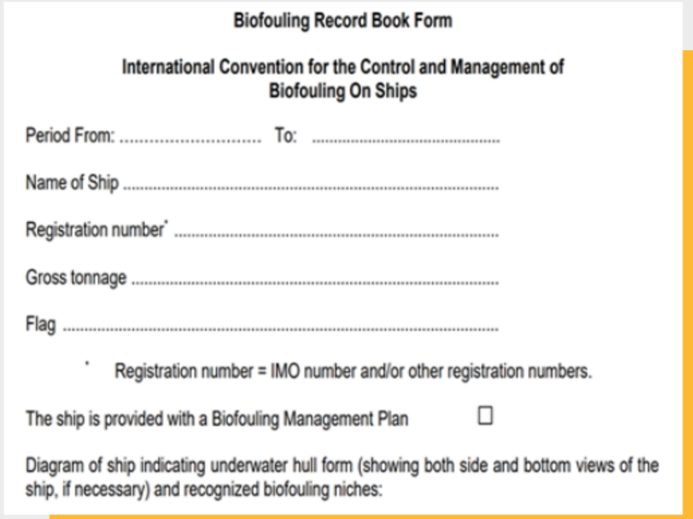
Gross Tonnage : _____

Length(LOA) : _____

Beam(Breath) : _____

Biofouling Management Plan(BMP)

To Provide a Description of the Biofouling Management Strategy for the vessel with sufficient details



Biofouling Record Book Form

International Convention for the Control and Management of Biofouling On Ships

Period From: ..... To: .....

Name of Ship .....

Registration number* .....

Gross tonnage .....

Flag .....

* Registration number = IMO number and/or other registration numbers.

The ship is provided with a Biofouling Management Plan ☐

Diagram of ship indicating underwater hull form (showing both side and bottom views of the ship, if necessary) and recognized biofouling niches:

Biofouling Record Book(BRB)

To Record Details of all Inspections and Biofouling Management Measure undertaken on the vessel

IMO (2011), Resolution MEPC.207(62)

Biofouling Management Plan

5.2 It is recommended that every ship should have a biofouling management plan. The intent of the plan should be to provide effective procedures for biofouling management. An example of a Biofouling Management Plan is outlined in appendix 1 of these Guidelines. The Biofouling Management Plan may be a stand-alone document, or integrated in part or fully, into the existing ships' operational and procedural manuals and/or planned maintenance system.

5.3 The biofouling management plan should be specific to each ship and included in the ship's operational documentation. Such a plan should address, among other things, the following:

.1 relevant parts of these Guidelines;

.2 details of the anti-fouling systems and operational practices or treatments used, including those for niche areas;

.3 hull locations susceptible to biofouling, schedule of planned inspections, repairs, maintenance and renewal of anti-fouling systems;

.4 details of the recommended operating conditions suitable for the chosen anti-fouling systems and operational practices;

.5 details relevant for the safety of the crew, including details on the anti-fouling system(s) used; and

.6 details of the documentation required to verify any treatments recorded in the Biofouling Record Book as outlined in appendix 2.

5.4 The biofouling management plan should be updated as necessary.

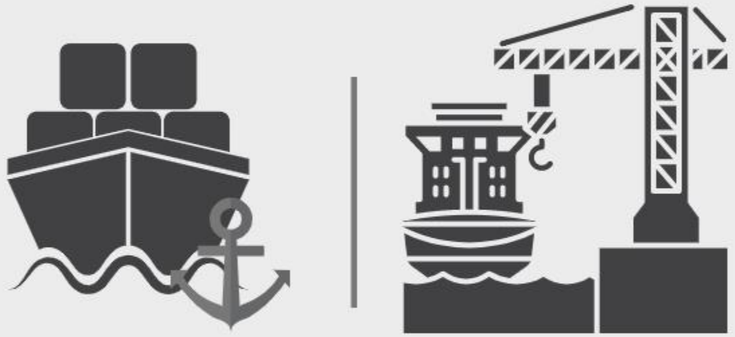
Biofouling Record Book

5.5 It is recommended that a Biofouling Record Book is maintained for each ship. The book should record details of all inspections and biofouling management measures undertaken on the ship. This is to assist the shipowner and operator to evaluate the efficacy of the specific anti-fouling systems and operational practices on the ship in particular, and of the biofouling management plan in general. The record book could also assist interested State authorities to quickly and efficiently assess the potential biofouling risk of the ship, and thus minimize delays to ship operations. The Biofouling Record Book may be a stand-alone document, or integrated in part, or fully, into the existing ships' operational and procedural manuals and/or planned maintenance system.

BFM CONVENTION

Mandatory and Stand-Alone Document

2. VESSELS THAT UNDERGO AN EXTENDED RESIDENCY PERIOD



Remaining stationary or moving slowly and infrequently

Vessels that have remained in one port for 45 or more consecutive days

- Biofouling in the niche areas should be managed in a manner that is consistent with the niche area management practices described in the Biofouling Management Plan;
- Any activities conducted to manage biofouling on niche areas or any wetted surface should be documented in the Biofouling Record Book

Vessels staying up to 45 days and only visiting designated ports

- ◆ Light amount of biofouling
- ◆ Slime layer, goose barnacles, and up to 5% cover of early biofouling depending on the area fouled

Vessels staying longer than 45 days or visiting places that are not places of first arrival

- ◆ Only allowed a slime layer and goose barnacles.
- ◆ In the interim, the port can take an action on vessels that pose a severe biofouling risk.

3. IN WATER INSPECTION & CLEANING

Grade Criteria for evaluating the development of
Hull Fouling Invasive Species in the areas subject to Inspection

Grade	Description	surface occupancy rate
0	No attachment. The whole surface is clean. No visible fouling on the surface	0
1	biofilm. Metal and painted surfaces are visible under the attachment. The hull is partially covered with biofouling, but there are no large attachments.	0
2	thick biofilm. Surfaces coated with metal and paint are difficult to see. The submerged area is entirely covered with biofilm, but there is no macro-biofouling.	0
3	Fewer attachments. However, there are several large groups of hull-bearing organisms consisting of biomembrane layers and one or more classifications. Seaweed with filaments of less than 75 mm in length and 6.5 mm in height, or a flat network of green, yellow or brown filaments in color, or soft attachment, such as seaweed, cysts,hatches or seaweeds of less than 6 mm in height. Attachments are not easily erased by hand	1~15%
4	Large calcareous attachments, such as barnacle or small patches in addition to the biomembrane	16 ~40%
5	Lots of attachments. Large calcareous attachments, such as barnacle or small patches in addition to the biomembrane	41~100%

01. For Grade 4 or below,
the entire hull must be cleaned.

02. In the case of grade 3 or above,
total cleaning is not required,
but partial cleaning is
recommended mainly
on limestone attached organisms.

03. The hull cleaning results must be
Grade 1 or above
based on the following grades.

Submit an outline of the operation plan to the ship and the port.

Cleaning Report should be retained on board the ship, along with the BRB.

i. Pre cleaning preparations

A meeting shall be held between the ship and the cleaning company's representative to determine appropriate safety parameters and relevant information on how to access niche areas.
The cleaning company shall plan the cleaning meticulously to ensure that the process is undertaken efficiently, safely and in an environmentally sound manner.
The cleaning company should submit an outline ofthe operation plan to the ship and the port.
The cleaning company shall plan its resources to avoid/minimize breakdowns/interruptions.
Communication between the ship and in-water cleaner shall be planned and tested. Before the planned operation, functional checks, pre-dive checks of the cleaning and capture system plus the associated ancillary equipment shall be conducted.
An approved pre-dive checklist for guidance shall be used and cross checked with the record of any possible defects and recent repairs. The ship shall follow established procedures to ensure that equipment such as thrusters, propellers etc are locked or tagged out in order to ensure they cannot be used while the diver and/or ROV are in the water. The divers, if any, must witness the locking and tagging of equipment prior to entering the water.

ii. The cleaning must be conducted using approved systems and procedures as outlined in the Approval procedure for in-water cleaning companies

- When choosing the cleaning equipment, careful consideration should be given to the information received from the AFS manufacturers and/or ship to ensure the performance of the AFS is not impaired.
- The cleaning unit must be able to safely reach the section of underwater area that has to be cleaned and be able to remove visible biofouling.
- Procedures must be in place to avoid accidental releases into the water and the cleaning system shall capture the dislodged material. If a cleaning unit accidentally releases material into the sea, it shall be assessed to find the root cause. In case of consecutive malfunctions or when a malfunction results in the release of captured materials to the marine environment, the cleaning equipment shall be taken out of service and tested. Any accidental release should be recorded in the cleaning activity log with the contingency measures taken and the relevant authorities should be alerted of the incident.
- Pictures and/or videos shall be used to document the effectiveness of the cleaning.

iii. Cleaning report

The results of the cleaning operation shall be accurately documented in the cleaning report, and shall be retained on board the ship, along with the biofouling record book. The cleaning report shall contain information based on documentation from reference areas or other areas if available about the biofouling observed prior to cleaning, details of the cleaning performed plus the state of the

APPENDIX 1

MODEL FORM OF INTERNATIONAL CLEAN HULL CERTIFICATE

INTERNATIONAL CLEAN HULL CERTIFICATE

(Official seal) *(State)*

Issued under the
International Convention for the Control and Management of Bio-Fouling on Ships

under the authority of the Government of

.....
(name of the State)

by

.....
(person or organization authorized)

When a Certificate has been previously issued, this Certificate replaces the certificate dated .....

Particulars of ship[1]

Name of ship .....

Distinctive number or letters .....

Port of registry .....

Gross tonnage .....

IMO number[2] .....

Invasive aquatic species referred in Article 4 has been removed up to level 0 or 1 which approved by survey referred in Article 6..... □
In water cleaning mentioned in Article 5 has been applied this ship..... □
In water cleaning mentioned in Article 5 has not been applied on this ship, but dry dock has been applied……. ..... …□
Clean hull condition recognized in Article 6 was recognized on this ship prior to….*(date)*[3], but must be reinspected according to the survey referred in Article 6 prior to ….*(date)*[4]..... □

4. INTERNATIONAL CLEAN HULL CERTIFICATE

THIS IS TO CERTIFY THAT:

1 the ship has been surveyed in accordance with Article 6 to the Convention; and

2 the survey shows that the ship's clean hull condition complies with the applicable requirements of Article 5 to the Convention.

Issued at.....
(Place of issue of Certificate)

....
(Date of issue) *(Signature of authorized official issuing the Certificate)*

Date of completion of the survey
on which this certificate is issued: ……

VALIDITY : ONE YEAR

Condition : Conduct In Water Inspection and Cleaning within 24 hours of entry.

IN WATER INSPECTION

MONITORING
IN WATER IMAGES

MEASUREMENT OF THE
AMOUNT OF BIOFOULING

GRADE 3 OR ABOVE?

YES

NO

CONDUCT MAJOR
HULL AREA INSPECTION

GRADE 4 OR BELOW

NO

YES

PARTIAL CLEANING

CONDUCT IN WATER CLEANING

DATA COLLECTION

ISSUANCE OF ICHC

5. ESTABLISHMENT OF MONITORING SYSTEM AND MANAGEMENT GUIDELINES

BIOLOGICAL AND CHEMICAL RISKS TO THE MARINE ECOSYSTEM.

Establish a monitoring system and a hull pollution management procedure.

A hazard distribution map by sea area and port.

Removing and Post-processing marine organisms in an Eco-Friendly measure.

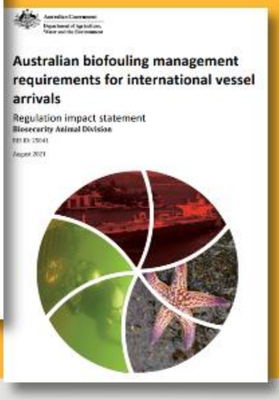
04

CONCLUSION

Why BFM convention needs

Direction of Industrial development

Expected effect on adopting BFM convention



Legally Binding

Unified and Specific Guideline

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF BIOFOULING ON SHIPS, 2022

IMPORTANT THINGS.

01.

In Water Inspection

Carry out In Water Inspection every year and then get an International Clean Hull Certificate issued.

02.

In Water Cleaning

Depending on the result of the Inspection, In Water Cleaning should be taken

03.

Eco-friendly removal of attachments

Management guidelines should be established for eliminating ship attached organisms eco-friendly and post treatment.

IN ADDITION

BFM convention

REFERENCE

- International Maritime Organization (https://www.imo.org/)
- INTERNATIONAL CONVENTION ON THE CONTROL OF HARMFUL ANTI-FOULING SYSTEMS ON SHIPS, 2001
- INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004
- RESOLUTION MEPC.207(62),2011 GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BIOFOULING TO MINIMIZE THE TRANSFER OF INVASIVE AQUATIC SPECIES
- Korea Maritime Institue
- Australian Government Department of Agriculture,Water and the Environment
- Australian Government Marine Pests
- https://www.doc.govt.nz/nature/habitats/marine/new-zealandsmarine-environment
- https://www.mpi.govt.nz/importing/border-clearance/vessels/arrival-process-steps/biofouling/biofouling-management/
- http://www.legislation.govt.nz/act/public/1993/0095/latest/DLM314623.html
-California State Lands Commission
- Unitied States Envirinment Protection Agency
- THAI SUBSEA SERVICES
-Starboard Yacht Group
-Swift Marine Yacht Management
- Glofouling Partnerships
- American Bureau of Shipping
- California State Lands Commission
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https://www.glofouling.imo.org/
https://www.gard.no/web/frontpage
https://safety4sea.com/
https://www.eea.europa.eu/
https://news.iwlearn.net/
https://sustainabledevelopment.un.org/content/documents/26620IMO_ACTION_TO_REDUCE_GHG_EMISSIONS_FROM_INTERNATIONAL_SHIPPING.pdf
https://chinadialogueocean.net/en/climate/blistering-barnacles-the-sticky-problem-of-biofouling/
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https://www.wildlifeandwelfare.org/news-blog/biofouling-what-is-it-and-why-should-we-care
https://www.ocpc.kr/03cc0777-b4e9-43e2-a9d6-c7143634a2d8
MEPC.1/Circ.811
MEPC.1/Circ.792
https://sustainabledevelopment.un.org/content/documents/26620IMO_ACTION_TO_REDUCE_GHG_EMISSIONS_FROM_INTERNATIONAL_SHIPPING.pdf
https://www.imokorea.org/main/main.asp
https://www.classnk.or.jp/hp/ko/index.html
https://www.mpi.govt.nz/

2022
모의IMO총회
The 2022 Mock IMO Assembly

THANK YOU

TEAM
THE GREATEST SEAMEN