

The Arctic blue economy

Current state, developments, and implications for marine conservation

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Abstract

This brief surveys the current state and recent development of the Arctic blue economy in the five Arctic coastal states (Canada, Denmark, USA, Russia and Norway), as well as the Arctic High Seas, to understand potential impacts on Arctic marine biodiversity. It also analyses the driving factors behind these developments. The findings of this brief can support decision-makers to identify and manage conflicts between economic development and biodiversity objectives.

Arctic marine biodiversity is under threat from climate change, as well as from economic development in sectors such as maritime transport, offshore oil and gas exploration and extraction, fishing, aquaculture, and cruise tourism. The pressures that these sectors can place on Arctic biodiversity means the development of these sectors will have implications for marine biodiversity conservation objectives

We build on case studies developed as part of the Pan-arktisches MPA-Netzwerk (Ark-MPA) project that summarise recent literature and data on sectoral economic development in the Arctic marine states. We find that the five considered economic sectors have either been growing or remained stable, but that there are considerable differences in status and trends across Arctic coastal states and the High Seas. The development of these sectors is driven by political, economic, social, technological, environmental, and legal factors. Some of these are external to the Arctic (e.g. global markets and prices, climate change, technological development), whereas others can be managed by Arctic coastal states (e.g. state support for sectors, national environmental regulations). These internal driving factors point to opportunities for Arctic coastal states to manage development in ways that conserves biodiversity. Any such management must also consider the role and rights of Indigenous and other local communities.

There are major data gaps and inconsistencies, as well as uncertainty surrounding the future development of the Arctic blue economy, not least due to the Russian war against Ukraine since February 2022. Against this backdrop of uncertainty, the precautionary principle should be applied when managing economic development in the Arctic.

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1 Introduction

Arctic marine biodiversity is threatened by multiple pressures (CAFF 2017). The Arctic climate has been warming at three times the global rate (AMAP 2021), resulting in higher water temperatures and sea ice decline (Meredith et al. 2019). Increasing carbon dioxide concentration in Arctic marine waters is causing ocean acidification, which is detrimental to corals, shellfish, and other marine organisms with calcium-carbonate shells (AMAP 2018). These physical changes are linked with significant biological changes, including northwards shifts of Arctic and competing non-Arctic species, range reductions for sea ice-dependent species, and decreased food resources for many Arctic species (CAFF 2017). Climate change adds to and interacts with already existing pressure on Arctic marine ecosystems from human activities such as maritime transport, offshore oil and gas exploration and extraction, fishing, aquaculture, and cruise tourism (CAFF 2017). Altogether, these pressures transform Arctic ecosystems and significantly impact the livelihoods of Arctic Indigenous peoples (e.g. Inuit Circumpolar Council 2014).

Against the backdrop of deteriorating environmental conditions in the Arctic, several biodiversity conservation objectives and processes have been established at national and international levels (see Box 1 for examples). They aim to conserve Arctic species and ecosystems by reducing or avoiding pressures in general or in specific protected areas. Notwithstanding these efforts, in 2016, marine protected areas covered only 4.7% of the Arctic marine area (CAFF and PAME 2017). Much remains to be done to effectively protect Arctic marine biodiversity.

In parallel to conservation efforts, the changing Arctic is a site of economic expansion. There is hope that economic growth can deliver growth, employment, and socio-economic development to the region and beyond; accordingly, there are both international calls and Arctic state strategies and policies to advance it (Arctic Economic Council 2020; Oxford Research 2018; World Economic Forum 2015). Expectations of marine economic opportunities are particularly linked to the decreasing sea ice cover (Bekkers, Francois, and Rojas-Romagosa 2018).

Many of the calls for further economic expansion in the Arctic mention the need for sustainable and equitable development (Lim 2020). For example, the World Economic Forum's Arctic Investment Protocol (2015) calls for measures to protect the environment of the Arctic, support local communities, and respect and include Indigenous peoples. Indigenous communities themselves emphasise that any economic development must be environmentally and socially sustainable, and respect Indigenous rights (e.g. Inuit Circumpolar Council 2011).

However, economic growth may come at the expense of marine ecosystem health and biodiversity. Human economic activities are already placing pressure on Arctic ecosystems and blue economy sectors compete for space with biodiversity conservation (European Commission 2021). Attention and research dedicated to the development of the Arctic blue economy is increasing (Arctic Council 2021; Atkisson et al. 2018; Glomsrød, Duhaime, and Aslaksen 2021), but the nascent state of most sectors and significant gaps in Arctic biodiversity and economic data and knowledge lead to uncertainty about the impacts of further economic development (Atkisson et al. 2018). What is clear, is that the scale, speed, and type of economic development in the Arctic will play a decisive role in whether biodiversity conservation objectives can be achieved.

Box 1. Examples of biodiversity conservation objectives and processes in the Arctic

- The **Aichi Targets** adopted by the UN Convention on Biological Diversity (CBD) for 2011-2020 aimed to conserve at least 10% of marine and coastal areas through protected areas and other effective area-based conservation measures (CBD 2010). The first draft of renewed targets, to be adopted in 2022 as part of the **post-2020 Global Biodiversity Framework**, increases this target to conserve 30% of coastal and marine areas (CBD 2021).
- The Arctic Council's working groups **CAFF (Conservation of Arctic Flora and Fauna)** and **PAME (Protection of the Arctic Marine Environment)** have issued non-binding Arctic-specific recommendations to safeguard important areas of biodiversity (CAFF and PAME 2017).
- Several processes have identified priority areas for protection, such as the CBD's **Ecologically or Biologically Significant Marine Areas**, the International Maritime Organization's **Particularly Sensitive Sea Areas (PSSAs)**, or the **WWF ArcNet project** (WWF Arctic 2021).
- **National policies in Arctic states** also set biodiversity protection objectives for their waters.

In this paper, we summarise the potential pressures that different blue economy sectors¹ place on Arctic biodiversity, as well as what is known about the current status and recent development trends. We also identify drivers behind these development trends. However, uncertainties about future economic development in the Arctic are high and have further increased with the Russian Federation's invasion of Ukraine on 24 February 2022. Sanctions against the Russian Federation will likely have substantial impacts on scientific, environmental, and economic activities and cooperation in the Arctic, including the protection of Arctic marine biodiversity and economic development. Considering these uncertainties, this paper offers some insights into the possible implications of blue economic development for Arctic biodiversity conservation objectives. This knowledge, though incomplete, could support decision-makers to identify and manage conflicts between economic development and biodiversity objectives in a way that is economically, environmentally, and socially sustainable.

2 Pressures of the Arctic blue economy

In this paper, we focus on shipping, offshore oil and gas exploration and exploitation, fishing, aquaculture, and cruise tourism; Table 1 provides further information on what each category covers.² These are the economically largest and most established and therefore are likely to have the largest near future impact on biodiversity conservation objectives in the Arctic. Emerging sectors such as seabed mining or renewable energies are not covered. While we focus on marine-based sectors with the most direct impacts on marine biodiversity, we acknowledge that onshore sectors are also drivers of marine biodiversity loss. For example, onshore mineral extraction may lead to marine pollution and can also increase the demand for shipping.

¹ The blue economy covers all marine-based or marine-related economic activities, with the largest sub-sectors including maritime shipping, offshore oil and gas exploration and exploitation, cruise tourism, marine fishing and aquaculture (European Commission 2021).

² We follow the categorisation established by the European Commission (2018) to the extent that international data availability allows. By using a common definition of categories, we increase comparability across countries and between the different sectors.

Drawing on the European Environment Agency (2019), Table 1 identifies pressures these sectors place on marine ecosystems.

Table 1: Arctic blue economy sectors, activities and potential pressures (adapted from EEA 2019)

Sector	Activities	Potential pressures
Shipping	Shipping Restructuring of seabed morphology (e.g. for port construction)	Underwater noise Marine litter Pollution/Contamination (e.g. from anti-fouling paints) Air pollution (e.g. carbon dioxide, sulphur dioxide, particulates) Introduction of non-indigenous species Associated pressures caused by ports (e.g. physical loss of/disturbance to seabed habitats)
Cruise tourism	Cruise shipping	<i>Same as shipping</i>
Offshore oil and gas	Exploration Construction Extraction Decommissioning	Pollution/contamination (through operation or accidents) Physical loss of/disturbance to seabed habitats Underwater noise
Fishing	Fish and shellfish harvesting Ocean-based processing Harvesting of marine plants	Mortality of target species and bycatch Physical disturbance/damage of seabed habitats Impacts on structure and functioning of the marine ecosystem (i.e. impact on food webs) Underwater noise (from fishing boats) Marine litter
Aquaculture	Fish farming Shellfish farming Seaweed farming	Pollution (from external inputs of feed, medicines) Eutrophication (from excess nitrogen) Marine litter Underwater noise Introduction of invasive alien species

The impact that different sectors have on achieving biodiversity conservation objectives depend not only on the pressures that they place on, but also the sensitivity of the Arctic marine ecosystem. Different ecosystem types and species vary in their sensitivity. This means that the actual impact of a sector depends on the specifics of where, at what scale, and how it operates. Pressures will be more problematic in sensitive, high-biodiversity areas, if the sector is large, and no mitigating actions are taken. Conversely, in some cases, carefully managed sectoral expansion may have limited impacts on marine biodiversity. In addition to understanding general trends in economic development of blue economy sectors in the Arctic, it is thus important to consider the exact geographic location. Moreover, marine ecosystems are affected by cumulative pressures, which collectively affect the health and resilience of marine ecosystems (EEA 2019).

3 Methodology

This review of the Arctic blue economy covers five sectors (shipping, offshore oil and gas exploration and exploitation, fishing, aquaculture, and cruise tourism) in the Arctic coastal

states: US (Alaska), Canada, Greenland (via Denmark), Russian Federation, as well as in the Arctic High Seas.³

Sectoral management often occurs at the national level, and it is therefore useful to understand how each sector is developing in each of the Arctic coastal states, though some sectors, especially shipping and fisheries, are also subject to significant regulation at the international level. In addition, sectoral information and statistical data is often collected and presented at the national level. While this coarse geographic scale does not allow us to specify exactly where sectoral expansion will occur, or to identify ecosystems that are more robust or sensitive to particular pressures, we can give an overview of the status and trends within the blue economy sectors and Arctic regions, as well as of the external factors influencing their development.

This brief draws on regional case studies carried out in the project 'Pan-Arctic Network of Marine Protected Areas' from 2020-2022, which contain information about the current status and recent development trends of the Arctic blue economy. The assessment was undertaken in December 2021. Full references for all information are recorded in the case study documents. We evaluated the case study data in three steps:

1) Current status: Firstly, we used the information collected in the individual case studies to evaluate the current status of the five blue economy sectors in each of the Arctic coastal states and the High Seas, categorising them as 'large', 'small' or 'not significant' sectors. This refers to a sector's current relative contribution to value generation and employment in the country's blue economy. The results can be used to compare the size of a sector to other marine blue economy sectors within the same country, but not to compare sector's sizes across countries.

2) Recent development trends: Secondly, we evaluated how the different national sectors have developed in the past decade. We categorised the trend as 'increasing', 'slowly increasing' or 'stable' (decreasing trends were not recorded anywhere). This categorisation does not follow exact quantitative indicators, but is a relative measure compared to other sectors in the same country and to the same sector in other countries. It should be noted that while past development trends may continue, blue economic development in the Arctic is subject to a range of external factors, which may cause future development to deviate from past trends. An example are the uncertain effects of the Russian Federation's invasion of Ukraine in February 2022.

3) External factors: Thirdly, we used the case studies to identify the range of potentially relevant external factors that have – and will likely continue to – determine the development of the blue economy. We grouped them into political, economic, social, technological, environmental, and legal factors.⁴ These factors are reported by sector, but it should be noted that not all of them are equally significant in the different Arctic regions.

There are some limitations and uncertainties associated with our qualitative evaluation. Inconsistencies in data across the different states mean we cannot make exact comparisons across countries (i.e., to compare whether maritime transport is larger or has been growing faster in Norway or in Canada), and due to some data inconsistencies within countries, care must be taken when comparing different sectors within a country (e.g. to compare whether marine fisheries or cruise tourism are growing faster in Alaska). We can make general conclusions about economic development in different Arctic coastal states, serving as a starting

⁴ This follows the approach of a 'PESTEL analysis'. While PESTEL is originally a business analysis tool helping to understand the macro-environmental factors that influence a business (CIPD 2021), here it is used to provide insight into the various external factors that drive or hinder the development of the Arctic blue economy, and thus eventually influence impact Arctic biodiversity conservation objectives.

point identify sectoral and regional developments that may pose risks to biodiversity conservation, as well as opportunities for sustainable development.

4 Status, trends and driving factors of Arctic blue economic development

Table 2: Overview of status and trends of blue economy sectors

	Maritime transport	Cruise tourism	Marine fisheries	Aquaculture	Offshore oil and gas
Alaska (US)	↗	↗	↗	↗	↗
Canada	↗	↗	↗	↗	≈
Greenland (DK)	↗	↗	≈	↗	≈
Norway	↗	↗	≈	↗	↗
Russia	↗	↗	↗	↗	↗
Arctic High Seas	≈	≈	↗	≈	≈
status of industry	large	small	not significant		
trend	↗ increasing	↗ slowly increasing	≈ stable		

The status of the five blue economy sectors considered is varied, and they exhibit different trends in the Arctic coastal states and the High Seas (see Table 2). Considering the region as a whole, all blue economy sectors have been growing in the past decade at least somewhere. In some places, most notably the Arctic High Seas, certain sectors remain stable. There have been no signs of decline anywhere.⁵ As mentioned above, these qualitative evaluations come with some uncertainty and only offer an indication of status and trend, rather than a definitive measure. Box 2 uses the example of fisheries in the Russian Arctic to illustrate how the evaluation was completed.

Maritime transport is a significant blue economy sector in each of the Arctic coastal states, as well as the one with the strongest increase in the recent past. The sector is smaller in Greenland than in the other states considered but has also started to grow there. There is currently almost no shipping in the Arctic High Seas, but this is changing with the onset of ice-free conditions in the Arctic Ocean allowing for the opening of the Transpolar Sea Route (TSR). The TSR, which passes straight through the Arctic Ocean, is predicted to be shippable for at least some portion of the year before 2050 (Bennett et al. 2020). The cruise tourism sector is also significant across the Arctic and has been growing. As of now, cruise tourism is almost non-existent in the Arctic

⁵ However, there are some examples of decline of sectors at the sub-sectoral or sub-regional level, which do not appear in this table. For examples, Broderstad and Eythórsson (2014) describe the collapse of local fish stocks in two fjords in the region of Finnmark in northern Norway.

High Seas due to the current extent of sea ice. As sea ice recedes, this may change in the upcoming decades.

Box 2. Fisheries in the Russian Arctic

The state and trend of Russian fisheries show how various external factors (see Table 3) shape the development of a sector. The main commercial fishing areas in the Russian Arctic are the Barents Sea and the Bering Sea, and the main target species are Atlantic Cod, Haddock and Capelin (Sea Around Us 2016). Elsewhere in the Russian Arctic the harsh climate, as well as low productivity, limit most marine fisheries to being small-scale fisheries close to shore (Taconet, Kroodsmma, and Fernandes 2019). Notwithstanding their small size, these are an important source of income for coastal communities (Russian Federation 2014).

Several important fish stocks in Russian waters have declined in the past due to natural fluctuations as well as overfishing and pollution (FAO 2007). Climate change and the recession of sea ice opens opportunities for intensified fishing activities, but also leads to a reduction of plankton and primary productivity, which in turn reduces the amount of fish (Stupachenko 2018). The overall future impact of climate change on the Russian fisheries sector remains unclear.

In addition to environmental factors, key hurdles to the growth of the Russian fisheries sector include an ageing fishing fleet, insufficient fishing port infrastructure, administrative barriers and a lack of investment (Eynde 2017). In response, the Russian government aims to modernise the fishing fleet, construct new fish processing facilities and distribution centres in the Russian Far East, develop aquaculture and mariculture in the Far East, and invest in research to study the possible increase of fishing in Arctic waters (Russian Federation 2019). In addition, efforts to establish free ports with preferential tax and customs regulations to attract foreign investment and businesses along the Northern Sea Route (the Russian section of the Northeast Passage) may help to improve port infrastructure and transportation routes in the Russian Arctic, and also promote overall growth in fishing activities (Tugushev 2020).

The economic sanctions and political isolation following the Russian Federation's invasion of Ukraine in February 2022 will likely hinder these efforts, though it is still too early to determine the exact impacts on the Russian Arctic fisheries sector.

Marine fisheries operate across the Arctic, especially in Greenlandic and Norwegian waters, but they have not grown strongly in the past decade. In Canada and Russia, the industry has been growing, but only at a slow pace. There is currently no fishing in the Central Arctic Ocean due to a 16-year moratorium that came into effect in 2021⁶. However, there is fishing activity in the so-called 'Banana Hole' in the Barents Sea, the 'Loop Hole' in the Norwegian Sea and the 'Donut Hole' in the Bering Sea, which also constitute the Arctic High Seas (Papastavridis 2018). Aquaculture in the Arctic currently occurs at very low levels: It is a small but growing industry in Norway and otherwise only beginning to emerge elsewhere.

Offshore oil and gas is the sector with the most divergent status and trend in the Arctic. It is most developed and has been growing strongest in Norway, but also exists in Alaska and Russia. There is currently no offshore oil and gas extraction in Canada, Greenland, and the High Seas.

The findings on status and trends raise the question of why some sectors have been growing faster than others, and why others fail to grow altogether. The source case studies identified drivers of and obstacles to sectoral development across the Arctic. Here these external factors are listed by sector, and classified as political, economic, social, environmental, technological,

⁶ Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, available online at <https://www.mofa.go.jp/files/000449233.pdf>

and legal (see Table 3). They can point to opportunities for managing growth sustainably and addressing potential conflicts between economic development and biodiversity conservation.

Table 3: Overview of external factors influencing sectoral development

Category	Offshore oil and gas	Maritime transport
Political	National political interest/ strategic considerations International cooperation Moratoria Indigenous involvement State support	International shipping agreements (e.g. navigational safety, environmental protection) State support
Economic	Costs Oil and gas prices Competing oil and gas resources (other regions/land-based resources) Demand for oil and gas Access to finance/investment	Economic activity in the Arctic (e.g. natural resource extraction, fishing) Demand for products in Arctic communities Costs Global trade Competing transport routes/modes
Social	Environmental concerns Reputational considerations	Crew trained for Arctic navigation Arctic population size
Technological	Technology for Arctic offshore conditions Supporting infrastructure (e.g. ports) Access to technology (e.g. sanctions)	Arctic-ready ships Supporting infrastructure (e.g. ports, roads) Search and rescue capacities Meteorological monitoring Remote monitoring (e.g. satellites)
Environmental	Discovery of commercially viable deposits	Seasonal sea ice cover Storm frequency and intensity Permafrost conditions (influencing construction of e.g. ports) Environmental concerns
Legal	Legal challenges Environmental impact assessment results National regulations	National and international regulations
Category	Marine fisheries	Cruise tourism
Political	International fisheries agreements State support Promotion of small-scale or low-impact fishing	International shipping agreements (e.g. navigational safety, environmental protection) State support (e.g. diversifying economies) Visa and entry requirements
Economic	Existence of export markets Market prices for fish and seafood Economic potential of unexploited species Access to finance/investment	Demand for cruises Tourism infrastructure (e.g. hotels, airports, transportation)
Social	Cultural importance of fishing Dependence of Arctic communities on fishing for income, employment and/ or subsistence Public opposition to regulation	Involvement of local communities Promotion of Arctic tourism

Technological	Increase in vessel size Monitoring, control and surveillance technologies Scientific advice Port and fleet infrastructure Capacity for fish processing and distribution	Arctic-ready ships Tourism infrastructure, e.g. hotels, airports Search and rescue capacities Meteorological monitoring
Environmental	Sea ice cover Species migration due to climate change Change in primary productivity Target species population size Long-range, coastal pollution Storm frequency and intensity	Seasonal sea ice cover Storm frequency and intensity Environmental attractions
Legal	National regulations, e.g. on gear, bycatch, threatened species, or area closures Indigenous subsistence fishing rights and co-management Enforcement of regulation	National and international regulations
Category	Aquaculture	
Political	State support	
Economic	Demand for aquaculture products Access to finance/investment	
Social	Public perception	
Technological	Research and development	
Environmental	Sea ice cover Parasites and diseases	
Legal	National regulation	

5 Discussion and conclusion

The development of the Arctic blue economy is likely to significantly impact the achievement of biodiversity conservation objectives. The major blue economy sectors place different pressures on Arctic marine ecosystems. Given the still relatively underdeveloped state of most sectors, there is a chance to manage their growth in a way that minimises the conflict between economic development and Arctic biodiversity conservation. However, to do so, decision-makers and stakeholders need an increased understanding into what scale, where, and how developments will occur. This study aims to support this by summarising existing knowledge on how key arctic marine sectors are developing in the different Arctic marine states, as well as on the drivers behind these trends.

We present research that illustrates that the different blue economy sectors place different pressures on Arctic biodiversity, and that these pressures will likely be exacerbated by climate change. The biodiversity impacts of these pressures depends on their scale and location, as well as the sensitivity of the specific ecosystem. While these impacts can be at least in part mitigated through management, they pose a growing risk as the Arctic blue economy expands.

At the national and sectoral level, no economic sectors are shrinking. Indeed, we find that most blue economy sectors are growing in the Arctic coastal countries. However, future development may be limited by the challenges inherent to the Arctic economy, which is characterised by

remoteness, poor accessibility, extreme climate, high costs, and limited human and financial resources (Larsen and Huskey 2020; Larsen and Petrov 2020). However, there are considerable differences in the status and trends of blue economy sectors across Arctic coastal states and the High Seas, which reiterates the importance of differentiating between Arctic sectors and regions. While Arctic economies are subject to similar signals and disturbances, they are heterogeneous due to diverse natural, economic and social conditions (Arctic Council 2021; Larsen and Petrov 2020).

These conclusions come with considerable uncertainties. Data gaps and inconsistencies, complexity, and methodological challenges limited our ability to consistently evaluate the development of different sectors in the different Arctic states. In many sectors, there is uncertainty surrounding the key political, economic, social, technological, environmental, and legal drivers of economic development. Moreover, high-level national and sectoral stories only tell part of the story: the shape of economic development and its impacts on biodiversity will depend on local context, with different sub-sectors developing in different ways.

Political, economic, social, technological, environmental, and legal factors drive the development of Arctic blue economy sectors. Many of these drivers are external to the Arctic, such as global markets and prices that drive shipping, oil and gas, and to a lesser extent fishing and aquaculture. Climate change is another key external driver, with mixed impacts on development: new opportunities such as reduced sea ice for shipping will fuel growth in some sectors, whilst climate change's mixed impact on fisheries, increased storms, and permafrost melt may negatively impact development of other sectors. Another external driver that will impact the path of the Arctic blue economy sectors is technological development that enables sectors to operate in the harsh Arctic environment.

Arctic coastal states and stakeholders have the power to manage some drivers within the Arctic. For example, our summary of drivers of sectoral development shows that national political decisions, including state support for sectors, national environmental regulations, and international political agreements significantly drive or inhibit national sectoral development. Accordingly, these offer opportunities to manage development in ways that conserve Arctic biodiversity.⁷

These national policies and regulations are in turn driven by multiple considerations, including the pursuit of economic benefits as well national security objectives. An example of this issue – and the inherent uncertainties in trying to understand economic development in the Arctic – is the Russian invasion of Ukraine in February 2022, and the accompanying international sanctions. These are likely to impact economic development in Russia and impact neighbouring countries in ways that previously were difficult to predict. For example, the Russian maritime transport sector had been expanding, with shipping across the Northern Sea Route along the Russian Federation's coastline growing in recent decades; economic sanctions and closed borders following the Russian invasion of Ukraine in February 2022 make it likely that shipping is going to be severely limited for months, if not years, to come. This could also impact neighbouring countries with harbours along main routes, such as Norway.

National pursuit of economic benefits and biodiversity conservation must also consider the role and rights of Indigenous and other local communities. Indigenous communities must be centred, both due to the rights that they hold and as the population most affected by blue economy development decisions. This includes consideration of subsistence use of marine resources, alongside the economic uses considered above, especially in relation to the fishing

⁷ An accompanying policy brief, xxxx by xxxx, link, outlines opportunities for achieving biodiversity conservation objectives through ecosystem-based approaches.

sector (Larsen and Petrov 2020). When considering how development can be made sustainable, Indigenous, and local communities must have agency to ensure that development serves their objectives, which may or may not pose additional conflicts with biodiversity conservation objectives.

Overall, our findings on the current status of sectors in each Arctic maritime state, the pressures they place on Arctic marine ecosystems, and how these sectors are likely to develop. It points to some key potential conflicts with biodiversity conservation objectives. This brief supports the identification of opportunities to manage these conflicts before they arise. The high degree of uncertainty with regards to the impacts and developments of the blue economy means that the precautionary principle should be applied when managing economic development in the Arctic.

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