

IMarEST voluntary commitments

Supporting United Nations Sustainable Development Goal 14

Year 1 Progress Report



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Table of Contents

1. Executive Summary	3
2. Commitment 1: Improving recruitment and retention of young people into the marine sector 5	5
2.1. Deliverable target 1	5
2.2. Deliverable target 2	6
2.2.1. Events and activities.....	6
2.2.2. Awards, grants and bursaries.....	7
2.2.3. Student Sections	8
2.2.4. IMarEST Echo.....	8
2.2.5. Further Knowledge and Outreach Materials	9
2.3. Upcoming year 2 contributions to voluntary commitment 1.....	10
3. Commitment 2: Working to protect the environment from harmful organisms transferred through ballast water or on hulls	12
3.1. Deliverable target 1	12
3.2. Deliverable target 2	12
3.3. Deliverable target 3.....	13
3.3.1 Ship biofouling management: a best practice guide.....	13
3.3.2 Proposed amendments to the draft Guidance on System Design Limitations of ballast water management systems and their monitoring.....	13
3.3.3 Contingency measure guidance in ballast water management plans.....	14

Nomenclature

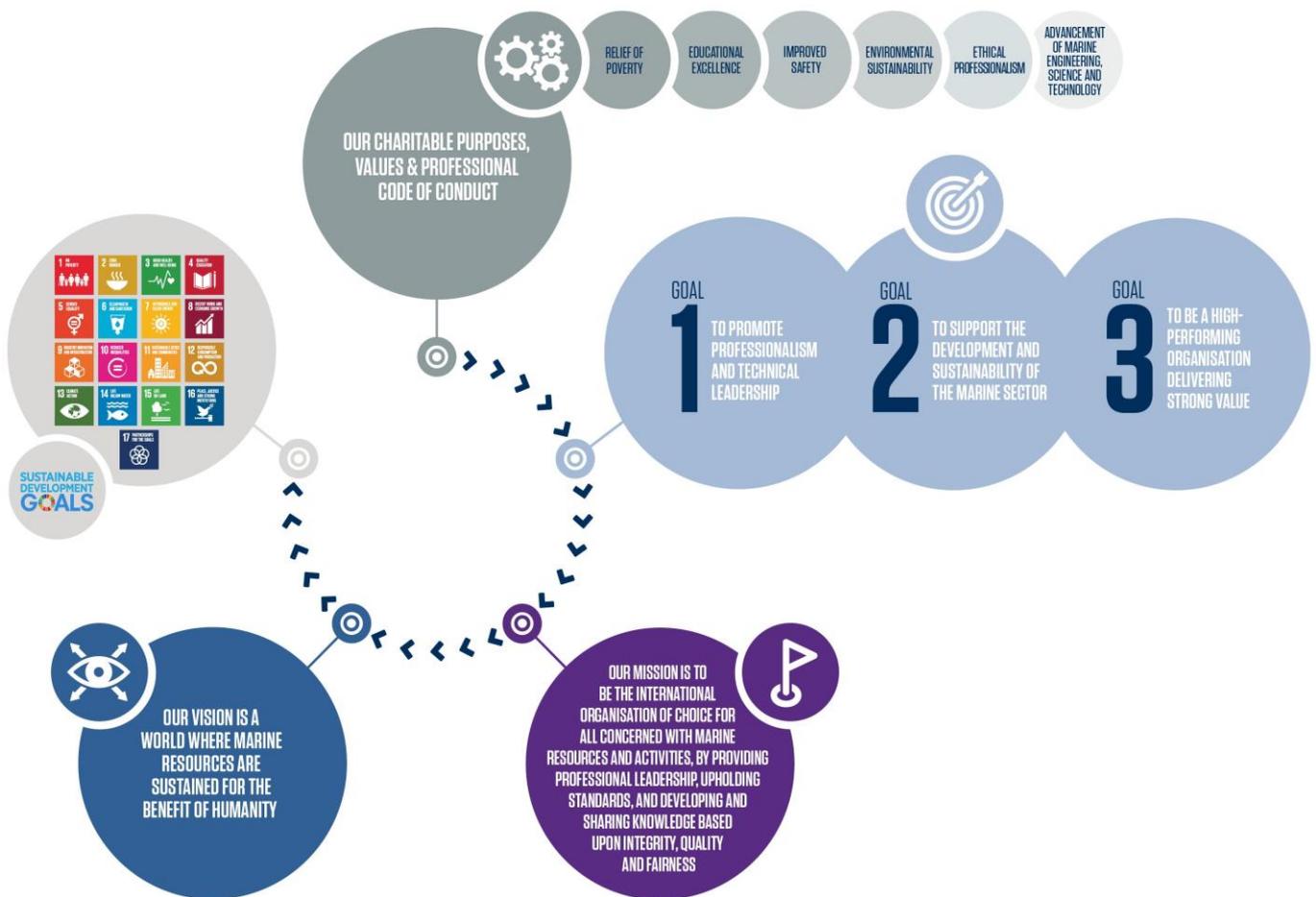
BWM	Ballast Water Management
BWMP	Ballast Water Management Plans
BWMS	Ballast Water Management Systems
BMEG	Biofouling Management Expert Group
BWEG	Ballast Water Expert Group
CPD	Continuing Professional Development
eISR	European International Submarine Races
FPSO	Floating Production Storage and Offloading
IMarEST	Institute of Marine Engineering, Science and Technology
IMEC	International Maritime Employers' Council
IMO	International Maritime Organization
IPD	Initial Professional Development
IPPIC	International Paint and Printing Ink Council
LDC	Less Developed Country
MEPC	Marine Environment Protection Committee
MLA	Marine Learning Alliance
NGO	Non-Governmental Organisation
NIS	Non-Indigenous Species
PEI	Professional Engineering Institution
PhD	Doctor of Philosophy
RP3	Raspberry Pi 3
SDG	Sustainable Development Goal
SDL	System Design Limitations
SIG	Special Interest Group
SNAME	Society of Naval Architects and Marine Engineers
SYF	Sea Your Future
TLB	Technical Leadership Board
UN	United Nations

1. Executive Summary

In September 2015, the United Nations (UN) established a set of goals intended to tackle an array of global problems by ending poverty, protecting the planet and ensuring prosperity for all, as part of its new sustainable development agenda. Each of the [17 'Sustainable Development Goals'](#) (SDGs) have specific targets that are to be achieved over the next 15 years.

In June 2017, the UN held the [Ocean Conference](#) – a high-level event aimed to support the implementation of SDG14 'life below water'. The conference marked a global breakthrough, with over 1,400 voluntary commitments pledged by governments, the UN system, civil society organisations, academia, the scientific community and the private sector. Each commitment focuses on one or several of the [SDG 14 targets](#).

The IMarEST is committed to the provision and implementation of these sustainable development goals as outlined in its strategic plan 2018 – 2022 (Fig. 1). The development, management and ongoing sustainability of the marine environment, alongside knowledge sharing and capacity building as a means by which to facilitate the prosperity of the marine environment, are held at the core of the IMarEST's mission and vision. As such, given the strong value it places on supporting the marine sector, the IMarEST made two voluntary commitments at the Ocean Conference to support the implementation of the SDG 14 targets.



Since making these commitments, the IMarEST has made significant progress towards achieving the promised deliverables. Outlined herein is the progress made between June 2017 to June 2018, following the Ocean Conference pledges.

Commitments made at the Ocean Conference 2017 towards SDG14

[Improving recruitment and retention of young people into the marine sector to ensure protection of the oceans for future generations #18457](#)

1

DELIVERABLE 1: To make IMarEST membership free to any student over the age of 18 enrolled in a recognised course at a recognised institution

DELIVERABLE 2: To provide student members with information and guidance on professional development

In order to ensure global blue growth is undertaken sustainably and safely there will be an ever-increasing need for all new entrants into the marine sector - be it engineers, scientists or technologists working in industries such shipping, offshore energy, fisheries or within research labs, academic institutions or in government offices - to have a broad multidisciplinary perspective. Furthermore, entrants must also be aware of ethics, socio-economics and environmental sustainability to ensure the protection of the ocean for future generations and to support the implementation of SDG 14.

The IMarEST seeks to improve worldwide recruitment and retention in the marine sector whilst improving professional standards. It does so by encouraging students on all marine-related academic courses to engage in continuing professional development throughout their lives. Both financial and developmental support will also be provided to students to help them in their studies.

[Working to protect the environment from harmful organisms transferred through ballast water or on hulls #18412](#)

2

DELIVERABLE 1: Publish a position paper on the environmental, economic and social impacts of aquatic invasive species associated with vessels hull fouling

DELIVERABLE 2: Conduct a study based on the existing regulations on in-water cleaning

DELIVERABLE 3: Produce a series of five guidance documents supporting the implementation of the Ballast Water Management convention and International Maritime Organization Biofouling Guidelines

The introduction of aquatic invasive species to new marine and freshwater environments through ship's ballast water and sediments, and through hull fouling, is considered to be one of the greatest threats to the world's freshwater, coastal and marine environments and to marine biodiversity.

The IMarEST, working through its member-led expert groups in Ballast Water and Biofouling Management and through its consultative status at the International Maritime Organization (IMO), aims to ensure shipping and other maritime industries can continue to underpin trade, safety and security, and economic development with minimal environmental impact.

2. Commitment 1: Improving recruitment and retention of young people into the marine sector

2.1. Deliverable target 1

To increase the worldwide recruitment of young people into the marine sector, the IMarEST has fulfilled deliverable target one by continuing to offer free membership to all students, apprentices and cadets over the age of 18, who are enrolled in a recognised course at a recognised institution.

Since waiving student membership fees, the IMarEST has increased its young member* population by 42%, recruiting 2,960 marine students to its membership base. This has increased the total young membership base at the IMarEST to nearly 10,000 students, apprentices and cadets that are receiving membership benefits to support them through the early stages in their careers.

To bolster its commitment to increasing young member recruitment, the IMarEST also has a dedicated accreditation scheme, to ensure that the next generation of marine professionals is taught to the highest standards. Since June 2017, 16 university marine courses have been accredited for their excellence in teaching standards. This has increased the total number of higher education courses accredited by the IMarEST to 114.

The IMarEST recognises that retention of young people in the industry is of paramount importance to the future development and management of the marine environment. As such, to complement its free student membership strategy, it has also launched the graduate pathway.

The graduate pathway offers graduating students a significantly reduced associate membership rate, which increases incrementally over the five years following graduation. With its international standing and the global nature of the marine industry, the IMarEST is eager to provide capacity building opportunities to young individuals who may not otherwise have access to learning resources. As such, it has included a focus on Less Developed Countries (LDC's), by offering an additional 50% discount** to graduate pathway membership fees, for those residing in LDC's.

**The IMarEST recognises that students can be of different ages. While the majority of its student members fall within the university/college age range of between 18-22, all individuals, of any age, enrolled in an academic course, apprenticeship or cadetship are offered free membership.*

***The IMarEST offers a reduced membership rate to all grades of membership, not just associate membership on the Graduate Pathway*

2.2. Deliverable target 2

2.2.1. Events and activities

The IMarEST, being a truly global organisation, has an established network of 49 member-led branches around the world, with staff offices in the UK and Singapore (Fig. 2). Working these branches, the IMarEST has organised or supported a multitude of professional development and careers events for its younger members. Each event and activity organised or supported over between June 2017 and June 2018 are outlined below.



Figure 2 - The IMarEST's global network of branches

Careers workshop at Oceanology International –

The IMarEST hosted a free to attend careers workshop for students and those seeking to embark on a career in the marine sector. The workshop was held at Oceanology International, ExCel, London and included sessions on the following subjects: an introduction to researching job vacancies and the subsequent job application, an introduction to basic job market statistics, guidance on what employers look for e.g. transferable skills, guidance on finding a career/organisation that suits career aspirations and advice on networking via social media.

Careers talk at the IMarEST Headquarters –

A day trip was organised for MEng Renewable Energy Engineering Students from the University of Exeter, who visited the London Headquarters in Westminster and were given a careers talks by members of the IMarEST Offshore Renewables Special Interest Group (SIG).

Philippines 'Engineer your career' –

The IMarEST is supporting a new campaign, '[Engineer Your Career](#)', launched by the international maritime employer's council (IMEC). Targeted towards high school students in the Philippines, the campaign aims to promote a positive image of marine engineering and highlights the benefits of choosing the vocation as a career path. As part of this campaign, the IMarEST is supporting students and cadets with their Initial Professional Development (IPD).

Student Poster Presentation Evening –

Hosted at the IMarEST Singapore joint branch, the event involved a technical talk on ‘maritime autonomous systems – workforce succession planning for the future’, which was followed by final year students presenting posters on their research designs for subsea flowlines, topside facilities as well as the FPSO. This was supplemented by a dinner event, to allow students an opportunity to network with experts in their given marine profession.

Design Challenge –

The IMarEST western joint branch in the UK hosted a design challenge where student teams were tasked with designing a method of rescuing a large number of people from the water and other vessels in a safe, quick and cost-effective manner. This challenge arose in response to the migrant crisis in the Mediterranean, where over 11,000 migrants have died trying to cross to Europe since 2015. The final challenge saw six student teams submitting designs and as part of the finals evening, the teams presented their designs to a panel of VIP judges, and other IMarEST branch members. This was followed by poster presentations and the team with the best solution won a grand prize of £1,000.

Water Project –

The IMarEST’s Houston branch hosted an event to encourage students to become involved with science and technology projects in the future. The branch coordinated a competition encouraging students to work in teams to design a ‘water-related’ use for the Raspberry Pi 3 (RP3) devices, in an environmental sense. Each team met bi-weekly, planned the project, and build a prototype followed by a working model. Each team was given an RP3 device and \$100 to spend on parts and components. The final saw five teams present their projects to judges and demonstrate how their device worked. Each student received a certificate of participation, alongside bronze, silver or gold medals and was also given a \$25 voucher to visit the Houston Museum of Natural Science.

HMS Summer Sultan Royal Navy Summer Show –

The summer event aimed to inspire children and students into the marine industry. The IMarEST supplied a water tank and remote-controlled submarines in the STEM tent.

2.2.2. Awards, grants and bursaries

The IMarEST offers a number of [awards, grants and bursaries](#), for which young marine members can apply for, to support them during the early stages of their careers. Since making its voluntary commitments on June 17 2017. 22 awards and 56 bursaries have been presented to a variety of individuals. The awards, grants and bursaries open to young members include:

David Henderson Inspiring Journeys Grant –

From diving in the Marshall Islands to exploring the Arctic, the annual David Henderson Inspiring Journey Grant aims to inspire public interest in the oceans and seas and to explore how we can ensure the human activity affecting them is conducted safely and sustainably.

John Blackburn Main Award –

The John Blackburn Main Memorial Fund helps support students at the University of Strathclyde to gain practical experience, lasting between 1 and 3 months, in a country different from their birth or normal citizenship.

Stanley Gray Fellowship –

To enable a significant piece of work to be undertaken in an approved marine engineering/science/technology subject to Doctorate (PhD) or post-Doctorate level.

[The IMarEST Whalefish Marine Conservation Course Bursary](#) –

The IMarEST provides 5 bursaries per year to fund places on the Whalefish Marine Conservation Course, held on the Isle of Cumbrae, over the summer. The bursary is targeted at IMarEST student members studying marine and/or environmental sciences.

[Student Bursaries](#) –

IMarEST bursaries are targeted at undergraduate and postgraduate students, cadets and apprentices studying or working in marine engineering, marine science and marine technology and related topics. The purpose of the bursaries is to encourage and support IMarEST Student members to work on technical research projects or community-based projects.

[Book Prizes](#) –

A book prize awarded for the highest achieving postgraduate student or cadet on any course or apprenticeship formally accredited by the IMarEST. The student should be in the final year of their course.

[Schools Poster Competition](#) –

Primary schools to design a poster to engage children in marine engineering.

2.2.3. Student Sections

The IMarEST recently launched 'student sections', sponsored groups of students who promote the marine sector within their university or college, and encourage IMarEST membership among their peers. These student groups are supported by their IMarEST Local Branch, with each branch having a student representative who is the liaison between the student section and the branch. These liaison officers also act as a mentor, providing guidance to students leading up to their graduation.

Following the success of the young member events outlined in section 2.2.1, it is hoped that sections will be instrumental in providing professional development and careers events, by hosting activities themselves in partnership with a local IMarEST branch, their university, college or local industry. The IMarEST is currently in talks with student groups from various leading academic institutions in the UK and the US to establish student sections for the forthcoming academic year, beginning in September 2018.

2.2.4. IMarEST Echo

To further the progress towards achieving deliverable 2, the IMarEST looks to provide additional professional development opportunities and guidance to its younger members, beyond the events outlined in section 2.2.1. Students are offered the opportunity to apply for interim registration, enabling them to begin working towards chartership in their chosen marine profession.

To facilitate progression towards Chartered status, and to strengthen their CV and career potential, graduating students are offered the use of '[IMarEST Echo](#)' – the IMarEST's Continuing Professional Development (CPD) monitoring tool. This allows any skills, knowledge and experience earned by graduates to be recorded, to provide evidence of progress towards full chartered status and boost their career opportunities. In addition to providing CPD recording, IMarEST Echo offers further learning and development resources on the platform. These include curricula on:

- Guidance and information on marine careers
- CV writing advice
- Interview skills
- Accredited IPD (Initial Professional Development) and graduate training courses
- Careers workshops
- Publishing opportunities in IMarEST publications (see section 2.2.5)

2.2.5. Further Knowledge and Outreach Materials

In addition to the specific platforms and strategies outlined above, the IMarEST offers a wealth of other materials to its young members, to aid them in professional development and learning opportunities:

Website

The IMarEST has a dedicated online resource centre directed at students and younger members, to support them through different stages of their academic and professional careers. This includes access to all, but not limited to, the specific digital platforms and information outlined in sections 1.2.1. – 1.2.4. The full array of website features available to young members includes:

- [Virtual Library](#): The IMarEST's online publication portal
- [IMarEST TV](#): A host of video content ranging from technical lectures to tutorial videos
- [IMarEST Echo](#): Available to graduating students
- [Careers guidance](#): Access to CV and interview support, advice on entering a specific marine industry, careers booklets and guide and a jobs board
- Online learning resources: online publication access, distance e-learning opportunities through the IMarEST's learning arm [MLA College](#)
- [Awards, grants and bursaries](#) application forms
- Interim registration application forms for early career engineers, scientists and technologists

Social media

The IMarEST has a dedicated social media presence across six different platforms: [Facebook](#), [Twitter](#), [Instagram](#), [LinkedIn](#), [YouTube](#) and [Google+](#). In particular, the IMarEST has two established Facebook outlets, a primary page and a group that is specifically targeted at young member engagement. Across all platforms, it regularly posts photos from student engagement events, advertising of technical lectures and other events that may be of relevance or interest to young members, as well as general information on the marine industry. These social media platforms reach a community of 40,000 worldwide followers.

Peer-reviewed publications

The IMarEST offers the opportunity for students to publish their undergraduate or post-graduate dissertation or thesis in its own editorial reviewed journal 'Marine Technical Notes'. This gives students the opportunity to share their research methodology and results with the marine community to get feedback, or simply to get some early publishing experience. This enables young members to develop their skills in writing academic papers.

Other publications and translations

- Marine careers guide: The IMarEST has produced a 38-page marine careers guide, providing guidance skill and qualification requirements, job opportunities within each sector, salary information, case study interviews of employees within each sector and further information on where to find out more
- Careers in oceanography guidance booklet: Small booklet detailed key skills and experience required for specific roles in oceanography
- MLA college literature: Literature detailing how young members can take a distance e-learning course in a range of marine professions to further their career
- Free student membership flyers: Literature detailing membership benefits offered with the IMarEST's free student membership scheme
- Graduate pathway literature: Literature detailing the 'reduced rate fees' offered to graduate students and the guidance/resources offered with the graduate membership scheme

2.3. Upcoming year 2 contributions to voluntary commitment 1



Figure 3 - The Sea Your Future Mission

The IMarEST's Sea Your Future (SYF) initiative aims to inspire school-aged children, support students, trainees, cadets and apprentices, and develop those starting out in their careers. The broad way in which it aims to engage in each of these three categories can be seen in figure 3.

More specifically, over the next year the SYF initiative to recruit, engage and retain its younger members focuses around 5 core areas:

- Providing a structure to promote engagement with its young members, through the continued provision of free student membership, facilitating the ongoing establishment of financially supported student sections (section 2.2.3) and an invigorated awards programme (section 2.2.2)
- Develop and expand on the series of activities and events that support IPD of its younger members (section 2.2.1)
- Establish a series of activities that allow for networking between early career professionals
- Further develop and expand on the series of activities that improve membership engagement; including competitions, social events and merchandising
- Describe a support network for member volunteers, including defining the relationship with IMarEST Branches, the Board of Trustees, Council and the committees of Council

In line with this strategy, the SYF initiative has a number of planned events over the forthcoming 12 months that are aimed at its younger members to further contribute to the voluntary commitment:

NGO partnership scheme – Planned for 2019, the IMarEST will be launching the conservation NGO partnership programme. The partnership will be open to all non-governmental organisations operating in the marine conservation sector. NGO partnership with the IMarEST will provide access to free member benefits, knowledge-sharing, online promotion and free membership for all volunteers enrolled in a programme with a conservation NGO. This will help provide a significant wealth of learning resources to young people, to assist with recruitment and retention into the marine sector. It is hoped that, in addition to those who are involved in academia, that this will also help recruit young people into the marine sector that are not currently involved in the marine space.

Careers talks – The IMarEST will continue to aspire to provide a host of marine careers talks throughout the forthcoming year. As part of its technical content strategy plan, several SIGs are committed to furthering the continued young member engagement, to inspire and retain more young members into the marine industry.

European International Submarine Races (eISR) – The IMarEST's flagship 2-week event, provides students with an opportunity to showcase their knowledge, skills and talent. Teams of university students will race their very own designed, human-powered submarines against the clock around a demanding slalom course in a unique sporting and engineering challenge.

The basic rules of the sport are straightforward: teams must design, build and race flooded submarines piloted by a single scuba diver, who must be fully enclosed within the hull of the machine. In addition to the opportunity to showcase their skills, the event also provides students with the opportunity to meet with experts in their field at the masterclass events at the eISR open day. This biannual event is an excellent way of providing students with professional development and career opportunities to strengthen their C.V.s as well as providing an inspirational outlet for the marine sector.

Mentoring scheme – In the forthcoming year, a pilot mentoring scheme is planned, which will support members of the graduate pathway in the early stages of their career by connecting them with established marine professionals.

3. Commitment 2: Working to protect the environment from harmful organisms transferred through ballast water or on hulls

3.1. Deliverable target 1

To publish a position paper on the environmental, economic and social impacts from introductions of aquatic invasive species particularly associated with vessels hull fouling

Biofouling is often widely acknowledged as the vector responsible for the most foreign marine species introductions. However, the majority of these species appear to have little detrimental impact in the receiving environment, with most only colonising disturbed and/or artificially created environments, and not invading healthy native ecosystems. Many publications on invasive and non-indigenous marine species list the *possible* impacts on their introductions citing an advocated precautionary approach due to the potential threat to human, animal and plant life, economic and cultural activities and the aquatic environment. Additionally, regulatory efforts focussed is on the prevention of adverse impacts from the use of anti-fouling systems and the biocides they may contain, rather than the prevention of the transfer of invasive aquatic species through biofouling.

There are a number of localised reviews underway to determine the significance of invasive marine species, however, a global review does not exist. The IMarEST's Biofouling Management Expert Group (BMEG) has scope to address this, given its global reach and will work to construct a position paper to identify and assess evidence on the environmental, economic and social impacts of marine species that have been introduced to new countries or regions, on (most probably) ship hulls.

The expert group will work as a consortium, with the aid of IMarEST members, to identify alien marine biofouling species that are understood to have had significant impacts, which will then be used to draw up a comprehensive list of species to review. Once this list has been drawn, the BMEG will then seek and collate published evidence of environmental, economic and social impacts from introductions of marine Non-Indigenous Species (NIS) in the published literature. Once this has been curated, they will attempt to document evidence where impacts of NIS (positive or negative) are known but remain unpublished. Where possible this will include an identification of the vector of introduction (ballast water, biofouling or other) and will consider species-specific management measures for high impact NIS and scope for developing more general management strategies and priorities based on vector association and characteristics of these species.

3.2. Deliverable target 2

To conduct a study based on the existing regulations on in-water cleaning

For a ship operator, the guidance, rules and regulations governing biofouling management are globally inconsistent and un-clear. In New Zealand, Australia and California regulations have been introduced, or are proposed, that address ship biofouling and, similarly, Australia and New Zealand have restrictions on in-water cleaning. The likelihood of effective and efficient biofouling management occurring would be increased if a global index of current and pending regulation were produced. This resource would enable operators to quickly identify which rules and regulations are relevant to their operations and allow them to budget effectively and plan for biofouling management. This resource, if appropriately distributed, would also remove the excuse of not performing responsible biofouling management due to a lack of information.

The IMarEST, through its BMEG, will create an open source global index of current and pending regulations governing in-water hull cleaning together with contact details for each port or anchorage. This global index will assist current understanding, given that the port-specific rules and regulations governing

in-water hull cleaning are variable, fragmented and subject to change, which leads to reduced uptake of responsible in-water hull cleaning.

The IMarEST's BMEG will work with industry to create a BMEG global index that would enable ship operators to quickly identify which rules and regulations are relevant to their operations and allow them to budget effectively and plan for biofouling management and cleaning service operations. Currently, the study is in its early stages, collating current and pending guidance, rules and regulations and publish via the IMarEST, a concise and easy to access booklet (and online version) allowing operators to quickly find which rules and regulations apply to a particular route or port.

3.3. Deliverable target 3

Produce a series of five guidance documents supporting the implementation of the Ballast Water Management Convention and International Maritime Organization Biofouling Guidelines

3.3.1 Ship biofouling management: a best practice guide

Effective biofouling management on a vessel requires a suite of technologies and practices suited to the design and operational characteristics of a given vessel. The relative efficacy and optimal application of these are often unclear and commercially driven. Maximum environmental and cost-benefit would be achieved if operators had a clear best practice guide to enable them to quickly select the most effective and appropriate methods to both optimise vessel performance and comply with any relevant regulations. Such a guide would also aid in the preparation of Biofouling Management Plans consistent with the IMO Guidelines.

The IMarEST, through its BMEG, will collate relevant practical and scientific experience and biofouling management within the group and beyond, for example by liaison with the International Paint and Printing Ink Council (IPPIC). This information will be used to produce a concise and practical 'best practice' document, recommending the optimum methods and techniques for dealing with a number of common fouling management scenarios including in-water cleaning.

Whilst IMO guidance details the information which is important to be recorded regarding fouling control, no formal template was provided in which to capture that information. In July 2017 the IMarEST, alongside the IPPIC produced a template to capture all relevant information prescribed in the IMO guidance with particular attention to coatings. The template can be [found on the IMarEST website](#).

3.3.2 Proposed amendments to the draft Guidance on System Design Limitations of ballast water management systems and their monitoring

The IMarEST submitted a document, produced by its Ballast Water Expert Group (BWEG) to the IMO outlining proposed amendments to the draft Guidance on System Design Limitations (SDL) of ballast water management systems (BWMS) and their monitoring. The paper specifically offered guidance on the inclusion of SDL on Type Approval Certificates of Ballast Water Management Systems (BWMS). It recommended potential SDL for various BWMS technology and self-monitoring parameters that may be associated with those SDL. The paper was taken forward for consideration at the Marine Environment Protection Committee, at its seventy-third session (MEPC 73) and the majority of proposed changes were accepted.

IMarEST members can view this submission in the [IMarEST's Digital Archive](#) or by contacting technical@imarest.org.

3.3.3 Contingency measure guidance in ballast water management plans

The IMarEST submitted a document produced by its BWEG to the IMO outlining proposed elements of the Guidance on Contingency Measures under the BWM Convention that should be included in ballast water management plans (BWMP). The document identified four areas related to contingency measures that should be considered for inclusion. These primarily related to corrective actions that could eliminate the need for, or improve the efficiency of, contingency measures. The paper was introduced and discussed by the Ballast Water Working Group at the Marine Environment Protection Committee, at its seventy-third session (MEPC 73) and it was agreed to have contingency measures added to the G4 guidelines.

IMarEST members can view this submission in the [IMarEST's Digital Archive](#) or by contacting technical@imarest.org.