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Select Committee on the Arctic

Report of Session 2014–15

Responding to a changing Arctic

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Responding to a changing Arctic

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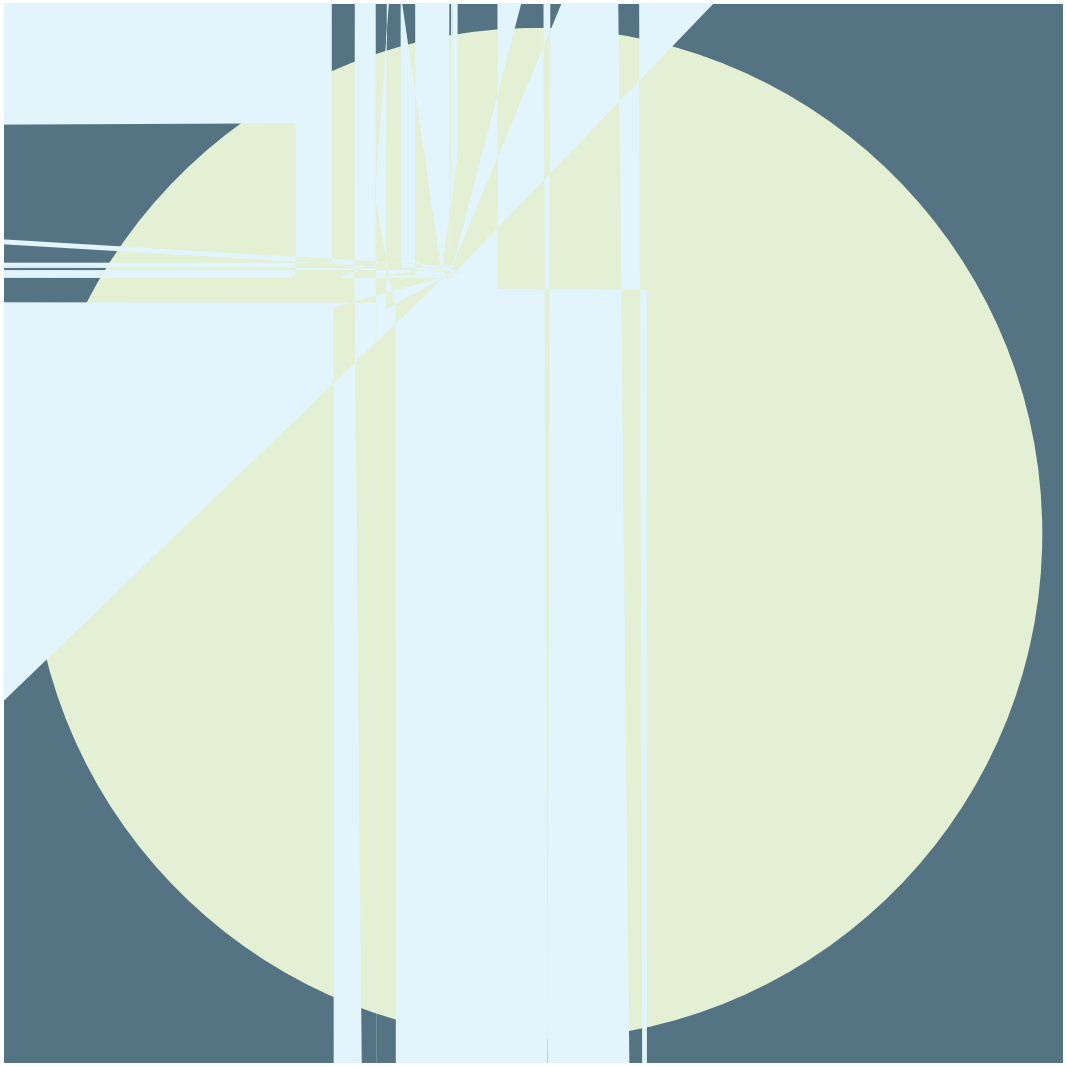
Figure 1: The Arctic Ocean



Source: Derived from original provided by British Antarctic Survey.

6. There is no universally agreed definition of 'the Arctic' and a number of definitions are in use. In approaching our inquiry we have not sought to restrict our focus to any one fixed spatial definition of 'the Arctic'. The various definitions of 'the Arctic' are each appropriate to the context or disciplines from which they derive, and different definitions may be appropriate in different circumstances. The Arctic environment is highly diverse, and includes significant variations in landscapes, temperature, weather, light and ice conditions, and water depths. It is not a uniform, ice-covered, uninhabited environment. The region is home to biologically rich and diverse ecosystems, with the Arctic forming a primary habitat for many well-known species such as seals, whales, walrus, narwhal, reindeer and polar bears. It is also a seasonal 'home' to many migratory bird species.

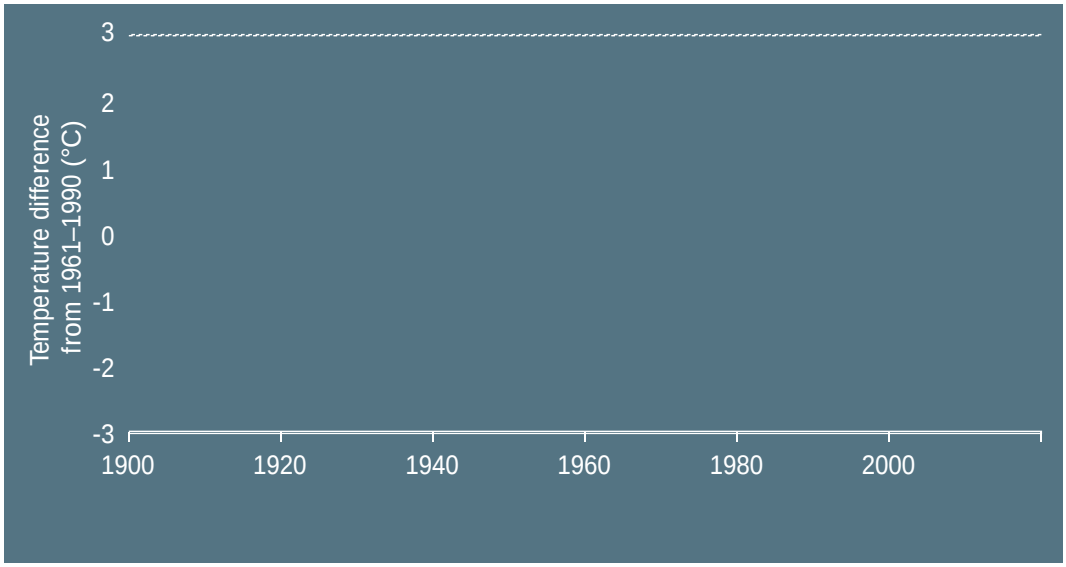
Figure 2: Common definitions of the Arctic

Source: Foreign and Commonwealth Office, 'Adapting to Change: UK policy towards the Arctic' (2013).

7. The region is also home to around four million people—a population larger than 70 of the members of the United Nations. This diverse population is spread across the eight states of the region, with approximately half residing in Russia, which is the largest Arctic state.[2] Arctic communities vary in size, from small villages and hamlets to the Russian port city of Murmansk, home to over 300,000 people.

8. Around 500,000 Arctic residents belong to indigenous groups.[3] Indigenous peoples have lived in the Arctic for millennia and different groups have

Figure 3: Arctic surface air temperature anomaly over land, 1900–2014



Source: Met Office (2015).

Figure 4: Polar amplification of warming in the last decade

Source: Written evidence from the Norwegian Polar Institute (ARC0061), using NASA Goddard Institute for Space Studies data: http://data.giss.nasa.gov.

Figure 7: September 1980 and September 2012 sea ice extents

Source: Derived from US National Snow and Ice Data Centre: https://nsidc.org.

29. A reduction in Arctic sea ice extent could have some potentially beneficial implications, including the opening up of new shipping and trade routes and 023 Tw 0 -1.12

lowest extent since satellite records began.[32] We were repeatedly told that,

Figure 9: Loss of mass in the Greenland ice sheet

Monthly mass anomalies (in gigatonnes, Gt) for the Greenland ice sheet since April 2002, estimated from GRACE measurements. The anomalies are expressed as departures from the 2002–2014 mean value for each month. For reference, orange asterisks denote June values (or May for tho

snow on the surface of the planet. As snow and ice melts, greater extents of darker coloured land and sea are exposed; these surfaces absorb more of the heat of the sun and therefore amplify the effects of warming.[50] In other words, loss of snow and ice has not only a direct effect, and impacts on ocean circulation and sea level: it also intensifies climate change by contributing to greater heat absorption.

46. We were told that the amplifying effects of the loss of albedo could have far-reaching consequences. The Arctic Methane Emergency Group told us that recent research had almost doubled the estimate of the effects of albedo loss, and that "The ultimate heat contribution, when the snow and sea ice have disappeared for much of the year, could be equivalent to a doubling of CO_2 … Such an addition to the energy balance would kibosh all efforts to keep global warming to a safe level through emissions control".[51]

Permafrost melting and infrastructure problems

47. Permafrost is ground that remains frozen for two or more years. IPCC Assessments have consistently highlighted that permafrost will be subject to melting as the Arctic region responds to climate change.[52] We were told that, in some parts of the Arctic, permafrost has now disappeared altogether.[53] Whilst thawing permafrost can cause some immediate and obvious local impacts, the wider and longer-term effects of this melting are largely unknown and difficult to predict.

48. The most direct indicators of changes in permafrost state are active layer thickness and temperature. The active layer is the top layer of soil and/or rock, sitting above the subsurface permafrost; the active layer thaws during the summer and freezes again during the autumn. In the period between

the Arctic Ocean had experienced long term declines in seawater pH and that these changes could have implications for marine ecosystems.[71] A recent report by the Arctic Council concerning ocean acidification concluded that:

> "The Arctic Ocean is rapidly accumulating carbon dioxide leading to increased ocean acidification—a long-term decline in seawater pH. This ongoing change impacts Arctic marine ecosystems that are already affected by rising temperatures and melting sea ice.

latitudes and the Arctic accordingly reduces, there is the potential for the jet stream to slow down.[85]

70. As the jet stream slows, there is the potential for it to meander, and to drift further southwards, causing changes in the distribution of temperature and precipitation patterns. This could have significant impacts for the weather of the UK; we were told that likely consequences could include heat waves in the summer and increased snow and heavy rain in winter.[86] There is also the potential for extreme weather to persist in one place for longer than would usually be the case[87]; changes to the jet stream have been identified as causative factors in the 2013–14 'Arctic blast' in Canada and the northern US.[88] Dr Nalân Koç of the Norwegian Polar Institute told us that:

> "We can surely say that the Arctic is influencing climate patterns well beyond the boundaries of the Arctic itself. It is having an impact on the whole northern hemisphere".[89]

Conclusions

71. **The Arctic region is at the frontline of climate change and is being affected more rapidly by climate change than other parts of the globe. Particular concerns exist over melting land ice and a consequent rise in sea levels, as well as diminishing sea ice and melting permafrost. Loss of sea ice is expected to continue in the Arctic Ocean, with open water contributing to the further amplification of climate change. Physical, ecological, economic and geopolitical changes—both negative and positive—are arising as a result of the changing Arctic climate, and polar warming will have an impact upon ecosystem dynamics and human communities. While reductions in sea ice extent will make access to parts of the marine Arctic easier in future, changes such as permafrost and ice road melting may make investment in the terrestrial Arctic more difficult at least in the medium term, although there may be countervailing factors: the jury is out.**

72. **Understanding of the effects of climate change upon the Arctic and their causes in many places is lacking or severely limited. A great deal of further research is still required in order to assess and understand the effects and implications of Arctic climate change.**

73. The impacts of Arctic changes are considered in the remaining chapters of this report. The consequences of climate change in the Arctic will bring opportunities, costs and risks, all of which will need addressing and managing.

85 See Pallab Ghosh, 'Wavier jet stream 'may drive weather shift', *BBC News*, (15 February 2014): http://www.bbc.co.uk/news/science-environment-26023166 [accessed on 19 February 2015]

86 W

CHAPTER 3:

figure could be significantly higher or lower.[108] The degree to which such opportunities may, in fact, be exploited is explored in Chapter 5.

81. The Arctic is "a sphere of increasing competition", both commercial and geopolitical.[109] The Royal Society saw environmental change in the Arctic as "awakening national interests in energy, fishing, shipping and tourism".[110] There was widespread agreement that the perception of increasing commercial opportunities in the Arctic has led to growing interest in the region from "a diverse range of industries and an increasing number of countries."[111]

82. The impacts of climate change in the Arctic are also generating external interest on non-commercial grounds, attracting attention from both Arctic and non-Arctic scientists and academics and from campaigning groups such as WWF and Greenpeace, as well as politicians.

[such as the UN Declaration on the Rights of Indigenous Peoples] mean that Inuit are a necessary partner in Arctic affairs", while we heard from many witnesses the importance in the Arctic of international law on matters such as freedom of navigation.[126]

90. The newly appointed US Special Representative for the Arctic, Admiral Robert J. Papp Jr., wrote in December 2014 that the Arctic was "quickly becoming a global cornerstone for scientific and academic research, trade, and tourism" and that "we are all connected through the Arctic, whether *environmentally*, through the global impacts of climate change; *economically* through international trade; or *scientifically* through multi-national research initiatives."[127] Climate change, among other pressures, is bringing about fundamental state changes in the Arctic not just in environmental and geophysical terms, but politically, economically, culturally and imaginatively.

A scramble for the Arctic?

The Arctic is not unclaimed

91. While the popular narrative of a 'scramble for the Arctic' might suggest that the Arctic is unclaimed territory, this is far from the case.[128] All of the Arctic's lands are part of the eight Arctic states (the US, Canada, Denmark, Iceland, Norway, Sweden, Finland and Russia), while much of the Arctic's waters are in the ExcS0(c)4(o)11(u-5(s)-1(i)1(v)13(e)1(E)4)1(E)-17(x8(E)-1hE)-1hE Ex8(

Box 2: The UN Convention on the Law of the Sea

- UNCLOS contains rules for determining national '**baselines**', which form the limit of a country's internal waters over which it has exclusive territorial sovereignty with no general right of passage for foreign ships.
- Working out from there, the coastal state has first a **territorial sea** extending up to 12 nautical miles from the baseline over which it also enjoys territorial sovereignty (it can regulate, police and adjudicate these waters and exploit their natural resources and those of the seabed). Ships of all states enjoy the right of innocent passage through territorial seas.
- A coastal state can also claim an **Exclusive Economic Zone** (EEZ) extending up to 200 nautical miles from the baseline, within which the coastal state enjoys sovereign rights for the purpose of exploring, exploiting, conserving and managing natural resources (including fish) of the waters and seabed and certain economic activities (such as the production of energy from the waters, currents and winds), and exercises jurisdiction over marine scientific research and environmental protection.
- A coastal state also has 'sovereign rights' over its **continental shelf** (seabed and subsoil only—not the water column) for the purposes of exploring and exploiting its natural resources (such as hydrocarbons). The continental shelf is the natural underwater prolongation of the land territory as far as 200 nautical miles if the continental margin falls short of this distance, or to the outer edge of the continental margin if it continues beyond 200 nautical miles (nm).[131]
- Where a state believes its continental shelf extends beyond 200nm, a submission is made to the scientific **Commission on the Limits of the Continental Shelf** (CLCS) to determine the geological and oceanographic parameters of the extended continental shelf, which might extend up to and even beyond 350nm from the baseline. Where states are claiming overlapping areas of an extended continental shelf, those states must come to a settlement on how it is to be delimited.[132]
- There is a process for compulsory adjudication or arbitration for disputes relating to UNCLOS, which can involve the International Tribunal for the Law of the Sea, the International Court of Justice or arbitration.[133]
- Once the extended continental shelves of coastal states have been established, the **seabed** beyond that point becomes an area beyond national jurisdiction. The seabed lying beyond all states' continental shelves is designated a global commons and managed by the International Seabed Authority.[134]
- Beyond states' EEZs, all parts of the sea (including above any continental

in areas within the EEZ covered by ice for most of the year.[136] Christian Le Mière, Senior Fellow for Naval Forces and Maritime Security at the International Institute for Strategic Studies (IISS), told us that the Arctic coastal states "often jealously guard their stewardship of the Arctic Ocean and the resources in the Arctic"; as international interest increases, claims to stewardship may become more important and contested, especially where sea ice cover diminishes.[137]

Claims to the North Pole

94. Reports of Arctic nations claiming the North Pole have generated much public interest. Despite the well-publicised (but purely symbolic) planting of a Russian flag on the Arctic seabed at the Pole in 2007,[138] Russia has not exerted any claim to sovereign rights over the Pole except through UNCLOS. Under that Convention, Russia, Denmark, Iceland, Norway and Canada are all at various stages of submitting materials to the CLCS regarding their sovereign rights to extended continental shelves beyond 200nm.[139] Russia and Denmark have claimed, and Canada is likely to claim, that the seabed at the North Pole is part of their extended continental shelves and that they should be able to exploit that seabed (subject to paying royalties to the International Seabed Authority), but the waters and airspace in the central Arctic Ocean are unambiguously un-claimable.[140]

95. In the 2008 Ilulissat Declaration, the five Arctic coastal states committed themselves to the orderly settlement of overlapping seabed claims, so in the view of Matthew Willis from the Royal United Services Institute, "the odds favour a negotiated solution to current and future differences".[141] The "high-profile disputes" about Arctic territory "have little substance behind them", Dr

Council would evolve over the next eight Chairmanships "into the central pillar of a multilayered, multi-instrument governance regime".[165]

110. Jane Rumble, head of the Polar Regions Department in the Foreign and Commonwealth Office (FCO), told us that the Council was "growing in its influence and ambition" and evolving in terms of its organisation and the breadth of the issues it considered.[166] Ambassador Else Berit Eikeland, for Norway,[167] saw an expansion of the Council's focus from environmental issues to climate change and now "more focus on sustainable business development".[168] Mr Rigby denied, though, any notion that "we have moved away from environmental protection" in the light of the creation of the Arctic Economic Council.[169]

111. The Arctic states have negotiated two legally binding multilateral agreements under the auspices of the Council, on search and rescue (2011) and oil pollution preparedness and response (2013).[170] Ambassador Eikeland predicted that the Council will discuss new areas of co-operation and possibly new binding agreements (she raised scientific co-operation and the possibility of a further initiative on oil spill prevention).[171] Mr Rigby confirmed that the Council is "looking at possibilities down the line" and that there might be "the beginning of a trend" towards legally binding agreements; other witnesses concurred.[172]

112. A permanent Arctic Council secretariat of ten staff was established in Tromsø, Norway, in 2013, which is improving co-ordination and communication.[173] Ambassador Thórdur Aegir Óskarsson (for Iceland) felt that the Council "is moving really fast now", but "Since the demands are increasing so fast, it needs to react much faster than it has done" and move more into decision-making. He told us that the secretariat was "weak for such a huge plethora of activities" but he was sure that it would be strengthened in the near future.[174] The Norwegian and Swedish ambassadors welcomed the strengthening of the Council, which looks likely to continue under the American Chairmanship (from late April 2015); Admiral Papp was reported in November 2014 as

165 Q 44 (Dr Jeffrey Mazo); see also Q 149 (Dr Richard C. Powell), written evidence from Dr Richard C. Powell (ARC0053)

166 Q 3, Q 322 (Jane Rumble)

167 HE Else Berit Eikeland is Norway's Polar Ambassador and Senior Arctic Official to the Arctic Council. The other Ambassadors, High Commissioner and Deperctic Council.

wanting to put the Arctic Council "on steroids" in order to promote a greater sense of institutional urgency.[175]

113. Whether biennial rotating chairmanships encourage sufficient continuity in the Arctic Council's work has been the subject of some speculation.[176] Ambassador Eikeland acknowledged the issue, saying that the Council was looking at the model of chairmanship 'troikas'.[177] While Mr Rigby acknowledged that balancing chairmanship priorities with longer-term objectives was a "dilemma" for any international body with a rotating chair, he argued that 04 ÞBDC 0.09 Tw T*[(c)- 12 0 0 12 510.2362 7g617(la982ho)11(k)

within and outside of EEZs", because "Current governance regimes do not adequately protect the Arctic, or provide (non-Arctic) stakeholders with a say in managing the region."[185] However, it seems unlikely that the Arctic states would agree to a new multilateral treaty regulating their activities within their national territories and EEZs. Current governance arrangements would seem to provide a good basis for future progress.

Tensions within the Arctic states

118. A further challenge to the consensus-based Council's future effectiveness is that as its agenda expands, "it is getting even closer to the more sensitive issues all the time".[186] Professor Geoffrey Boulton of the University of Edinburgh,

peace'.[193] Many of the Arctic state representatives we heard from reinforced this aim.[194]

Russian remilitarisation?

123. Regional security co-operation and the 'security architecture' nevertheless lag behind Arctic political, environmental and economic co-operation.[195] Duncan Depledge (Royal Holloway, University of London) told us that "The biggest challenge facing international governance in the region concerns how relations are managed between Russia and the other Arctic states (and arguably the Arctic observer states)."[196]

124. We were told that in the summer of 2013, Russia re-established a permanent military presence -15(a)-20(3)1(t)-30(h)-6(a)12(t "9)1(t)-17(t)-21(i)7(c o)8(b)1(s)-3(1(i)9(

126. The build-up could also be interpreted as 'securitisation'.[203] Throughout the region, tasks such as aerial surveillance, anti-smuggling inspections and fisheries monitoring, patrolling, search and rescue, and assistance with oil spill response efforts fall to armed forces because they have a near monopoly on the training, equipment and capabilities necessary to operate in Arctic conditions.[204] Russia aims to make the Arctic its 'foremost strategic base for natural resources' by 2020: to do so it must invest "massist T 183.4126 703.0642 Tm

those nations, over 50 per cent of the world's population is now represented by members or observers at the Council.[223] The UK's own observer status dates to the first tranche of admittances, in 1998.

142. The granting of observer status to these six new nations doubled the number of observer states, and expanded the realm of observer countries beyond Europe for the first time. This generated much press attention: was China's

150. While progress has recently been made regarding the seal ban dispute and Canada's objection to EU observer status has been lifted, it now seems possible that the EU's application will continue to be treated opportunistically, this time as a foil for Russia's anger over Western sanctions relating to Ukraine.[240]

151. **The EU's application for observer status at the Arctic Council should be treated on its merits. The UK should continue to voice its strong support for the EU to be granted permanent observer status at the 2017 Ministerial meeting at the latest.**[241]

Pressures resulting from the growth in Arctic Council observers

152. We heard that the increasing numbers of observer states and organisations at the Arctic Council are creating new pressures and a concern that "the bigger and more unwieling new pressures ac5 (MtT/Sp 0.042 18(s o)1 4174)-9(a)-20(n)-19(lu)-

156. Dr Mazo and Dr Foxall both suggested that new observers had been admitted for the ulterior purpose of obtaining their acknowledgement of the Council's status and legitimacy and the primacy of UNCLOS (noted in the criteria for admittance).[249]

157. The Norwegian, Swedish and Danish ambassadors expressed particular enthusiasm for engagement with observers and inclusivity.[250] Somewhat in contrast, however, Vincent Rigby, the Canadian Chair of the Senior Arctic Officials, told us that "Ultimately, [observers'] primary role is to observe and understand even more the impact that their policies may have on the Arctic and the impact that policies in the Arctic may have on them".[251]

158. Mr Le Mière told us that Canadian Prime Minister Stephen Harper had "opined that the Arctic Council has expanded too quickly and involved too many observers from outside the Arctic, which is diluting and complicating the interactions of the Arctic states themselves."[252] Alan Kessel (Deputy High Commissioner for Canada) noted that the Arctic states "are extraordinarily beholden to observers and the contribution that they can make" but immediately added "It goes without saying that 99 per cent of the pollution that we find in our Arctic region emanates from some of those observers who are with us. If those states really want to do something, domestic regulation on issues [such as mercury pollution] would be helpful".[253] Prof Boulton felt that Russia (the other of the two largest Arctic states) was also "rather sensitive to the potential that the Arctic Council might expand".[254]

159. The Japanese and Icelandic ambassadors raised concerns over the lack of clarity regarding the role of observers and Mr Rigby accepted that there needed to be further discussions on the subject.[255]

160. Our evidence indicates there is a careful balance yet to be worked out between the degree of contribution (financial, scientific and political) that Arctic states wish observers to make in return for their presence, and the degree of influence that the observers want in return for their contribution. Mr Rigby had the sense from a lot of observers that they would like to do more and "have a slightly more prominent place in the Arctic Council"; we heard this expressed by the Japanese Ambassador.[256] Ben Ayliffe of Greenpeace found it hard to imagine observers such as China and India "agreeing to the status quo where they are in effect kept on the side-lines of what is an increasingly important and geostrategic forum."[257]

161. On the other hand, Mr Reilly felt that it was now implicit to observers that "if you want to join the party, you must share the burden and ask what you bring to the party"; he noted as a recent development in Arctic affairs "Explicit demands from the [Arctic Council] for Observer countries to increase their

249 Q 168 (Dr A

Arctic Council is necessary, the Council must also be open to further co-operation beyond its own membership.

Other international bodies and agreements affecting the Arctic

167. The Arctic Council, though pre-eminent, is not the only international

since 2013,[286] and the Arctic Frontiers conference has been held annually since 2007 in Tromsø, Norway.[287] The Conference of Parliamentarians of the Arctic Region is a biennial conference for parliamentarians representing the eight Arctic countries and the European Parliament, with Arctic indigenous peoples represented as Permanent Participants (plus observers—our Chairman attended its 2014 meeting in Whitehorse, Canada).[288]

177. **Arctic fora in addition to the Arctic Council are important for building international consensus on Arctic issues, and should be encouraged.**

178. It is quite probable that yet more bodies and agreements will come to acquire relevance in the Arctic as the sea ice melts and the region at least appears

CHAPTER 4: THE IMPACT OF ARCTIC CHANGES: INTERNAL PRESSURES AND OPPORTUNITIES WITHIN THE ARCTIC

Pressures within the Arctic

181. We have explored above the ways in which forces within the Arctic are contributing to its further 'globalisation' and the international relations aspects of this shift. In this chapter and the next we consider the other pressures that may arise within the Arctic region and their possible significance, including for the UK. This chapter focuses upon 'internal' challenges within the Arctic region which arise, mainly but not exclusively, from the effects of

202. The importance of collaboration on Arctic science was emphasised throughout our evidence; we also heard that the UK was an active player in many international collaborations on Arctic research, including through the International Arctic Science Committee (IASC).[315] The IASC seeks to encourage and facilitate co-operation on all aspects of Arctic science, promoting the sharing of knowledge and data across all countries engaged in Arctic research. This activity is delivered through a number of working groups and overseen by a Council made up of delegates from 22 different countries. The UK is represented by the Head of the NERC Arctic Office (see paragraph 359 below).

203. HE Keiichi Hayashi, the Japanese Ambassador to the UK, told us about work that Japan was undertaking to promote international co-operation on these matters:

> "We are concerned with developing an international joint research exchange programme not only with the Arctic countries but with other observer countries such as the UK, by making the most of Japan's historically accumulated expertise in science—observation and research of the Arctic, as well as advanced technology. Japan will feed back as much as possible on the outcome of initiatives relevant to international fora such as the working groups and task forces of the Arctic Council".[316]

204. The European Union is able to play an important role in promoting international co-operation on Arctic science. Since May 2012 an EU-funded project has worked to develop a joint EU/Russian facility[317] to promote the sharing of Arctic research between Russia, Norway and EU member states.[318] We were told that "EU funding is very good for Arctic work because it allows multinational partners to work together on one project, and it provides quite a lot of funding".[319]

> "The Germans have a long history of strong collaboration … They have a large marine geophysical and oceanographic capacity in the North Atlantic and Norwegian Sea and are thinking about ways in which they can engage with the Russian scientific effort that will not embarrass the Russian position".[324]

207. In 2011 Germany and Russia held a bilateral year of science; a Russian-German Academy of Young Scientists was established as part of this initiative. The Academy has since taken forward a number of joint projects, including a 2012 symposium on Russian-German synergies in the scientific exploration of Northern Eurasia and the Arctic Ocean.[325]

208. Newer Arctic Council observer states have also worked to develop bilateral science co-operation with Russia. India and Russia last year agreed a joint statement which declared that:

> "India and Russia recognise the importance of the Arctic and the contributions in promoting cooperative activities to address Arctic issues by the Arctic Council … The sides agreed to facilitate scientific co-operation to study the challenges (like melting ice, climate change, marine life and biodiversity) facing the rapidly-changing Arctic region".[326]

209. **The challenges and changes facing the Arctic are international in nature and there is a strong case for greater international co-operation and communication on Arctic research to be promoted. The UK has existing strengths in collaborative science and research, and should seek to play a role in bringing Arctic scientific communities together. In addition, the Government should support research funders such as the Natural Environment Research Council (NERC) in promoting international collaboration and networking when awarding funding to UK Arctic scientists.**

210. **It is likely that different types of relationship and collaboration will be appropriate for different circumstances. The Government and NERC should examine the role that bilateral relationships could play in enhancing co-operation with Russian researchers and scientists.**

The impact upon Arctic residents

211. The effects of climate change in the Arctic, and related changes to

declared in 11 communities in Canada which could not receive supplies due to the melting of ice roads.[329] In addition, as sea ice melts and oceanic turbulence increases, a greater number of communities are exposed to the risk of coastal erosion, with evidence suggesting that the removal of coastal sea ice allows waves to erode shorelines. We were told that:

> "The residents, the indigenous peoples, will almost certainly have to retreat from some areas because it will be hugely expensive and quite difficult to protect … The coastal communities are by and large not rich, so poor people are seeing what infrastructure and property they have threatened".[330]

213. Many Arctic residents earn their living from, or rely for subsistence upon, the natural resources of the region. Changes to ecosystems and biodiversity will therefore have implications for food security and, accordingly, an impact upon the lives of Arctic residents. Food costs in the Arctic are typically

Sámi Parliament of Norway, the Inuit Tapiriit Kanatami (ITK)[335] and the Indigenous Peoples' Secretariat of the Arctic Council, in addition to receiving written evidence from the Arctic Athabaskan Council (one of the Arctic Council's Permanent Participants). Their insights have proved particularly

to negotiate directly with business interests, government agencies and other stakeholders who wish to undertake developments in these territories. We were told that Inuit now control more than 50 million hectares of land through five constitutionally protected treaties "stretching from one end of Canada to the other".[336] Indigenous communities are now one of the largest landowners in Canada.

220. In the Nordic countries, indigenous peoples have been empowered through the creation of Sámi Parliamentary bodies in Norway, Sweden and Finland, giving the Sámi an important right to be consulted on developments that affect them and powers over certain aspects of policy pertaining to their cultural heritage including education.[337] Land settlements have been less common, although the Finnmark Act of 2005 transferred around 46,000 square kilometres of land from the Norwegian state to the Sámi people.

221. We welcome these developments, wg17 Tm[kpecf e-21(i)9(o)4(n o)03lText (7)9(e526(m)e l

to the work of the Arctic Council and the people on the ground in the north".[342] Mr Rigby went on to explain that, under the Canadian Chairmanship of the Council (2013–2015), the emphasis had very much been upon "development for the people of the north", and that Permanent Participants and indigenous communities had helped to define that agenda.[343] The UK Government told us that indigenous groups play a "key role" in steering the work of the Arctic Council.[344]

225. It is apparent, however, that there are a number of practical limitations upon the ability of indigenous representatives to participate fully in the work of the Arctic Council and its task forces and working groups. We received evidence which suggested that the expansion in the number of observer states and organisations had had a limiting effect upon the ability of indigenous peoples to participate. Dr Mazo told us that the expansion of the number of observers risked "diluting the role of the indigenous peoples, who have a unique position on the Arctic Council—a position that they do not have in similar forums for other parts of the world".[345]

226. In addition, we heard that the expansion in the sheer volume of work undertaken by the Council and its sub-divisions, and the finite resources possessed by indigenous groups, meant that it was not always possible for representatives to attend meetings. Mr Audla, reflecting on his work with the Inuit Circumpolar Council (ICC), told us that:

> "ICC has been active in various working groups and program areas of the Arctic Council … However, it is fair to say that funding—including the resources of the Indigenous Peoples' Secretariat—has not kept pace with the increasing attention on the Arctic and the demands of Inuit in Canada and around the circumpolar world to respond. There is an almost overwhelming amount of work going on in the Arctic Council. With our limited resources we struggle to keep up. We don't currently have the capacity to attend and contribute to working groups and activities as we would like".[346]

227. The Indigenous Peoples' Secretariat suggested that resource limitations, and the expansion of the work of the Arctic Council, had meant that over time there had been a shift from indigenous bodies leading projects and task groups to, instead, participating or attending meetings led by others. Mr Rigby acknowledged the resource limitations of indigenous representatives, stating that:

> "If I were going to speak about resources, I would focus more on making sure that Permanent Participants have the tools to do the job than anything else. This has been an issue for a long time in the Arctic Council—that Permanent Participants are not Governments. While we may bemoan the fact that we do not have as many resources as we would like on the Government side, the Permanent Participants are in an even more difficult position".[347]

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342 Q 226 (Vincent Rigby)
343 *Ibid*.
344 Written evidence from the Foreign and Commonwealth Office (ARC0024)
345 Q 42 (Dr Jeffrey Mazo)
346 Written evidence from Terry Audla, ITK (ARC0030)
347 Q 231 (Vincent Rigby)

should be encouraged to develop a greater number of activities that were relevant to local communities.[351]

234. Dr Ilan Kelman (University College London and Norwegian Institute of International Affairs) suggested that mechanisms that support the ability of Arctic communities to deal with change should be a future priority topic for research.[352] We were also told that the community of social scientists and humanities scholars working on the Arctic in the UK is significant and diverse. Dr Richard Powell (University of Oxford) suggested that a key, distinctive strength of the UK's contribution to Arctic social sciences is the academic, objective assessment of resource developments and their wider socioeconomic and environmental impacts, based on long-standing knowledge and expertise.[353] Professor Mike Bradshaw (Warwick Business School) highlighted expertise in Arctic social sciences at the Scott Polar Research Institute, Cambridge University, and University of Aberdeen, but suggested that co-ordination of these interests was limited.[354]

235. We were told that Singapore—another Arctic Council observer—had developed a sustained programme of collaborative work with Arctic indigenous peoples, intended to "exchange experiences on how to adapt to change".[355] The High Commissioner of Singapore in the UK, HE Foo Chi Hsia, explained that this activity included customised study visits to Singapore for Perm272acyca4ti10(c)-1xayorphesctativesal-22(n)k witoclscholarthafoe t pot raiincou1(la)--2(r)-183ces ot a(s)-1(i)2(o)11(u)wa183c-23(pea)8(c)-175e1(o)1p28(iu5 includiniu5(la)92liheatn,tebrationapom2724(h)-63igmacanci ahchange 1(o)4(d20(m)-153i)en [(f)11(

our planet in front of us, that policies on development and ecology come together and become integrated".[364]

247.

comes from onshore fields in Russia and Alaska (with the clear majority of this in Russia). Overall production of oil and gas in the Arctic has remained relatively stable since the late 1980s.[375]

259. In 2008 the United States Geological Survey estimated that undiscovered conventional oil and gas north of the Arctic Circle amounted to about 90 billion barrels of oil, 1.67 trillion cubic feet of natural gas and 44 billion barrels of natural gas liquids. The total estimated resources amount to about 30 per cent of the world's undiscovered, recoverable, gas and 13 per cent of its undiscovered, recoverable, oil. Around 84 per cent of the undiscovered resources are expected to be found offshore and under less than 500 metres of water.[376]

260. This potential for significant hydrocarbon discoveries in the Arctic has led to sustained interest from governments, businesses and the media in recent years, as well as from campaign groups opposed to further extraction in the region. Although rising temperatures and receding sea ice could improve access to energy resources, we received evidence concerning the wider effects of climate change, including thawing permafrost, increased wave and storm action and unpredictable sea ice movements, all of which would hinder construction, extraction and transport to markets.[377]

261. The Government's 2013 Arctic Policy Framework highlights the importance to the UK economy of natural gas imports from Norway (in 2012, 55 per cent of UK gas imports were from Norway), stating that "Norwegian success in further developing its Arctic gas reserves is important to UK energy security and for British companies that are active on the high northern areas of the Norwegian Continental Shelf".[378]

262. British companies active in the Arctic region include BP, which has projects in the US, Canada, Greenland and Norway (in addition to owning 19.75 per

seasonal restrictions on operations, due to the presence of sea ice in some oil and gas provinces and extreme weather conditions; onshore transportation difficulties due to surface thawing of roads in summer; high labour costs due to travel distances and conditions and stringent natural environment regulations.

264. The presence of sea ice is a significant complicating factor in undertaking Arctic oil operations. Statoil told us that their approach to the Arctic divided the region into three different zones. The first was the 'workable Arctic', in which "hardly any" sea ice was present.[384] The next was the 'stretch Arctic', where exploration was taking place, but further technological development was required. The third zone was the 'extreme Arctic', where ice was present for almost all of the year, and where Statoil, while holding licences, "did not see that we will have any development for the coming many years".[385]

265. We were told that the Norwegian government had restricted oil and gas activity in certain parts of the Barents Sea. These restrictions were informed, in part, by the presence of sea ice, with a prohibition on any drilling within 50 kilometres of the sea ice edge.[386]

266. We received substantial evidence concerning the environmental effects of oil and gas development in the Arctic. Much of this evidence centred on the extent to which oil spilt from offshore projects or from the shipping of oil could be successfully retrieved without causing significant environmental damage. The International Association of Oil and Gas Producers (OGP) highlighted some of the factors that needed to be taken into account when considering prospective energy developments in the Arctic:

> "Arctic conditions that must be fully understood include weather, daylight, remoteness, tides, water depths, ice, biological systems and ecosystem services important to local communities and indigenous peoples … In any territory, oil spill response is challenging and the first priority for OGP members is prevention. Arctic conditions (e.g., ice, cold temperatures, remoteness, darkness) can add to these challenges. However, oil spill response is entirely possible in the Arctic".[387]

“no worthwhile *de minimis*

prospect, even comparing the NSR to a new 'Great Silk Road' between Europe and Asia.[423]

293. There are limitations, however. We were told that both the NSR and Northwest Passage would have shallower draft restrictions than the Suez Canal and the Panama Canal (once new locks are inaugurated on the latter).[424] Licence fees are also applied on some parts of the NSR[425], as are regulatory requirements to inform the Russian authorities some 15 working days in advance of any NSR transit.[426] In addition, the average cost for icebreaker escort through the NSR is $200,000.[427] All of these factors limit the potential advantages.

294. However, recent years have, on balance, seen an increase in the number of ships traversing the NSR. The overall volume of ships involved, though, is small and there was a steep fall in usage in 2014, when sea ice conditions were not as favourable as in preceding years.

Table 1: Transits of the Northern Sea Route, 2010–2014

2010	4
2011	41
2012	46
2013	71
2014	31

Sources: Northern Sea Route Information Office and Arctic Bulk AG[428]

295. Lord F

296. Tom Paterson, Senior Vice-President, Ship Owning, Arctic and Projects for Fednav, concluded that:

Risks and challenges associated with a growth in shipping

301. Growing destination-based shipping and cruise traffic in the Arctic could

315. Concerns were expressed, however, regarding the extent of the environmental provisions of the Code. Greenpeace noted that:

We urge the Government, and all relevant UK interests, to pursue full implementation of the Code as a matter of urgency and, also, to consider ways in which its implementation could be monitored.

321.

327. There is, therefore, no current legal provision to prevent the over-fishing of fish stocks in the central Arctic Ocean, if or when fishing there becomes possible and profitable. Professor Robin Churchill from the University of Dundee told us:

> "As for fishing, within 200 miles[477] that would be regulated by coastal states, but if in several decades the central Arctic [Ocean] becomes ice-free and open to fish—and, indeed, if there are fish there—there is still no regime beyond the general obligations of the Law of the Sea Convention to co-operate. The general view is that some sort of regime ought to be developed fairly quickly in a precautionary way to prevent the same kind of destruction of high-seas fisheries as has happened elsewhere".[478]

328. The lack of knowledge of Arctic marine ecosystems is particularly important here. The 2013 Arctic Biodiversity Assessment designated 63 marine fish

allowed to play an active role in developing regulatory solutions to avert a 'tragedy of the commons' situation. We were told that the UK Government had "made those representations to the Arctic littorals" and that the Arctic littoral states "well understand that they could not control this area on their own. The idea is that they want to show leadership".[487]

332. **The central Arctic Ocean is, under the provisions of UNCLOS, designated as international waters and the discussion of future ways to sustainably manage fish stocks in this area is, therefore, an international issue. We recommend that the Government seeks to promote and to play an active role in such discussions. The Government should push for real international consultation and progress on this issue well before any fishing begins. That consultation should include nearby RFMOs, which might have a part to play.**

333. **Given the current lack of understanding of Arctic marine ecosystems and their responses to climate change, we recommend that a moratorium on fishing in the high seas area of the Arctic Ocean is required, at least until a recognised management regime for the area is agreed. We recommend that the UK Government should pursue a precautionary approach in any negotiations on this matter. The Government should advocate for any future management regime to be based upon sound and responsive science. We also recommend that any future Arctic fisheries management organisation, once Gsivny**

CHAPTER 6: THE UK AND THE ARCTIC

345. The UK's contribution to Arctic issues, particularly through its participation in the Arctic Council's working groups, was praised by the Canadian Deputy High Commissioner, the Chair of the Council's Senior Arctic Officials, and Norway's Polar Ambassador, who said that Norway wanted to work even more closely with the UK on the Arctic.[498]

Stepping up the UK's Arctic engagement

346. The UK works for the global public interest when it works to support Arctic biodiversity, to preserve the Arctic's vulnerable environment, to reduce the impact of warming and melting in the Arctic on the global climate and world sea levels, and to uphold the human rights of Arctic indigenous peoples.[499] Arctic engagement is also strongly in the UK's self-interest for a number of compelling reasons.[500]

347. First, the Arctic is strategically important for the UK. The Arctic is the UK's neighbourhood, and the UK has a large stake in good governance, stability and healthy co-operation in this region which is both geographically proximate and significant for access to the north Atlantic.[501] The UK does not want to find itself disconnected from the fast-paced and wide-ranging changes occurring in its own neighbourhood—it needs to be part of that co-operation and governance. As Mr Coffey told s5-0.135q8(u)61(l)-20(n)14(t)581.1351 Tm(.

Box 4: Trading links between the UK and the Arctic Council member states

Economic relationships between the UK and the Arctic states are already important. Half of the member states of the Arctic Council—the United States, Russia, Canada and Sweden—are also top 20 trading partners for the UK.[508] Exports to Sweden were worth £5.6 billion in 2013; in the same year, exports to Russia were worth £5.2 billion and exports to Canada were worth £4.5 billion.[509]

Norway supplies 30 per cent of UK energy in total,[510] and 55 per cent of UK gas imports.[511] Bilateral trade between the UK and Norway is worth £18 billion per annum.[512]

The UK is the 9th largest importer to Finland: UK imports to Finland totalled £1.75 billion in 2013.[513] The UK is the largest supplier of imported services to Iceland, and the 10th largest total supplier of imported goods for Iceland.[514]

349. Third, the Arctic is increasingly being understood as having a direct effect on rter b -0.037 Tw T4(f)-28(f)115 Td[(f)13(o)6(r I)17(c)-3 Twa2r8(f)11Sstc-0im(r t)-25(

and the emerging opportunities and challenges mean that British engagement with the region now needs to intensify.

352. **British policies towards the Arctic have to date been more reactive than proactive. The UK's approach needs to be more strategic, better co-ordinated, and more self-confident and proactive, or the UK risks being outmanoeuvred by other states with less experience in the Arctic but a more positive and forward-looking engagement.**

353. **By dint of its combination of Arctic proximity, history, skills, knowledge and research, its competitive advantage in applicable**

The UK's current contribution to Arctic science and technology

Programme, the programme management for which is due to expire in March 2016.[531]

361. The UK is making major contributions to understanding the cryosphere and biosphere, we were told, and is "strong in research on physical (energy exchange), biological (greenhouse gas emissions) and cryospheric (glacier decline) processes that lead to globally important issues such as sea level rise and amplified warming".[532] UK science is a world leader on climate modelling, sea ice prediction, Greenlandic ice sheet evolution and atmospheric sciences.[533]

362. UK centres of excellence include the Met Office,[534] the Scottish Association for Marine Science (SAMS), the NERC National Oceanography Centre, the NERC Centre for Polar Observation and Modelling,[535] the NERC National Centre for Atmospheric Science (NCAS), the British Antarctic Survey, the Scott Polar Research Institute, CASP (Cambridge Arctic Shelf Programme), University College London and the Universities of Oxford, Reading, Bristol and Leeds.[536] The National Centre for Atmospheric Science told us that "The UK (through NCAS, NERC and the Met Office) is a world-leader in monitoring the Arctic, interpreting the observed changes, and developing sea-ice and Arctic forecasting."[537] The British Antarctic Survey has led an international EU-funded programme on the contribution of glaciers (including Arctic glaciers) to future sea-level rise and is leading another such programme on sea-ice change in the Arctic and its physical, social and economic impacts.[538]

363. British science is also particularly strong on ecology, polar ecosystems and biodiversity research, and devotes significant resources to monitoring Arctic birds that winter in this country.[539] According to NERC, the UK "plays a key role in world-wide environmental and oceanographic monitoring and assessment."[540] In terms of technology, we were advised that the UK leads in marine observation through autonomous systems and sensors, while Professor Chris Rapley from University College London stressed the British contribution to the development of the European Space Agency's Earth-observing satellites including the UK-led 'CryoSat' programme which

531 Q 263 (Prof Jane Francis)
532 Written evidence from Prof Terry V. Callaghan (ARC0030). See also written evidence from the National Oceanography Centre (ARC0032)
533 Written evidence from the Met Office (ARC0044), Alan Gadian (ARC0036), Q 27 (Dr Ed Hawkins), written evidence from Dr Ed Hawkins, Dr Sheldon Bacon, and Prof Chris Rapley (ARC0013), the National Centre for Atmospheric Science (ARC0021) and Prof Andy Shepherd (ARC0045), Q 261 (Prof Jane Francis)
534 We heard that the Met Office runs "one of the foremost global operational weather forecasting systems" and "has one of the best Arctic ice models" (written evidence from the World Meteorological Office's (WMO's) Polar Prediction Project (ARC0026), Q 13 (Jane Rumble). See also written evidence from Prof Andy Shepherd (ARC0045).
535 This Centre "provides world-leading expertise in observing and modelling Arctic sea and land ice" (written evidence from Prof Andy Shepherd (ARC0045)).
536 Written evidence from Dr Ed Hawkins, Dr Sheldon Bacon, and Prof Chris Rapley (ARC0013). See also written evidence from the WMO's Polar Prediction Project (ARC0026).
537 Written evidence from the National Centre for Atmospheric Science (ARC0021), Prof Andy Shepherd (ARC0045). See also written evidence from NERC (ARC0041), National Oceanography Centre (ARC0032), Q 272, Q 261 (Prof Julian Dowdeswell)
538 'Ice2sea' and 'ICE-ARC': written evidence from the British Antarctic Survey (BAS) (ARC0038)

monitors polar ice.[541] Expertise in polar oceanography, bathymetry, marine geology and the geophysics of the Arctic was also highlighted.[542] British

Antarctic science.[552] Prof Francis told us that about 400 or 500 scientists in the UK working on the Arctic (across at least 60 institutions) had been identified: "We just about know who they are now through meetings that we have organised."[553] UK scientists attending Arctic Council meetings are not expected to report to the FCO or other co-ordinating bodies.[554]

368. Prof Shepherd told us that he "would be surprised if the Government were able to use UK scientific expertise on the Arctic effectively, as it is widely distributed among many organisations, and there is no obvious activity overseeing the combined effort".[555] He argued in favour of establishing a scientific body "to appraise and perhaps co-ordinate" British Arctic research.[556] The Arctic Office saw the need for a "strategic plan for growing a more co-ordinated on-going Arctic science presence" in order for the UK to contribute effectively to sustained Arctic observational studies.[557]

369. An integrated research programme on the Arctic, including socio-economic issues and involving industry partners, was recommended by Prof Wall as a successor to the expiring Arctic Research Programme; international law, geopolitics, indigenous affairs and governance might also be usefully included, as UK social scientists have also made contributions directly and indirectly to the work of the Arctic Council working groups.[558]

370. The UK Arctic and Antarctic Partnership, established in 2014 and consisting of representatives from academia and institutes with polar interests (including social scientists), is intended to "bring together the Arctic community to be a little more influential and a bit more coherent, with a proper strategy for Arctic science."[559]

371. UK Antarctic science is better co-ordinated.[560] The Government recently published UK Science in Antarctica 2014–2020, which outlines the UK's high-level 'direction' for Antarctic science and aims to foster UK and international partnerships.[561] The Director of the Norwegian Polar Institute, Dr Jan-Gunnar Winther, told us that his Institute has a technical and strategic advisory role to the Norwegian government, including the Ministry of Foreign Affairs, and had given advice on where oil drilling should be allowed to take place in relation to sea ice.[562] When we asked Prof Francis whether any UK Arctic body had a similar role, she replied: "The British Antarctic Survey is now extending its remit … we are officially broadening out and extending our work into the Arctic"; BAS stated that its commitment to scientific and operational excellence helped it sustain a leading position for the UK in Antarctic affairs, and that it would "welcome the opportunity to provide

552 Q 262 (Prof Jane Francis)
553 Q 262 Prof Jane Francis), Q 262 (Dr Ray Leakey)
554 Q 321 (Jane Rumble)
555 Written evidence from Prof Andy Shepherd (ARC0045)
556 Written evidence from Prof Andy Shepherd (ARC0045)
557 Written evidence from the NERC Arctic Office (ARC0028)
558 Written evidence from Prof Frances Wall (ARC0056). UK social scientists have made contributions directly throu

similar support to the UK in the Arctic."[563] Prof Francis also confirmed that "We do not as yet have an Arctic strategy, but we are developing one."[564]

372. Dr Winther told us that the UK would gain from increasing its scientific work in the Arctic, arguing, "You are an observer to the Arctic Council, you are located where you are located and you are affected by climate change in the Arctic region", as well as having well-recognised science institutions and

the Ny-Ålesund base in Svalbard.[572] When she told us that BAS (funded by BIS through NERC) is developing an Arctic science strategy, she added "We are not particularly funded for scientific work in the Arctic specifically, so we have to do that on grants."[573] She said that BAS was hoping to "establish something a bit longer term" after the expiry of the Arctic Research Programme but there seems not to be clarity about what may be arranged; the Year of Polar Prediction beginning in 2017 underlines the urgency of organising a replacement.[574] Prof Francis also highlighted the importance of the UK exerting influence in Brussels to promote more EU funding for Arctic science.[575]

377. Dr Jan-Gunnar Winther told us that "if you invest one penny in studying the Arctic, you gain more in improving your domestic management of your resources" because of the effects of climate change in the Arctic on climate, weather and flooding at home.[576]

378. We note that in UK Science in Antarctica 2014–2020, Ministers from BIS and the FCO clearly cited the connection between investing in polar science and deriving benefits for the UK: "We fund science that benefits humanity, sustainable use of resources, helps protect the planet and generates economic and social impact. … Innovation and research are at the heart of the UK growth agenda. The advancement of Antarctic knowledge and understanding is essential to a promising future for the UK. As the key Ministers with responsibilities for investment and increased national and international collaboration in Antarctic research, infrastructure and governance, we expect UK polar science to continue to be amongst the best in the world."[577]

381. As long as UK Arctic science is funded as it is at present, on a project-by-project basis, the quality will remain high but there will be little opportunity for further co-ordination beyond that which is already done through the NERC Arctic Office and the host of informal UK and European fora. The relatively short duration of Research Council funding and its spread across a range of Arctic disciplines means that there is relatively little opportunity or incentive for UK researchers to significantly contribute to, let alone influence, the work of the Arctic Council bodies. It has already been noted that there is no budget for non-government UK representatives to attend these meetings and because attendance is occasional and by different people, attendees can be little more than passive observers at the meetings. In any case there is no agreed policy that they should be advancing nor any reporting process.

382.

Increasing the UK's diplomatic presence in Arctic co-operation

395. We heard that the UK needs to be better represented at international meetings relating to the Arctic (see paragraph 381 above). The PRD co-ordinates Government representation and scientific input through the cross-Whitehall Arctic network and Arctic Office. Jane Rumble told us that the issue of funding for attending meetings came up "all the time", saying "We just cannot attend every single meeting." She emphasised that "we always weigh up the value for money—what we would expect to achieve and how important it is for the UK."[592]

396. While Ms Rumble could not think of an example where the PRD felt that

411. WWF also recommended that the FCO share its experience of developing Arctic policy with other non-Arctic states with interests in the region: we are sure the PRD would not miss the soft power benefits to be had from such international engagement.[610]

Scrutiny

412. The PRD's role in ensuring sufficient attention within Government to the opportunities and challenges arising in the Arctic should be supported by the focusing effect of ongoing public and Parliamentary scrutiny. The Government will respond to this report in a Command Paper published after the General Election and a debate in the House of Lords will follow.

413. **We recommend that the Government should write to the Chairman of the House of Lords Liaison Committee (which recommended the establishment of this** ad hoc **Committee) to update the House on the progress that has been made between a year and 18 months after the publication of the Government's response.**

414. **We further recommend that the Minister responsible for the Polar Regions should write to the Chairman of the House of Commons Foreign Affairs Committee at least annually, updating that Committee on the progress of Arctic co-operation and the UK's contribution to it through all Government departments, sections of the FCO and Government-funded work.**

Bilateral relationships

415. The UK's bilateral relationships with Arctic states are also, naturally, important. The UK has very strong bilateral relationships with many of the eight Arctic states, including through history, trade, defence alliances and science.[611] We received plentiful evidence about the desirability of closer bilateral co-operation, particularly on Arctic science, with other Arctic Council observer states such as Japan and Singapore; Dr Aki Tonami of the University of Copenhagen suggested setting up a forum with countries such as Japan to engage political, business and scientific communities on the Arctic.[612]

416.

Arctic security resources

422. We heard about limitations to the UK's physical capabilities for operating in polar conditions: the MoD has reduced its Antarctic helicopter capability,[622] its surface ships go to the high north but not into Arctic waters, and the UK has had no significant maritime patrol aircraft capability since the last of the Nimrod MR2s was retired in 2010.[623]

423. The UK should replace its maritime patrol capability through the 2015 Strategic Defence and Security Review, Mr Willis recommended, saying that Norway had been patrolling a portion of the North Sea that would ordinarily be the UK's responsibility, and that the expenditure was justified by the likelihood of increased maritime traffic in the Greenland-Iceland-UK gap and North Sea.[624] Luke Coffey (The Heritage Foundation) argued that without maritime patrol aircraft, "the UK is blind in the Arctic" and that while the UK had mitigated the loss of the capability with short-term solutions, the gap "could become a critical and long-term problem".[625]

424. Nimrod aircraft were previously available at short notice for search and rescue operations, and were used to locate aircraft, ships and people in the water and co-ordinate rescue efforts, as well as carrying survival equipment. Former Chief Coastguard Rod Johnson told us that since the loss of the maritime patrol aircraft, what the UK had been able to offer Iceland and Denmark in terms of support for search and rescue activities had been limited in terms of reach.[626] We discuss search and rescue in paragraphs 309 and 310.

425. Julian Brazier MP, Parliamentary Under-Secretary of State at the MoD, told us that the 2015 Strategic Defence and Security Review will look "very carefully" at the question of the UK's maritime patrol aircraft capacity. We were told that Nimrod aircraft had not generally been deployed outside the UK region for search and rescue purposes, but that other assets including HMS Scott, the Royal Navy's ice-enabled ocean survey vessel, and other aircraft were capable of operating in the region.[627]

426. Manson Oceanographic Consultancy recommended that the UK should use the Royal Navy's survey vessels to gather hydrographic data in the Arctic

masters in maritime law at the University.[637] British academics are represented at the University Centre in Svalbard, which teaches international students Arctic courses in English.

434. The UK is also home to world-famous institutions with relevance to the Arctic such as the British Library, National Maritime Museum, Royal Geographical Society and Scott Polar Research Institute Museum, the latter of which has substantial volumes of Russian Arctic research and literature.[638]

435. **The UK higher education sector could further build on its Arctic strengths by building up courses and offering international scholarships at all levels in Arctic science, technology, geology, engineering, social sciences, health and mental health and strengthening its academic collaborations with Arctic states and other Arctic observer states such as Singapore and Japan, and with Arctic academic institutions such as the University Centre in Svalbard.**

436. **The UK's existing world-class museum and cultural sector should build further connections and collaborations with similar institutions in the Arctic region. There is already impressive evidence of collaboration within the UK, but this could be expanded upon as part of the enhancement of UK soft power.**[639]

437. **The UK should be making use of its expertise in areas such as hydrography, weather and ice prediction in its relationships with the Arctic states through the Arctic Council and other Arctic fora in order to ensure that the UK is considered a primary partner in the Arctic, earning the UK both influence and commercial benefits in the region. The Government should support the UK Hydrographic Office in developing the links required to work effectively with partners in Arctic states, in order that it is able to respond to demand for new charting of Arctic waters.**

Drawing together commercial strengths

438. As explored above (see Chapter 5), there are many commercial entities based in or particularly connected with the UK which operate in Arctic industries, territories and waters or provide technologies, materials and services to those which do.

an Arctic event at the International Festival for Business in Liverpool in June 2014 as well as "various prosperity events across the Arctic".[644] UK diplomatic posts in Arctic states also offer assistance.[645] Jane Rumble told us that there was "quite an active forum of support" for UK companies involved with the Arctic, although there have been no Arctic-specific trade missions to the Arctic in the last three years.[646]

440. Richard Morgan, head of government relations for the mining firm Anglo American, was not aware of Arctic-specific support from the Government, and Claude Perras, head of sustainability for London Mining, was critical of embassy support and felt the Government "could do much more to support British industry", including through supporting the development of local infrastructure necessary for commercial resource development, which he said other countries were doing.

on hydrocarbon extraction,[653] and London is a particularly well-established hub for maritime law and maritime service industries, including insurance and reinsurance, brokerage and financing.[654]

445. The fact that cities such as London and Aberdeen are already recognised to some extent as centres of Arctic expertise brings home the degree to which UK scientists, academics, diplomats, businessmen and other experts are

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Chapter 2: Climate change in the Arctic

1. While it is not currently possible to predict accurately when the Arctic Ocean will experience summers that are reliably free of sea ice, it is evident that there is a sharp underlying downward trend in sea ice extent and volume. It is a question of ‘when’ rather than ‘if’ the Arctic will be substantially free of sea ice in summer. (Paragraph 39)

2. The potential for significant amounts of carbon dioxide and methane to be released from the Arctic permafrost and seabed, as a result of rising temperatures, is acknowledged but not yet fully measured or understood. Further research is required if the risks assoas e1 -2(e)c watf tes i asuet ar.

8.

17. Arctic fora in addition to the Arctic Council are important for building international consensus on Arctic issues, and should be encouraged. (Paragraph 177)

18. As access to at least the maritime Arctic increases and international commercial, scientific, campaigning, personal and governmental attention on the region strengthens, a significant and difficult challenge facing Arctic states and residents and non-Arctic interests will be managing global demands to either exploit or to exercise stewardship over this simultaneously inhabited and wild region and its changing environment. (Paragraph 179)

19. The Arctic will be the site of economic, geopolitical and cultural claims, conversations and disputes in the years ahead, although the risk of territorial or military conflict seems low. The UK's interest, the global interest, and the interest of Arctic citizens will be best served by the highest possible degree of rules-based negotiation and the widest possible scope of international co-operation and consent. The UK needs to be ready to bring its influence to bear in the region where appropriate to further its own interests and those of the common good. (Paragraph 180)

Chapter 4: The impact of Arctic changes: internal pressures and opportunities within the Arctic

20. Knowledge of Arctic ecosystems, particularly marine ecosystems, is limited and in some areas severely lacking. This knowledge gap hampers our ability to understand the effects of climate change, and of human activity, on marine species in the region. (Paragraph 197)

21. Significant further research is required on Arctic ecosystems as a matter of priority. Research collaboration and knowledge sharing is essential to this mission. Understanding the systems that stand to be affected by increased human interventions in the Arctic environment is vital to making policy decisions about what interventions can be made with an acceptable level of risk or damage to Arctic biological diversity. A precautionary approach must be pursued by commercial interests until the scientific understanding of Arctic ecosystems is sufficient to allow fully-informed decision making. (Paragraph 198)

22. The challenges and changes facing the Arctic are international in nature and there is a strong case for greater international co-operation and communication on Arctic research to be promoted. The UK has existing strengths in collaborative science and research, and should seek to play a role in bringing Arctic scientific communities together. In addition, the Government should support research funders such as the Natural Environment Research Council (NERCp9(c)-14(i-29(i) Tf-0.012 Tc 0.18(o)14(v)aph)]TJETBT/Span ≤ActuTJEMC /Sp
A U s. 18(la rPr)-18()11(c)-4(h)13(a s)1(t)4(h)JEM8(03.1115 Tm[(()-37(P)7(a)-27(r)-2

peoples, should enjoy full and effective involvement in the Arctic Council and in other bodies that affect their lives and interests. (Paragraph 222)

25. Indigenous groups have played an important role in the work of the Arctic Council to date. The recognition and status afforded to the six Permanent Participants within the Council is to be commended. (Paragraph 228)

26. It is clear to us, however, that the expansion in the workload of the Council poses challenges to full participation by indigenous representatives. The Arctic Council should make appropriate structural and financial provision to allow full and effective participation by indigenous representatives. We also believe that the UK Government should continue actively to support the right of Permanent Participants to participate effectively within the Arctic Council. (Paragraph 229)

27.

Arctic oil and gas production in the short to medium term. This may offer a window of opportunity for taking stock and gaining increased clarity on whether oil and gas extraction in ice-affected Arctic waters can be achieved safely and responsibly and, if so, how. (Paragraph 277)

33. Maximum advantage needs to be taken of this 'breathing space' to establish whether it is possible to reach a point where it is categorically clear that the risks of a major spill are acceptably low and that the damage caused by a major spill could be contained. This should also provide an opportunity to improve wider understanding of the impacts of oil spills in ice-affected waters and to consider whether any international standards on where drilling can be undertaken in relation to ice can be agreed.(Paragraph 278)

34. The UK has significant technological and research expertise in oil spill responses, and operations in harsh environments; the Government should work, with UK Trade & Investment, research funders and others, to ensure that) the UK is in a position to make a strong contribution to this work.278

39. The UK has a recognised expertise in search and rescue and the Government should give urgent attention to developing a pan-Arctic search and rescue strategy along with the Arctic states. (Paragraph 323)

40. We believe that consideration should be given to whether the Arctic maritime tourism industry should be required to make a contribution to strengthening search and rescue in the region. (Paragraph 324)

41. The central Arctic Ocean is, under the provisions of UNCLOS, designated as international waters and the discussion of future ways to sustainably manage fish stocks in this area is, therefore, an international issue. We recommend that the Government seeks to promote and to play an active role in such discussions. The Government should push for real international consultation and progress on this issue well before any fishing begins. That consultation should include nearby Regional Fisheries Management Organisations, which might have a part to play. (Paragraph 332)

42. Given the current lack of understanding of Arctic marine ecosystems and their responses to climate change, we recommend that a moratorium on fishing in the high seas area of the Arctic Ocean is required, at least until a recognised management regime for the area is agreed. We recommend that the UK Government should pursue a precautionary approach in any negotiations on this matter. The Government should advocate for any future management regime to be based upon sound and responsive science. We also recommend that any future Arctic fisheries management organisation, once established, should be granted observer status on the Arctic Council. (Paragraph 333)

43. The commercial opportunities that could arise in the Arctic are significant. However, the volatility of global markets for resources, and the changing degree to which resource sources and shipping routes in other parts of the world compete with opportunities in the Arctic, suggest there will be long-term uncertainty about the extent to which Arctic potentials will be realised. At the same time, the local effects of climate change may help economic development in the Arctic, but they may also hinder it. There is therefore no straightforward correlation between climate change and the creation of real economic opportunities in the Arctic. (Paragraph 336)

44. These uncertainties reinforce the need for the UK to be fully engaged with the region, so that it can maximise any opportunities that arise, and also be vigilant about potential challenges and risks. (Paragraph 337)

45. These uncertainties also, however, provide one particularly important opportunity: for international knowledge and understanding of the vulnerable Arctic environment to get ahead of further substantial human interventions. Any substantial interventions must be informed by that knowledge, so that any harm they might cause can be judged and minimised. (Paragraph 338)

46. As international engagement with the Arctic intensifies, the Government should work to ensure that the UK, as a near Arctic state, takes a leading role in this work. (Paragraph 339)

Chapter 6: The UK and the Arctic

47. The breadth of the UK's interests in the Arctic demonstrates the importance of this region to the UK. While we commend the work that the Polar Regions

Department (PRD) has done to date to articulate and pursue the UK's Arctic interests, the speed of change in the region and the emerging opportunities and challenges mean that British engagement with the region now needs to intensify. (Paragraph 351)

48. British policies towards the Arctic have to date been more reactive than proactive. The UK's approach needs to be more strategic, better co-ordinated, and more self-confident and proactive, or the UK risks being outmanoeuvred by other states with less experience in the Arctic but a more positive and forward-looking engagement. (Paragraph 352)

49. By dint of its combination of Arctic proximity, history, skills, knowledge and research, its competitive advantage in applicable business sectors, and its own international standing, the UK should be positioned as the premier partner for Arctic states and other interests in Arctic co-operation: the Government should adopt this as its ambition in Arctic affairs. (Paragraph 353)

50. We recommend that discussions be initiated by the Foreign and Commonwealth Office (FCO), involving the Government Chief Scientific Adviser and the UK Research Councils, with a view to establishing a substantial long-term programme of Arctic research and fully effective representation on Arctic Council bodies. Relevant partners from industry and technology developers and appropriate NGOs should be fully consulted and involved in the programme. (Paragraph 385)

51. The UK can and should be more active in Arctic affairs. Our view is that the Government should follow the example of others in appointing a UK Ambassador for the Arctic, based in the FCO's Polar Regions Department, to ensure greater focus on and co-ordination of Arctic affairsai6Span 4(n)1(o)18(w)1e34(t)-1

55.

with Arctic academic institutions such as the University Centre in Svalbard. (Paragraph 435)

65. The UK's existing world-class museum and cultural sector should build

2–5 June 2014, courtesy of the Royal Norwegian Embassy in London. Including transport, meals, accommodation, short boat trip, and briefings by the Norwegian Joint Headquarters, the Norwegian Coast Guard, Statoil, the Norwegian Polar Institute, the Arctic Council Secretariat, the office of the Governor of Svalbard, Longyearbyen University Centre, Kings Bay AS, the Norwegian Mapping Authority, the French-German research station at Ny-Ålesund, SvalSat, and the Association of Arctic Expedition Cruise Operators

*	Erik Haaland, Leader, Arctic Non-Technical Risk, Statoil	QQ 98–115
*	Rúni M Hansen, Vice-President, Arctic Unit, Statoil	
*	Runar Myrnes Balto, Political Adviser to Ms Aili Keskitalo, President of the Sámi Parliament of Norway	QQ 116–130
*	Jon Petter Gintal, Senior Adviser, Department of Rights and International Affairs, the Sámi Parliament of Norway	
*	Lord Fairfax of Cameron, Chairman of Sovcomflot Overseas Holding Ltd	QQ 131–141
**	Rob Hindley, Lead Specialist in Arctic Technology, Lloyd's Register	
*	Tom Paterson, Senior Vice-President, Shipowning, Arctic, and Projects, Fednav	
**	Professor Mike Bradshaw, Warwick Business School	QQ 142–157
**	Dr Richard Powell, University of Oxford	
**	Professor Frances Wall, Camborne School of Mines, University of Exeter	
*	Professor Geoffrey Boulton OBE FRS FRSE, University of Edinburgh	QQ 158–172
**	Dr Andrew Foxall, Director of the Russia Studies Centre at The Henry Jackson Society	
**	Tim Reilly, Arctic Advisory Group	
**	Ben Ayliffe, Head of Campaigns for the Greenpeace Arctic Programme, Greenpeace International	QQ 173–188
**	Charlie Kronick, Senior Climate Advisor, Greenpeace UK	
**	Nathalie Rey, Deputy Unit Head of the Political and Business Unit of Greenpeace International, Greenpeace International	
**	Dr John Campbell, Technical Director, International Association of Oil and Gas Producers (OGP)	QQ 189–202
**	Dr Michael Engell-Jensen, Executive Director, International Association of Oil and Gas Producers (OGP)	
**	Claude Perras, Head of Sustainability, London Mining	QQ 203–213
*	Richard Morgan, Head of Government Relations, Anglo American	
**	Rod Johnson, former Chief Coastguard	

** Henry Burgess, Deputy Head of Polar Regions Department, Foreign & Commonwealth Office

** Nick Gurr, Director for International Security Policy, Ministry of Defence

** Jane Rumble, Head of Polar Regions Department, Foreign & Commonwealth Office

Alphabetical list of all witnesses

* Anglo American

*	Christian Le Mière, International Institute for Strategic Studies	
*	Dr Ray Leakey, Arctic Research Theme Leader, Scottish Association for Marine Science	
**	Lloyd's Register	ARC0048
**	London Mining	ARC0046
	Hugh Mackay	ARC0042
**	Colin Manson, Manson Oceanographic Consultancy	ARC0005
*	Dr Jeffrey Mazo, International Institute for Strategic Studies	
**	Professor Maurice Mendelson QC, Blackstone Chambers	ARC0039
**	Met Office	ARC0044 ARC0071
**	Ministry of Defence	ARC0002 ARC0073
	National Centre for Atmospheric Science (NCAS)	ARC0021
	National Oceanography Centre	ARC0032
	The Natural Environment Research Council (NERC)	ARC0041
	Natural Environment Research Council (NERC) Arctic Office	ARC0028
*	HE Thórdur Aegir Óskarsson, Ambassador of Iceland to the United Kingdom	
**	Dr Richard C. Powell, Mansfield College, Oxford	ARC0053
	Professor Chris Rapley, University College London	ARC0013 ARC0049
**	Vincent Rigby, Chair of the Senior Arctic Officials, Canadian Chairmanship, the Arctic Council	ARC0068
	Åke Rohlén, President, Arctic Marine Solutions	ARC0054
	The Royal Society	ARC0047
*	The Sámi Parliament of Norway	
**	Professor Andy Shepherd, University of Leeds	ARC0045
*	Statoil	
	Dr Dmitriy S. Tulupov, St. Petersburg State University	ARC0009
*	Professor Philip Steinberg, Centre for Borders Research, University of Durs5(t)97H6ynii115.69912TMCID 11217372(n)542BDC12 4DC -0.8bTh	

Per Andersson, Managing Director/CEO, Store Norske Spitsbergen Grubekompani (the coal mining company 99.9 per cent owned by the government of Norway operating in Svalbard)

Eva Therese Jenssen, Information Manager, the University Centre in Svalbard (UNIS), Professor Jan Otto Larsen, head of the UNIS Arctic technology department, Adjunct Associate Professor Lars Henrik Smedsrud (University of Bergen and UNIS), and Adjunct Professor Jørgen Berge (University of Tromsø and UNIS)

Frigg Jørgensen, Executive Director, Association of Arctic Expedition Cruise Operators.

Note: refreshments were on occasion offered to the Committee by the hosts of these meetings.

The Committee also wishes to thank the students and teachers from the five schools that took part in the debate, chaired by Lord Teverson, in the House of Lords on Friday 9 January 2015:

Ibstock Place School, Roehampton

Redland High School, Bristol

St Leonards-Mayfield School, Mayfield, East Sussex

Thames Christian College, London

Ysgol Dyffryn Amam, Ammanford

5. Are there sufficient data on the Arctic to make informed policy decisions? If not, where are the gaps and how should they be remedied?
6. Are there climate change mitigation and adaptation strategies local to the Arctic that should be deployed or tested? What contribution can the UK make?
7. Are current international governance and security arrangements appropriate for dealing with anticipated challenges in the Arctic? How should the UK support the Arctic states in their stewardship of the region?
8. How effectively does the UK interact with Arctic governance structures? Is the UK Government's approach, as set out in the Arctic Policy Framework, proportionate and appropriate?

APPENDIX 4: GLOSSARY OF TERMS AND ABBREVIATIONS

A5	The five states with Arctic Ocean coastlines: Canada, Denmark, Norway, Russia and the United States
A8	

APPENDIX 5: LIST OF INTERNATIONAL AGREEMENTS (OR BODIES WITH REGULATORY POWERS) OF MATERIAL RELEVANCE TO ARCTIC DEBATE, SUPPLIED BY THE FOREIGN AND COMMONWEALTH OFFICE

Name of agreement	Category	Summary	Signatories
United Nations Convention on the Law of the Sea (UNCLOS)	Governance	Lays down a comprehensive regime of law and order in the world's oceans and seas establishing rules governing all uses of the oceans and their resources. It enshrines the notion that all problems of ocean space are closely interrelated and need to be addressed as a whole. The Convention comprises 320 articles and nine annexes, governing all aspects of ocean space, such as delimitation, environmental control, marine scientific research, economic and commercial activities, transfer of technology and the settlement of disputes relating to ocean matters. Separate briefing to follow.	166 ratifications, including all Arctic States except the United States, and the UK
International Maritime Organization	Shipping		

Name of agreement	Category	Summary	Signatories
Food and Agriculture Organisation of the United Nations	Food supply /fisheries	Three main goals are: the eradication of hunger, food insecurity and malnutrition; the elimination of poverty and the driving forward of economic and social progress for all; and, the sustainable management and utilization of natural resources, including land, water, air, climate and genetic resources for the benefit of present and future generations. Have a role regarding some RFMOs and the UN Fish Stocks Agreement.	194 member countries including all Arctic States and the UK
UN Fish Stocks Agreement	Fisheries	Full name is "The Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks". The agreement sets out principles for the conservation and management of those fish stocks and establishes that such management must be based on the precautionary approach and the best available scientific information. The Agreement elaborates on the fundamental principle, established in the Convention, that States should cooperate to ensure conservation and promote the objective of the optimum utilization of fisheries resources both within and beyond the exclusive economic zone.	81 ratifications, including all Arctic States and the UK

Name of agreement	Category	Summary	Signatories
UN Framework Convention on Climate Change (UNFCCC)	Climate	International environmental treaty negotiated at the	

Name of agreement	Category	Summary	Signatories
Convention on International Trade in Endangered Species	Environment	Aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival, as well as addressing issues of illegal trade. Species are offered three levels of protection	