Draft Anti-fouling and In-water Cleaning Guidelines

MAF Discussion Paper No: 2011/13

ISBN 978-0-478-38744-5 (online)
ISSN 2230-2816 (online)

October 2011

Ministry of Agriculture and Forestry
Te Manatū Ahuwhenua, Ngāherehere

BIOSECURITY NEW ZEALAND

NEW ZEALAND FOOD SAFETY AUTHORITY

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Feedback Sought

The Ministry of Agriculture and Forestry seeks your views on the draft version of the Anti-fouling and In-water Cleaning Guidelines (the Guidelines) in the Annex to this Discussion Paper. The Guidelines are intended to replace the ANZECC Code of Practice for Anti-fouling and In-Water Hull Cleaning and Maintenance, 1997 (the ANZECC Code of Practice).

This Discussion Paper canvases the need for new guidance to support the management of environmental effects of the application, maintenance, removal and disposal of anti-fouling coatings at shore-based maintenance facilities; and the in-water cleaning and maintenance of vessels and movable structures. It outlines how the Guidelines were developed and differ from the existing ANZECC Code of Practice.

Your views will assist the Ministry of Agriculture and Forestry with: finalising the text of the Guidelines; and/or advising the Government on New Zealand's endorsement of the Guidelines.

Questions are posed in this paper to help focus feedback on what MAF considers are the key aspects of the Guidelines. However, feedback on any aspect of the Guidelines is welcome.

The submission form provided contains the questions and space for any additional comments. This can be emailed to:

aquaticbiosecurity@maf.govt.nz, or posted to:

Ministry of Agriculture and Forestry
PO Box 2526
WELLINGTON

Attention: Allan Bauckham

The closing date for submissions is 18 November 2011.

To help us accurately attribute your submission please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please let us know who the organisation represents.

Submissions or comments provided on this discussion document will be subject to the Official Information Act (OIA) 1982. The OIA requires information to be made available unless there is good reason, pursuant to the Act, to withhold the information. The reason to withhold information must outweigh the public interest in making the information available. If you want your submission to be treated as confidential, please clearly identify the material and why you wish the information to be withheld.

What is the ANZECC Code of Practice?

In 1997, the Australian and New Zealand Environment and Conservation Council (ANZECC) published the Code of Practice for Anti-fouling and In-water Hull Cleaning and Maintenance (the ANZECC Code) to provide guidance to boat owners, industry and government in Australia and New Zealand on the appropriate:

1. application, use, removal and disposal of anti-fouling coatings, and
2. practices for in-water cleaning and maintenance of vessels.

ANZECC comprised Ministers from New Zealand central government and the Australian Commonwealth, state, and territory governments with responsibility for environmental and conservation matters.

The ANZECC Code was developed in response to dual concerns over the toxic effects of anti-fouling biocides (particularly tributyltin (TBT) and copper-based compounds) on the marine environment and the potential of in-water hull cleaning practices to facilitate the establishment of non-indigenous marine species.

The ANZECC Code describes practices that should be avoided to prevent the release of toxic chemicals and non-indigenous species into the marine environment and recommends protocols to contain potentially harmful waste. In-water cleaning of vessels is strongly discouraged, but the ANZECC Code's guidance on in-water cleaning and maintenance only applies to commercial vessels.

A copy of the ANZECC Code can be found at:
http://www.environment.gov.au/coasts/pollution/anti-fouling/code/index.html

Why Revise the ANZECC Code of Practice?

Since the release of the ANZECC Code, a number of significant changes have occurred within the maritime industry in relation to anti-fouling coatings and the management of biofouling on vessels. As a result of these changes the Natural Resource Management Ministerial Council (NRMMC), which took over some of the functions of Australian and New Zealand Environment and Conservation Council in 2001, agreed to review and revise the ANZECC Code to ensure its alignment with current technologies and international conventions.

In 2001, an international conference convened to address the harmful effects of TBT in anti-fouling coatings, adopted the International Convention on the Control of Harmful Anti-fouling Systems on Ships, 2001 (the AFS Convention). The AFS Convention subsequently entered into force globally in September 2008. Under the AFS Convention, TBT based anti-fouling coatings were not to be applied to any vessels from January 2003, and were not to be present on any vessels from January 2008. The ANZECC Code is now at variance with the AFS Convention as it indicates that TBT based anti-fouling coatings may be used on vessels over 25 m in length in Australia.

After 2001, the anticipated entry into force of the AFS Convention encouraged the development and increased use of anti-fouling coatings that contain alternative biocides or technologies. Some modern paint types, such as fouling-release coatings, do not contain active biocides, but require regular cleaning or grooming in-water to curtail biofouling

accumulation. In-water cleaning of surfaces that lack biocides may not have the chemical pollution risks attributed to other types of coatings.

There is now a growing acceptance that regular hull maintenance, including in-water cleaning to prevent the development of mature biofouling, may create a smaller biosecurity risk than no management of biofouling on vessels between dry-dockings. For example, the International Maritime Organization (IMO) recently adopted guidelines that encourage ship owners and operators to implement biofouling management practices, including the use of effective anti-fouling systems and routine in-water cleaning to reduce the development of biofouling, with appropriate capture of waste. In-water cleaning is strongly discouraged in some jurisdictions in Australia and New Zealand on the basis of the ANZECC Code.

How was the ANZECC Code Reviewed and Revised?

Responsibility for reviewing and revising the ANZECC Code lies with the Ministry of Agriculture and Forestry (MAF) in New Zealand; and the Department of Agriculture, Fisheries and Forestry (DAFF) and the Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) in Australia.

The process for reviewing and revising the ANZECC Code has three phases.

Phase 1 Review: a literature review and analysis of the benefits and risks of in-water hull cleaning based on an understanding of current and proposed in-water cleaning techniques and technologies. This phase was completed in 2009 with the publication of a report[1] available at http://www.marinepests.gov.au/marine_pests/publications.

Phase 2 Revision: the ANZECC Code was revised in consultation with key regulatory, industry and non-government stakeholders through a Redrafting Correspondence Group (RCG) as detailed below. This phase was completed in June 2011 with the completion of the Guidelines in the Annex to this document.

Phase 3 Consultation: formal consultation on the Guidelines. This will inform the final content of the Guidelines and decision-making by the Australian and New Zealand governments. This discussion document forms the core of this phase in New Zealand. A separate consultation process will take place simultaneously in Australia.

HOW WAS THE ANZECC CODE OF PRACTICE REVISED (PHASE 2)?

The objectives for Phase 2 were to:

1. revise the ANZECC Code of Practice to provide up to date and consistent in-water cleaning guidance to address biosecurity and chemical contaminant risks in Australian and New Zealand waters;
2. update the guidance on the application, maintenance, removal and disposal of anti-fouling coatings contained in the ANZECC Code of Practice; and
3. use information obtained in the Phase 1 literature review to inform the development of practical decision-making criteria and tools that regulators and industry can use to assess and manage biosecurity and contaminant risks posed by in-water cleaning activities.

[1] Floerl, O; Peacock, L; Seaward, K; Inglis, G., 2009. Review of biosecurity and contaminant risks associated with in-water cleaning. Research report prepared for the Department of Agriculture, Forestry and Fisheries Australia. National Institute of Water and Atmospheric Research, New Zealand.

Contractors were engaged by DAFF (co-funded by MAF and DSEWPaC) to assist with revising the ANZECC Code of Practice, and coordinate the input of the RCG.

The RCG comprised groups or organisations that could be affected by, or were able to contribute critical expertise toward a revision of the ANZECC Code. RCG members represented government agencies (central, state/territory and local government), the maritime industry (commercial shipping, recreational boating, fishing, ports, maintenance operations, anti-fouling coating manufacturers, etc.), defence forces and conservation authorities.

Separate RCGs were convened for Australian and New Zealand stakeholders. Consultation workshops were held in Canberra and Wellington for the respective RCGs. The first round of consultation workshops was held in October 2010 to discuss a first draft of the revised ANZECC Code. A second round of workshops was held in February 2011 to discuss the second draft of the revised ANZECC Code. The RCGs also provided written feedback on each draft of the revised Code. The final draft of the revised Code was renamed the Anti-fouling and In-water Cleaning Guidelines.

The RCGs provided a useful and constructive platform for the development of the Guidelines. Its diverse membership meant that a wide range of expertise and perspectives were included in the Guidelines' development. The New Zealand RCG comprised the following groups or organisations:

Association of Diving Contractors New Zealand
Department of Conservation
Environmental Risk Management Authority
Local Government New Zealand
Port companies CEO group
Maritime New Zealand
New Zealand Association of Ship Owners and Agents
New Zealand Defence Force
New Zealand Marina Operators Association
Top of the South Marine Biosecurity Partnership

What's different about the Guidelines?

The Guidelines include a suite of principles. These reflect the balance that would need to be sought between managing environmental risks and operational realities when the Guidelines are applied by environmental managers. The principles are that:

1. the risks posed by biofouling management measures should be balanced with the risks of failing to manage biofouling;
2. there is an operational need to manage biofouling on vessels and movable structures;
3. it is preferable to minimise the accumulation of biofouling on vessels and movable structures;
4. the release of potentially toxic chemicals and invasive aquatic species into the environment should be minimised; and
5. the removal of vessels and movable structures from the water for cleaning and maintenance should, where practicable, be used in preference to in-water operations.

The Guidelines also differ from the ANZECC Code in several key aspects.

Their scope is broader, covering all vessel types and other movable structures, in all aquatic (marine, estuarine and freshwater) environments. Within scope is infrastructure such as pontoons and aquaculture installations; and recreational craft.

Their guidance is now consistent with existing international conventions, such as the AFS Convention, and it is aligned with the recently adopted IMO Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species. See IMO guidelines posted at http://www.biosecurity.govt.nz/enter/ships

Their guidance on anti-fouling coatings is based on up-to-date assessments of anti-fouling coating technologies; outlines requirements for optimal coating performance; and explains the contamination risks associated with coating application and maintenance.

They contain separate advice for professional and non-professional maintenance, given that the application, maintenance, removal and disposal practices for anti-fouling coatings differ between commercial and recreational facilities.

They acknowledge that regular and appropriate in-water cleaning can reduce biofouling risks by preventing the development of mature biofouling on vessels and movable structures. However, in-water cleaning is not a replacement for coating maintenance and renewal in shore-based maintenance facilities.

They emphasize that the biosecurity and contamination risks posed by in-water cleaning depend on a number of factors including: the type and origin of the biofouling; the age and type of anti-fouling coating on the surface; and the type of cleaning method used including its capacity to contain cleaning waste. Where these risk components are assessed and appropriately managed, in-water cleaning can be acceptable as a maintenance or biofouling management tool.

To aid environmental managers in making decisions about in-water cleaning practices within their jurisdictions, a Decision Support Tool (DST) for in-water cleaning is included in the Guidelines. The DST has the format of a decision-tree that allows users to determine whether in-water cleaning is likely to be acceptable (and under what conditions). The DST uses information on the maintenance and voyage history of a vessel or movable structure.

The DST also helps owners or operators of vessels and other movable structures to determine the types of information and documentation that may be required from them in order for environmental managers to make decisions on in-water cleaning.

WHAT ARE THE EXPECTED OUTCOMES OF THE GUIDELINES?

Biofouling on vessels is one of the primary means by which aquatic pests and diseases can be introduced into and spread in New Zealand waters. Such introductions can harm New Zealand's aquatic environment and activities associated with it.

Implementing practices to control and manage biofouling on vessels and movable structures can reduce the risk of introducing and spreading pests and diseases. However, in-water cleaning as part of good hull maintenance practice can also result in the release of potentially toxic chemicals, and pests and diseases into the aquatic environment.

The Guidelines are intended to provide a transparent framework for balancing the risks associated with biofouling management practices with the risks of failing to manage biofouling.

Implementing this framework within New Zealand will mean that decision-making on in-water cleaning will use a risk based approach. Such an approach is expected to provide more flexibility around situations where in-water cleaning may be permitted.

Environmental managers will be able to determine the likely contamination and biosecurity risks associated with a particular vessel or movable structure, and determine the appropriateness of in-water cleaning or the need for the vessel or structure to be removed from the water for cleaning and maintenance.

Operators of commercial and recreational vessels and movable structures will be encouraged to adopt maintenance practices that optimise anti-fouling coating performance and restrict biofouling development, whilst minimising the biosecurity and contamination risks of their maintenance practices. In doing so, they will reduce their risk of introducing and spreading pests and diseases, and gain operational benefits such as reduced fuel consumption.

Questions about the Guidelines

GENERAL

1. The Guidelines contains a suite of principles. Do these principles adequately reflect the balance that environmental managers should be seeking between managing the environmental risks of maintenance practices and operational realities of the maritime industry? If not, what changes would you recommend?
2. The scope of the Guidelines is broader than the ANZECC Code of Practice, covering all vessel types and movable structures in all aquatic (marine, estuarine and freshwater) environments, regardless of whether they are coated in an anti-fouling coating. Do you agree or disagree with the proposed scope of the Guidelines, and why?

PART 1: SHORE-BASED APPLICATION, MAINTENANCE, REMOVAL AND DISPOSAL OF ANTI-FOULING COATINGS

3. Part 1 is organised under the following headings:

- Anti-fouling Coating Types.
- Choosing the Correct Anti-fouling Coating.
- Requirements for Shore-based Maintenance Facilities.
- Application of Anti-fouling Coatings.
- Maintenance and Removal of Anti-fouling Coatings.
- Disposal of Residues and Wastes.
- Emergency Response.

Is the guidance under each of these headings accurate, complete, effective, practical, and easy to understand? If you consider the guidance could be improved, please explain how.

4. Is the guidance in Part 1 likely to have a positive or negative effect on your current activities or practices? If so, please explain how.

PART 2: IN-WATER CLEANING AND MAINTENANCE

1. Do the Guidelines provide a transparent decision framework for balancing the risks associated with biofouling management practices with the risks of failing to manage biofouling? If you consider the framework could be improved, please explain how.
2. Is the guidance in Part 2 of the Guidelines sufficiently clear about when to use in-water cleaning and when to remove vessels and movable structures from the water for cleaning and maintenance? If not, how could it be improved?
3. Section A, provides information on the factors that determine the environmental risk of in-water cleaning. These factors are:
   - Anti-fouling coating type.
   - Biofouling origin.
   - Biofouling type.

   Does the information provided under each of these headings adequately describe the contamination and biosecurity risks associated with in-water cleaning? If you consider the guidance could be improved, please explain how.
4. Section B provides guidance on situations where in-water cleaning is considered acceptable and any conditions that may apply. Do you agree or disagree with this guidance, and why?

5. Section B also contains recommendations for decision-making on in-water cleaning according to biofouling type and origin. Do you agree or disagree with the recommendations, and why?
6. The Guidelines incorporates a Decision Support Tool (DST) that allows users to determine whether in-water cleaning is likely to be acceptable and under what conditions. Will the DST assist environmental managers in making decisions about in-water cleaning practices within their jurisdictions; and/or help owners or operators of vessels and other movable structures to determine the type of evidence that may be required to obtain approval for in-water cleaning?
7. If you consider the DST could be improved, please explain how.
8. Is the guidance in Part 2 likely to have a positive or negative effect on your current activities or practices? If so, please explain how.

How will the Guidelines be Implemented

In New Zealand, the primary purpose of the Guidelines will be to assist environmental management authorities (principally regional councils (including unitary authorities) and territorial authorities) to avoid, remedy, or mitigate any adverse environmental effects arising from shore-based and in-water maintenance of the submerged surfaces of vessels and movable structures.

It is intended that environmental managers will take account of the guidance in the Guidelines when carrying out their resource planning and/or consenting/permitting functions in relation to the cleaning and maintenance of vessels and movable structures.

The Guidelines can also be used by owners and operators of vessels and movable structures, operators of maintenance facilities, and contractors providing vessel maintenance services to help them meet the consenting / permitting requirements of their activity.

The Guidelines are only advisory and have no legal status. Should there be any conflict or inconsistency between the guidance provided in the Guidelines and a requirement in legislation, plans, or rules administered by the relevant authority, the latter would prevail.

COMPLIANCE WITH THE RESOURCE MANAGEMENT ACT 1991

All maintenance of vessels and movable structures that occurs on land, in fresh water, or within the coastal marine area (i.e. within 12 nautical miles of the coast) must comply with the Resource Management Act 1991 and plans prepared under it.

Requirements for an activity covered by the Guidelines can be found in either the regional or district plan, or the regional coastal plan (or both) produced by the relevant authority; or by contacting the relevant regional council or territorial authority.

In-water cleaning within the coastal marine area may only be carried out with approval from the relevant regional council[2].

COMPLIANCE WITH THE MARITIME TRANSPORT ACT 1994

Within the Exclusive Economic Zone (i.e. beyond 12 and within 200 nautical miles of the coast), all maintenance of vessels and movable structures must comply with the Maritime Transport Act 1994.

In-water cleaning of vessels and movable structures may only be carried out with a permit from Maritime New Zealand, made under the Maritime Transport Act 1994 and the Marine Protection Rules Part 180–Dumping of Waste or Other Matter.

In the near future, the regulation of dumping within the Exclusive Economic Zone is to transfer from the Maritime Transport Act to the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Bill, and responsibility for it is to transfer from Maritime New Zealand to the Environmental Protection Authority.

[2] The Minister of Conservation is the regional council for the Kermadec and Subantarctic Islands.

What happens next?

Following the consultation process, the feedback received will be analysed by the Ministry of Agriculture and Forestry and taken into consideration when the final text of the Guidelines is determined in agreement with Australia.

The feedback received will also be incorporated into the Ministry's advice to Government Ministers on whether the New Zealand Government should endorse the Guidelines.

In Australia, decision-making on the Guidelines will be undertaken by the Standing Council on Primary Industries, whose remit includes biosecurity. The Standing Council comprises Ministers from the Commonwealth, states, and territories (as well as New Zealand).

The Standing Council's deliberations on the Guidelines will take into account New Zealand's position on the Guidelines.

ANNEX: Draft Anti-fouling and In-water Cleaning Guidelines

Application of the Guidelines in New Zealand

INTRODUCTION

The Anti-fouling and In-water Cleaning Guidelines (the Guidelines) provides guidance on the application, maintenance, removal and disposal of anti-fouling coatings at shore-based maintenance facilities; and the in-water cleaning and maintenance of vessels and movable structures.

The primary purpose of the Guidelines is to assist environmental management authorities in New Zealand (regional councils (including unitary authorities) and territorial authorities, and Maritime New Zealand) to avoid, remedy, or mitigate any adverse effects on the environment arising from shore-based and in-water maintenance of the submerged surfaces of vessels and movable structures. Environmental managers may take account of the guidance in the Guidelines when carrying out regional and district planning, and/or consenting/permitting functions.

The Guidelines can also be used by owners and operators of vessels and movable structures, operators of maintenance facilities, and contractors providing vessel maintenance services.

The Guidelines are only advisory and has no legal status. Should there be any conflict or inconsistency between the guidance provided in the Guidelines and a requirement in legislation, plans, or rules administered by the relevant authority, the latter prevail. The 'relevant authority' is the authority that has responsibility for environmental management in the area of land or water where an activity covered by the Guidelines is to take place.

BACKGROUND

Biofouling on vessels is one of the primary means by which aquatic pests and diseases can be introduced into and spread in New Zealand waters. Such introductions can harm New Zealand's aquatic environment and activities associated with it.

Implementing practices to control and manage biofouling on vessels and movable structures can reduce the risk of introducing and spreading pests and diseases.

Global measures for managing biofouling on vessels adopted by the International Maritime Organisation encourage the use of effective anti-fouling systems and routine in-water cleaning as integral parts of biofouling management.

While in-water cleaning as part of good hull maintenance practice can be beneficial for managing the biosecurity risks of biofouling, it can also result in the release of potentially toxic chemicals, and pests and diseases into the aquatic environment. The Guidelines seeks to balance the operational need to manage biofouling on vessels and movable structures with protecting the environment from biological and chemical hazards.

Although the Guidelines recommend the use of in-water cleaning in some circumstances, where practicable, vessels and movable structures should be removed from the water for cleaning and maintenance. In-water cleaning is not recommended as an alternative to anti-fouling coating maintenance and renewal in shore-based maintenance facilities.

SHORE-BASED AND NEAR SHORE IN-WATER MAINTENANCE

All maintenance of vessels and movable structures that occurs on land, in fresh water, or within the coastal marine area (i.e. within the Territorial Sea) must comply with the Resource Management Act 1991 and plans prepared under it. Requirements for an activity covered by the Guidelines can be found in either the regional or district plan, or the regional coastal plan produced by the relevant authority; or by contacting the relevant regional council[3] or local authority.

In-water cleaning within the coastal marine area may only be carried out with approval from the relevant regional council. The 'local water quality standards' for contaminant discharges arising from hull maintenance operations are obtainable from the regional council.

OFF SHORE IN-WATER MAINTENANCE

Within the Exclusive Economic Zone (i.e. beyond the Territorial Sea), all maintenance of vessels and movable structures must comply with the Maritime Transport Act 1994. In-water cleaning of vessels and movable structures may only be carried out with a permit from Maritime New Zealand, made under the Maritime Transport Act 1994 and the Marine Protection Rules Part 180–Dumping of Waste or Other Matter.

In the near future, the regulation of dumping within the Exclusive Economic Zone is to transfer from the Maritime Transport Act to the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Bill, and responsibility for it is to transfer from Maritime New Zealand to the Environmental Protection Authority.

GENERAL

Owners and operators of vessels and movable structures, operators of maintenance facilities, and contractors providing vessel maintenance services also need to be aware of the requirements and duties imposed by other legislation that may apply to hull maintenance operations. In particular:

- All biocidal anti-fouling coatings applied in New Zealand must be registered and approved for use under the Hazardous Substances and New Organisms Act 1996.
- If you have found an aquatic organism not normally seen or otherwise detected in New Zealand, you are obligated by the Biosecurity Act 1993 to report it to MAF. This can be done by calling the free Exotic Pest and Disease hotline on 0800 80 99 66.
- The Health and Safety in Employment Act 1992 requires employers to identify and actively manage hazards in the workplace, and generally to provide a safe and healthy work environment. Information on health and safety in employment can be found at www.osh.dol.govt.nz.

In New Zealand, the Anti-fouling and In-water Cleaning Guidelines are administered by MAF.

[3] The Minister of Conservation is the regional council for the Kermadec and Subantarctic Islands.

About these Guidelines

INTRODUCTION

The growth and accumulation of aquatic organisms (biofouling) on vessels and other movable submerged structures affects their performance and can lead to the spread of invasive aquatic species. Anti-fouling coatings are commonly used to protect submerged surfaces and prevent the accumulation of biofouling. The application, maintenance and removal of anti-fouling coatings on vessels and movable structures in maintenance facilities or in-water can result in contamination of the aquatic environment. Accidental release of biofouling organisms during cleaning operations can facilitate the spread of invasive aquatic species that can threaten human health, the aquatic environment, and social, cultural and economic values.

PURPOSE AND PRINCIPLES

These Guidelines provide guidance on best-practice approaches for the application, maintenance, removal and disposal of anti-fouling coatings and the management of biofouling and invasive aquatic species on vessels and movable structures in Australia and New Zealand. The Guidelines are also intended to assist authorities to decide on the appropriateness of in-water cleaning operations in general and on a case-by-case basis. In achieving this purpose, it is the aim of the Guidelines to minimise the contamination and biosecurity risks associated with shore-based and in-water maintenance of vessels and movable structures.

These Guidelines are based upon the following principles:

1. The risks posed by biofouling management measures should be balanced with the risks of failing to manage biofouling.
2. There is an operational need to manage biofouling on vessels and movable structures.
3. It is preferable to minimise the accumulation of biofouling on vessels and movable structures.
4. The release of potentially toxic chemicals and invasive aquatic species into the environment should be minimised.
5. The removal of vessels and movable structures from the water for cleaning and maintenance should, where practicable, be used in preference to in-water operations.

SCOPE

The Guidelines apply to all vessels and other movable structures in aquatic (marine, estuarine and freshwater) environments, regardless of whether they are coated in an anti-fouling coating. They should be used by owners and operators of vessels and movable structures, operators and customers of maintenance facilities and contractors providing vessel maintenance services.

These Guidelines replace the ANZECC Code of Practice for Anti-fouling and In-Water Hull Cleaning and Maintenance (1997).

The practices described in these Guidelines have been aligned with the international conventions that are intended to protect the aquatic environment from invasive aquatic species and contaminants from shipping. These include the International Convention on the Control of Harmful Anti-Fouling Systems on Ships (AFS Convention, 2001), the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972 and the International Maritime Organization (IMO) Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species.

The Guidelines are consistent with both countries' developing national biofouling management approaches.

Occupational Health and Safety (OH&S) should always be a principal concern in vessel maintenance. These Guidelines do not specify detailed OH&S requirements, (a link to the relevant government website can be found in the section on Application of the Guidelines).

STRUCTURE OF THESE GUIDELINES

These Guidelines are divided into two main parts:
Part 1: Best practice guidance for the application, maintenance, removal and disposal of anti-fouling coatings at shore-based maintenance facilities to minimise environmental risk.

Part 2: Best practice guidance for the in-water cleaning and maintenance of vessels and movable structures to minimise environmental risk.

Relevant supporting information is provided in appendices:
Appendix 1: A decision-support tool to determine the appropriateness of in-water cleaning in specific circumstances.

Appendix 2: Information on the types of anti-fouling coating commercially available and the means by which they prevent biofouling growth.

Appendix 3: Information on currently available in-water cleaning techniques.

Appendix 4: A template for a Biofouling Management Plan and Biofouling Record Book developed by the International Maritime Organization.

Appendix 5: Information on how to identify different biofouling types on vessels and movable structures.

Definitions

For the purposes of these Guidelines the following definitions apply:

Adequate documentation refers to records of the recent history of anti-fouling installation and hull maintenance undertaken on a vessel or movable structure.

Anti-fouling coating refers to a coating that is applied to submerged surfaces to prevent or reduce the accumulation of biofouling. Common types of anti-fouling coating are described in Appendix 2.

Anti-fouling coating system refers to the combination of coatings (anti-corrosive, undercoat, binder and anti-fouling coatings), number of coats, and dry-film thickness of the coatings applied to submerged surfaces to provide the required anti-fouling performance

AFS Convention, 2001 refers to the International Convention on Control of Harmful Anti-Fouling Systems on Ships, 2001.

Anti-Fouling System (AFS) Certificate refers to the International Anti-Fouling System Certificate that vessels greater than 400 gross tonnes and registered to a Flag State that is a Party to the AFS Convention (2001) are required to carry. This certificate indicates that the vessel's anti-fouling system complies with the Convention.

Australian or New Zealand waters refers to the internal waters, the Territorial Sea and the Exclusive Economic Zone (EEZ) of Australia or New Zealand.

Biocide refers to a chemical substance that is incorporated into anti-fouling coatings to prevent the settlement or survival of aquatic organisms.

Biofouling refers to the accumulation of aquatic organisms (micro-organisms, plants, and animals) on surfaces and structures immersed in or exposed to the aquatic environment.

Biofouling type refers to the level and composition of biofouling that accumulates on submerged surfaces over time. These Guidelines distinguish between two types of biofouling (for more detail refer to Appendix 5).

Biosecurity refers to the exclusion, eradication or effective management of pests and diseases that threaten the economy, environment, human health, social and cultural values.

Biosecurity risk refers to the potential harm to the economy, environment, human health and social and cultural values posed by pests and diseases entering, emerging, establishing or spreading in Australia and New Zealand.

Contaminant refers to any undesirable substance occurring in the environment as a result of human activities, even without adverse effects being observed.

Contamination refers to the presence of a contaminant in the environment, or the process whereby a contaminant is introduced into the environment.

Controlled waste refers to material or liquid waste that is regulated because of its toxicity or imminent hazardous nature.

Declaration on Anti-fouling System refers to the declaration required to be carried by vessels of less than 400 gross tonnes but greater than 24m, and registered to a Flag State that is Party to the AFS Convention, 2001. This declaration ensures that their anti-fouling coating system complies with the Convention.

Exclusive Economic Zone refers to those waters beyond the limits of the Territorial Sea out to 200 nautical miles.

In-water cleaning refers to the physical removal of biofouling and/or anti-fouling coating surface deposits from submerged surfaces. For the purposes of these Guidelines, 'in-water'

refers to the parts of a vessel or movable structure that are either below the load line or normally submerged and/or are coated in anti-fouling coating.

Local water quality standards refer to the concentrations or discharge of contaminants (such as those arising from hull maintenance operations) that are regarded as acceptable by the relevant authority.

Maintenance facility refers to any location or facility where on-shore maintenance of vessels or other movable structures is carried out. This includes the maintenance, removal and application of anti-fouling coatings and the removal of biofouling organisms.

Movable structure refers to a structure or installation deployed in aquatic environments that can be moved between locations. Movable structures include (but are not limited to) oil and other exploration rigs, floating dry-docks, pontoons, aquaculture installations, navigational structures.

Niche areas refer to areas on a vessel or movable structure that are more susceptible to biofouling accumulation due to different hydrodynamic forces, susceptibility to anti-fouling coating wear or damage or absence of anti-fouling coatings. They include, but are not limited to, waterline, sea chests, bow thrusters, propeller shafts, inlet gratings, jack-up legs, moon pools, bollards, braces and dry-docking support strips.

Planned in-service period refers to the intended interval (decided at the time of anti-fouling coating application) until the next scheduled application of anti-fouling coating on a vessel or movable structure

Relevant authority refers to the authority that has responsibility for managing the environmental effects of activities. Refer to section on Application of these Guidelines for further information.

Service life refers to the period of time an anti-fouling coating system is expected to protect a treated surface from biofouling and/or corrosion if the coatings are applied in accordance with the manufacturer's specifications.

Statement of Compliance refers to a document (and associated evidence) issued by a Classification Society to vessels greater than 400 gross tonnes that are registered in Flag States not Party to the AFS Convention, 2001.

Vessel refers to any craft that operates in an aquatic environment, be it to transport people or commodities, to carry out maintenance or provide a platform for other activities (e.g. recreational, fishing, cruise, merchant, exploration, research or naval vessels and barges and other vessel types).

Part 1: Shore-based Application, Maintenance, Removal and Disposal of Anti-fouling Coatings

A. ANTI-FOULING COATING TYPES

A wide range of anti-fouling coatings are available for owners or operators of vessels and movable structures. For simplicity, in these Guidelines anti-fouling coatings are grouped into two main categories based on whether or not they rely on the release of biocidal (toxic) compounds to prevent biofouling. It should be noted that both biocidal and biocide-free anti-fouling coatings may contain harmful substances that pose a contamination risk if released into the environment.

1. Biocidal coatings are coatings that release chemicals, e.g. copper compounds, that aim to prevent the settlement or survival of aquatic organisms. See Appendix 2 for detail on different types of biocidal coatings.
2. Biocide-free coatings are coatings that do not depend on chemicals or pesticides for their anti-fouling properties, instead relying on their physical nature. See Appendix 2 for detail on different types of biocide-free coatings.

All biocidal anti-fouling coatings applied in Australia and New Zealand must be registered and permitted for use as an "anti-foulant" by the Australian Pesticides and Veterinary Medicines Authority (APVMA) or the New Zealand Environmental Protection Authority (EPA)). The sale and application of unregistered biocidal coatings is prohibited in Australia and New Zealand, as is the addition of any biocidal additive to an anti-fouling coating.

The sale and application of anti-fouling coatings containing tributyltin (TBT) are prohibited in Australia and New Zealand. However, Australian and New Zealand maintenance facilities may still carry out maintenance on vessels and movable structures that have TBT-based anti-fouling coatings beneath barrier coats and compliant anti-fouling coatings, provided these facilities are able to contain waste produced during maintenance and minimise the release of contaminants.

Material Safety Data Sheets (MSDS) and relevant product descriptions should be consulted for advice and information on correct storage, handling and emergency treatment procedures for all anti-fouling coatings and chemicals.

The application, maintenance, removal and disposal of anti-fouling coatings should only be carried out at maintenance facilities that have adopted measures to ensure that all biofouling, coatings and other physical contaminants removed from vessels and structures are retained and treated in a manner that is compliant with relevant local regulations.

B. CHOOSING THE CORRECT ANTI-FOULING COATING

Different anti-fouling coatings are designed and developed with different uses in mind. Therefore, it is essential that the purchaser or coating applicator obtains appropriate technical advice, generally from the coating manufacturer or supplier, prior to choosing an anti-fouling coating. Application of an inappropriate anti-fouling coating may result in increased and unnecessary accumulation of biofouling, increased loadings of biocide in the environment, and a requirement for more frequent maintenance.

The following factors should be considered when choosing an anti-fouling coating system:

1. The activity profile of the vessel or movable structure – different anti-fouling coatings are designed to optimise anti-fouling performance for specific speeds, aquatic environments or levels of activity;
2. Planned in-service periods before coating system renewal – different coating types and film thicknesses have different service lives that must be matched with planned maintenance and re-application;
3. Design and construction of the vessel or movable structure – the coating must be compatible with the construction material, and the use of specific coatings in niche or high and low water flow areas should be considered;
4. Any legal requirements for the sale and use of anti-fouling coatings.

Planned in-service period

The anti-fouling coating manufacturer and/or commercial applicator should be consulted when choosing an anti-fouling coating to ensure it is capable of meeting or exceeding the planned in-service period. Anti-fouling coatings that are older than the planned in-service period may not provide adequate protection from biofouling.

For commercial vessels and structures, the type and thickness of anti-fouling coatings (in particular for self-polishing systems) are generally determined by the planned in-service period and operational profile. The planned in-service period is determined by logistic and economic factors, and should be recorded in the vessels' Biofouling Management Plan.

For recreational vessels, the maintenance schedule is not usually determined by operational forecasts and logistical constraints, and anti-fouling coatings are chosen according to other factors. Based upon the recommended service lives of currently available anti-fouling coatings, the following generic in-service periods are recommended: 12 months for biocidal anti-fouling coatings and 24 months for biocide-free coatings.

Record-keeping

Documentation of the anti-fouling coatings chosen and applied should be kept on record. For commercial vessels and structures, the preferred form of documentation of anti-fouling coating type and age is: (1) a Biofouling Record Book and/or Biofouling Management Plan (as described in Appendix 4); or (2) an Anti-fouling System Certificate or Declaration on Anti-fouling System; or (3) original receipts or invoices stating the coating type, volume purchased, vessel name and date of application, where the former documents are not held.

For recreational vessels, the preferred form of documentation is: (1) a biofouling record book and/or biofouling management plan (as described in Appendix 4); or (2) original receipts or invoices stating the coating type, volume purchased, vessel name (if possible) and date of application, where the former document(s) are not held.

C. REQUIREMENTS FOR SHORE-BASED MAINTENANCE FACILITIES

1. Maintenance facilities should be familiar with the best-practice recommendations set out in these Guidelines for all application, maintenance and removal of anti-fouling coatings and ensure that all customers are similarly informed.
2. Maintenance facilities should adopt measures that ensure that all biofouling waste, coating waste and other contaminants arising during maintenance activities are captured and retained in a manner that minimises their release into the terrestrial and aquatic environment.
3. Maintenance facilities should provide clearly designated areas where maintenance activities producing debris are isolated from the environment. Facilities that enable customers to undertake their own maintenance on their vessel or movable structure

(i.e. non-professional maintenance) should ensure that sufficient information on how to prevent any discharges is provided. This can be done by developing clear facility operational rules that must be followed.
4. Coating and biofouling waste should be disposed of as controlled waste and the method of disposal should be compliant with relevant local regulations.

D. APPLICATION OF ANTI-FOULING COATINGS

General guidance

The manner in which an anti-fouling coating is applied influences its performance. Reduced performance will result in a need for more frequent maintenance. To achieve optimum performance, the following is strongly recommended:

1. Technical advice regarding the correct surface preparation, application and curing time required for maximum performance of the anti-fouling coating should be sought from the manufacturer prior to applying the coating. These elements vary according to the type and brand of coating used and will affect performance.
2. All anodes, sensitive fittings and sensors should be removed or heavily taped before application to avoid physical damage.
3. Any primer and/or anti-corrosive coatings used must be compatible with the type of anti-fouling coating and appropriately applied to ensure optimal coating adhesion and distribution. Specialist or manufacturer's advice should be sought before new anti-fouling coating is applied over an existing anti-fouling coating, to ensure that the coatings are compatible or that appropriate barrier coatings are used.
4. It is important that the manufacturer's recommended coating film thickness be achieved to help ensure that the coating provides the expected service life.
5. The manufacturers recommended method of application must be followed to achieve optimal results. Use of non-approved techniques will compromise the anti-fouling and corrosion protection, and the service life of the coating system. Spray application of anti-fouling coatings achieves the best coating adhesion, surface consistency and smoothness. Where spray application is not possible, practical specialist advice should be sought.
6. Hull locations prone to high water flow and wear (e.g. exposed edges around bilge keels, intake grates and weld joints) should be coated with suitably durable anti-fouling coatings to the specified coating thickness. Housings, recesses and retractable fittings such as stabilizers, thruster bodies and guards should all be coated with a suitable anti-fouling coating.
7. The position of docking blocks, slings, and other structures used to support vessels or movable structures during out of water maintenance should, where possible, be varied each time new coatings are applied. This ensures that areas under the docking blocks are coated with anti-fouling, at least at alternate dockings.

Specific guidance for professionals

1. A work area should be used that is designed to prevent the discharge of any contaminant into the environment, whether through run-off or aerosol distribution. This may include full bunding and screening of the work area, as appropriate.
2. To prevent aerosols from drifting into neighbouring environments, all work should take place in an area that is protected from windy conditions.
3. Clean, appropriate, efficient and well-maintained spray equipment must be used for application to ensure optimal coating thickness and distribution.
4. Dedicated spray equipment must be used for silicone-based coatings to prevent silicone cross-contamination.

5. All application equipment and containers should be cleaned immediately after use and left-over coatings disposed of in a manner that minimises contamination of the environment and follows local regulations for the disposal of controlled waste.
6. The relevant Occupational Health and Safety (OH&S) requirements should be adhered to at all times.

Specific guidance for non-professionals

1. Wherever possible, anti-fouling coatings should be applied by experienced professionals. However, non-professional application of anti-fouling coatings is common for small vessels and infrastructure, such as recreational yachts and launches or small fishing vessels. Non-professionals should follow manufacturer's recommendations when determining how they intend to apply the anti-fouling coating. The anti-fouling coating industry emphasises that spray application is the preferred method and will achieve the best coating performance. Spray equipment should only be operated by professionals to ensure optimal application. Spray equipment should never be used outside of screening or other containment to prevent spray drift and contamination of nearby environments and structures.
2. Anti-fouling coatings should be mixed (if necessary) in designated areas that are sealed, bunded and well ventilated. Preparation and mixing of anti-fouling coatings must never be carried out in intertidal areas.
3. Spills should be cleaned up using absorbent material and any residues should be allowed to dry rather than being washed into the wastewater collection system or aquatic environment.
4. Any excess coating, empty coating and thinner containers and other material contaminated with primer, anti-corrosive or anti-fouling coatings should be disposed of as controlled waste. Empty coating and thinner containers should be allowed to air dry in a well-ventilated area prior to this. Coatings should not be allowed to enter water drains, gutters, sewers or the aquatic environment.
5. Contaminants should be captured out of run-off water using permeable tarpaulins, screens or filter cloths.
6. The area around maintenance areas should be swept or vacuumed frequently to minimise distribution of debris by wind.
7. Contaminants such as coatings, pesticides, thinners, oils, detergents, paint strippers, etc. should be stored in accordance with Material Safety Data Sheets and in a manner that complies with any relevant local regulations.
8. Relevant information on handling of, or exposure to coatings, thinners and other materials used during the application process should be obtained from the product label, the manufacturers' websites (e.g. Material Safety Data Sheets) or the retailer, and adhered to at all times.
9. The recommended drying time of the primer and anti-fouling coatings must be observed to achieve optimal adhesion and coating performance. Premature over-coating or submersion will compromise coating adhesion and/or anti-fouling and anti-corrosion performance.

E. MAINTENANCE AND REMOVAL OF ANTI-FOULING COATINGS

Maintenance by professionals

A number of methods are available for removal and maintenance of anti-fouling coatings. Each method requires consideration of different factors. In all cases disposal of removed material should follow the recommendations set out in section F.

Pressure water blasting

1. Spray drift created during water blasting contains anti-fouling residues. The dispersal of spray drift beyond the working area should be minimised by the use of screening and by avoiding spraying during windy conditions.
2. Anti-fouling coatings are toxic and hazardous both to personnel and the environment. The work area where cleaning is carried out should be adequately isolated and personnel engaged in the blasting should be completely protected from contact with all wastewater and spray drift.

Pressure abrasive blasting

1. All anodes, sensitive fittings and sensors should be removed or heavily taped before blasting to avoid physical damage.
2. Vacuum blast cleaning is recommended over all other abrasive blasting methods.
3. Wet abrasive blasting is preferred over dry blasting, as it creates less toxic dust.
4. In the absence of vacuum blasting equipment, abrasive blasting operations should be conducted using one of the following options:
   - An abrasive blasting chamber vented to the atmosphere via an effective dust collector or fabric filter; or
   - Ensure that the screening material for outdoor/open-air blasting is tear-resistant, UV-resistant, fire retardant and of suitable material and construction (preferably fully enclosed) to minimise the escape of fine dust.
5. Dry abrasive blasting should not be carried out in windy conditions where dust may escape. Water or a proprietary suppressant agent should be used to minimise dust emissions from the work area.

Spot repair or maintenance

If coating removal or maintenance is carried out using small power tools or manual methods, the recommendations for non-professionals (below) should be followed.

Maintenance by non-professionals

It is recognised by these Guidelines that the maintenance tools available to non-professionals may differ from those available to professionals. Therefore, some additional advice is provided for non-professionals. In all cases disposal of removed material should follow the recommendations set out in section F.

1. Wherever feasible, mechanical or manual buffing and scraping should be used in preference to pressure water blasting and abrasive grit blasting for cleaning, as solid wastes are less likely to escape and more likely to be retained for disposal. These processes should be carried out wet to reduce the potential for aerial distribution of wastes. Pressure water blasting and abrasive grit blasting should only be conducted if appropriate screening and containment is available. All waste and debris should be collected using tarpaulins or drop-sheets and by avoiding work during windy conditions.
2. Removal of coatings by wet sanding or scraping is preferred to chemical paint stripping as it creates less toxic waste material. The use of a heat gun can make coating removal easier

on some surfaces. If chemical paint strippers must be used, consider soy-based or water-based products that are less hazardous. In all cases it is recommended that manufacturer's instructions are sought to determine the safest and most appropriate method for removing coatings.

F. DISPOSAL OF RESIDUES AND WASTES

To manage biosecurity and contaminant risks associated with shore-based maintenance activities, the following recommendations should be adhered to:

1. Any removed material or liquid should not be allowed to enter a waterway or storm water system.
2. All residues, solid coatings, liquid or any other form of waste, including removed biological material and used product containers should be collected and stored for disposal in line with the requirements of the relevant authority.
3. Anti-fouling coatings should not be incinerated as this may generate toxic fumes, smoke and gases.

G. EMERGENCY RESPONSE

1. It is recommended that all maintenance facilities have an Emergency Response Plan, whether required by regulation or not. This plan should cover responses to spills of coatings and other hazardous substances, release of organisms, and other incidents with potential contamination and/or OH&S risks. If such an emergency occurs, the relevant authority should be notified.
2. Any coating spillages should be assumed to contain hazardous substances and be disposed of as controlled waste and in accordance with the requirements of the relevant authority.
3. Spill clean-up equipment, such as absorbent materials, non-toxic dispersants, and booms (physical barriers for containing liquids) should be available for facility users and kept maintained. The relevant authority should be contacted for further information on decontamination procedures.

Part 2: In-Water Cleaning and Maintenance

In-water cleaning can be used to manage biofouling to optimise the performance of vessels and other movable structures and to minimise biosecurity risks. However, in-water cleaning can physically damage some anti-fouling coatings, shorten coating service life and release a pulse of biocide that can contaminate the environment. In-water cleaning can also facilitate the release of invasive aquatic pests into the surrounding environment. In-water cleaning should therefore only be undertaken when the removal of biofouling does not harm the coating and presents an acceptable biosecurity or contaminant risk.

Although these Guidelines recommend the use of in-water cleaning in some circumstances, the removal of vessels and movable structures from the water for cleaning and maintenance should, where practicable, occur in preference to in-water operations. Furthermore, in-water cleaning should not be considered as a replacement for necessary coating maintenance and renewal in shore-based maintenance facilities.

Part 2 of these Guidelines is divided into two sections:
Section A: Information on the factors that determine the environmental risk of in-water cleaning.
Section B: Specific guidance on situations where in-water cleaning is acceptable and any conditions that may apply.

A. WHAT DETERMINES THE CONTAMINATION AND BIOSECURITY RISK OF IN-WATER CLEANING?

The recommendations regarding in-water cleaning contained in these Guidelines are made on the basis of the associated contamination and biosecurity risks. Several factors determine these risks and are described below.

Anti-fouling coating type

These Guidelines distinguish between anti-fouling coatings that contain toxic biocides and those that do not (refer to Appendix 2). All types of anti-fouling coating pose a contamination risk during in-water cleaning. This risk is attributed on the basis of the toxicity and/or longevity of many approved biocides and other compounds found in coatings, including those that are biocide-free.

Not all anti-fouling coatings are suitable for in-water cleaning. For some coatings, specific methods need to be used to prevent damage to the coating and its future performance. Information on the suitability of an anti-fouling coating for in-water cleaning and the appropriate cleaning methods should be obtained from the coating manufacturer or retailer at the time of purchase. Cleaning technologies are outlined in Appendix 3.

Record-keeping

Documentation of coating type, date of application, and the planned in-service period of a vessel or movable structure should be kept on record as it may be required by the relevant authority when considering requests for in-water cleaning. If this information is not available the relevant authority may not grant permission for in-water cleaning.
Examples of suitable systems for keeping and maintaining information on coatings and hull maintenance are the Biofouling Management Plan and Biofouling Record Book recommended in the IMO Guidelines for the control and management of ships' biofouling to

minimise the transfer of invasive aquatic species. Templates for these documents are provided in Appendix 4.

As an alternative, the type and age of anti-fouling coatings can be provided using documents required to demonstrate compliance with the AFS Convention, 2001; or other relevant documents such as receipts or invoices that state the anti-fouling coating type and application date.

Biofouling origin

The geographic origin of biofouling organisms on a vessel or movable structure contributes to its biosecurity risk. If all biofouling was acquired in the same location where in-water cleaning is intended, cleaning may not pose a biosecurity risk as all biofouling species on the vessel or movable structure are already present in that area. However, biofouling acquired from distant locations may contain invasive aquatic species that pose a biosecurity risk. To aid in assessing the risk, three origin categories are defined:

- **Regional biofouling** – biofouling that has been acquired in the same location where in-water cleaning is proposed. "Regional" is as specified by the relevant State or Territory government in Australia and local government authority in New Zealand. This category may be defined on the basis of the known distribution of established invasive aquatic species or ongoing pest management, or the location of high-value environments. Such delineation is the responsibility and prerogative of the State or Territory government or local government.
- **Domestic biofouling** – biofouling that has been acquired from outside the region where in-water cleaning is proposed, but within the respective country's waters. Examples of this would be in-water cleaning of a vessel or movable structure in Sydney (New South Wales) whose biofouling may have been acquired in Fremantle (Western Australia), or cleaning of a vessel in Nelson, South Island, whose biofouling originates from Auckland, North Island.
- **International biofouling** – biofouling that has been acquired from outside the waters of the country where the cleaning is proposed.

Log books that detail the voyage history (geographic locations visited and dates of each visit) of a vessel or movable structure since its last cleaning or full anti-fouling coating renewal should be kept on-board. This will provide the relevant authority with information on the possible origins of the biofouling on the vessel or movable structure when in-water cleaning is proposed.

Biofouling type

These Guidelines divide biofouling into two categories: microfouling and macrofouling. These represent biofouling assemblages of differing diversity, age and abundance.

- **Microfouling** refers to a layer of microscopic organisms including bacteria and diatoms and the slimy substances (usually extracellular polysaccharides) that they produce. It is often referred to as a "slime layer". It can be easily removed by gently passing a finger over the surface.
- **Macrofouling** refers to large, distinct multicellular organisms visible to the human eye, such as barnacles, tubeworms, mussels, fronds of algae and other large attached or mobile organisms.

Macrofouling growths represent a greater biosecurity risk as they may contain a diverse range of organisms, and are more difficult to remove and contain effectively. Example images of both types of biofouling can be found in Appendix 5. The type of biofouling on a vessel or

movable structure can be determined via inspection (e.g. the use of divers or remotely-operated cameras). Documentation of an inspection, such as an entry in a Biofouling Record Book, may be adequate evidence of the type of biofouling on a vessel or movable structure.

B. GUIDANCE ON IN-WATER CLEANING

This section describes situations where in-water cleaning may be appropriate or not and the conditions that may apply. This section should be used together with the Decision-Support Tool provided in Appendix 1.

General guidance:

1. If used regularly, in-water cleaning is an effective measure to limit the development of biofouling to microfouling. Regular (i.e. 6-12 monthly) in-water cleaning is recommended for all submerged surfaces and in particular for propellers and other niche areas on vessels and movable structures.
2. In-water cleaning to routinely remove mature and extensive macrofouling as a substitute for earlier and/or better maintenance practices is not recommended.
3. In-water cleaning is only acceptable where contaminant discharges from the cleaning activity meet water quality standards set by the relevant authority.
4. In-water cleaning of vessels or movable structures should only be carried out before departing to new destinations, not after arriving at these destinations.
5. In-water cleaning should only be carried out on anti-fouling coatings that are suitable for in-water cleaning. Information on the suitability and ability of a coating to withstand in-water cleaning without damage and effects on service life, and on appropriate cleaning methods, should be obtained from the coating manufacturer.
6. In-water cleaning should not be performed on vessels or movable structures that have reached or exceeded their planned in-service period. The anti-fouling coating on such vessels or movable structures has reached the end of its service life and the vessel or movable structure should be removed from the water and a new anti-fouling coating applied.
7. In-water cleaning or treatment of biofouling should only be carried out using technology that does not harm the underlying coating or result in the excessive release of contaminants. The capabilities of new technologies should be verified independently. Information on the suitability of particular cleaning or treatment methods can be obtained from coating manufacturers.
8. When in-water cleaning involves the removal of macrofouling, methods should be used to ensure that unacceptable amounts of biological material are not released into the water column. In-water cleaning technologies should aim to, at least, capture debris greater than 50 µm in diameter which will minimise the release of viable adult, juvenile and larval stages of macrofouling organisms. Any cleaning debris collected must be disposed of on land and in compliance with the waste disposal requirements of the relevant authority.
9. If suspected invasive or non-indigenous aquatic species are encountered during in-water cleaning or other vessel maintenance activities, the relevant authority should immediately be notified and the cleaning or maintenance activity ceased.

Recommendations for decision-making on in-water cleaning:

1. Microfouling, regardless of origin, may be removed without the need for full containment of biofouling waste, provided the cleaning method is consistent with the coating manufacturer's recommendations. Where microfouling is removed using a gentle, non-abrasive cleaning technique, the contamination risk is likely to be acceptable.
2. Macrofouling of regional origin (as defined by the relevant authority) may be removed without the need for full containment of biofouling waste provided the cleaning method is

consistent with the coating manufacturer's recommendations and contaminant discharges meet local water quality standards.

3. Macrofouling of domestic origin may be removed without the need for full containment of biofouling waste following risk assessment by the relevant authority. If the relevant authority determines containment of biofouling waste is required, then the guidance provided in point 8 (above) should be used. In either case, the cleaning method must be consistent with the coating manufacturer's recommendations and contaminant discharges must meet local water quality standards.
4. Macrofouling derived from international locations should only be removed using cleaning methods that are able to minimise the release of all organisms, or parts of organisms, and anti-fouling coating debris, using the guidance described in point 8 (above). The cleaning method must be consistent with the coating manufacturer's recommendations and contaminant discharges must meet local water quality standards.

Appendix 1 provides a Decision-Support Tool to aid decision-making on in-water cleaning based on these recommendations.

Exceptions to these recommendations

1. The recommendations on in-water cleaning may not apply in locations where quarantine controls have been implemented for invasive aquatic species management purposes.
2. A need for in-water cleaning may arise during an emergency situation, to address an operational, health and safety or biosecurity hazard. The identification and handling of such situations is the responsibility of the relevant authority.
3. Situations not covered by the Decision Support Tool are solely at the discretion of the relevant authority.

Appendix 1: Decision-Support Tool for in-water cleaning.

This Decision Support Tool for in-water cleaning is designed to assist relevant authorities with making decisions about in-water cleaning practices in their jurisdictions. The Decision-Support Tool also helps owners or operators of vessels and other movable structures to determine the types of information and documentation that relevant authorities may require of them to make decisions on in-water cleaning. Relevant authorities may require additional information for their risk-assessment and decision-making processes. Persons who wish to in-water clean vessels or movable structures should contact the relevant authority.

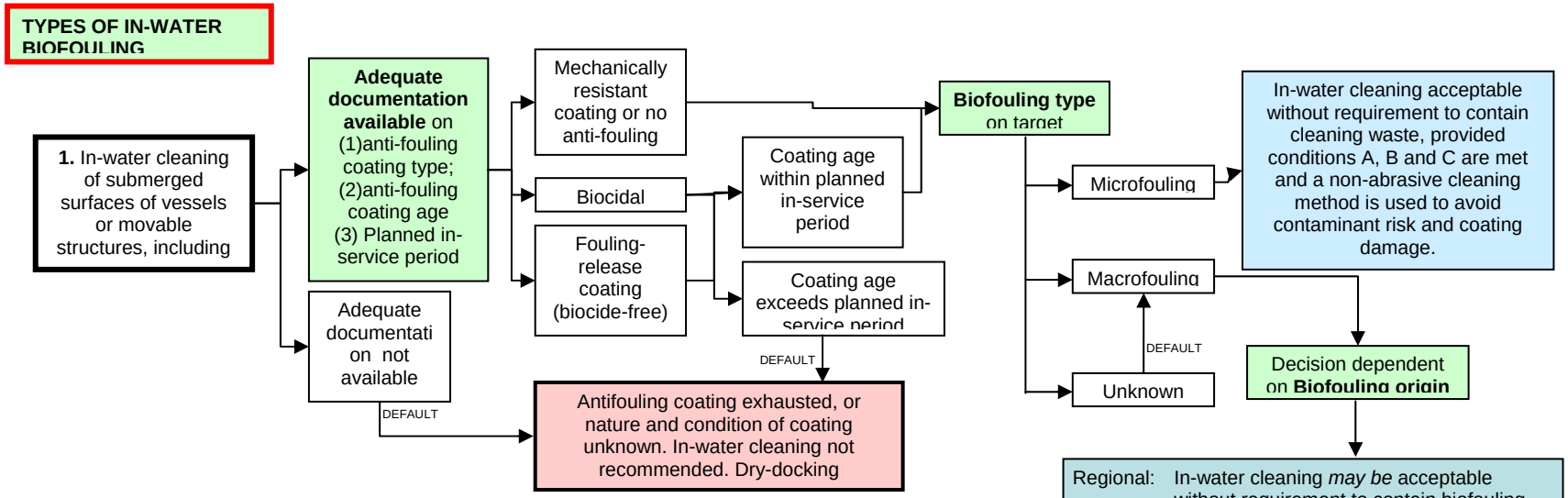
When information and/or documentation required for making decisions on in-water cleaning is not available, the following default assumptions apply:

- If the type of a coating (e.g. biocidal; biocide-free) cannot be reliably determined, then it should be assumed that the coating contains biocides.
- If the age of a coating cannot be reliably determined, then it should be assumed that the coating has reached the end of its service life.
- Where the type of biofouling on a vessel or structure is unknown, it should be assumed that macrofouling is present.
- If the origin of the biofouling on a vessel or movable structure is unknown, then it should be assumed that it is of international origin. If the biofouling is likely to be from more than one origin category (e.g. regional and international) then decisions on in-water cleaning should be based on the furthest likely origin (i.e. international).

The Decision-Support Tool should be used in conjunction with the main text of the Anti-fouling and In-Water Cleaning Guidelines.

Decision-Support Tool for in-water cleaning

This tool is designed to assist relevant authorities with making decisions about in-water cleaning practices in their jurisdictions. The tool is a part of, and must be used in conjunction with, the main text of the *Anti-Fouling and In-Water Cleaning Guidelines*. The terms used in this tool are defined in the *Guidelines*.



Conditions for removal and/or treatment of biofouling:

A: Antifouling coating is suitable for cleaning.
B: Cleaning method does not damage coating surface.
C: Discharges meet local water quality standards.
D: Cleaning method ensures that unacceptable amounts of biological material are not released into the water column through the capture and containment of biofouling waste. Cleaning methods should aim to, at least, capture debris greater than 50 µm in diameter which will minimise the release of viable adult, juvenile and larval stages of macrofouling.

Appendix 2: Types of Anti-fouling coatings

Biocidal coatings are coatings that release chemicals such as copper compounds or other pesticides that aim to deter biofouling organisms. There are four general types of biocidal coatings:

1. **Soluble matrix**, Controlled depletion polymer or Ablative anti-fouling coatings contain a binder that is slightly soluble in seawater. Hydration causes the coating surface to slowly dissolve, releasing the freely associated biocide.
2. **Insoluble matrix**, Contact leaching, Longlife or Diffusion anti-fouling coatings use an insoluble binder that contains a high concentration of biocide that is released from the coating through a diffusion process.
3. **Self-polishing copolymer** anti-fouling coatings release biocides as a result of hydrolysis causing the coating to "erode" when a vessel is moving.
4. **Metallic** anti-fouling coatings use copper or copper nickel alloy as either metal sheathing or metal particles mixed into a coating.

Biocide-free coatings are coatings that do not depend on chemicals or pesticides for their anti-fouling properties, instead relying on their physical nature. They are further split into two sub-categories:

5. **Fouling release coatings** rely on non-stick, low surface energy compounds such as silicone or fluoropolymers to impair the adhesive attachment of biofouling.
6. **Mechanically resistant coatings** (epoxy, ceramic/epoxy, and epoxy/glass) are tough and highly durable coatings. They do not have any anti-fouling properties. They allow biofouling organisms to accumulate and are designed to withstand regular in-water cleaning (including abrasive methods.

Appendix 3: Information on currently available in-water cleaning technology

The most commonly available in-water cleaning technologies are currently brushing/scraping, use of soft cleaning tools, and water or air jet systems. These methods vary in their effectiveness in removing and containing biofouling organisms, and in their suitability for use on different anti-fouling coating types. Brief descriptions of their use and limitations are provided below:

- **Brush systems** – Brushes are a widely used method for in-water hull cleaning because of their ability to remove surface deposits and low levels of biofouling from biocidal coatings. They can have a rejuvenating effect on the performance of some coating types. Existing brush systems are not able to remove all biofouling from a surface or contain all of the removed material. The use of abrasive brushes can also result in the exacerbated release of biocidal coating material. Use of brushes on fouling-release coatings can damage the coating surface and is not recommended unless the brushes are sufficiently soft and will not harm the integrity of the coating. Advice should be sought from the coating manufacturer or supplier prior to using any brush system on an anti-fouling coating.
- **Soft tools** – Fouling release coatings prevent firm attachment of biofouling organisms. Soft cleaning tools, such as cloths, squeegees and wiping tools can be used to remove micro and macrofouling effectively from surfaces coated in fouling release coatings without harming the integrity of the coating. These coatings are delicate and scratching of the surface should be avoided. If cloths are used for cleaning, it is necessary to ensure that no shell fragments or other hard objects are trapped beneath the cloths that could scratch and damage the coatings.
- **Water jet and air jet (blast) systems** – Water and air jet cleaning systems are versatile tools because their operating pressure (and jet pattern) can be varied according to coating type and biofouling extent. The effects of water jet technology on biocidal coatings are not fully understood. Currently available water jet systems are not able to contain all of the removed biofouling or coating material. Water pressures should be used that do not harm the integrity of the anti-fouling coating.

Other technologies:

- **Technologies that kill, but not necessarily remove biofouling** – Several types of biofouling treatment are available that kill biofouling organisms but do not actively remove them from a surface. These include the use of heat (in the form of steam or heated water) or enveloping technologies (wrapping of a vessel or movable structure in plastic sheets or canvas sleeves to suffocate biofouling). These are generally developing technologies and their effectiveness and effects on anti-fouling coatings have not been evaluated.
- **Developing technologies** – A number of technologies that collect biofouling and coating material are under development but not commercially available in either Australia or New Zealand at the time these Guidelines were developed. Any novel technology should aspire to achieve the standards set out in Part 2 Section B of these Guidelines.

Appendix 4: Template for Biofouling Management Plan and Biofouling Record Book as prepared by the IMO

A. FORMAT AND CONTENT OF BIOFOULING MANAGEMENT PLAN

Introduction

This section should contain a brief introduction for the ship's crew, explaining the need for biofouling management, and the importance of accurate record keeping. The Plan should state that it is to be available for viewing on request by a port State authority and should be written in the working language of the crew.

Ship Particulars

At least the following details should be included:

- Ship's name.
- Flag.
- Port of registry.
- Gross tonnage.
- Registration number (i.e. IMO number and/or other registration numbers, if applicable).
- Regulation Length.
- Beam.
- Ship type (as classified by Lloyds Register).
- International call sign and Maritime Mobile Service Identity (MMSI).

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A table of contents should be included.

Purpose

The purpose of the Plan is to outline measures for the control and management of ships' biofouling in accordance with the Guidelines for the control and management of ships' biofouling to minimize the transfer of invasive aquatic species (the Guidelines). It provides operational guidance for the planning and actions required for ships' biofouling management.

Description of the Anti-fouling Systems

The Plan should describe the anti-fouling systems in place for different parts of the ship, including as follows:

- type(s) of anti-fouling coating systems applied;
- details of where anti-fouling systems are and are not applied or installed;
- manufacturer and product names of all coatings or products used in the anti-fouling coating systems; and
- anti-fouling system specifications (including dry film thickness for coatings, dosing and frequency for MGPSs, etc.) together with the expected effective life, operating conditions required for coatings to be effective, cleaning requirements and any other specifications relevant for paint performance.

Previous reports on the performance of the ship's anti-fouling systems should be included, if applicable, and the AFS certificate or statement of compliance or other documentation should also be referenced, as appropriate.

Description of Operating Profile

The Plan should describe the ship's operating profile that has determined the performance specifications of the ship's anti-fouling systems and operational practices, including:

- typical operating speeds;
- periods underway at sea compared with periods berthed, anchored or moored;
- typical operating areas or trading routes; and
- planned duration between dry-dockings/slippings.

Description of areas on the ship susceptible to Biofouling

- The Plan should identify the hull areas, niche areas and seawater cooling systems on the ship that are particularly susceptible to biofouling and describe the management actions required for each area. It should also describe the actions to be taken if the ship is operating outside of the desired operating profile, or if excessive unexpected biofouling is observed, and any other actions that can be taken to minimize the accumulation of biofouling on the ship.

Areas of the ship which are particularly susceptible to biofouling	**Management actions required for each area** (e.g., inspections, cleaning, repairs and maintenance)	**Management actions to be undertaken if ship operates outside its usual operating profile**
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		

A diagram of the ship should be included in the Plan to identify the location of those areas of the ship that are particularly susceptible to biofouling (including access points in the internal seawater cooling systems). If necessary these should show both side and bottom views of the ship.

Operation and Maintenance of the Anti-fouling System

This section should contain a detailed description of the operation and maintenance of the anti-fouling system(s) used, including schedule(s) of activities and step-by-step operational procedures.

Timing of operational and maintenance activities

This section should stipulate the schedule of planned inspections, repairs, maintenance and renewal of the anti-fouling systems.

In-water cleaning and maintenance procedures

This section should set out planned maintenance procedures (other than for on board treatment processes) that need to be completed between dry-docking events to minimise biofouling. This should include routine cleaning or other treatments. Details should be provided on the treatment/cleaning to be conducted, the specification of any equipment required, details of the areas to which each specific treatment/cleaning is to be applied, step-by-step operational procedures where relevant and any other details relevant to the processes (e.g. chemicals required for treatment, any discharge standards).

Operation of onboard treatment processes

This section should provide specific advice about MGPS fitted, internal seawater cooling systems covered by the system and any not covered, and the associated maintenance and inspection schedule and procedures. This would include information such as when each MGPS is run, for how long and any cleaning/maintenance requirements of the system once use is finished. This section should also include advice for ship operators on procedures for biofouling management if the MGPS is temporarily out of operation.

Safety Procedures for the Ship and the Crew

Details of specific operational or safety restrictions, including those associated with the management system that affects the ship and/or the crew. Details of specific safety procedures to be followed during ship inspections.

Disposal of Biological Waste

This section should contain procedures for the disposal of biological waste generated by treatment or cleaning processes when the cleaning is conducted by, or under the direct supervision of, the shipowner, master or crew.

Recording Requirements

This section should contain details of the types of documentation to be kept to verify the operations and treatments to be recorded in the Biofouling Record Book as outlined below.

Crew Training and Familiarization

This section should contain information on the provision of crew training and familiarization.

B. FORMAT AND CONTENT OF THE BIOFOULING RECORD BOOK

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 Y/N

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

1 Introduction

The Guidelines recommend that a Biofouling Record Book is maintained for each ship, in which should be recorded the details of all inspections and biofouling management measures undertaken on the ship.

2 Entries in the Biofouling Record Book

The following information should be recorded in the Biofouling Record Book:

2.1 After each dry-docking:
a. Date and location that the ship was dry-docked.
b. Date that ship was re-floated.
c. Any hull cleaning that was performed while dry-docked, including areas cleaned, method used for cleaning and the location of dry-dock support blocks.
d. Any anti-fouling coating system, including patch repairs, that was applied while dry-docked. Detail the type of anti-fouling coating system, the area and locations it was applied to, the coating thickness achieved and any surface preparation work undertaken (e.g. complete removal of underlying anti-fouling coating system or application of new anti-fouling coating system over the top of existing anti-fouling coating system).
e. Name, position and signature of the person in charge of the activity for the ship.

2.2 When the hull area, fittings, niches and voids below the waterline have been inspected by divers:
a. Date and location of ship when dive surveyed and reason for survey.
b. Area or side of the ship surveyed.
c. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g., mussels, barnacles, tubeworms, algae and slime).
d. What action was taken, if any, to remove or otherwise treat biofouling.
e. Any supporting evidence of the actions taken (e.g. report from the classification society or contractor, photographs and receipts).
f. Name, position, signature of the person in charge of the activity.

2.3 When the hull area, fittings, niches and voids below the waterline have been cleaned by divers:
a. Date and location of ship when cleaning/treatment occurred.

b. Hull areas, fittings, niches and voids cleaned/treated.
c. Methods of cleaning or treatment used.
d. General observations with regard to biofouling (i.e. extent of biofouling and predominant biofouling types, e.g. mussels, barnacles, tubeworms, algae and slime).
e. Any supporting evidence of the actions taken (e.g. report from the classification society or contractor, photographs and receipts).
f. Records of permits required to undertake in-water cleaning if applicable.
g. Name, position and signature of the person in charge of the activity.

2.4 When the internal seawater cooling systems have been inspected and cleaned or treated:
a. Date and location of ship when inspection and/or cleaning occurred.
b. General observations with regard to biofouling of internal seawater cooling systems (i.e. extent of biofouling and predominant biofouling types, e.g. mussels, barnacles, tubeworms, algae, slime).
c. Any cleaning or treatment undertaken.
d. Methods of cleaning or treatment used.
e. Any supporting evidence of the actions taken (e.g. report from the classification society or contractor, photographs and receipts.
f. Name, position and signature of the person in charge of the activity.

2.5 For ships with a MGPS fitted:
a. Records of operation and maintenance (such as regularly monitoring the electrical and mechanical functions of the systems).
b. Any instances when the system was not operating in accordance with the biofouling management plan.

2.6 Periods of time when the ship was laid up/inactive for an extended period of time:
a. Date and location where ship was laid up.
b. Date when ship returned to normal operations.
c. Maintenance action taken prior to and following the period laid up.
d. Precautions taken to prevent biofouling accumulation (e.g. sea chests blanked off).

2.7 Periods of time when ship operating outside its normal operating profile:
a. Duration and dates when ship not operating in accordance with its normal operating profile.
b. Reason for departure from normal operating profile (e.g. unexpected maintenance required).

2.8 Details of official inspection or review of ship biofouling risk (for ships arriving internationally, if applicable):
a. Date and location of ship when inspection or review occurred.
b. Port State authority conducting the inspection/review and details of procedures followed or protocol adhered to and inspector/s involved.
c. Result of inspection/review.
d. Name, position, signature of the person in charge of the activity for the ship.

2.9 Any additional observations and general remarks:
a. Since the ship was last cleaned, has the ship spent periods of time in locations that may significantly affect biofouling accumulation (e.g. fresh water, high latitude (Arctic and Antarctic) or tropical ports)?

Record of Biofouling Management Actions

SAMPLE BIOFOULING RECORD BOOK PAGE

Name of Ship: .....

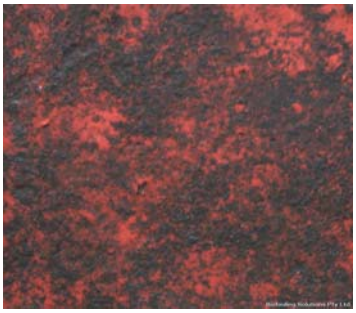
Registration number: .....

Date	Item (number)	Record of management actions	Signature of officers in charge

Signature of master .....

Appendix 5: Example images of microfouling and macrofouling

Microfouling: a layer of microscopic organisms including bacteria and diatoms and the slimy substances that they produce. Often referred to as a "slime layer", microfouling can usually be removed by gently passing a finger over the surface.


Macrofouling: large, distinct multi-cellular organisms visible to the human eye, such as barnacles, tubeworms, mussels, fronds of algae and other large attached or mobile organisms.