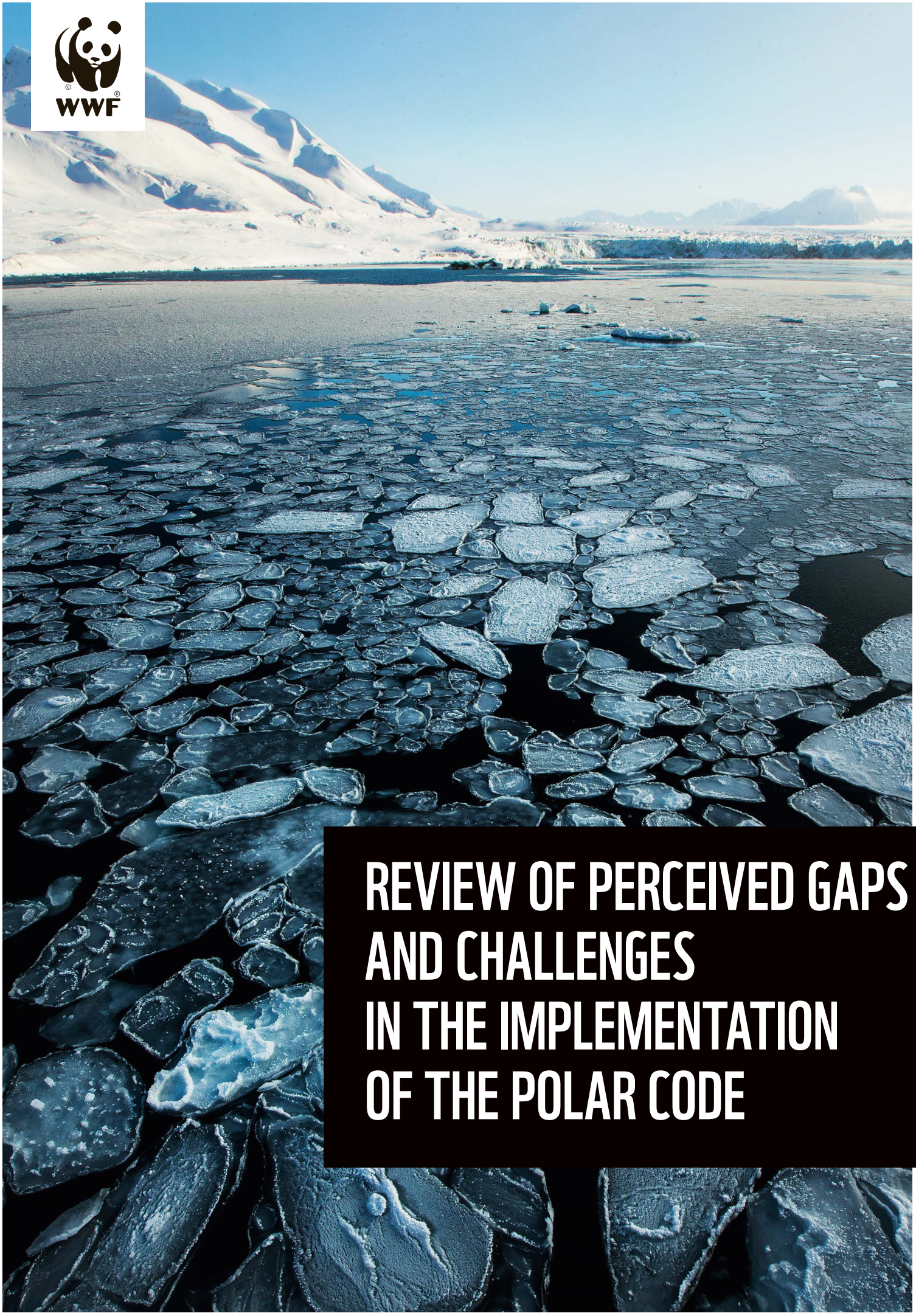
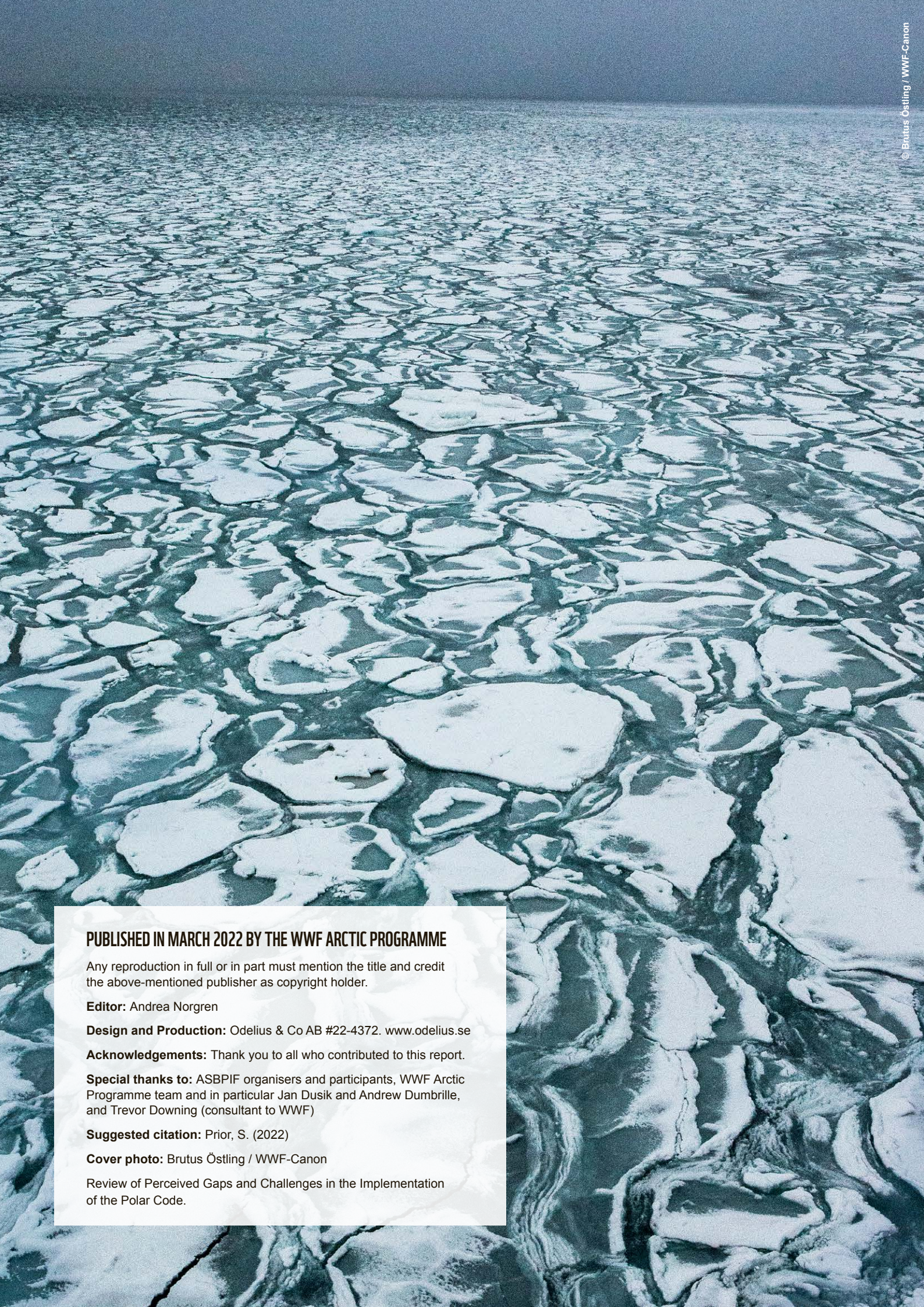


REVIEW OF PERCEIVED GAPS AND CHALLENGES IN THE IMPLEMENTATION OF THE POLAR CODE



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Review of Perceived Gaps and Challenges in the Implementation of the Polar Code.

For WWF's Arctic Programme

Dr Sian Prior

March 2022

SUMMARY

A study of commentary on the implementation of the Polar Code has been undertaken in order to make substantive recommendations with respect to the implementation and potential review of the Polar Code.

The study involved reviewing:

- papers submitted to the IMO's subcommittee III 7, resulting from a study commissioned by WWF on the implementation of the Polar Code,
- an investigation into the grounding of the passenger vessel Akademik Ioffe by the Transportation Safety Board of Canada,
- information presented at the Arctic Council's Best Practice Information Forum meetings on the implementation of the Polar Code,
- papers prepared by environmental non-governmental organisations during the development of the Polar Code and submitted to the IMO and to Antarctic Treaty Consultative Meetings, and
- feedback from communication with ASBPIF participants.

Many issues have been identified for which the report also indicates possible action and routes for action. A summary of the issues and concerns identified is presented in Tables 1 (challenges) and 2 (gaps). Note that the issues included in tables 1 and 2 may not be exhaustive.

In August 2018, the passenger vessel Akademik Ioffe ran aground on an uncharted shoal 78 nautical miles north-west of Kugaaruk, Nunavut.

TABLE 1: SUMMARY CHALLENGES IN IMPLEMENTATION OF THE POLAR CODE

A. CHALLENGES IN GOVERNANCE AND REGULATION
Compliance with the Polar Ship Certificate
Possible confusion in the role of recognised organisations versus flag states
Difficulties in conducting operational assessments and in establishing operating limits due to many variables
Provision of a Polar Water Operational Manual, including the role of the operational assessment in the context of the PWOM (it is not captured in the PWOM)
Challenges in interpreting the Code's goal-based requirements
Lack of experience and information (data) in using POLARIS / validation the efficacy of the POLARIS* methodology for determining a ship's operation capabilities and limitation in ice / identification of appropriate sea ice charts
Relationship between categories and ice class not clear / Category C vessels operate in ice but with no or little ice strengthening
B. OPERATIONAL AND KNOWLEDGE CHALLENGES
Ice accretion, removing ice accretion and damage / stability issues
Difficulties in obtaining mean daily low temperature data when some areas not covered by metrological data and the need for ship observations (ice properties and weather) to be made mandatory
Independent communication systems and data accessibility should be harmonised, and guidance on communications at high latitudes (underway)
Further guidance on life-saving appliances and arrangements for ships in polar waters, including provision of adequate resources and taking into account the need to remain on board for potentially five days in the event of a rescue situation (toilet, ventilation, insufficient room, no special means for boarding, communications, food and water)
Lack of data for voyage planning (particularly hydrographic data, sea ice data, marine mammal populations and migration routes, and marine protected areas)
Manning and training of masters and crew, including lack of crew experience in polar regions, and the need for simpler publications aimed at engineers and ratings (not just deck officers)
Introduction of competency standards for ice navigation / provision of ice navigation courses
Geographic limitation of the area of the Polar Code – possibility of extension to include other areas of high traffic density and subject to ice conditions

*N.B. POLARIS is considered interim guidance and was due to be reviewed in 2021.

TABLE 2: SUMMARY OF GAPS IN IMPLEMENTATION OF THE POLAR CODE (Note: this list is not exhaustive)

A. GAPS IDENTIFIED DURING DEVELOPMENT OF THE POLAR CODE
■ Non-SOLAS* vessels including fishing vessels, pleasure yachts not engaged in trade, small cargo vessels (300–500 GT) N.B. Non-SOLAS vessels have subsequently been addressed to some extent with Guidelines for fishing vessels 24m and over in length and for pleasure yachts over 300 GT adopted in 2021.
B. GAPS IN ENVIRONMENTAL PROTECTION
■ Air pollution including carbon dioxide (CO2), particulate matter (PM) and black carbon (BC), sulphur dioxide (SOx), nitrogen oxides (NOx)
■ Loss of packaged dangerous goods
■ Grey water discharges
■ Raw, untreated sewage discharges
■ Underwater noise
■ Introduced species – via ballast water and via biofouling
■ Use and carriage of HFO in the Arctic**
■ Spill preparedness and response in polar waters
■ Routeing measures

*N.B. Non-SOLAS vessels have subsequently been addressed to some extent with Guidelines for fishing vessels 24m and over in length and for pleasure yachts over 300 GT adopted in 2021.

**N.B. An Arctic HFO use and carriage ban was adopted in 2021.

ACRONYMS

ASBPIF	Arctic Shipping Best Practice Information Forum
ASOC	Antarctic & Southern Ocean Coalition
CO2	carbon dioxide
HFO	heavy fuel oil
IACS	International Association of Classification Societies
ICS	International Chamber of Shipping
III	Sub-Committee on the Implementation of IMO Instruments
IMO	International Maritime Organization
MARPOL Convention	International Convention for the Prevention of Pollution from Ships
MEPC	Marine Environment Protection Committee
MOSPA	Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic
MOU	Memorandum of understanding
MSC	Maritime Safety Committee
NCSR	Sub-Committee on Navigation, Communications and Search and Rescue
NOx	nitrogen oxides
OCIMF	Oil Companies International Marine Forum
PAME WG	Protection of the Arctic Marine Environment Working Group
PWOM	Polar water operational manual
RO	Recognised organisation
SDC	Sub-Committee on Ship Design and Construction
SEG	Shipping Expert Group
SOLAS Convention	International Convention on the Safety of Life At Sea
SOx	sulphur dioxide
SSE	Sub-Committee on Ship Systems and Equipment
STCW Convention	Standards of Training, Certification and Watchkeeping Convention
WWF	World Wide Fund for Nature / World Wildlife Fund

A. INTRODUCING THE POLAR CODE

The International Code for Ships Operating in Polar Waters (Polar Code) came into effect in January 2017. It supersedes International Maritime Organization (IMO) Guidelines developed initially for the Arctic but extended to cover both polar regions in 2008.

The Polar Code addresses both safety measures for ships operating in polar regions (Part I) and environmental protection measures (Part II). Each Part of the Code is divided into Part A for mandatory measures and Part B for recommendatory measures or additional guidance.

TABLE 3: CHAPTERS OF PART I A AND PART II A OF THE POLAR CODE

POLAR CODE PART IA	POLAR CODE PART IIA
INTRODUCTION	
Chapter 1: General	Chapter 1: Prevention of Pollution by Oil
Chapter 2: Polar Water Operational Manual (PWOM)	Chapter 2: Control of Pollution by Noxious Liquid Substances in Bulk
Chapter 3: Ship Structure	Chapter 3: Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form
Chapter 4: Subdivision and Stability	Chapter 4: Prevention of Pollution by Sewage
Chapter 5: Watertight and Weathertight Integrity	Chapter 5: Prevention of Pollution by Garbage
Chapter 6: Machinery Installations	
Chapter 7: Fire Safety / Protection	
Chapter 8: Life-Saving Appliances and Arrangements	
Chapter 9: Safety of Navigation	
Chapter 10: Communication	
Chapter 11: Voyage Planning	
Chapter 12: Manning and Training	

The provisions of the Code are made mandatory by applying them through existing IMO regulation – the International Convention on the Safety of Life At Sea (SOLAS Convention), the Standards of Training, Certification and Watchkeeping (STCW) Convention, and the International Convention for the Prevention of Pollution from Ships (MARPOL Convention).

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The safety provisions of Part I are applicable to vessels to which the SOLAS Convention applies – all cargo vessels including tankers, container ships, general cargo, bulk carriers, ro-ro vessels, and to all passenger vessels. Part II applies to all vessels (or as stipulated in each of the MARPOL Convention's Annexes) and thus covers both SOLAS vessels as described above, and non-SOLAS vessels including fishing vessels, pleasure yachts, and small cargo vessels.

The Polar Code was adopted via Resolution MSC.385(94), while Resolution MSC.386(94) amends the SOLAS Convention making the safety provisions mandatory. Circular Letter No. 3495 lays out the amendments to the MARPOL Convention, and Resolution MEPC.264(68) adopted on 15 May 2015 adopts the environmental protection measures.

There is no requirement for a formal review of the Polar Code, however, MSC.1 / Circular 1519 includes the accompanying Guidance on methodologies for assessing operational capabilities and limitations in ice (so called POLARIS Guidance). It was clearly the intent in the circulated letter for this Guidance to be reviewed in 2021, four years after the entry into force of the Polar Code. Paragraph 4 states: "This guidance has been issued as 'interim guidance" to gain experience in its use. It should be reviewed four years after the entry into force of the Polar Code to make any necessary amendments based on experience gained."

B. REVIEW OF REPORTS AND PRESENTATIONS

Considering the scope and implementation of the Polar Code

Although the adoption of the first mandatory Polar Code was very welcome, there were immediate concerns that some provisions would not lead to the level of protection required for polar waters and that the Polar Code could lead to different interpretations of ice strengthening standards for Category C vessels. Throughout the development of the Code there was discussion of the three categories of ships introduced by the Code and which categories would be able to operate in different levels of ice cover[1]. Category A and B ships need to be ice-strengthened in accordance with the ice conditions in which they operate and are required to meet damage stability provisions. Category C ships are not required to meet these provisions even though some are ice strengthened and able to operate in first year ice, and even those that are not ice-strengthened are able to operate in some level of ice cover. The Antarctic and Southern Ocean Coalition (ASOC), with others, for example, argued for a reversal of the burden of proof with all vessels required to meet the damage stability provisions unless exempt due to the intended area of operation[2].

In addition, some areas were quickly recognised as being particularly challenging in terms of implementation. The voyage planning requirements included provisions requiring consideration of marine mammal populations and migratory routes that might be encountered on a voyage and the identification of marine protected areas in the vicinity of a route. These two requirements are new to voyage planning and there is little experience amongst the shipping community of systematically considering these elements as a part of voyage plans compounded by the fact that relevant data is dispersed and not all collated in one location[3].

In nearly five years since the Polar Code came into effect, several studies, presentations and reports considering the implementation of the Polar Code have been made publicly available. This report draws on a review of a study for WWF UK addressing the implementation of the Polar Code, papers submitted to international frameworks such as the Antarctic Treaty System as well as the International Maritime Organization (IMO) and other publicly available material, particularly presentations given to the Arctic Council's Protection of the Arctic Marine Environment (PAME) Working Group's Arctic Shipping Best Practice Information Forum (ASBPIF) and available on the Forum's website.

B.1 Study on the implementation of the Polar Code (III 7/14/2 and III 7/14/2/Add.1)

In III 7/14/2 and 7/14/2/Add.14 submitted to the Sub-Committee on Implementation of IMO Instruments (III) the areas identified as major challenges focused on compliance including polar ship certification and the provision of a Polar Water Operational Manual as required by Part I A Chapter 2 of the Code.

III 7/14/2 and 7/14/2/Add.1 identify a number of concerns through survey and outreach to responders. Issues include the provision of polar ship certificates which is generally left to an administration's "recognised organisation" (RO). The ROs however don't know which ships require a polar ship certificate, so the provision of a polar ship certificate is

1 Category A: ships designed for operation in polar waters at least in medium first-year ice, which may include old ice inclusions; Category B: ships not included in Category A, designed for operation in polar waters in at least thin first-year ice, which may include old ice inclusions; and Category C: ships designed to operate in open water or in ice conditions less severe than those included in Categories A and B.

2 MSC 94/3/17 Category C ships in the draft Polar Code. Submitted by Friends of the Earth International (FOEI), Pacific Environment and the Clean Shipping Coalition (CSC). 26 September 2014.

3 0915 4 June-Dan Hubbell-PCBPF Presentation (pame.is)

4 III 7/14/2 Implementation of the Polar Code – Results of a survey by the WWF-UK. Submitted by WWF, 21 May 2020. III 7/14/2/Add.1 Implementation of the Polar Code. Submitted by WWF, 29 April 2021.

reliant on the shipowner seeking it. This could be a problem since tracking of vessels and compliance is the responsibility of the flag state and not the RO, and there is no tracking by ROs of vessels which are Polar Code certified, or indeed of vessels which are not certified. This could lead to insurance problems if ships operate in polar waters without a polar ship certificate. In consultation one RO argued that this is not considered to be a problem however, since shipowners must comply with regulations and certificates and that for any responsible owners there will be a good follow-up system in place, plus complying with all regulations is a prerequisite for valid insurance. It was also argued that in their experience the authorization of Polar shipping is working fine and that there is good cooperation with flags in ensuring aligned interpretations.

Another challenge identified is that the development of polar water operational manuals (PWOMs) can be outsourced to consultants and this is resulting in PWOMs being generic and not ship or operation specific, though it was also argued during consultation that owners' lack of experience should lead to experts being contracted to contribute to the development of PWOMs.

In addition, challenges have been experienced in developing PWOMs including difficulties in:

- obtaining mean daily low temperature data as some areas are not covered by metrological data,
- establishing and providing adequate resources – communications, food, water - for a full ship's complement for the anticipated maximum rescue time (5 days) due to the remoteness and few rescue assets,
- difficulties in establishing operating limits due to many variables.

In discussion, III 7/14/2 proposes that elements of a State's implementation of the Polar Code should be included in flag state audits, and that the IMO Secretariat should be responsible for proposing updates to the RO Code, in line with feedback on the degree of Flag States' oversight of ROs.

III 7/14/2/Add.1 refers to a Paris Memorandum of Understanding (MoU) polar inspection campaign due to commence in 2022. Between the beginning of 2019 and the time of publishing this paper (April 2021), eight inspections and deficiencies had been recorded by three port state control regimes – the Black Sea MOU, the Tokyo MOU and the Vina del Mar Agreement. These all appear to relate to issuance of certificates and documentation.

B.2 Grounding of passenger vessel Akademik Ioffe in Nunavut, August 2018

In August 2018, the passenger vessel *Akademik Ioffe* ran aground on an uncharted shoal 78 nautical miles north-west of Kugaaruk, Nunavut. Although the number of such Arctic groundings in the past 15 years is low – three passenger vessels and one chartered yacht – it is in fact high in proportion to the number of passenger voyages during this period. It is also necessary to be conscious that any accident in polar region, especially if any of these accidents involves an oil fuel spill, may have catastrophic long-lasting implications for the Arctic marine environment. Voyage planning or execution of voyage plans were found to be significant contributing factors in three of the cases[5].

In response to the *Akademik Ioffe* accident, the Transportation Safety Board of Canada recommended that the Department of Transport in collaboration with the Department of Fisheries and Oceans should develop and implement mandatory risk mitigation measures for all passenger vessels operating in Canadian Arctic coastal waters.

Key findings of the investigation were that the area had not been surveyed to modern or adequate hydrographic standards and the Master has relied on a Canadian chart that contained incomplete bathymetric data. In addition, the echosounders were not being closely monitored and the echo sounders low water depth alarms were turned off. In addition, none of the crew had sailed in the region beforehand.

Other investigation findings included:

- there were not enough life-saving appliances available on the "rescue" vessel for the combined complement of both vessels,
- the four certified bridge watch officers had completed and signed a checklist for bridge equipment which included use of echo-sounders but did not include electronic chart display information systems,
- the Arctic Pollution Prevention certificate referred to publications which were not on board,
- the minimum and maximum draughts in the Arctic Pollution Prevention certificate differed to those in the Polar Ship Certificate.

5 Safety communications related to TSB investigation M18C0225 – August 2018 grounding of passenger vessel Akademik Ioffe in Nunavut - Backgrounder - Transportation Safety Board of Canada (bst-tsb.gc.ca)

The report also notes that the first port state control inspection of the ship had been conducted a little over month ahead of the accident but none of the deficiencies were noted at that time, also forward-looking sonar systems are not mandatory for vessels operating in polar waters.

In considering additional mitigation strategies to address the risks associated with itineraries and potential weaknesses in the voyage, the following measures were identified:

- more detailed inspections of domestic and foreign flagged passenger vessels to confirm adequate navigational practices, procedures and equipment,
- prohibiting passenger vessels from waters not yet adequately surveyed,
- mandatory carriage of additional navigation aids such as forward-looking sonar (and crew qualified to operate and maintain them),
- a requirement to use spotting craft to survey the waters ahead,
- mandatory use of supernumercy navigational experts with local knowledge,
- a requirement for operators to schedule itineraries so that there is always another passenger vessel in proximity to aid in case of an emergency,
- sharing best practices and navigational information about past, current and proposed itineraries.

B.3 Presentations to the Arctic Shipping Best Practices Information Forum

PAME's Arctic Shipping Best Practice Information Forum (ASBPIF) was established to support effective implementation of and compliance with the Polar Code with a wide range of stakeholders. It includes a web-portal containing information relevant to the implementation of the Polar Code, and annual Forum meetings for exchange of information and best practices on issues of relevance to the implementation of the Polar Code.

Between 2017 and 2021, the Forum held five annual meetings – three were held in-person and the two latest meetings were held virtually due to the Covid-19 pandemic. Each meeting discussed matters of relevance to the implementation of the Polar Code and identified challenges in the Code's implementation.

The first meeting in 2017[6], soon after the Polar Code took effect, identified a small number of challenges including concerns over delays to surveys which would result in some vessels not being surveyed till 2020, and noted that in Denmark new pilotage and navigation rules and training had been introduced that go beyond the Polar Code in an attempt to preserve developed experience and knowledge amongst crews and navigators.

By the time of the 2nd Forum meeting[7], knowledge and experience was developing and new challenges were exposed. The requirement for a Polar Ship Certificate, the Polar Waters Operational Manual (PWOM) and operational assessments were identified as key components of the Polar Code that would benefit from authoritative and reliable information. The value of "unified interpretations" of the Code was emphasised.

Challenges encountered thus far included:

- how to conduct operational assessments
- how to model a PWOM
- how to set requirements that meet the minimum five day rescue time provision (survivability).

A number of knowledge gaps were identified including the need for better information of sea ice break-up / freeze-up patterns and how to accurately determine ice thickness. Identifying the right information and disseminating it to those that need it were also highlighted as challenges. A wide range of further issues could be identified from presentations given during the 2nd Forum as follows.

From Lloyd's Register, on the basis of seven polar ship certificates issued[8], the following issues were raised:

- the output of the operational assessment is not captured in the PWOM
- the need for a standard template for a PWOM, and
- interpreting the Code's goal-based requirements.

6 ASBPIF_Meeting_Summary_5-6_June_2017_-_Final.pdf (pame.is)

7 ASBPIF_-_2nd_Meeting_Summary_12_July.pdf (pame.is)

8 Lloyds Register (pame.is)

From a presentation by the Russian Federation, on the basis of 662 permits in 2017 to use the Northern Sea Route and 49 deficiencies amongst Russian flagged vessels including one detention[9], further issues were identified:

- life-saving appliances – do not take into account the need to remain on board for 5 days (no toilet, no ventilation, insufficient room, no special means for boarding)
- need for simpler publications aimed at engineers and ratings (not just deck officers)
- guidelines are needed for survival and first aid, and not just navigation and safe working practices on board
- ice navigation courses advisory, and
- check lists.

The World Meteorological Organisation's presentation also identified 10 concerns:

- should the Polar Code introduce competency standards for ice navigation
- the area of the Polar Code is geographically limited – it could be extended to include other areas of high traffic density and subject to ice conditions
- independent communication systems and data accessibility should be harmonised
- ship observations (cryosphere and weather) should be made mandatory.

DNV-GL, based on 60 vessels approved or in the approval loop, prepared a comprehensive assessment of "experience" including a Polar Code chapter by chapter breakdown identifying issues such as the relationship between the operational assessment and the PWOM not being understood, concerns around the relationship between the A, B, and C category ships and ice class, and the definition of up-to-date information including ice information (see Box 1)[11].

BOX 1: DNV-GL's issues arising from experience of implementation of the Polar Code

Chapter 2: Polar Water Operation Manual

- difference of interpretations in chapter 2 and appendix 2
- limited understanding of the main goal of the manual
- need for a template for the table of contents
- the connection between the operational assessment and the PWOM was not understood.

Chapter 3: Ship Structure

- relationship between Categories and Ice Class
- actual ice limit for Cat C is maximum thin first year ice (0.3m)
- category refers to ice class but not same definition of ice conditions (as WMO)

Chapter 4: Stability and Subdivision

- confusion if damaged stability (Cat A and B) requirements to be fulfilled with ice accretion.

Chapter 8: Life Saving Appliances and Arrangements

- maybe reduce the 5 days' requirement to equipment should be possible based on actual operation e.g. for ships that have limited operations
- gap between actual requirements to equipment to ensure survival and what will be required by flags
- content and quality of personal survival kit and group survival kit
- thermal protection
- thermal protective aid and survival suits.

Chapter 9: Safety of Navigation

- definition of up-to-date information including ice information.

Chapter 10: Communication

- battery capacity / operational procedure

Chapter 12: Manning and Training Familiarity

- how to fulfil training requirements
- implementation timeline of training requirements and STWC.

9 Title Layout (pame.is)

10 PAME-Shipping-BP2-WMO-Requirements-Polar-Code-ECharpentier-v2

11 Morten DNV GL Polar Code PAME 14may18

The 3rd meeting of the Forum[12] included sessions focused on implementation challenges highlighting in particular the need for more consideration of and guidance on:

- PWOMs (note – as being developed by ICS and OCIMF),
- validation of the efficacy of the POLARIS methodology for determining a ship's operation capabilities and limitation in ice,
- on communications at high latitudes, and life-saving appliances and arrangements for ships in polar waters,
- crewing and training, and
- voyage planning.

A presentation on Voyage Planning from the Environmental Investigation Agency and ASOC[13], highlighted the need for information on marine mammal populations including seasonal migration areas and on marine protected areas to meet the voyage planning requirements of the Code.

Presentations at both the 3rd and 4th ASBPIF[14,15], in 2019 and 2020, reiterated many of the issues previously identified, and during a presentation by Aker Arctic and the American Bureau of Shipping the importance of the POLARIS guidance was identified. The presentation also noted that it is considered interim guidance and was due to be reviewed in 2021. However, data would be needed if it is to be updated and currently there is no mechanism for collecting and collating the data. The Polar Ice project run by NORSE Norwegian Research Centre also identified the POLARIS guidance as needing strengthening and enhanced implementation[16].

During the 5th ASBPIF, a presentation by Aker Arctic and ABS[17], addressed the next steps for the POLARIS guidance and argued that data needed to be gathered, evaluated and the conclusions made available to understand the effectiveness of the Guidance as an operational tool and to identify any needs for refinement. A further concern was raised that the guidance is being used by yachts, but that it hadn't been designed for yachts. In light of the need to review progress with the use of the POLARIS guidance, the creation of a repository of open access data on ship operations in ice, the ice conditions they operate in and the reporting of POLARIS was proposed. During discussions at the meeting, a further proposal was made for an informal correspondence group to develop a proposal to be considered by the Arctic Council's PAME WG in 2022. The PAME WG meeting in March 2022 (PAME I/2022) was however put on pause, as was the case for the whole Arctic Council.

Information was also presented during the 5th ASBPIF on a PAME Interpretation of the Polar Code Project led by Norway. An expert group had identified and agreed to common interpretations of issues covering:

- the relationship between ship category, ice / polar class, ice conditions and POLARIS or similar tools as a decision support tool,
- ice conditions and category C ships
- the Polar Water Operation Manual
- removing ice accretion.

Ice accretion and damage stability calculations and manning and training were also considered.

Several presentations to the ASBPIF over the past five years have identified the need for additional guidance and in some cases unified interpretation of elements of the Polar Code.

B.4 Discussion at the IMO's sub-committee on ship design and construction

At the 8th session of the IMO's sub-committee on ship design and construction (SDC) in January 2022, delegates reviewed two submissions from the International Association of Classification Societies (IACS). The first sought views as to whether an operational assessment could be used to exempt or reduce the equipment requirements of the Polar Code[18]. While the second, in response to detailed questions relating to ice accretion and vessel stability, proposed a unified interpretation to clarify the requirements of the Polar Code for the ice accretion and its application for both the intact and damage stability calculations[19].

12 Forum_report_final_29_August.pdf (pame.is)

13 0915 4 June-Dan Hubbell-PCBPF Presentation (pame.is)

14 1115 3 June-Rob Hindley-POLARIS Update Rev 1 (pame.is)

15 Polaris: What's Next. Industry Perspective. Bond & Hindley. Best Practice Information Forum, 2020.

16 PowerPoint Presentation (pame.is)

17 PowerPoint Presentation (pame.is)

18 SDC 8/10 Clarification of paragraph 1.3.3 of part I-A of the Polar Code. Submitted by IACS. 14 September 2021.

19 SDC 8/10/1 Proposal for a Unified interpretation relating to the ice accretion and the intact and damage stability under the Polar Code. Submitted by IACS. 14 September 2021.

Following discussion at SDC-8, the sub-committee in addressing the "perceived lack of clarity" agreed that the operational assessment required by the Polar Code should not be used to exempt or reduce equipment requirements for polar ships[20]. Nor was the proposed unified interpretation addressing ice accretion and stability considerations accepted, but IACS and interested delegations were invited to submit a revised proposal, considering the discussion, to a future session[21].

B.5 Experience from the Southern Ocean

In a submission to the Antarctic Treaty Consultative Meeting (June 2021)[22], Spain summarised experience in certifying for polar operations a Category C research ship. The paper addresses a wide range of requirements under the Polar Code and highlighted some areas where challenges were experienced with respect to the implementation of the Code, including the use of goal-based standards, polar service temperature requirements, operational assessment and risk assessment models, and life-saving equipment and polar conditions. Establishing the Polar Service Temperature (PST) is identified as a challenge when data from direct temperature measurements is not available. The paper concludes that for some routes it is necessary to extrapolate data and suggests that it would be helpful if there was clarity on which extrapolation models are considered acceptable.

A further challenge highlighted focused on the consideration of hazards listed in the Polar Code. Currently there is only a risk assessment model for ice hazards and nothing available to address or consider the risk associated with operating in low temperatures and at high latitudes. Without a standard assessment model to assess these hazards, the paper concludes that it is difficult to undertake full risk assessments and points out that sailing in low air temperatures has implications for ship's structure.

20 SDC 8/18 paragraph 10.4. Report to the Maritime Safety Committee. 4 February 2022.

21 SDC 8/18 paragraph 10.7. Report to the Maritime Safety Committee. 4 February 2022.

22 ATCM XLIII IP 57 Implementation of the IMO Polar Code in Spain: Certification of the Research Vessel (RV) *Sarmiento de Gamboa Submitted 16/6/2020.*

C. PERCEIVED GAPS IN THE POLAR CODE

During the development of the Polar Code some issues were identified and proposed for inclusion but didn't make it into the final Code. In particular, the decision to implement the Code via existing IMO instruments, rather than negotiate a new Convention, resulted in environmental protection measures being restricted to those addressed through the MARPOL Convention. The chapters of Part II of the Polar Code mirror the first five annexes of the MARPOL Convention, with Chapter 3 included as a placeholder even though no specific measures are proposed for the polar regions. Despite the inclusion of Chapter 3 as a placeholder, there is no placeholder "Chapter 6" which would consider air emissions thus mirroring MARPOL's Annex VI on the prevention of air pollution.

Ideally it should also have been possible to introduce additional measures addressed by other IMO instruments such as the ballast water management or antifouling systems conventions as necessary, to provide adequate environmental protection in Arctic waters. It was however considered to be sufficiently complicated dealing with amendments to three (SOLAS, STCW and MARPOL) Conventions in parallel.

In papers[23] to Antarctic Treaty Consultation Meetings in 2015 and 2016, the Antarctic and Southern Ocean Coalition (ASOC) identified several issues as gaps in the Polar Code including spill preparedness and response, risk of introduced species (via ballast water discharge or hull fouling), the treatment and discharge of grey water, emissions of air pollutants such as black carbon, sulphur and nitrogen oxides. Many of these threats to polar ecosystems, communities and wildlife are also currently being considered by the Arctic Council's PAME Working Group and its Shipping Expert Group (SEG)[24].

Other issues were considered to be not sufficiently progressive including the fact that the threat from the use of heavy fuel oil in the Arctic, which poses both a spill risk and produces high black carbon emissions continues[25]. Similarly, the discharge of raw, untreated sewage into the sea provided a ship is more than 12nm from land, ice-shelves, or fast ice and as far as possible from areas of ice concentrations exceeding 1/10 remains acceptable even though this will result in raw, untreated sewage being discharged directly into the feeding grounds of marine wildlife. In addition, the Code does not address the management of polar shipping and protection of the environment through routeing measures such as areas to be avoided and deep-water routes.

In addition, at the ASBPIF's fourth meeting in November 2020, a number of presentations were made which identified gaps and weaknesses in the Polar Code. Polar Ice, a project run by NORSE Norwegian Research Centre, investigating Polar Code implementation, compliance and enforcement noted that some parts of the Code were left blank

23 ATCM 38_ip113_e Next steps for Vessel Management in the Southern Ocean submitted by ASOC, 05/05/2015 ATCM 39_ip082_e Progress on the Polar Code submitted by ASOC, 25/04/2016.

24 Arctic Council - Protection of the Arctic Marine Environment (arctic-council.org)

25 A ban on the use and carriage of heavy fuel oil by ships operating in the Arctic has subsequently been supported and adopted.

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and not addressed and that these are primarily environmental. The following gaps were listed: heavy fuel oil, grey water, underwater noise, air emissions from ships / black carbon, and marine plastic litter. For some of these gaps it is recognised that an alternative route to address the threat exists and in one instance there has been some progress with an Arctic ban on the use and carriage of heavy fuel oil as fuel adopted in 2021, although it won't be fully effective till 2029.

Another area that was recognised as a major gap during the initial development of the Polar Code was the omission of non-SOLAS vessels. A small number of IMO Member States were keen from the beginning to include non-SOLAS vessels in the Polar Code, however it was considered expedient to focus initially on the SOLAS vessels and address non-SOLAS vessels during a Step or Phase 2 of Polar Code development. The work on non-SOLAS vessels is now underway but how comprehensive the coverage will be is uncertain. While some IMO Members felt that measures for non-SOLAS vessels should be mandatory and identified the 2012 Cape Town Agreement[26] – which seeks to enhance safety on board fishing vessels - as a potential mechanism for introducing mandatory provisions for fishing vessels operating in polar regions, most of the provisions will be included in non-binding guidelines. Chapter 9 on navigation and Chapter 11 on voyage planning will however be applied to non-SOLAS vessels in a mandatory manner. Two sets of Guidelines were adopted in May 2021 – addressing fishing vessels over 24m in length and pleasure yachts over 300 gross tonnes (GT).

D. OTHER POSSIBLE SOURCES OF INFORMATION

As mentioned, the Arctic Council's PAME Working Group project on the interpretation of the Polar Code led by Norway is due to consider a progress report during 2022. The initial proposal aimed to compile a list that summarized how States understand and apply the Polar Code and some early results were presented at the 5th ASBPIF. Another Arctic Council Working Group, the Emergency Pollution Prevention and Response Working Group also developed a new project focused on life-saving appliances and survivability in Arctic waters. Led by Canada the project will try to validate if 5 days is really an appropriate length of time to have to provision for survival. The US Coastguard R&D centre is also starting a validation of the time to rescue in polar regions.

Finally, it is worth noting that Russia is currently leading an IMO Correspondence Group looking to develop guidance on mitigation measures to be applied by ships continuing to use heavy fuel oil in the Arctic ahead of the deadline for the Arctic HFO ban to become fully effective in mid-2029. It is hoped that such guidance would be finalised and applied early enough to have an impact.

26 The Cape Town Agreement of 2012 on the Implementation of the Provisions of the Torremolinos Protocol of 1993 relating to the Torremolinos International Convention for the Safety of Fishing Vessels, 1977 (2012 Cape Town Agreement)

E. SUMMARY OF CHALLENGES AND GAPS IN THE POLAR CODE

The analysis of a variety of sources of information has led to the identification of a long list of challenges and gaps. These have been summarised in the following tables. The challenges are largely focused around safety, i.e. Part I of the Polar Code and clearly indicate that there is need for more consideration of these concerns, in some cases clearer interpretation and for some matters possibly amendment of the Code.

TABLE 1: SUMMARY CHALLENGES IN IMPLEMENTATION OF THE POLAR CODE

C. CHALLENGES IN GOVERNANCE AND REGULATION
Compliance with the Polar Ship Certificate
Possible confusion in the role of recognised organisations versus flag states
Difficulties in conducting operational assessments and in establishing operating limits due to many variables
Provision of a Polar Water Operational Manual, including the role of the operational assessment in the context of the PWOM (it is not captured in the PWOM)
Challenges in interpreting the Code's goal-based requirements
Lack of experience and information (data) in using POLARIS / validation of the efficacy of the POLARIS* methodology for determining a ship's operation capabilities and limitation in ice / identification of appropriate sea ice charts
Relationship between categories and ice class not clear / Category C vessels operate in ice but with no or little ice strengthening
D. OPERATIONAL AND KNOWLEDGE CHALLENGES
Ice accretion, removing ice accretion and damage / stability issues
Difficulties in obtaining mean daily low temperature data when some areas not covered by meteorological data and the need for ship observations (ice properties and weather) to be made mandatory
Independent communication systems and data accessibility should be harmonised, and guidance on communications at high latitudes (underway)
Further guidance on life-saving appliances and arrangements for ships in polar waters, including provision of adequate resources and taking into account the need to remain on board for potentially five days in the event of a rescue situation (toilet, ventilation, insufficient room, no special means for boarding, communications, food and water)
Lack of data for voyage planning (particularly hydrographic data, sea ice data, marine mammal populations and migration routes, and marine protected areas)
Manning and training of masters and crew, including lack of crew experience in polar regions, and the need for simpler publications aimed at engineers and ratings (not just deck officers)
Introduction of competency standards for ice navigation / provision of ice navigation courses
Geographic limitation of the area of the Polar Code – possibility of extension to include other areas of high traffic density and subject to ice conditions

Exception for the application of the Polar Code to non-SOLAS vessels, the gaps identified during the analysis relate largely to environmental protection of the polar waters. Some of the threats to polar marine environments identified as gaps have been considered further in separate workstreams by the IMO, for example, the development of an Arctic ban on the use and carriage of heavy fuel oil as fuel. Others remain as significant gaps such as measures to address discharges of grey water which remains unregulated either globally or regionally. The application of measures to non-SOLAS ships has been the subject of further effort and in April 2021, guidelines were adopted addressing safety measures for fishing vessels over 24m in length and for pleasure yachts over 300GT. Work to apply the provisions of Chapters 9 (navigation) and 11 (voyage planning) is ongoing.

TABLE 2: SUMMARY OF GAPS IN IMPLEMENTATION OF THE POLAR CODE (Note: this list is not exhaustive)

C. GAPS IDENTIFIED DURING DEVELOPMENT OF THE POLAR CODE
Non-SOLAS vessels including fishing vessels, pleasure yachts not engaged in trade, small cargo vessels (300 - 500 GT) N.B. Non-SOLAS vessels have subsequently been addressed to some extent with Guidelines for fishing vessels 24m and over in length and for pleasure yachts over 300 GT adopted in 2021.
D. GAPS IN ENVIRONMENTAL PROTECTION
Air pollution including carbon dioxide (CO2), particulate matter (PM) and black carbon (BC), sulphur dioxide (SOx), nitrogen oxides (NOx)
Loss of packaged dangerous goods
Grey water discharges
Raw, untreated sewage discharges
Underwater noise
Introduced species – via ballast water and via biofouling
Use and carriage of HFO in the Arctic N.B. An Arctic HFO use and carriage ban was adopted in 2021.
Spill preparedness and response in polar waters
Routeing measures

F. POSSIBLE ACTION AND ROUTES

Many issues have been identified and Table 3 and 4 (below) attempt to summarise the issues and indicate what action would be needed. "Expansion of Code" simply indicates that if the Polar Code was to address the issue, expansion of the Code would be required. In some cases, there are alternative routes to action which would be at least as feasible as expanding the Polar Code. Possible routes for action are also indicated.

TABLE 3: IDENTIFICATION OF ROUTES AND OPPORTUNITIES FOR ACTION FOR CHALLENGES

ISSUE	POSSIBLE ACTION	ROUTE FOR ACTION
Interpreting the Code's goal-based requirements.	Develop unified interpretation	MSC / SDC
Mandatory risk mitigation	Guidance / amendment of Code	MSC
Inspections	More detailed inspections of vessels to confirm adequate navigational practices, procedures and equipment Guidance	MSC
Polar ship certificate – compliance, role of ROs versus flag state	Develop guidance or unified interpretation. Norway is leading an interpretation of the Polar Code project.	MSC/ AC PAME WG / SEG
Roll of recognised organisations versus flag states	Guidance Norway is leading an interpretation of the Polar Code project.	AC PAME WG / SEG
POLARIS Guidance including validation of efficacy of POLARIS methodology, lack of information (data) including sea ice break up & freeze patterns, and how to determine ice thickness	Update / amend guidance (as per the envisaged review and informed by data collation)	ASBPIF / MSC / SDC
Operational assessment – lack of experience	Develop Guidance on operational assessment	MSC / SDC
PWOMs – provision of a PWOM, how to model a PWOM, output of the operational assessment not captured by the PWOM	Develop guidance or unified interpretation. Norway is leading an interpretation of the Polar Code project. *Note: ICS and OCIMF have prepared a model PWOM.*	ASBPIF / MSC / SDC
Cat C vessels – operations in ice with no or little ice strengthening, relationship between categories and ice class	Amendment of Code. Guidance. Norway is leading an interpretation of the Polar Code project.	MSC / SDC PAME WG / SEG
Ice accretion / stability issues – removing ice accretion	Amendment of Code and / or unified interpretation. Norway is leading an interpretation of the Polar Code project.	MSC / AC PAME WG / SEG

TABLE 3 CONTINUED: Identification of routes and opportunities for action for challenges

ISSUE	POSSIBLE ACTION	ROUTE FOR ACTION
Life-saving appliances and arrangements for ships in polar waters – requirements that meet the minimum 5 days rescue time provision (survivability). No toilet, no ventilation, insufficient room, no means for boarding.	Guidance and possibly amendment. IMO addressing currently. PAME / SEG project.	IMO / SDC
Navigation – mandatory carriage of additional navigation aids (and crew qualified to operate and maintain them). Requirement to use spotting craft to survey waters ahead. Use of navigational experts with local knowledge. Itineraries scheduled so that another vessel is in proximity to aid in case of an emergency (passenger vessels). Sharing best practices and navigational information.	Amendment of Code / Guidance	IMO / NCSR
Communication - independent systems and data accessibility should be harmonised. Communication at high latitudes to be addressed.	Guidance and possibly amendment Being addressed by IMO	MSC / SSE
Access to hydrographic data and to ice data	ASBPIF is well-placed to engage with relevant bodies on the provision of ice data and hydrographic data.	ASBPIF
Manning and training of masters and crew - need simpler publications aimed at engineers and ratings (not just deck officers). Guidelines needed for survival and first aid. Ice navigation courses & should the Polar Code introduce competency standards. Check lists.	Development of guidance.	MSC / AC PAME WG / SEG
Voyage planning – lack of experience and guidance. Access to hydrographic data and to ice data. Lack of data e.g. on marine mammal populations and migratory routes. Lack of data for mariners on marine protected areas.	Voyage planning has been considered by ASBPIF sessions. The development of guidance or a unified interpretation would be valuable. A strategy is needed to raise awareness of the challenges around voyage planning and particularly the environmental elements, this could include reporting back on the ASBPIF's consideration of voyage planning and proposing next steps on Polar Code voyage planning.	NCSR / MSC / ASBIF
Ship Observations (cryosphere and weather)	All ships should be required to provide data on weather and ice conditions. Amendment of the Code.	MSC
Geographic application	The Polar Code application is geographically limited and could be extended to include other areas of high traffic density subject to ice conditions. Amendment of the Code.	MSC

TABLE 4: IDENTIFICATION OF ROUTES AND OPPORTUNITIES FOR ACTION ON PERCEIVED GAPS IN THE POLAR CODE

ISSUE	OPPORTUNITIES
Non-SOLAS vessels	MSC is already considering safety measures for non-SOLAS vessels. A NCSR Correspondence Group is considering mandatory application of navigation and voyage planning provisions to non-SOLAS vessels. A proposal for a project for the Arctic Council PAME / SEG to consider addressing the need to extend safety measures for non-SOLAS vessels to fishing vessels under 24m in length due to the numbers of smaller fishing vessels involved in incidents and accidents in the Arctic could be developed.
Air pollution	Air pollution globally is already a MEPC agenda item and work is underway. Arctic specific work is focused on black carbon emissions impacting the Arctic and a resolution has been proposed. Arctic emission control areas which could further reduce the sulphur content of air emissions and also black carbon emissions could be considered and promoted. Expansion of the Code needed (potentially new Chapter 6 to Polar Code Part IIA).
Sewage	Address discharge of raw / untreated sewage beyond 12 nm. Amend Chapter 4.
Grey water discharges	No action to address grey water discharges either globally or in the Arctic has been agreed as yet. PAME has a project on Survey of Select Wastewater Discharges with the intention of developing a better understanding of vessel practices[27]. Expansion of MARPOL Annex IV and / or Polar Code Part IIA Chapter 4.
Underwater noise	A mainstream MEPC agenda item. PAME is undertaking a project on underwater noise which aims to have developed mitigation pathways for reducing UWN in the Arctic by mid-2022 with the intention of them being incorporated in an update of the IMO voluntary guidelines[28]. Expansion of the Code.
Introduced species	Ballast water management is a long-standing MEPC agenda item. The Ballast Water Management Convention includes provisions for exchange of ballast water in the Antarctic, but nothing specifically for the Arctic. PAME / CAFF is undertaking an Arctic marine invasive species project. Expansion of the Code.
HFO use / carriage	A ban on HFO use and carriage in the Arctic was adopted in June 2021. It will take effect from July 2024 but will not fully eliminate HFO use until July 2029. Domestic bans could also be effective complements. Update Part IIB.
Scrubber discharges	Developing rules and guidance on scrubber discharges is on MEPC's agenda and further work is due to commence in 2022.
Spill preparedness and response	Not currently addressed by the Code but is addressed elsewhere at a global level within IMO, e.g. guidelines in development alongside the Arctic HFO ban (but purely addressing HFO spills). EPPR Review of legal issues related to the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response (MOSPA). Specific requirements for polar regions should be considered.
Routeing measures	Identification and designation of areas to be avoided, green corridors for marine mammals or deepwater routes in the Arctic.

27 Survey of Select Wastewater Discharges (pame.is)

28 Underwater Noise in the Arctic (pame.is)

G. CONCLUSIONS AND POSSIBLE NEXT STEPS

There is currently still work underway within the IMO focused on the amendment/extension of the Polar Code and the development of safety measures for non-SOLAS vessels operating in Arctic waters. Similarly, within the framework of the PAME Working Group and the ASBPIF there is considerable discussion of both the ongoing implementation of the Polar Code and the need for review or amendment, along with some suggestions for addressing gaps in the Polar Code. The breadth of issues under discussion is much broader than those subjects currently being addressed by the IMO. For efficient implementation of the Polar Code, it should be in the genuine interest of all countries, as well as operators, to address the entirety of the issues as currently identified.

In terms of procedure, two options exist:

OPTION 1: Seek a comprehensive review of the Polar Code – pushing for it to be opened up and expanded to include all aspects of shipping safety and environmental protection pertinent to both the Arctic and Antarctic. Such comprehensive review could directly follow, or be combined with, the review of the POLARIS Guidance, as it is rolled out.

OPTION 2: Review the implementation of the existing provisions and guidance of the Polar Code, addressing those issues which are already covered by the Code or potentially could be (such as grey water discharges in Part IIA Chapter 4 or black carbon emissions in a new Part IIA Chapter VI). This would also include consequential updating due to other developments such as the new Arctic HFO ban, and the development of additional guidance and advice along with unified interpretation of the Code where needed.

Action on other environmental protection matters such as underwater noise or polar routeing measures could be considered through other routes.

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