

Joint HELCOM/OSPAR Task Group on
Ballast Water Management Convention (BWMC) and Biofouling
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Note that this document was submitted after the established deadline. It will be decided by the Meeting whether the document can be discussed or is postponed to the next meeting.

Background

Following discussions at TG BALLAST 11-2020 on a proposal by the Netherlands for a pilot study serving as input for the development of a **baseline research protocol** for the general assessment of biofouling on commercial vessels in the European regional seas (document 7-1, Presentation 6, and Outcome of TG BALLAS 11-2020, paragraphs 7.2-7.7), the present document describes the work done and the progress made by the Netherlands towards the development of a pilot study.

The pilot study initiated by the Netherlands is strongly influenced by the involvement of a large number of stakeholders including government authorities, port authorities, customs, vessel owners, shipyard /dry-dock owners, fouling inspection services working with scuba-divers and ROVs, and governmental ship inspection authorities at the sea ports. These stakeholders must be willing to contribute to the development of a harmonized research protocol by sharing knowledge and exchanging critical views on all issues related to biofouling on commercial ships.

The initial focus of the pilot study was to make an inventory of relevant categories necessary to distinguish the structure and function of the proposed protocol for biofouling assessment on commercial vessels. Three main categories were defined which include:

- A. Technical issues
- B. Technically related administrative issues and
- C. Pure Administrative issues.

Each of the three categories was further analyzed based on the need to support the development process of a robust assessment protocol for biofouling. A number of relevant activities were enumerated under each of the categories. The activities per category are defined below.

Category A: Technical Issues

1. Prioritization of ships-parameters
2. Identification of niche areas
3. Establishing ratios: (niche area/vessel area) as the scale for biofouling
4. Monitoring methodologies (frequency and reporting times)

Category B: Technically related administrative issues

5. Frequency for conducting base line surveys
6. Identification of Collaborators for the protocol development process

Category C: Administrative issues

7. Identification of responsible government authorities
8. Inspection procedures and reporting

In the current year (2021), the Netherlands focused mainly on understanding the nature of activities defined under category A: Technical issues. Efforts to understand the activities defined under Category B (Technically inclined administrative issues) and Category C (Administrative issues) were postponed to the next two years (2022/2023).

Action required

The Meeting is invited to take note of the progress made by the Netherlands on the three-year pilot study as a contribution towards the development of a protocol for guiding future baseline research for the assessment of biofouling on commercial vessels in the European Regional Seas.

Update on the pilot study proposed by the Netherlands for serving as input for the development of a baseline research protocol for the general assessment of biofouling on commercial vessels in the European Regional Seas.

The initial target of the pilot study by the Netherlands as input for the development of a harmonized protocol for the general assessment of biofouling on commercial vessels was to define the main areas and categories of work and the related activities to shape the structure and the functionality of the proposed protocol. Three main categories were defined in the pilot study. These include: (Category A) Technical issues (Category B) Technically related administrative issues and (Category C) Pure Administrative issues. Each of the three categories was further analyzed to identify a number of relevant activities to support the development process of the proposed assessment protocol for biofouling on commercial vessels. The present paper describes the activities outlined in Category A (Technical issues) and provides an update on the progress made by the Netherlands in 2021.

Category A, (Technical issues) is an embodiment of four main activities. These activities include (1) Prioritization of ships-parameters, (2) Identification of niche areas, (3) Establishing ratios: (niche area/vessel area) as the scale for biofouling and (4) Monitoring methodologies (frequency and reporting times)

(Category A, Activities 1,2)

Prioritization of ships-parameters, and the identification of Niche areas

The prioritization of ships-parameters, and the identification of niche areas on the commercial vessels can be gainfully understood by studying the vessel type impact assessment and vessel selection steps. Progress in these areas is described in the paragraphs below.

Vessel type impact assessment

This is based on Wetted Surface Area (WSA) and Niche Area (NA) per ship type arriving in a country. Automatic Identification system (AIS) or similar tracking data system could be used to track ships potentially aiding the primary or secondary introductions of NIS in biofouling.

Update

- In cooperation with port authorities, data of vessels from outside of Europe to the port of Rotterdam can be retrieved, in many cases up to 10 ports in retrospect.
- Getting access to this data was more difficult than expected because of various reasons.
- The data could be granted under contract, whereby one has to consider privacy related laws and regulations
- The data analyses will commence soon and will be completed in the early part of 2022.

Vessel selection steps

This is based on shipping behaviour, including the manner in which they travel/sail over the sea.

Update

- Assessing which vessel types carry the most risk of biofouling could not be done yet as this depends on the analyses of data on vessels entering the port of Rotterdam. Data analysis is expected to start at the beginning of 2022.
- Some vessel types like container ships and oil-tankers are not easily available for inspection in dry-docks in Europe, as dry-dock maintenance of these ships is generally done outside of Europe, e.g. in Asia.
- Corona risk mitigating regulations in dry-docks appear to have made it more difficult to grant access to dry-docks for doing surveys and selecting specific vessel types for dry-dock inspection.

(Category A, Activity 3 and 4)**Establishing scales and Monitoring methods for biofouling assessment on vessels**

Survey methodologies for biofouling on vessels and in port areas certainly provide more knowledge on the monitoring options to be exploited for biofouling assessment. Relevant options for monitoring may include frequencies, seasonality as well as the use of parameters and ratios (niche areas/vessel areas) for the assessment scales of biofouling on commercial vessels. Progress made by the Netherlands on each of the activities is described under the heading “Update” in the following paragraphs.

In the literature, it is clear that the most fouling on vessels occurs on either the hull areas or in the niche areas. Survey sampling can therefore be limited to the outer hull and the Niche areas.

The hull areas can be easily accessed for fouling assessment through visual observation, or the hull may be scraped for further assessment.

Niche area(s), may include propellers, thruster tunnels, grates, etc. These may have higher non-indigenous species diversity often difficult to access, except in dry dock or with divers or ROVs. Distinguished niche area(s) types may show higher non-indigenous species diversity in specific niche types. It is possible to rank the risks of different types of niche areas, which could facilitate decision making about eventual management measures in the future. It is also important to develop tools for easier access to the remote parts of niche areas for sampling.

Update

- As surveying vessels in dry docks do not seem to be specifically possible in the Netherlands or in Europe for all ship types (due to dry dock maintenance activities outside Europe), survey methods for biofouling assessments on vessels, were focused more on “in-water” possibilities.
- To assess whether maintenance is necessary because of fouling, specialized underwater inspection services (using scuba-divers) are offered in ports to assess fouling intensities and conclude for example whether maintenance in dry-dock is or is not necessary.
- Several videos taken during these inspections in the port of Rotterdam were reviewed to assess their value for detection of alien species and fouling classes in various niche areas. Further analyses of these videos and their potential use in risk analysis for alien fouling species, are pending.
- Currently, there is a tool under development and it is being tested with the specific aim of making high resolution videos and taking samples from fouling communities on ship hulls and especially in and around niche areas. The tool may be used to assess fouling communities down to about 12 meters under the water surface without the need of scuba-divers. The same tool may also be used to access niche areas (e.g. grates / propellers) that are up to about 12 meter high from the ground during dry dock inspections.

Monitoring methods for biofouling assessment in sea ports as a stepping stone for NIS distribution

Generally, three main methods could be investigated depending on the fouling situation. These include: biofouling intensity, diversity of morph-species/types and diversity of species.

Biofouling intensity assessment is easy and quick to assess, fouling intensity levels are commonly used in literature. This is not necessarily linked to fouling species diversity and the presence of non-indigenous biofouling species.

The diversity of morpho-species/types does not identify species, but organisms that look distinctly different in morphology, are separated. That gives an indication of species group and/or genus diversity. A higher diversity of fouling species may be used as an indicator of a higher chance of non-indigenous species being present. No knowledge of species is necessary. Material of each morpho-type

may be preserved for potential DNA-analyses. This is a hypothesis that will be further verified in the pilot study.

Diversity of species (communities), indigenous and non-indigenous

Hard to identify at first glance, but this may be resolved by a reference database (to be made) with photos (showing diagnostic characters) and DNA-barcodes of hull fouling species recorded in similar EU baseline studies on hull-fouling. Identifying species is the most accurate method to evaluate the role of biofouling on commercial vessels as a vector for non-indigenous species into and across European regional seas.

Update

- A nationwide Alien Species Monitoring Network has been set up in the Netherlands to commence in 2021, whereby fouling species are monitored seasonally in 10 ports and harbours along the coast on fouling plates. Additionally, in September 2021 a more intense survey is conducted in these ports and harbours, also including for example dock scrapings and bottom sediment grabs, whereby identifications are done both by conventional methods and by DNA-barcoding. Specifically focusing on "stepping stones" a survey of fouling communities on navigational buoys was started in 2021.